PROJECT NAME: **Forest Ridge PBCP (LP-08-14)**

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KITTITAS COUNTY
LAND USE HEARING EXAMINER

IN THE MATTER OF	)	**RECOMMENDED FINDINGS OF FACT, CONCLUSIONS OF LAW, DECISION AND CONDITIONS OF APPROVAL**
	)	
LP-08-14	)	
Forest Ridge Performance Based Cluster Plat	)	
	)	

THIS MATTER having come on for hearing in front of the Kittitas County Hearing Examiner on October 28, 2010, the Hearing Examiner having taken evidence hereby submits the following Recommended Findings of Fact, Conclusions of Law, Decision and Conditions of Approval as follows:

I. RECOMMENDED FINDINGS OF FACT

1. Iron Snowshoe LLC, property owner, has applied for a 171-lot performance based cluster plat on approximately 479 acres of land that is zoned Rural-5. The project is proposed to be served by a Group A water system and individual or community on-site septic systems. (Staff report)

2. The applicant is Iron Snowshoe, LLC, 206 W. First St., Cle Elum, WA 98922. Contact is David Blanchard. (Application materials)

3. The subject property is located northeast of the city of Cle Elum off of the extension of Columbia Street in Section 24, T.20N, R.15E, WM.; Kittitas County parcel map numbers 20-15-24000-0001, -0003, -0004, -0007, -0015, -0016, -0017, -0018, -0019, -0020, -0021, and -0022. (Staff report)

4. The proposed lots range in size from one-acre to 4-acres in size. The project is proposed to be served by a Group A water system and individual or community on-site septic systems. (Staff report)

5. Site Information:

Total Project Size:	479 acres
Number of Lots:	171
Zoning district	Rural 5
Domestic Water:	Group A water system
Sewage Disposal:	Individual/Community on-site septic systems
Power/Electricity:	Puget Sound Energy
Fire Protection:	Fire District #7
Irrigation District:	None

(Staff report)

6. Site Characteristics: The area is characterized as mountain terrain. (Staff report)

7. Surrounding Property:
North: Vacant
South: Vacant
East: Vacant
West: Vacant
(Staff report)

8. The Comprehensive Plan designation is Rural. (Staff report)

9. The subject property is zoned Rural 5, which allows for one residential unit per 5 acres and one-half acres for platted cluster subdivisions served by public water and sewer systems. All subdivision lots under five acres in size must be served by public water and sewer systems (KCC 17.30A.040). (Staff report)

10. A complete long plat application was submitted to Community Development Services on April 24, 2008. The application was deemed complete on July 17, 2009. The Notice of Application for the preliminary plat application was issued on July 30, 2009. This notice was published in the official county paper of record and was mailed to jurisdictional government agencies, adjacent property owners and other interested parties. The last day to submit written comments was on August 14, 2009. (Staff report)

11. In accordance with Kittitas County code 15A.030.110, this project was accurately posted with the "Land Use Action" sign as provided by Community Development Services. The Affidavit of Posting was signed by the applicant and returned to the planner and is included as part of the record. (Staff report)

12. Based upon review of the submitted application materials including an environmental checklist, correspondence received during this 15 day comment period and other information on file with Community Development Services, a Mitigated

Determination of Non-Significance (MDNS) was issued on September 23, 2010. The appeal period ended on October 7, 2010 at 5:00 p.m. No appeals were filed. (Staff report)

13. The proposal is consistent with the goals and policies of the Kittitas County Comprehensive Plan. The proposed subdivision will be adequately served by rural levels of service. The lots will be served by a Group A water system and individual or community septic systems. Staff has conducted and an administrative critical area review in accordance with KCC 17A and found wetlands, seasonal stream areas of steep slopes and potential landslide areas on the subject properties. (Staff report)

14. This proposal is consistent with the Kittitas County Subdivision Code Chapter 16.09 for Performance Based Cluster Plats. (Staff report)

15. All roads are required to meet all Kittitas County Road Standards as outlined in the September 8, 2010 memorandum issued by the Department of Public Works. As conditioned, the proposal is consistent with the provisions of KCC Title 12. (Staff report)

16. The following agencies provided comments during the comment period: Department of Ecology, Washington Department of Transportation, Washington Fish & Wildlife, Kittitas County Department of Public Works, and Environmental Health. These comments have been included as conditions of approval to address these agency concerns. (Staff report)

17. Public and agency comments that were received were considered by the Hearing Examiner in rendering this Decision and forming Conditions of Approval. (Hearing Examiner finding based on the record)

18. The entire Planning Staff file was admitted into the record at the public hearing. (Public hearing record)

19. The Kittitas County Community Development Services recommended approval of this permit, subject to the recommended conditions of approval. (Public hearing record)

20. An open record public hearing after due legal notice was held on October 28, 2010. (Open record public hearing testimony)

21. The following documents were admitted as Exhibits at the open record hearing:

    21.1 Exhibit 1: Long Plat Application & Environmental Checklist
    21.2 Exhibit 2: Affidavit of Posting

21.3 Exhibit 3: Letter of Complete Application
21.4 Exhibit 4: Letter from Sapphire Skies re: Explanation of Water Rights use for projects 7/14/09
21.5 Exhibit 5: Notice of Application
21.6 Exhibit 6: Affidavit of Mailing & Publication
21.7 Exhibit 7: Memo from Kittitas Co. Public Works 7/17/09
21.8 Exhibit 8: Memo from Kittitas Co. Environmental Health 7/31/09
21.9 Exhibit 9: Comment letter from Kittitas Co. Fire Marshal's Office 8/24/09
21.10 Exhibit 10: Comment letter from WDF&W 8/14/09
21.11 Exhibit 11: Comment letter from Dept. of Ecology 8/27/09
21.12 Exhibit 12: Sapphire Skies letter responding to WDF&W comments 8/19/09
21.13 Exhibit 13: Sapphire Skies letter responding to Dept. of Ecology comments 8/31/09
21.14 Exhibit 14: Comment letters from Kittitas Co. Public Health 1/11/09 & 9/30/09
21.15 Exhibit 15: Sapphire Skies letter responding to Public Health's comments 10/21/09
21.16 Exhibit 16: Letter to Iron Snowshoe LLC from Anna Nelson, CDS Contract Planner re: early notice EIS 10/28/09
21.17 Exhibit 17: Preliminary Storm Drainage Report 12/14/09
21.18 Exhibit 18: Downstream Analysis 8/1/09
21.19 Exhibit 19: Stream & Wildlife Habitat Study
21.20 Exhibit 20: Critical Areas Report 12/15/09
21.21 Exhibit 21: Revised Transportation Impact Analysis 11/19/09
21.22 Exhibit 22: Revised SEPA Checklist date stamped 12/29/09
21.23 Exhibit 23: Revised Plat Drawings 12/2009
21.24 Exhibit 24: Road Plan & Profile date stamped 12/29/09
21.25 Exhibit 25: Abandoned Mine Lands Report 11/17/09
21.26 Exhibit 26: Revised Forest Ridge Narrative & Public Benefit Rating System Chart date stamped 12/29/09
21.27 Exhibit 27: Letter from Sapphire Skies re: supplemental information submitted 12/28/09
21.28 Exhibit 28: Comment letter from WSDOT 2/4/10
21.29 Exhibit 29: 2/16/10 Memo from Public Works re: Stormwater issues
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21.31 Exhibit 31: 3/26/10 Public Works memo re: responses to comments
21.32 Exhibit 32: Comment letter from WSDOT 4/26/10
21.33 Exhibit 33: Forest Ridge Geological Hazards Assessment 8/19/10
21.34 Exhibit 34: Memo from Public Works 9/8/10
21.35 Exhibit 35: SEPA MDNS issued 9/21/10
21.36 Exhibit 36: Notice of Decision SEPA Action & Public Hearing
21.37 Exhibit 37: Hearing Examiner Staff Report

21.38 Exhibit 38: October 28, 2010, letter from Dr. Bonnie Reay of Cle Elum City Council to the Hearing Examiner
21.39 Exhibit 39: September 15, 2010, Kittitas County request for public records with attachment
21.40 Exhibit 40: November 9, 2009, letter from Mandy Weed to Catherine Clerf with attachments related to a public disclosure request
21.41 Exhibit 41: Transcript of handwritten statement of Catherine Clerf at September 21, 2010, Board of County Commissioner meeting
21.42 Exhibit 42: Series of emails between Christina Wollman, Kittitas County Public Works, Matt Morton, City of Cle Elum, Jim Leonhard and Jan Olivier from September 8, 2010, through September 14, 2010
(Open record public hearing record)

22. Testifying on behalf of the applicant was Shawn Northrup. Mr. Northrup testified that he is the owner of the property and the applicant. Mr. Northrup indicated that the applicant agreed with all of the proposed conditions of approval stated within the staff report as well as the Mitigated Determination of Nonsignificance. He stated that the project would utilize pedestrian paths within the open space, would comply with dark sky ordinances and would prohibit wood stoves as a primary means of heating. (Open record public hearing testimony)

23. Also testifying on behalf of the applicant was Mark Kirkpatrick. Mr. Kirkpatrick testified that the stormwater system will be designed to withstand a 100-year storm event. It will be designed to account for both rain and snow events and will provide retention for stormwater up to a 25-year storm event. He stated that the plat map had multiple dark shaded areas which represent potential location of stormwater ponds and bioswales. (Open record public hearing testimony)

24. Mr. Northrup returned to testify concerning off-site traffic mitigation measures. (Open record public hearing testimony)

25. Mr. Northrup also represented that the project will have a second access point during Phase 1. Regarding off-site improvements, Mr. Northrup acknowledged that Forest Ridge will be required to participate with Columbia Street (Cle Elum) mitigation when required to do so by traffic volume generated by the development. (Open record public hearing testimony)

26. No member of the public testified in favor of the project. (Open record public hearing testimony)

27. Testifying in opposition to the project were the following persons:

27.1 Bonnie Reay: Dr. Reay represented that she was testifying on behalf of the Cle Elum City Council and the City of Cle Elum. Dr. Reay is a current member of the Cle Elum City Council.

Dr. Reay's testimony is found in Exhibit 38.

Although Dr. Reay testified that the City of Cle Elum was not involved in discussion of off-site mitigation measures, the applicant submitted Exhibit 42, documenting City of Cle Elum Public Works' involvement in suggesting mitigation measures for this project as late as September, 2010.

27.2 Catherine Clerf: Also testifying in opposition to the project was Catherine Clerf. Ms. Clerf submitted Exhibits 39, 40 and 41. Ms. Clerf had concerns as to egress through this northeast corner of the project area and whether or not this was for future development to the property to the north of the subject property. Ms. Clerf also echoed Dr. Reay's comments as to why an environmental impact statement was not required. Ms. Clerf had concerns over wetlands identified as J and K and testified that no development should occur on those wetlands. She was curious as to whether or not this project area is within a fire district as there was conflicting information within the application materials and the Mitigated Determination of Nonsignificance. Finally, Ms. Clerf testified that none of the roads within the development should be greater than 12% grade.

27.3 Diedra Link: Ms. Link testified that in her opinion GPO 3.1 had not been met. She testified that 6,000 lots had approved for development within Kittitas County in the last four years and that this was more than adequate inventory of lots for projected residential growth within the County.

27.4 Kevin Daily: Mr. Daily also testified in opposition to the project. His personal concerns related to stormwater, roads, multiple unresolved issues and fire protection. He stated that his land was to the southwest of the project area and is not within Fire District No. 7. He also testified as to easement problems concerning the applicant and Mr. Daily's property and how difficult it has been to resolve those issues. He questioned how more significant unresolved issues for this project will be resolved when, as he put it, even his simple issue could not be resolved.

(Open record public hearing testimony)

28. In rebuttal, Mark Kirkpatrick testified for the applicant that of the 478 acres within the project area, only 79 acres drained towards the City of Cle Elum through Balmers Canyon while the remainder of the property drained through Steiners Canyon. He also testified that the impervious surface of the project would be between 12% and

15% of the entire site. The point of this testimony was that 85% to 88% of the property would be pervious allowing for the rain and snow to be naturally absorbed into the ground according to the soil's capacity. (Open record public hearing testimony)

29. Mr. Northrup also provided additional testimony. Mr. Northrup recognized that there was a written public comment received from Scott Huish that was not referenced in the staff report. Mr. Northrup also testified that there were meetings between the applicant, the County and the City of Cle Elum Public Works & Planning Departments regarding this project. Mr. Northrup submitted Exhibit 42 as evidence of the City of Cle Elum's participation in the development of mitigation measures and off-site project mitigation measures for the project. Mr. Northrup testified that the road access point on the northeast portion of the project is required by certain easements upon which the subject property is required to protect. He testified that Wetlands J and K are protected through the proposed conditions of approval. Mr. Northrup testified that while the project area is not currently within Fire District No. 7, approval is imminent. Mr. Northrup testified that the problem regarding Mr. Daily's property involved what Mr. Northrop termed as "floating" easements that go through the subject property according to prior forest and logging requirements. Mr. Northrup stated that they will move the road back onto the project boundary. He also testified that the final stormwater plan and build-out will prevent water from flowing from the project area onto Mr. Daily's land. (Open record public hearing testimony)

30. The applicant has requested performance based increases in bonus density based upon the public benefit rating system. (Open record public hearing testimony)

31. The applicant is proposing 191.38 acres of open space (40% of project) allowing for 40 bonus points. (Open record public hearing testimony)

32. The applicant is proposing a Group A water system which allows for 50 points. (Open record public hearing testimony)

33. This allows for a total of 90 points and a total bonus density percentage of 90% which ultimately allows for 182 total lots for this cluster plat. (Open record public hearing)

34. In the event that a Group A water system is not developed, those points shall not be awarded. In the event the applicant does not provide for a minimum of 191.38 acres of open space, then those 40 points will not be allowed. (Open record public hearing)

35. The proposal is appropriate in design, character and appearance with the goals and policies for the land use designation in which the proposed use is located. (Hearing Examiner finding based on the record)

36. The proposed use will not cause significant adverse impacts on the human or natural environments that cannot be mitigated by conditions of approval. (Hearing Examiner finding based on the record)

37. The proposal will be served by adequate facilities including access, fire protection, water, storm water control, and sewage disposal facilities. (Hearing Examiner finding based on the record)

38. Any Conclusion of Law that is more correctly a Finding of Fact is hereby incorporated as such by this reference. (Hearing Examiner finding based on the record)

II. RECOMMENDED CONCLUSIONS OF LAW

1. The Hearing Examiner has been granted authority to render this recommended decision.

2. As conditioned, the development meets the goals, policies and implementation recommendations as set forth in the Kittitas County Comprehensive Plan.

3. As conditioned, this proposal is consistent with applicable federal and state laws and regulations.

4. Public use and interest will be served by approval of this proposal.

5. As conditioned, the proposal is consistent with Kittitas County Code Title 16 Subdivision, Title 17 Zoning, Title 17A Critical Areas, Title 15 Environmental, and Title 12 Roads and Bridges.

6. As conditioned, the proposed use is consistent with the intent, purposes and regulations of the Kittitas County Code and Comprehensive Plan.

7. As conditioned, the proposal does conform to the standards specified in Kittitas County Code.

8. As conditioned, the use will comply with all required performance standards as specified in Kittitas County Code.

9. As conditioned, the proposed use will not be contrary to the intent or purposes and regulations of the Kittitas County Code or the Comprehensive Plan.

10. As conditioned, this proposal does comply with Comprehensive Plan, the Shoreline Master Program, the zoning code and other land use regulations, and SEPA.

11. Any Finding of Fact that is more correctly a Conclusion of Law is hereby incorporated as such by this reference.

III. RECOMMENDED DECISION

Based on the above Recommended Findings of Fact and Recommended Conclusions of Law, the Hearing Examiner hereby recommends that Application LP-08-14, Forest Ridge Performance Based Cluster Plat, be **APPROVED** subject to the following Recommended Conditions of Approval.

IV. RECOMMENDED CONDITIONS OF APPROVAL

All Conditions of Approval shall apply to the applicant, and the applicant's heirs, successors in interest and assigns.

1. All conditions imposed herein shall be binding on the "Applicant," which terms shall include the owner or owners of the property, heirs, assigns and successors.

Platting Standards and Zoning Code:

2. Certificate of Title: A certificate of title of the property proposed to be platted shall be submitted with the final plat.

3. Lot Closures: It is the responsibility of the Professional Licensed Surveyor (PLS) to ensure the lot closures are correct and accurate.

4. Conditions, Covenants, and Restrictions: Prior to final plat approval, a copy of the proposed final Conditions, Covenants, and Restrictions shall be submitted to Community Development Services for review and approval.

5. Open Space Tracts: Prior to final plat approval, all areas not included in development lots shall be labeled as individual tracts. Tracts shall not be further subdivided or altered. All tracts, except the tract(s) containing the private road area, shall be labeled "Open Space.". All open space tracts shall be identified on the face of the final plat.

6. Open Space Tract Ownership and Maintenance: Open space tracts shall be jointly owned and maintained by the developer or legally responsible owner or homeowner's association or other legal entity made up of all benefited property owners.

7. Clustering of Lots: Lots shall be designed to meet the requirements of KCC 16.09.100.A relating to clustering requirements.

8. Performance Based Cluster Plat Open Space: The preliminary plat map states that 193.38 acres (or 40% of the total site) meets the definition of "Open Space" contained in Chapter 16.09.100.C (on the date of application). Prior to final plat approval, the applicant shall present to the County for review and approval a map demonstrating that at least 40% of the total plat area meets the open space requirements of Chapter 16.09. For purposes of calculating open space, the following areas shall not be included: Commercial Forest setback area; seasonal streams and their 15' buffer area; wetlands and buffers; areas where development is otherwise restricted, and private roadways within open space.

9. Final mylars shall be submitted in accordance to KCC 16.20: Final Plats. All applicable survey data and dedications shall be reflected pursuant to KCC 16.24: Survey Data-Dedications.

10. Both sheets shall reflect the Plat number: LP-08-00014.

Critical Areas:

11. Wetland Impacts: The proposed plat area contains ten wetlands. All wetland areas and their buffers shall be shown on the face of the final plat. The plat shall also contain the following note:

> *Development involving disturbance to wetlands may require additional County review and possible mitigation. KCC 17A.04.015 requires all wetland impacts to be avoided to the extent practical. Any unavoidable wetland impacts shall be required to be replaced at a ratio of 2:1 for Category 2, 1.5:1 for Category 3, and 1:1 for Category 4 (KCC 17A.04.050).*

12. Wetland J: The applicant's wetland biologist identifies Wetland J as a Category 2 high value wetland measuring 2,008 square feet in area. This wetland has a required minimum buffer of 25 feet according to 17A.04.020. The proposed design places Wetland J in Lots 152 and 156. A private road crosses through Wetland J and its buffer. KCC 17A.04.015 requires all wetland impacts to be avoided to the extent practical. Any unavoidable wetland impacts to Category 2 wetlands shall be required to be replaced at a ratio of 2 square feet created for every 1 square foot lost (KCC 17A.04.050). Impacts to buffers may be mitigated through buffer averaging, as allowed by KCC 17A.04.050. Prior to final plat approval, the applicant shall redesign the layout to prevent unavoidable impacts to Wetland J and its buffer, and submit a wetland replacement plan and/or wetland buffer averaging plan, if necessary, for County review and approval.

13. Wetland K: The applicant's wetland biologist identifies Wetland K as a Category 2 high value wetland measuring 525 square feet. The proposed design places Wetland K in Lots 151 and 152. A private road crosses through Wetland K. KCC 17A.04.015 requires all wetland impacts to be avoided to the extent practical. Any unavoidable wetland impacts to Category 2 wetlands shall be required to be replaced at a ratio of 2 square feet created for every 1 square foot lost (KCC 17A.04.050). Prior to final plat approval, the applicant shall redesign the layout to prevent unavoidable impacts to Wetland J and its buffer, and submit a wetland replacement plan, if necessary, for County review and approval.

14. Stream Crossings: The preliminary plat map contains ten instances where private roads cross mapped streams and their buffers. It is the applicant's responsibility to obtain appropriate state permits for all stream crossings.

15. Stream Buffer Impacts: The proposed plat area contains five streams. Chapter 17A.07.010.2 establishes performance standards for buffers of streams. Type 5 streams are subject to a 15 foot building setback. All streams and their buffers shall be shown on the face of the final plat. The plat shall also contain the following note:

A 15 foot building setback is required from seasonal streams. Stream crossings may require additional permitting from state agencies.

16. Access to Lots: Some lots contain natural conditions making access from the private roads difficult. Notes shall be placed on the face of the final plat stating:

Access to some lots requires crossing a seasonal stream. Additional permitting may be required to access these lots from the private road.

Access to some lots requires crossing a critical slope area. Additional technical design may be required to access these lots from the private road.

17. The following note shall be placed on the face of the final plat:

The placement of buildings and structures on or adjacent to ascending or descending slopes steeper than 1 unit vertical in 3 units horizontal (33.3-percent slope) shall conform to the building setback requirements of current adopted building codes (IRC Section R403.1.7 and IBC Section 1805.3.1). Alternate setbacks and clearances are permitted, subject to the approval of the building official. The building official is permitted to require an investigation and recommendation of a qualified engineer to demonstrate the requirements necessary to construct a building on or adjacent to ascending or descending slopes. Such an investigation shall include consideration of material, height of slope, slope gradient, load intensity and erosion characteristics of slope material.

Stormwater and Drainage

18. This project will require a NPDES Construction Stormwater General Permit from the Washington State Department of Ecology. This permit requires that the SEPA checklist fully disclose anticipated activities, including building, road construction, and utility placements. Obtaining a permit is at least a 38 day process and may take up to 60 days if the original SEPA does not disclose all proposed activities.

19. The NPDES permit requires that a Stormwater Pollution Prevention Plan (Erosion Sediment Control Plan) is prepared and implemented for all permitted construction sites. These control measures must be able to prevent soil from being carried into surface water (this includes storm drains) by stormwater runoff. Permit coverage and erosion control measures must be in place prior to any clearing, grading, or construction.

20. Erosion control measures must be in place prior to any clearing, grading or construction. These control measures must be effective to prevent soil from being carried into surface water by storm water runoff. Sand, silt, and soil will damage aquatic habitat and are considered pollutants.

21. Any discharge of sediment-laden runoff or other pollutants to waters of the state is in violation of Chapter 90.48, Water Pollution Control, and WAC 173-201A, Water Quality Standards for Surface Waters of the State of Washington, and is subject to enforcement action.

22. Best management practices must be used to prevent any sediment, oil, gas, or other pollutants from entering surface or ground water.

Transportation and Infrastructure

23. Timing of Improvements: This application is subject to the current version of the Kittitas County Road Standards, dated 9/6/05. The following conditions apply and must be completed prior to the issuance of a building permit for any of the residences within this plat. A Performance Bond or acceptable financial guarantee may be used, in lieu of the required improvements, per the conditions outlined in the current Kittitas County Road Standards.

24. Private Road Certification: Private roads serving any of the lots within this development shall be inspected and certified by a licensed professional engineer for conformance with current Kittitas County Road Standards, 9/6/05 edition. Kittitas County Public Works shall require this road certification to be completed prior to the issuance of a building permit for any of the structures within the proposed plat.

25. Second Access: A second access is required of this project. Prior to final approval for each phase, the applicant shall conduct an analysis showing whether the threshold for a second access has been met. If a second access is required, the applicant must submit to Public Works for approval a route that has easement or other access rights secured and recorded. The second access must conform to Kittitas County Road Standards and the second access requirements as clarified by the Board of County Commissioners on April 2, 2007. The BOCC clarified KCRS 12.01.095(2) with the following requirements: 1) If the second access is restricted to emergency access only, it must meet or exceed the following requirements: 60' easement, 20' roadway width, BST/ACP surface, and a paved apron. Access restrictions such as gates or bollards must be approved by the Fire Marshall; 2) If the second access is to be used for ingress and egress, it must meet the same standards as the first access.

26. Cul-de-Sac: A cul-de-sac turn-around having an outside right-of-way or easement diameter of at least 110 feet shall be constructed at the closed end of all dead-end roads serving 3 or more lots. The driving surface shall be at least 96 feet in diameter. Cul-de-sacs must also conform to the requirements specified by the 2006 International Fire Code. Contact the Fire Marshal regarding any additional cul-de-sac requirements.

27. Joint-Use Driveway: A joint-use access shall serve no more than two tax parcels. See Kittitas County Road Standards, 9/6/05 edition.
    a. Access easements shall be a minimum of 20' wide. The roadway width shall have a minimum width of 12'.
    b. The surface requirement is for a minimum gravel surface depth of 6".
    c. Maintenance of driveway approaches shall be the responsibility of the owner whose property they serve. The County will not maintain accesses.
    d. Any further subdivision or lots to be served by proposed access may result in further access requirements.

28. Single-Use Driveway: A single-use access shall serve no more than one lot. See Kittitas County Road Standards, 9/6/05 edition.
    a. The roadway shall be a minimum of 8' wide with gravel surface.
    b. Maintenance of driveway approaches shall be the responsibility of the owner whose property they serve. The County will not maintain accesses.
    c. Any further subdivision or lots to be served by proposed access may result in further access requirements.

29. Private Road Maintenance Agreement: The applicant shall meet all applicable conditions of any pre-established or required Private Road Maintenance Agreements.

30. Access Permit: An approved access permit shall be required from the Department of Public Works prior to creating any new driveway access or performing work within the county road right of way.

31. Addressing: Contact the Kittitas County Rural Addressing Coordinator at (509) 962-7523 to obtain addresses prior to obtaining a building permit. A parcel cannot receive a building permit or utilities until such parcel is identified with a 911 address.

32. Mailbox Placement: The U.S. Postal Service requires that private roads with 6 or more residences install USPS approved Cluster Box Units (CBUs) at a safe location at the mouth of the private road. Contact your local Post Office for location and additional design requirements before beginning construction.

Air Quality

33. Dust, diesel emissions, and wood stove emissions are possible sources of air pollution from this project. The applicant shall comply with all state and County standards for air emissions and obtain any necessary air quality permits from applicable agencies.

34. According to County standards, a water truck shall be available during construction to minimize dust emissions.

Water and Sewer

35. The applicant has proposed a Group A Public Water System. Prior to final plat approval, the applicant shall submit a signed letter of agreement between the public water system purveyor or official and the land developer/owner granting delivery of potable water for the entire development. If the public water system is being developed specifically for the subdivision/plat, the water system must be approved by Washington State Department of Health (DOH), including issuance of a public water system ID number, prior to recommendation by Kittitas County Public Health Department for final plat approval.

36. Community septic systems with wastewater flows under 3,500 gallons/day are permitted by the Kittitas County Public Health Department. For flows exceeding 3,500 gallons/day, design review and approval will be needed from the Washington State Department of Health. For flows greater than 14,500 gallons/day, design review and approval will be needed from the Washington State Department of Ecology.

37. The maximum allowable slope for septic drain fields will depend on permitting agency. According to Kittitas County Code 13.04.150(5) no drain field disposal

system may be designed for a site with a slope of greater than 30% grade. According to WAC 246-272A the maximum allowable slope is 45% grade.

38. Prior to final approval, the final Mylar must identify the wastewater disposal option for each lot and the locations of the proposed drain fields that do not exceed the maximum allowable slope.

Fire Safety

39. Design and construction must comply with Kittitas County Code, Kittitas County Zoning, the 2006 International Fire and Building Codes, and all other development agreements.

40. Given the provided pre-review documents, these residences will require fire flow of 100 gallons per minute for a duration of no less than 30 minutes. A reduction in required fire flow of 5- percent is allowed when the buildings are provided with an approved automatic sprinkler system.

41. An approved water supply capable of supplying the required fire flow for fire protection shall be provided. A standpipe or hydrant system with an adequate source of water (supply), a distribution system and adequate pressure for delivery shall be installed for this plat. Hydrant spacing shall comply with International Fire Code and its appendices' requirements.

42. A separate permit and deposit shall be required for installation of a hydrant/standpipe system.

43. The Kittitas County Fire Marshal's Office will require a minimum of three (3) complete sets of plans for full review: 1) Office Copy; 2) Permit Copy; and 3) Fire Department Copy.

44. This property is currently located outside of a fire district. As such, until such time that the development is within a Fire District, all future development must meet the International Urban Wild Land Interface Code for building construction, defensible space allocation, access, etc.

45. Roads with a slope or grade greater than 12% shall not be allowed.

SEPA Mitigation

46. A Mitigated Determination of Nonsignificance (MDNS) was issued on September 23, 2010. The mitigation measures in the MDNS shall be conditions of final plat approval.

47. The following mitigation conditions from the SEPA Mitigated Determination of Non-Significance shall be noted on the face of the final plat and included in the Covenants, Conditions, and Restrictions (CC&Rs) document recorded with the final plat:

a. All outdoor lighting shall be shielded and directed downward to minimize the effect to nearby residential properties.

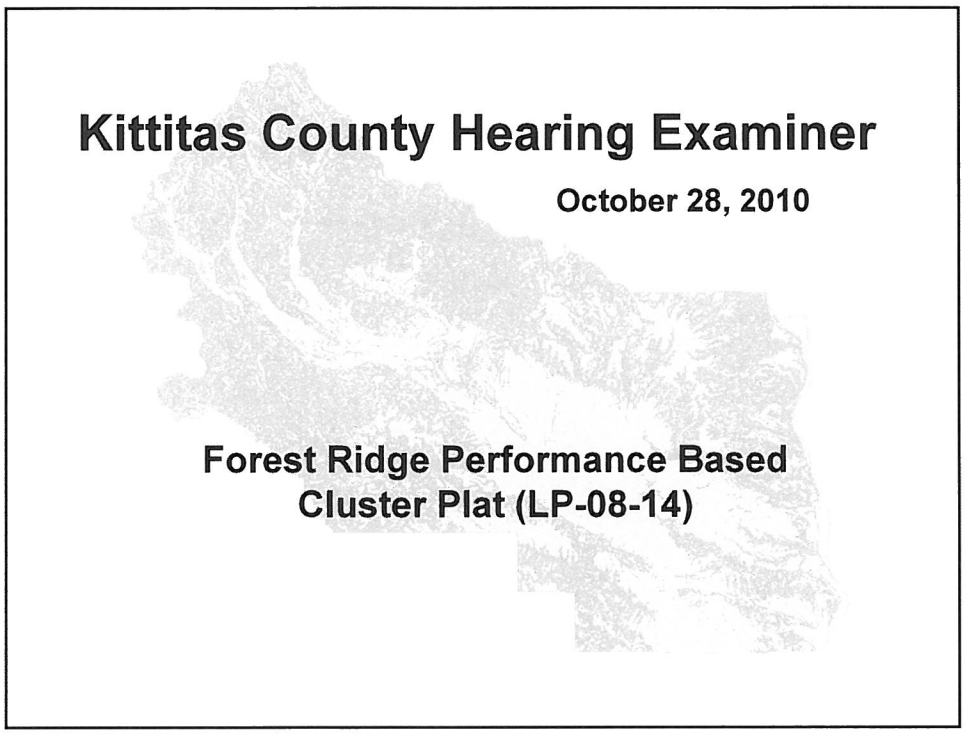
b. The use of wood burning stoves shall be prohibited.

c. Snow removal shall be the responsibility of the Homeowners Association. Snow storage shall be limited to those areas shown on the face of the plat and shall be located outside of wetland and stream areas and their buffers.

Dated this 10th day of November, 2010.

KITTITAS COUNTY HEARING EXAMINER

Andrew L. Kottkamp



Good Evening Mr. Hearing Examiner

For the record ……

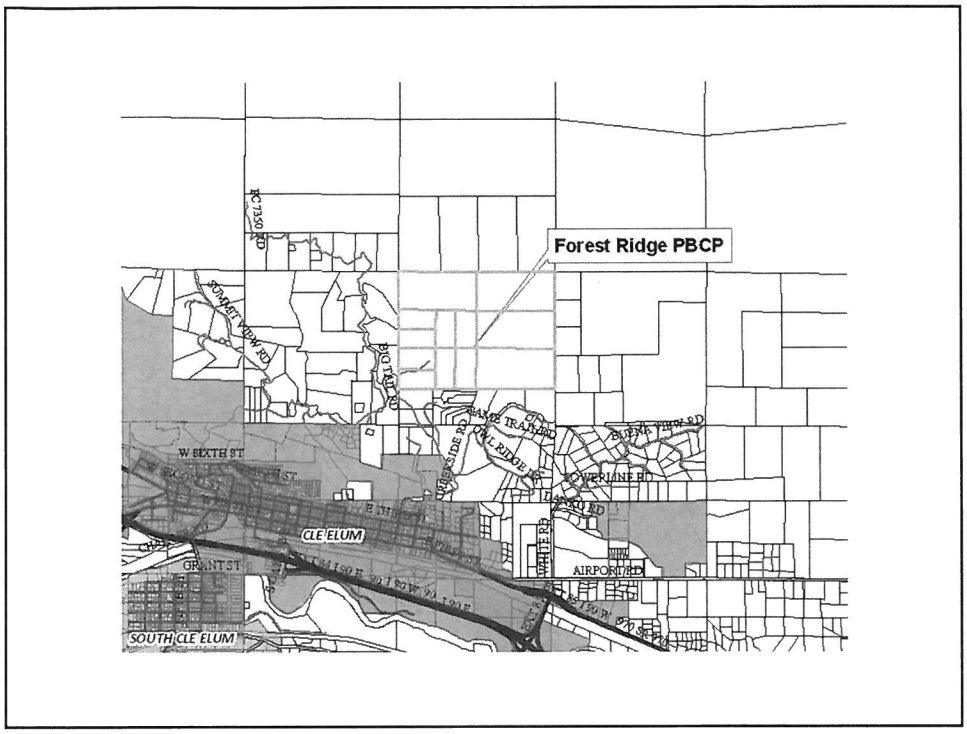
You have before you tonight for consideration is the Forest Ridge Performance Based Cluster Plat.

43

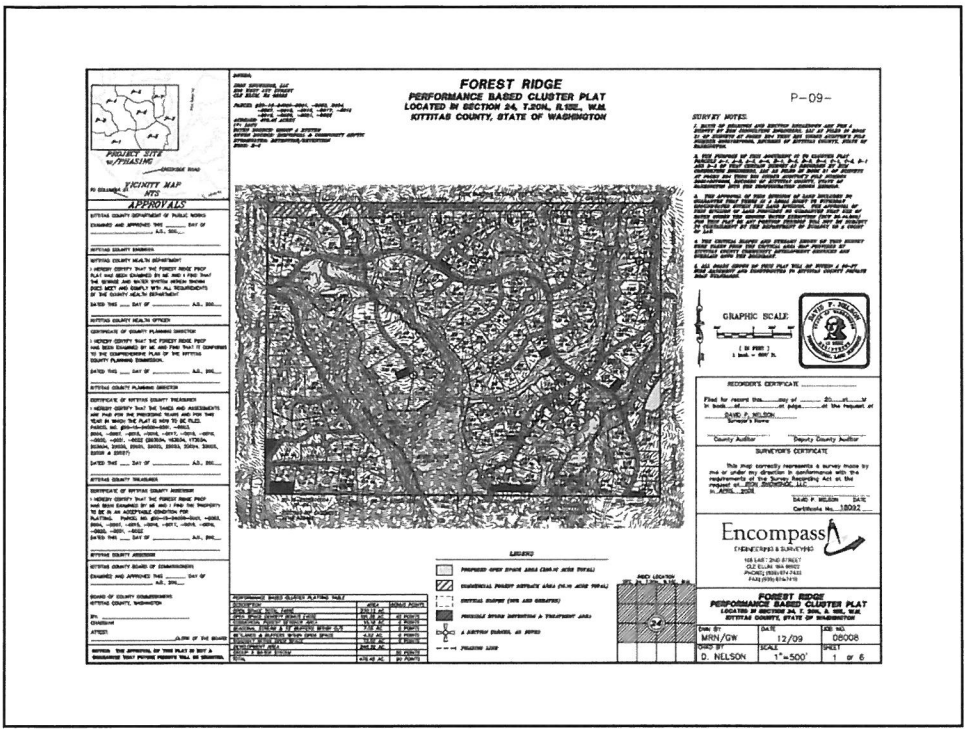
Overview of Proposal

- 171 lot Performance Based Cluster Plat on 479 acres.
- Zoning: Rural 5
- Group "A" water system and individual or community on-site septic systems are proposed.

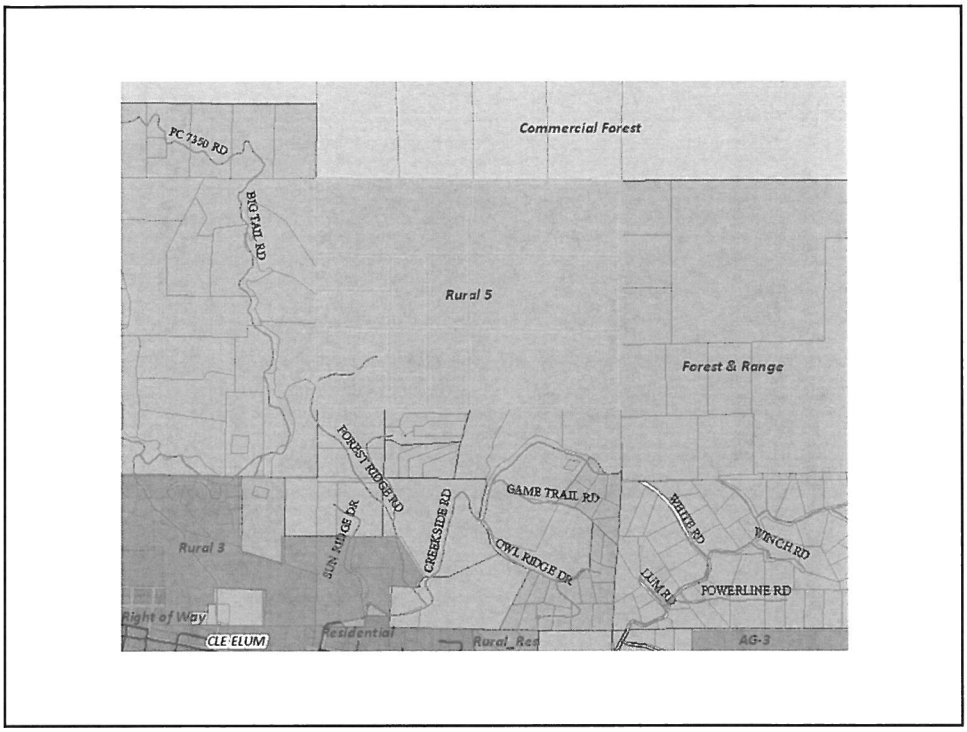
Iron Snowshoe LLC, property owner, have applied for a 171-lot performance based cluster plat on approximately 479 acres of land that is zoned Rural-5. The project is proposed to be served by a Group A water system and individual or community on-site septic systems.



The subject property is located northeast of the city of Cle Elum off of the extension of Columbia Street

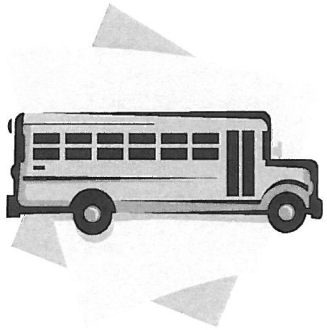


Copy of the plat map showing the lot configuration for the Forest Ridge Cluster Plat

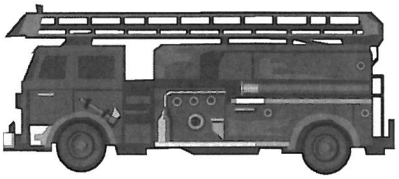


The subject property is zoned Rural 5.

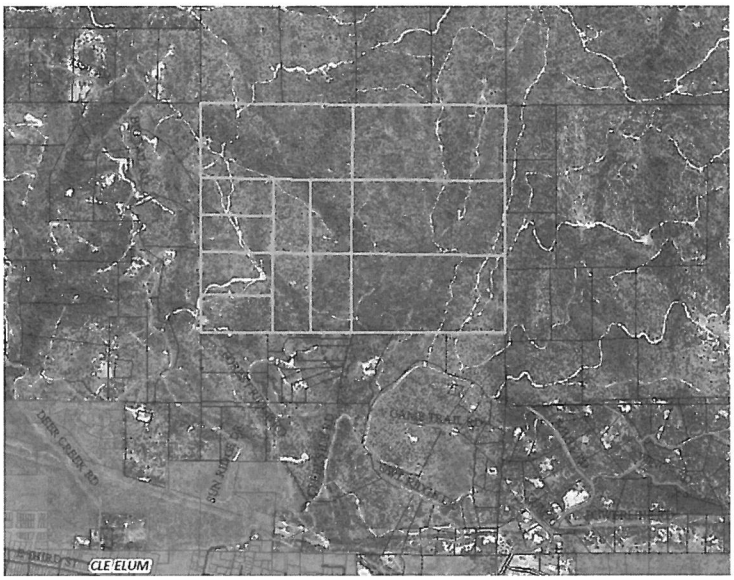
Cle Elum-Roslyn School District



Fire District #7



The property is located within the Cle Elum Roslyn School District. It is located within the Fire District #7 service area.



2009 air photo of the area.



An administrative critical areas review was done in compliance with KCC 17A.. Areas of steep slopes, wetlands, and landslide areas were identified.

Notices

- Application received April 24, 2008and deemed complete on July 17, 2009.
- Notice of Application was issued and published on July 30, 2009.
- Comments were received from Department of Ecology, WSDOT, Washington Fish & Wildlife, Kittitas Co. Dept. of Public Works and Public Health.
- SEPA MDNS issued September 23, 2010.

In review: A complete long plat application was submitted to Community Development Services on April 24, 2008. The application was deemed complete on July 17, 2009. The Notice of Application for the preliminary plat application was issued on July 30, 2009. Comments were received from Department of Ecology, Washington Department of Transportation, Washington Fish & Wildlife, Kittitas County Department of Public Works, and Environmental Health. A Mitigated Determination of Non-Significance (MDNS) was issued on September 23, 2010, no appeals filed. Staff recommends approval of the Forest Ridge PBCP subject to the conditions contained in the staff report.


Questions ?

???

From: Christina Wollman [mailto:christina.wollman@co.kittitas.wa.us]
Sent: Tuesday, September 14, 2010 1:46 PM
To: Katie F. Cote; Marc Kirkpatrick (mkirkpatrick@encompasses.net)
Subject: FW: Forest Ridge Conditions

Christina Wollman

Planner II
Kittitas County Department of Public Works
[P] 509.962.7051

From: Jim Leonhard [mailto:Jleonhard@cityofcleelum.com]
Sent: Tuesday, September 14, 2010 1:44 PM
To: Christina Wollman; mmorton@cityofcleelum.com
Cc: Jan Ollivier
Subject: Re: Forest Ridge Conditions

Christina,

I have been on vacation and apologize for the slow reply.

a. OK
b. A 2-inch overlay on Columbia Avenue from First Street to Fifth Street or end of existing pavement shall be constr construction of phase 5.
c. The drainage ditch from Balmer Canyon running southerly through private property until it reaches Fourth Street Floral Avenue shall be cleaned. The culvert on the North side of the Owens property in Balmer Canyon shall be che and replaced if the City of Cle Elum decides it necessary. These requirements shall be completed prior to final appr

Thank you,

Jim Leonhard
Public Works Director
City of Cle Elum

> ----- Original Message -----
> **From:** Christina Wollman
> **To:** 'mmorton@cityofcleelum.com' ; 'Jim Leonhard'
> **Cc:** Jan Ollivier
> **Sent:** Wednesday, September 08, 2010 9:01 AM
> **Subject:** Forest Ridge Conditions
>
> Matt & Jim,
>
> Are these the conditions you would like added into the approval of Forest Ridge? I've attached you can review the other conditions. Please let me know as soon as possible. We will be revie Allison tomorrow. Thank you.
>
> 1. City of Cle Elum: The City of Cle Elum has the following requirements:
>
> a. Potholes must be repaired on Columbia Avenue from First Street to Fourth Street as requi Elum prior to receiving final approval.
>
> b. A 2-inch overlay on Columbia Avenue from First Street to Fourth Street shall be constructe construction of Phase 5.

EX 42

c. The drainage ditch located ??WHERE?? shall be cleaned out and the culvert checked for condition. The culvert shall be replaced if the City of Cle Elum decides it necessary. These req completed prior to final approval

Christina Wollman

Planner II
Kittitas County Department of Public Works
411 N Ruby St, Suite 1 Ellensburg WA 98926
[P] 509.962.7051
[F] 509.962.7663

Notice: All email sent to this address will be received by the Kittitas County email system and may be subject to public disclosure under Chapter 42.56 RCW and to archiving and review.

message id: 38eb45916c6dcbdac24bb8719d004a14

THURSDAY, OCTOBER 28, 2010 WRITTEN COMMENTS FORESTRIDGE P.B.C.P (LR-08-14) Exhibit

Transcript of Hand-Written Statement: Catherine Clerf
September 21, 2010 2 p.m. BOCC Hearing
Teanaway Solar Reserve Development Agreement
[One 8 x 11-1/2-inch double-sided handwritten statement turned in to BOCC Clerk Catherine Dunn at time of meeting]

OBJECTIONS TO TECHNICAL ADVISORY COMMITTEE MEMBERS

Jeff Jones - AFLC - Theft of Public Documents

Brenda Larsen - Current fire marshall; collaborated in illegal occupancy permit and ignoring DA (Development Agreement) of Suncadia

Kirk Holmes - Current DPW and interim Director of CDS - not qualified in any rregard; theft of public documents - failure to report theft as department head/part of legislative branch of county government

****
****

I informed DPW KH (Kirk Holmes) on Monday, July 13, 2009, in an early morning phone call from my office to PW (Public Works) of the potential theft of some, most, or all of 3 binders submitted by AFR (American Forest Resources) for administrative segregation. I told DPW KH that I had 3 questions that needed to be ansswered in 24 hours by him as DPW of KC. They were 1, 2, and 3: Did three 3-ring white AFR binders exist? Are they missing? What are you going to do about it?

Before I posed question #3 [while speaking to him on the phone Monday] I emphasized that for him to answer question 3 he had to go to the BOCC as he could not unilaterally answer for the BOCC. I counseled him that whatever ansswer he got he should get his instructions/directions in writing.

On Tuesday, July 14, 2009, KH (Kirk Holmes) called me using his personal cell hone on my cell phone. After my returning his call and leaving my message on this number, he returned my call and arranged to come to my office to answer the 3 questions.

[in my office I posed to KH Q1 and Q2 with the below answers.]
Q1: What three 3-ring white AFR binders exist? A: Y [YES]
Q2: Are they missing? A: 2 of 3 and 3 of 3 totally gone and only map remains in binder 1 of 3.

Here I passed and reminded him again of what I had told him yesterday - that before he could come to my office to tell me the answer to 3 he had to get his instructions from the BOCC - the legislative branch - first.

Then I asked Q3: What are you going to do about it? A: "Nothing." A monosyllabic answer

Then KH [Kirk Homes] said to me, "He [meaning Mr. Rudey] could do with his land what he wanted to," to which I replied, "No, he can not."

What I did not tell KH [Kirk Holmes] was that PA GZ {Prosecuting Attorney Greg Zempel] had be [en] personally informed by me of the potential theft of public documents AND their significance. It was arranged in a private meeting with PA GZ on Friday, July 17, 2009, in my ofifce to allow DPW KH and the BOCC another opportunity to report the theft of public documents. PA GZ was to approach DPW KH privately in a period of 7-10 days as to when he, the PA, could expect to receive the report of the theft of public documents. I was later informed that this event between PA GZ and DPW KH took place and the result.

Ex #41

In 2 public hearings at Teanaway-Swauk Grange (September 17, 2009, and then October 28, 2009) I revealed that the binders had been taken from CD. CC [County Commissioner} Paul Jewell and KH in attendance both times as were JJ [Jeff Jones] and ST [Scott Turnbull]. I personally confronted JJ [Jeff Jones] at the S-T [Swauk-Teanaway] Grange public information night on Thursday, August 20, 2009, to which he claimed to me that he knew nothing of these binders being gone and claimed no participation in their disappearance.

**********END**********
****

FURTHER WRITTEN COMMENTS TO BOARD OF COUNTY COMMISSIONERS
RE: PROPOSED TEANAWAY SOLAR RESERVE DEVELOPMENT AGREEMENT

1. This development agreement requires explicit construction schedule limitations and restrictions that no construction of any type shall take place from November 1 through March 31 of each year with the exceptions of repairing damage due to force majeure events or events that substantially inhibit or preclude the production of electricity and in these events require Kittitas County Public Works daily supervision with daily logs being generated by county staff.

Why do the citizens of Kittitas County require this?

The current board of county commissioners chose to ignore the Development Agreement between Kittitas County and Suncadia and violated the explicit terms under which construction may take place in the past year, not the least of which was the willful violation of allowing Suncadia and its contractor(s) to lay down the sewer line from Phase 2, Division 2 of Suncadia to Phase 1 of Suncadia. Such willful violation was reported to the Department of Ecology in February of 2010 and the Department of Ecology shut down construction. However, this illegal construction activity on the part of Suncadia was allowed to resume by Suncadia. As a result of not being able to perform, let alone achieve, minimum standards of compaction in the sewer pipe bedding, substandard construction standards were accepted by both Suncadia and Kittitas County Public Works, putting at risk the integrity of the sewer line and the waster water treatment facility of the City of Cle Elum, as well as the health, safety and welfare of the residents in Phase 2, Division 2 and the public at large, as well as the environment regarding the impact of any sewer line rupture to air, water, and ground. To solve a problem of Suncadia's own making (lack of Final Mylar'd infrastructure required BEFORE a legal occupancy permit could ever be issued by any department of Kittitas County, according to state statutes and codes and county codes AND the explicit Development Agreement and the explicit engineering standards on ALL FINAL Mylars of Suncadia with Kittitas County) the legislative branch of Kittitas County, the Board of County Commissioners, deigned to unilatearlly solve Suncadia's financial problems by violating the terms and provisions of the Development Agreement between Suncadia and Kittitas County, as well as ignoring all other ancillary documentation, including engineering standards on Final Mylar for Phase 2, Division 2 of Suncadia.

To protect all property owners in the vicinity of the proposed footprint of the Teanaway Solar Reserve, upstream and downstream, including all PUBLIC proepty in the form of county roads and the nearby state route 970, the development agreement between the Teanaway Solar Reserve and Kittitas County must explicitly prohibit construction, as discussed above, from November 1 through March 31 annually. Staff can borrow ALL language from the Development Agreement between Suncadia and Kittitas County.

2. I concur with the position of the Yakama Nation that the BOCC must negotiate separately and directly with the Yakama Nation regarding the Development Agreement that is proposed for the Teanaway Solar Reserve.

Why do I believe the Yakama Nation is justifably demanding this "government-to-government" negotiation?

Because of the recent acts of egregious violation by the legislative branch of Kittitas County, embodied by the the Board of County Commissioners AND the departments of Public Works, Community Development Services, Fire Marshall, and Health Department/Environmental Health Department for which the BOCC is directly responsible, of the Development Agreement between Suncadia and Kittitas County which in consequence violated the three-way agreement among the Department of Fish and Wildlife (State of Washington), Suncadia, and the Yakama Nation. Specifically, the BOCC allowed the illegal design and illegal installation of an illegal temporary holding tank, in lieu of the sewer lift station that Suncadia did not have the monies to purchase or install ,to support sewer waste stream from the one residence which had illegally been given a building permit in September of 2008 by CDS in Phase 2, Division 2, Suncadia. Further, the BOCC knew that this illegal temporary holding tank further had to be illegally pumped and dumped elsewhere (allegedly into a sewer manhole in Phase 1 of Suncadia). Further, the BOCC knew that a completely fraudulent document had been given to and accepted by the Interim Director of CDS, also the DPW, to cover up the lack of a sewer lift station AND several hundred feet of missing sewer pipe that were physically necessary to connect Phase 2, Division 2 to Phase 1 to the City of Cle Elum sewer treatment plant, as part of the scheme to provide fraudulent documentation to a mortgage lender of said residence totalling nearly $1 million.

3. No where in the Development Agreement does it EXPLICITLY cite WHO is responsible for snow removal of :
a. Wiehl Road BEFORE "substandard" road improvements as called for in the Development Agreement;
b. Wiehl Road AFTER "substandard" road improvements as called for in the Development Agreement;
c. Loping Lane (even though it is cited as a "private" road) BEFORE "substandard" road improvements as called for in the Development Agreement;
d. Loping Lane (even though it is cited as a "private" road) AFTER "substandard" road improvements as called for in the Development Agreement.

This is explicitly necessary because the Development Agreement is ambiguous and regardless of what planner Anna Nelson said at the September 21, 2010, BOCC meeting after all public speakers had spoken and in answer to my questions and comments, all other mention of the ancillary documents, e.g., the "Exhibits" are also ambiguous. All county taxpayers need to know up front if snow plowing is or is NOT the taxpayers' responsibility in all FOUR cases cited above.

4. With regard to the problem of liability created in the Development Agreement regarding the construction of Wiehl and, especially, Loping Lane wherein TSR can disagree with the county's professional engineer as to the actual design thereof and costs of construction to meet design thereof and has a pathway to avoid meeting county road standards which ALL OTHER PARTIES IN THE COUNTY HAVE TO MEET IN THEIR ROAD CONSTRUCTION and is being allowed a legal pathway to avoid what is WELL KNOWN AND WELL DOCUMENTED TO BE AN ENVIRONMETALLY SENSITIVE, HAZARDOUS, AND CHALLENGINGLY DIFFICULT CONSTRUCTION ZONE for this part of Kittitas County. In other words, the BOCC knows of the problems in this area of the proposed project and have agreed to allow this project to proceed in terms of road construction through the use of preferential treatment to the applicant, currently "Teanaway Solar Reserve LLC" and any further transferees/assignees, instead of requiring what other applicants have to adhere to, e.g., county road standards, not SUB- or SUB-SUB-standards. This is notably an egregious act of the legislative branch of Kittitas County catering and pandering to "special parties," just as it has for Suncadia et al. for over a decade, in allowing the health, safety, and welfare of others to come second.

5. As I stated in the public hearing, I found over 2 dozen spelling errors, especially in the misuse of words such as is, in, of, on, and or, that DO change the meaning of phrases, clauses, and sentences. Please rigorously edit this document. Also punctutation errors and missing words in several places.

Respectfully submitted,

Catherine Clerf
60 Moe Road
Ellensburg, Washington 98926

****

FOREST RIDGE P.B.C.P (LP-08-14) Exhibit

KITTITAS COUNTY COMMUNITY DEVELOPMENT SERVICES
411 N. Ruby St., Suite 2, Ellensburg, WA 98926
CDS@CO.KITTITAS.WA.US
Office (509) 962-7506
Fax (509) 962-7682

November 9, 2009

Catherine Clerf
60 Moe Rd
Ellensburg, WA 98926

RE: Public Disclosure Request

Dear Catherine:

In accordance with the Washington State Public Records Act (RCW 42.56), this letter shall serve as acknowledgement that Kittitas County Community Development Services is in receipt of your requests for public records information, dated November 3, 2009.

Request number one was for all documents and attachments originally contained in the three, three ring binder submitted by AFR in the spring of 2007. At this time the 2007 AFR Administrative Segregation binder has been confiscated by the Ellensburg Police Department as part of an ongoing investigation and is not available to view at our office. Also, the other two binders have been returned to the Ellensburg Police Department and also not available for viewing at our office.

Request number two was for all documents and attachments that comprise and are encompassed in the electronic file folder maintained by Kittitas County CDS. At this time, no electronic records have been found. Our Information Service Department is currently searching backups to if any of the requested documents were ever created.

Should you have any further questions, please do not hesitate contacting me.

Sincerely,

Mandy Weed

Mandy Weed
Administrative Assistant II
(509) 962-7047
mandy.weed@co.kittitas.wa.us

Copy By

November 3, 2009

RECEIVED
NOV 0 3 2009
KITTITAS COUNTY
CDS

Mandy Weed, Public Disclosure Officer
Kittitas County Community Development Services
411 Ruby Street, Suite 2
Ellensburg, Washington 98926

This a request authorized under the Washington State Public Disclosure Act (RCW 42.56) for the following public records:

1. All documents and attachments, etc., originally contained in the three (3), 3-ring binders submitted to Kittitas County Community Development Services in the spring of 2007, by American Forest Resources (AFR), now known as American Forest Land LLC, containing materials related to their Teanaway properties in Kittitas County.
2. All documents and attachments, etc., that comprise and are encompassed in the electronic file folder maintained by Kittitas County Community Development Services of the AFR Administrative Segregation 2007 from the first entry into the electronic file folder to all that exist as of the date that this public disclosure request is processed.

Should any of this request appear to be unclear, vague, or over broad, I specifically ask that I be contacted immediately so that I may reform such request, so it is entirely clear to the county to ensure that full disclosure and compliance are obtained.

Thank you in advance for Kittitas County's full cooperation with this request.

I may be reached at:
e-mail: cclerf1341@fairpoint.net
OFF TEL: 509-933-4751
CELL: 206-399-1341
MAIL: 60 Moe Road, Ellensburg, Washington 98926

Respectfully,

Catherine Anne Clerf

Catherine Anne Clerf
60 Moe Road
Ellensburg, Washington 98926

PUBLIC DISCLOSURE/RECORDS REQUEST

ELLENSBURG POLICE DEPARTMENT

- Per RCW 42.56.520 EPD has up to 5 business days to respond to your request.
- Per RCW 10.97.050, not all criminal record information is disclosable.
- Per RCW 42.56.120 a fee of $.15 cents per page is charged for copies.
- Valid identification may be required.

Name of Requestor Catherine (First) Anne (Middle) Clerf (Last)

Mailing Address 600 Moe Road
(Street)

Ellensburg (City) WA (State) 98926 (Zip)

Daytime Phone # 509-933-4751 OFF
206-399-1341 CELL
Date of Birth 02-20-1954

Report #(s)/Information requested: E09-13928

Please provide date, time, and location of incident(s), and names of persons involved (including their dates of birth or approximate age): THEFT OF PUBLIC RECORDS FROM COMMUNITY DEVELOPMENT SERVICES

If this record concerns someone other than yourself, what is your relationship to the case?:

I AM THE CITIZEN WHO REPORTED THE MISSING/POTENTIALLY STOLEN PUBLIC RECORDS

I understand that records requests are subject to Washington State Disclosure Law and that criminal history information released to my custody may not be released to any unauthorized persons pursuant to RCW 10.97. I agree to pay any fees incurred for the copies that I am requesting. I understand that I will receive a response within 5 business days from the date that this form is received by the Ellensburg Police Department.

Catherine Anne Clerf
Signature

November 12, 2009
Date

For Office Use Only

Request Received: ✓ In Person _____ By Phone _____ Fax/Mail

Received By WP Date Received 11/12/09

Released By & Details _____

Ellensburg Police Department

Detail Incident Report

Incident Number: E09-13928
Reference Number:
Incident: THEFT
Area: AREA 0, CITY OF ELLENSBURG
Observed: Theft, Property, Other
Location: 411 N RUBY ST;PLANNING DEPT
When Reported: 12:18:52 10/29/09
Occurred Between: 07:00:00 03/20/09
And: 17:00:00 07/11/09

ARRESTEES:

Name: TURNBULL, SCOTT A.
SSN: 536-64-1190 **DL STATE:** WA **DL #:** TURNBSA442RP
State ID: **FBI #:**
DOB: 12/17/1956 **Race/Sex:** W/M **Height:** 5'08"
Weight: 220 **Hair:** BRO **Eyes:** BLU
Address: 2534 CARRIAGE LOOP
ELLENSBURG, WA 98926
Home Phone: (509)925-2538 **Work Phone:** ( ) -
Contact: **Name:**
Address: **Phone:**

COMPLAINANTS:

Name: CLERF, CATHERINE A.
DOB: 02/20/1954 **Race/Sex:** W/F
Address: 60 MOE RD
ELLENSBURG, WA 98926
Home Phone: (509)925-7118 **Work Phone:** (206)399-1341

MENTIONED IN REPORT:

Name: KITTITAS CO PUBLIC WORKS
DOB: **/**/**** **Race/Sex:** /
Address: 411 N RUBY ST; 2
ELLENSBURG, WA 98926
Home Phone: (509)962-7523 **Work Phone:** (509)962-7523
Name: CLERF, CATHERINE A.
DOB: 02/20/1954 **Race/Sex:** W/F
Address: 60 MOE RD
ELLENSBURG, WA 98926
Home Phone: (509)925-7118 **Work Phone:** (206)399-1341
Name: HOLMES, KIRK S.
DOB: 07/12/1962 **Race/Sex:** W/M

Address: 4971 ROBINSON CANYON RD
ELLENSBURG, WA 98926
Home Phone: (509)925-3023 **Work Phone:** (425)831-4919
Name: JONES, JEFF R.
DOB: 01/10/1949 **Race/Sex:** W/M
Address: 702 E 6TH AVE
ELLENSBURG, WA 98926
Home Phone: (509)925-3857 **Work Phone:** (509)899-0106

NARRATIVE:

Name: BRUNK, JASON

Ellensburg Uniform Incident Report

CASE #: E09-13928
CRIME: THEFT

NARRATIVE:

On 10-29-09 at 1218 I was dispatched to a theft call at Kittitas County Planning Dept. The RP, Catherine Clerf, was at EPD. I contacted Clerf, who advised she had been made aware that two Administrative Segregation folders from American Forest Land Company had been stolen from the permit center.

Clerf advised the folders entailed a 34,000 home development plan for the upper Teanaway River area. Clerf advised she believed the folders were stolen by a former employee before the recent reduction in forces on 3-31-09 at the County Permit Center. Clerf advised a rival developer had the plans and was using the plans to his benefit.

An Administrative Segregation plan is a plan which is independent of public review, to which decisions regarding the plan are handled by an administrator alone. In this case the Administrative Segregation was being handled by the director of the Community Development Services (CDS). The plan was submitted in the spring of 2007. The plan was on hold and no work was being done to continue setting the plan into motion. The plan was being handled by Daryl Piercy the director of CDS until he was relieved of his duties.

I contacted the Kittitas Permit Center to establish whether or not the files existed and had in fact been stolen. The current interim director, Kirk Holmes advised the folders did exist, and were missing. Holmes advised he was unsure if the files were missing or stolen. Holmes showed me where the file had been kept in Piercy's old office. One of the files was still there. The file binder said AFR SEG BINDER 1 of 3. Holmes said several files had gone missing in the time between March and July of 2009.

Holmes advised the binder was last seen by an employee in late March of 2009. They discovered the binders were missing on or around July 11th of 2009. There was a request from Jeff Jones, AFLC's lawyer, on the binder the permit center still had requesting the files back. The letter was dated March 20th 2009. Holmes advised once a plan is submitted to the permit center it is a matter of public record and can't be released. The letter attached to binder had not been stamped as received. Holmes advised the Permit Center stamps any letters received at the time of receiving them.

Holmes advised the person who took the AFLC account when Piercy left was Scott Turnbull. Holmes advised Turnbull was part of the reduction in forces on March 31, 2009. Holmes advised no one currently is handling the account.

I contacted Turnbull at his residence. Turnbull initially advised he recalled the account and the binders in question. Turnbull advised the last time he recalled seeing the binders was about a week before he was terminated. Turnbull eventually admitted he gave the binders to Jeff Jones. Turnbull advised Jones probably had the binders at his office. I contacted Jones who advised he had the binders.

Turnbull also advised he is currently employed by AFLC.

I went to Jones' office to recover the binders. Jones advised he had actually sent the binders to his legal office in Seattle. I contacted Patrick Ryan, AFLC's lawyer in Seattle who advised he would sent the binders with their contents to EPD immediately.

Jones advised he wrote the letter requesting the binders back on March 20th 2009. Jones advised he walked the letter in to Turnbull who handed the binders to Jones. Jones advised he did not know he was not allowed to have the binders, furthermore, Jones advised he asked Turnbull if it was OK to take the folders back and Turnbull said it was not a problem. I asked Jones if he had ever been told the folders were public property and he was not able to get them back, Jones advised he did not know that. I asked Jones if there ever was an agreement between Turnbull and AFLC in which AFLC would employ Turnbull after he was terminated in return for the binders. Jones said there was never an agreement between AFLC and Turnbull.

Sgt. Weed and I re-contacted Turnbull who provided a recorded statement explaining how Jones came into possession of the folders. Turnbull advised he never thought giving records back to customers was an issue. Turnbull advised he had done it before on several other occasions and accounts. Turnbull advised Jones hand delivered the letter requesting the binder to him and Turnbull gave the binders requested back to Jones. Turnbull advised he consolidated the plans which were still being worked on into one folder and gave Jones the three binders containing the rejected plans.

Report for information.

I declare under penalty of perjury, under the laws of the State of Washington, that the foregoing is true and correct to the best of my knowledge.

Date: Thu Oct 29 18:25:24 PDT 2009

Officer Signature: _____

Officer Name/Badge #: J. Ingraham #135

SUPPLEMENTAL NARRATIVE:

Name: WEED, JAMES

Date: 16:55:00 10/29/09

SCOTT TURNBULL VOLUNTARY TAPED STATEMENT
E09-13928
DS230265.DSS

WEED: This is Officer James P Weed with the Ellensburg Police Department. Current time is 1655. I'm with uh, Mr. Turnbull. Sir, can you state your full name and spell your last name for me?
TURNBULL: It's Scott A Turnbull. T-U-R-N-B-U-L-L.

WEED: Okay and uh, what's your current address sir?
TURNBULL: 2534 Carriage Loop

WEED: And a phone number for ya?
TURNBULL: 925-2538

WEED: Okay and the time is 1655 hrs uh, as I said on Thursday, October 29, 2009. What's your date of birth? Did I ask you that?
TURNBULL: No. 12/17/56

WEED: Okay and place of birth?
TURNBULL: Uh, Yakima.

WEED: And uh, do you understand this interview is being mechanically recorded and is that okay with you sir?
TURNBULL: Yes, it's fine.

WEED: Okay. Um - this case is taken for IR - IR# E09-13928. Sorry, I got someone talking in my ear here. Um - today, we were - uh, had a complaint that we received about missing uh, project binders for American Forest Lands that they submitted. Tell me - you used to work for the County for the um - community development services, correct?
TURNBULL: Correct.

WEED: And you - what was your role there?
TURNBULL: I was a planner 2.

WEED: You were a planner 2 and so, at some point you had a relationship with the um - person responsible for submitting plans, Jeff Jones?
TURNBULL: Correct.

WEED: And he was a representative for AFL?
TURNBULL: Correct.

WEED: Okay and you knew him from - you - I can't remember which board you said it was.
TURNBULL: Forest lands advisory committee.

WEED: You were on the forest lands advisory committee.
TURNBULL: I was the staff lias - liaison.
WEED: Okay and had AFL submitted other projects through that - that committee or how did you...
TURNBULL: No. No. that was just - it was just an advisory committee.

WEED: Okay, but uh...
TURNBULL: So, that's...

WEED: You had come to know Jeff through some other means on that committee or how was...
TURNBULL: Yes.

WEED: Or from this project?
TURNBULL: Well, I - I knew Jeff a little bit um - before he - well, you know we started up the committee. Just from um - projects that - that they had done.

WEED: Okay.
TURNBULL: They're one of the largest land owners up in the Teanaway.

WEED: Okay and then - so, they had submitted uh, the project. Uh, I don't even know the name of it at - uh, that we're talking about.
TURNBULL: They submitted three binders of administrative segregations.

WEED: Right, administrative segregations for a project in the Teanaway that they were anticipating to try and undertake.
TURNBULL: Correct.

WEED: And those binders went - uh, to a planner and who ultimately left CDS and then my understanding, to Darryl Piercy. Is that correct?
TURNBULL: That's correct.

WEED: And then at some point the - when Darryl no longer worked for CDS, the binders stayed in his office.

WEED: And he was a representative for AFL?
TURNBULL: Correct.

WEED: Okay and you knew him from - you - I can't remember which board you said it was.
TURNBULL: Forest lands advisory committee.

WEED: You were on the forest lands advisory committee.
TURNBULL: I was the staff lias - liaison.
WEED: Okay and had AFL submitted other projects through that - that committee or how did you...
TURNBULL: No. No. that was just - it was just an advisory committee.

WEED: Okay, but uh...
TURNBULL: So, that's...

WEED: You had come to know Jeff through some other means on that committee or how was...
TURNBULL: Yes.

WEED: Or from this project?
TURNBULL: Well, I - I knew Jeff a little bit um - before he - well, you know we started up the committee. Just from um - projects that - that they had done.

WEED: Okay.
TURNBULL: They're one of the largest land owners up in the Teanaway.

WEED: Okay and then - so, they had submitted uh, the project. Uh, I don't even know the name of it at - uh, that we're talking about.
TURNBULL: They submitted three binders of administrative segregations.

WEED: Right, administrative segregations for a project in the Teanaway that they were anticipating to try and undertake.
TURNBULL: Correct.

WEED: And those binders went - uh, to a planner and who ultimately left CDS and then my understanding, to Darryl Piercy. Is that correct?
TURNBULL: That's correct.

WEED: And then at some point the - when Darryl no longer worked for CDS, the binders stayed in his office.

TURNBULL: Correct.

WEED: Tell me what happened at that point?
TURNBULL: Um - about a week before I left, I left the end of March um...

WEED: 2009?
TURNBULL: Correct. Jeff Jones came in and he had a letter from AFR asking to withdraw some administrative segs. So, we went back in the conference room at CDS and him and I went through the binders and we put all of the segregations that were in progress, that they were finishing - I think in one binder and the other two binders were the ones that they wanted to withdraw.

WEED: Okay, so part of the - one binder had uh, segregations that they were still trying to entertain, going forward with.
TURNBULL: Hmm, mmm.

WEED: And the other products or uh, that were in the other binders you packaged up separately and gave back to them.
TURNBULL: Right.

WEED: Okay and so, Mr. Jones did not go through the front counter with the letter or requesting the binders back. He contacted you personally?
TURNBULL: Well, he handed me the letter at the counter. I went up to the counter.

WEED: Okay. He requested you and you came to the counter.
TURNBULL: Yeah.

WEED: Okay and um - ultimately, you gave those binders back to him.
TURNBULL: Right.

WEED: And do you know what the status of the binders was at that point?
TURNBULL: I - I thought they were in the office down on Mountainview. That's why I sent your officer down there to get em'.

WEED: Okay and at - I think you told us earlier when we were talking about the public records situation and you were unaware of the public records (inaudible)?
TURNBULL: Yeah. I - what I should have done is made a copy of em'. Just gave him the copies instead of the originals.

WEED: Okay, uh you are - you're a planner and your role is not uh, records dissemination as far as that goes. You weren't aware that essentially that you

couldn't...
TURNBULL: You - we got records and stuff in all the time.

WEED: Okay but...
TURNBULL: But, no I'm not the records - I wasn't the records person.

WEED: Where was records uh, dissemination was - I think you said that other - on occasion there was other projects that you had turned to people.
TURNBULL: Yeah, yeah.

WEED: Okay. Anything else you think we should know about that particular situation? Do - do you recall exactly when you gave the - you said a week before you left?
TURNBULL: Probably a week before I left.
WEED: Was it the same day that he brought the letter in?
TURNBULL: Yeah, yeah.

WEED: Okay and uh...March 29th (inaudible)...
TURNBULL: 20th - 2-0.

WEED: 20th, 2009.
TURNBULL: Yes.

WEED: Okay. Anything further to add sir that I should know?
TURNBULL: No.

WEED: Okay.
TURNBULL: No.

WEED: At this time, 1700 hrs, October 29, 2009. This interview is ended.

/CB 11/9/2009 10:52:00 PST

SUPPLEMENTAL NARRATIVE:

Name: WEED, JAMES

Date: 16:19:44 11/02/09

ELLENSBURG POLICE DEPARTMENT
SUPPLEMENTAL REPORT

CASE #:E09-13928
CRIME:Injury to Public Record
SUSPECT:

NARRATIVE:
On Thursday 10/29/2009 Officer Ingraham called me to the station reference a theft call he was handling at the Ellensburg Police Department. Upon arriving, he told me that he was with Catherine Clerf, who was reporting the theft of public records from the Kittitas County Community Development Services (CDS).

Officer Ingraham and I then met with Clerf about her complaint. She advised us that approximately two years ago, a company called American Forest Land Company(AFLC), turned in a project plan to Kittitas County CDS. They submitted the plan for several thousand acres of land which is designated as commercial forest land. The plan was submitted to the county so that the developer could break the land up into buildable parcels, under an "administrative segregation". That means that there is no public review of the changing of the land use designation. The plan could be approved without public notice or input. According to Clerf, the land plan was to be able to build approximately 34,000 homes and is called a "master plan community". Essentially containing shopping, schools, public works and everything required to sustain a new town in Kittitas County. The plan contained three-three ring binders containing forms, maps, surveys, etc.

Clerf advised that in March of 2009, AFLC went to CDS and requested to withdraw the administrative segregation plan. They were told that they could do that, but they were not allowed to have the binders back as they were considered public records. At that time, CDS was in the process of RIFF'ing approximately 12 jobs out of that section. March 31, 2009 was the last day of work for those workers who had been laid off. Clerf advised that staff at CDS went to locate the binders in July of 2009 and were unable to locate two of the three binders.

Clerf advised she found out about the missing project at that time. Clerf thought it was timely that the binders were gone, as a subsidiary company of AFLC had just turned in a large solar project plan to be constructed in the Teanaway. Clerf found out that the solar project was estimated to be able to

produce power for approximately 34,000 homes, about the same amount AFLC had sought to build after completion of the admin. segregation. Clerf advised that she did not know where the books had gone or who had taken them, but she thought the theft may have been timely with the termination of a number of employees.

Officer Ingraham and I went to CDS and met with Kirk Holmes and Dan Valoff. They advised the books had been at CDS and several staff members had seen them. The project had originally been assigned to Joanna Valencia. She left CDS employment for a new job in April of 2008. The books then went to CDS director Daryl Piercy. He had the books in his office until October of 2008, whereupon he was terminated from the position. The books sat in Piercy's office until early 2009 when the project was assigned to Scott Turnbull, another planner. Turnbull had done little work on the project. No one had seen the books for sure, since Turnbull had them. He was part of the March 2009 RIFE.

On the remaining binder, there was a letter requesting the books back, written on AFLC letterhead and signed by Jeff Jones, the local company representative. The letter had not been date stamped, which was apparently out of the ordinary for requests of that nature.

The county filing system for keeping track of completed and pending projects appeared to be a shambles and no one at CDS knew if the missing books were gone from the facility or if they had just been lost internally. The office at one time employed 22 employees, but now only 7 work there. According to Clerf, she had spoken with Prosecuting Attorney Greg Zemple about the books.

It was decided that Officer Ingraham would speak with Scott Turnbull and I would speak with Greg Zemple about what he knew of the books. We then planned to speak with Jones.

I spoke with Prosecutor Zemple, and he told me he had learned approximately four months prior that the books had been missing and he had advised CDS to find the books or to report the theft to law enforcement. He advised CDS worked closely with one of his office's civil attorneys.

Officer Ingraham called me a short time after meeting with Turnbull and advised Turnbull had told him he gave the books back to Jeff Jones one day in March 2009 when he came in and asked for them back.

Ingraham then went to speak with Jones. Jones told him that he had gone into the county to get the books back and that he'd received them from Turnbull, but sent them on to their attorney's office in the Seattle area. Jones requested the

books back from the attorney, as he was advised they were a public record and needed to be returned to the county.

Officer Ingraham and I went back to Turnbull's and spoke with him again. I asked him how the exchange of records had transpired. Turnbull told me that Jones had requested him specifically at the front counter. He met Jones and brought him back into the office. Turnbull said the meeting was late in March and he was getting ready to be done working at CDS. He told me that Jones had the letter with him, and that he took several maps and so forth out of the binders and put the maps and other work products into one binder and gave Jones back two binders. I asked if Turnbull had ever done that before and he told me there had been other times when developers would ask for submissions back and he would return them. Turnbull advised he thought nothing of it, since AFLC had submitted a request to the county for a sub-area plan, which essentially usurped the prior admin. seg. request making it null.

Turnbull advised Jones left with the books. We asked how Turnbull knew Jones such that Jones could request him personally. He told us that he knew Jones due to his being on a forest advisory committee. Turnbull told us that the committee advised on forest land use projects and Jones had submitted other projects to that committee in the past. We asked Turnbull if he had received any compensation from Jones or AFLC in exchange for providing the documents. He told us no, but that he works for AFLC now. I asked in what capacity he works for AFLC. He told me "I'm sort of their eyes and ears on the street". He explained that he attends the public meetings that have been going on regarding the solar project. He then reports back to AFLC about what the public was saying at the meeting. In essence, it sounded as though he reports to AFLC, what the crowd member's thoughts and moods were at a particular meeting. Turnbull receives compensation for that work from AFLC. This appeared to me to have been a conflict of interest. I questioned Turnbull about the timing of this employment. He told me he didn't start working in this capacity until approximately a month after he was laid off at the county, but had released the records before.

I asked Turnbull if he would provide a taped statement about this and he agreed to do that. I took a taped statement from Turnbull and it is attached to this report.

Officer Ingraham advised he'd spoken with a lawyer of AFLC who advised he'd be overnight shipping the books back to EPD.

The books arrived at EPD on Saturday 10/31/2009. They are maintained at EPD until this investigation is concluded. Case open at this time.

I declare under penalty of perjury, under the laws of the State of Washington, that the foregoing is true and correct to the best of my knowledge.

Date:Mon Nov 02 17:17:38 PST 2009

Officer Signature: _____

Approved By: _____

Officer Name/Badge #:J.P. Weed #109
FINALIZED - CB - Wed Nov 04 08:45:32 PST 2009

SUPPLEMENTAL NARRATIVE:

Name: WEED, JAMES

Date: 10:11:43 11/03/09

ELLENSBURG POLICE DEPARTMENT
SUPPLEMENTAL REPORT

CASE #:E09-13928
CRIME:Theft of Public Records
SUSPECT:

NARRATIVE:
On 11/03/2009 at approx. 0900 hrs. I was advised by P.A. Zemple that the electronic folder containing copies of generated correspondence, case notes and e-mails on the project had been deleted and no one was able to find the information.

I called Kittitas county information services. They advised that the folder was apparently missing. I spoke with Davis Senter, who told me that CDS has a "G" drive, which is shared. The drive can be accessed by any of the CDS employees. The "G" drive is used to store the project correspondence folders. That drive is held on a data storage server at IT services in the basement of the courthouse. The "G" drive is backed up regularly. I asked Senter how to go about searching for the folder or reconstituting if from the tape backup. He advised the first step in that process would be for CDS to make a service request. He advised he would call Mandy Weed and ask her to submit the request.

I made contact with Kirk Holmes, the interim CDS Director at approx. 1400 hrs. He told me he hadn't seen the folder and didn't know it had been deleted. He did advise that once he found out about it on Friday 10/30/2009 he spoke with other CDS employees about the office's security. He found out that it was widely known that the north door to the building could be accessed by anyone sliding a credit card in front of the lock throw mechanism. He advised he'd not known that prior. He called facility services and advised them it needed to be rectified, and that it was a priority. Holmes advised me to speak with Mandy Weed about the electronic file.

I spoke with her and she advised she did not recall seeing it, but that she'd spoken with the original project planner who did recall starting such a folder. She told me the original planner's name was Joanna Valencia. She gave me Valencia's phone number. Mandy also told me she'd gotten a return response from Senter at IT services and they'd closed the service request ticket without having been able to locate the folder on their server.

At approx. 1715 hrs. I called Valencia. She told me she had originally been assigned to the project and always started a project folder on the "G" drive and had done so in this case. She kept e-mail correspondence, and letters and word documents in the folder. She advised that upon receiving the project she did a map work up on the project. It became apparent to her that the project was extremely large, and she did not feel that the administrative segregation was appropriate to evaluate the project. She advised state law limits projects which can be evaluated in the admin seg process to 11 lots. Larger projects are required to go through the SEPA process, and have environmental impact requirements. Valencia advised she met with Jeff Jones, the project representative, and he asked her to reconsider. AFLC was concerned that the project would be extremely contested by the public if it had to go through the public review and hearing process that a SEPA requirement would cause.

Valencia advised that once it was made clear to AFLC that it would not be an admin seg candidate, AFLC asked to withdraw the application. Valencia advised it seemed unusual that they would submit such a large project under that process to begin with, as the fees are based on a per-lot basis, making the initial application very expensive.

I asked about whether or not she had been asked to or would have returned the binders to AFLC. She told me "no" that "once it crosses the front counter it becomes public record". She would not give the project binders back, but that AFLC could request copies as could any member of the public.

I asked about Turnbull being on the forest advisory committee. She told me that there are three land use advisory groups at CDS and they monitor projects in their respective areas and advise Kittitas county about the those projects. She advised the position required a strong ethical background since the committee members would be making decisions about the projects submitted and could potentially be subject to influence by the project submitters and investors.

I declare under penalty of perjury, under the laws of the State of Washington, that the foregoing is true and correct to the best of my knowledge.

Date:Tue Nov 03 10:38:10 PST 2009

Officer Signature: _____

Approved By: _____

Officer Name/Badge #:J.P. Weed #109
FINALIZED - CB - Wed Nov 04 08:43:34 PST 2009

SUPPLEMENTAL NARRATIVE:

Name: WEED, JAMES

Date: 17:33:31 11/03/09

ELLENSBURG POLICE DEPARTMENT
SUPPLEMENTAL REPORT

CASE #:E09-13928
CRIME:Theft of Public Record
SUSPECT:

NARRATIVE:
On 11/03/2009 I went back to the residence of Scott Turnbull. I went with the intention of interviewing Turnbull again about the binders we'd received from AFLC's legal counsel. We had received three binders and Turnbull had advised he'd only given two binders to Jones. In addition, the binder's we'd received were tabbed with number tabs. Several numbers were non-sequential. I wanted to inquire as to why that would be.

At approx. 1120 hrs. I arrived at Turnbull's residence and he allowed me inside. I had one of the black binders we'd received in the Fedex parcel. I showed it to him. He told me that he expressly had given Jones two white binders which had original material inside. He told me the binder I had contained photo copies of the material and he did not recall it being organized in the way that it was.

I asked him why there were a few number tabs missing. He told me that would be the case if the county had maintained the records on those particular seg requests or if that particular one had been completed already. Turnbull has provided information on every occasion I met with him, but he did say words to the effect of "I don't know how much I can say and not get in more trouble", as a response to one question about his giving Jones the binders.

I had asked specifically how he had decided which information to give them and and which information to keep in the one remaining binder. He told me he pulled out the large map and some of the other papers that were in the other two binders and put them in the one remaining white one. Turnbull did agree that the project was really too large to have ever been viable as an admin segregation, and that the reason why it was filed would be to avoid public scrutiny for the project.

At approx. 1600 hrs. I went back to CDS to request the remaining binder so that I could compare it with the three we had already received. In talking with CDS employees I had learned that Jeff Jones had made a public disclosure request to

see the remaining binder the day after Officer Ingraham and I had spoken with him about the two missing binders. CDS employees let Jones review it on site. I looked through the binder with Director Kirk Holmes. We looked at several proposed segregations. It appeared to me in looking at the proposed maps, that arbitrary lot lines had been drawn on multiple different quarter sections of property as opposed to surveyed lines. I asked who drew the maps up and he told me that they were drawn up by the submitter. I noted that there were usually approx. nine lots drawn on the maps. I asked Holmes if the submitter had drawn the lots arbitrarily just to get the property segregated and out of the "commercial forest" designation, which is hard to do, and would split the property into surveyed lots once it had the appropriate designation, which would be much easier and would not require an environmental impact statement or public comment. In addition, nine lots is under the state threshold of eleven lots maximum without an environmental impact statement. Holmes advised that was the reason why that was done.

I received the binder from CDS and left them a receipt for property seized and returned it to the Ellensburg Police Department.

I did note in the binder was a letter from Jeff Jones that mentioned he wanted to meet with CDS before they issued an official decision on the admin seg. It looked to me like the letter was confirming what Valencia had told me earlier, which was that they had given Jones their initial impression of the project and its unsuitability for admin seg and that he was requesting a reconsideration of that decision, although that is not completely clear in short letter which is on AFLC letterhead. The Ellensburg Police Department currently maintains control of all the existing binders regarding this case.

Case open at this time.

I declare under penalty of perjury, under the laws of the State of Washington, that the foregoing is true and correct to the best of my knowledge.

Date:Tue Nov 03 18:16:42 PST 2009

Officer Signature: _____

Approved By: _____

Officer Name/Badge #:J.P. Weed #109
FINALIZED - CB - Wed Nov 04 09:51:02 PST 2009

SUPPLEMENTAL NARRATIVE:

Name: HOUCK, DREW

Date: 16:43:30 11/04/09

ELLENSBURG POLICE DEPARTMENT
SUPPLEMENTAL REPORT

CASE #: E09-13928
CRIME: Theft 2nd
SUSPECT: Turnbull, Scott A
Jones, Jeff R

NARRATIVE: On November 4th 2009 I was contacted by Chief Miller about this investigation. Chief Miller briefed me on the case and requested that I attempt to conduct an interview of Turnbull. I made two attempts to contact Turnbull at his residence located at 2534 Carriage Loop, but received no answer at the door.

I briefed Det. Brunk on the case in case he needed to do interviews as well. While we were speaking about the case Det Brunk received a call from Jones. Jones told Det Brunk that he had located the two missing binders in his office. Det Brunk made arrangements for Jones to bring the binders to EPD.

At about 1355hrs Jones arrived at the station and provided us with the binders. We then conducted a taped interview of Jones. Jones consented to having the interview recorded. Det Brunk advised Jones of Miranda which he stated he understood and agreed to waive.

Jones then provided a taped statement indicating that he was the General Manager for American Forest and Land Company. He told us that in 2004 the company filed paperwork to perform several Administrative Segregations with the Community Development Services Office. He said that these requests basically sat at CDS until 2007 when the company filed additional paperwork. According to Jones the company interests in the area changed and the company therefore decided to withdraw the paperwork they had filed. Jones claimed to not know that it was illegal to take the paperwork from the County, and said that it had been given to him by Turnbull when he requested the paperwork in writing.

According to Jones he wrote a letter requesting the paperwork, which was not part of the original filing, in a letter dated March 20th. Jones said that he gave the letter to Turnbull because Turnbull was the only person at the counter at the time. He said he had never gone into Turnbull's Office but that Turnbull had given him the binders.

We asked why the company had wanted the documents back. Jones stated that he had been at a meeting with the CEO of the company and lawyers Patrick Ryan and possibly Sandy Mackie. He told us that during the meeting it was decided that the public did not need to know about what was in the documents because it would be controversial.

At one point Jones agreed with me that it was odd that the Company Attorneys would ask him to write the letter to the county requesting the documents back instead of doing it at part of their services paid for by the company. Additionally, I pointed out that it was odd that Turnbull was hired by the company a short time after he illegally provided the documents to the company.

Jones stated that Turnbull was not hired until several months after the documents were received. He admitted to indicating to the company that Turnbull would be a good person for the company to hire, however he claims that any discussion regarding the employment of Turnbull was well after the documents had been received and Turnbull had been "Rifted" by the County.

Jones repeatedly indicated that the reason the company wanted the documents back was because the information in them was going to be controversial.

When Chief Miller had briefed me on the incident he showed me 3 black binders which had been sent to EPD by the company's attorney. I showed these binders to Jones. He told me these were not the binders he had sent to the company.

At one point Jones asked if he could leave. I informed him that he was free to get up and walk out of the interview room at any time he wanted. Jones however continued to engage us in conversation. A short time later Jones said he wanted to leave. The interview was then terminated and Jones was allowed to leave.

The binders were secured as evidence.

Det Brunk and I decided to attempt to contact Turnbull one more time at his residence. As we were nearing his residence I noted Turnbull's vehicle (a black Audi TT), south bound on Alder Street. We followed the vehicle in my unmarked car first to the high school and then to the Fred Meyer parking lot. Turnbull pulled into a parking space. I stopped my car, without activating any emergency lighting equipment, and without blocking Turnbull's vehicle in anyway. I approached Turnbull and identified myself to him. Turnbull agreed to meet me at EPD in approximately 15 minutes to discus this matter further.

At about 1540hrs Turnbull arrived at EPD for an interview. I advised Turnbull

of Miranda. Turnbull requested not to speak with us until he spoke to an attorney. The interview was then terminated and Turnbull was allowed to leave.

The binders were then entered into the File On Q evidence system and placed into an evidence locker.

Investigation to continue.

I declare under penalty of perjury, under the laws of the State of Washington, that the foregoing is true and correct to the best of my knowledge.

Date: Wed Nov 04 17:55:13 PST 2009

Officer Signature: _____

Approved By: _____

Officer Name/Badge #: A.D. Houck #119
FINALIZED - RM Fri Nov 06 11:51:19 PST 2009

SUPPLEMENTAL NARRATIVE:

Name: WEED, JAMES

Date: 09:57:36 11/06/09

ELLENSBURG POLICE DEPARTMENT
SUPPLEMENTAL REPORT

CASE #:E09-13928
CRIME:Theft of Public Records
SUSPECT:

NARRATIVE:
On 11/06/2009 I went to CDS and requested to have the one remaining records binder so that I could compare it to what was contained in the black binders returned to us from the AFLC attorney's office. Mandy Weed turned over the binder to me from their safe. I left a receipt for items seized with them.

I asked Mandy also about whether or not there is a Kittitas County Personnel manual or human resources manual that prescribes behavior for its employees. I requested the manual as I suspected there would be language which described the process for releasing public records to the public. Mandy advised she would attempt to locate the items and would call when they were ready.

On 11/06/2009 I went to the CDS office to pick up the records. I was given a copy of a section of the Kittitas County Personnel Policy Manual section which was labeled as (4-1) Employee Conduct & Work Rules. Paragraph E. states "County property, records, or other materials shall not be removed from the premises without permission of Department Head".

It appears the section was put in the manual to control the location of public records and to prevent them from becoming lost, misplaced or stolen. I placed the printed material in the case file.

I also received from Mandy, who is the public records disclosure person for CDS, a copy of a publicly posted note about public records and the disclosure process. The posting was put in place on approximately January 22, 2009. This process should have been known by Jones and AFLC at the time the records came back into his possession. The correct procedure for obtaining copies of public records, was to fill out a Kittitas County request form, or send a written request to the CDS office address. All requests were to be directed to Mandy Weed at the CDS office.

In addition, I was advised that county IT professionals were currently in the

process of continuing to search their back up files for the deleted correspondence file which has apparently been deleted. Case open pending investigation.

I declare under penalty of perjury, under the laws of the State of Washington, that the foregoing is true and correct to the best of my knowledge.

Date:Fri Nov 06 10:13:10 PST 2009

Officer Signature: _____

Approved By: _____

Officer Name/Badge #: J.P. Weed #109
FINALIZED - CB - Tue Nov 10 08:57:55 PST 2009

SUPPLEMENTAL NARRATIVE:

Name: BRUNK, JASON

Date: 11:31:03 11/06/09

ELLENSBURG POLICE DEPARTMENT
SUPPLEMENTAL REPORT

CASE #: E09-13928
CRIME: Theft 2nd
SUSPECT: Turnbull, Scott A.

NARRATIVE: On 11-4-09 I was asked by Det. Houck to take over this investigation. Shortly after Det. Houck informed me about the details about the case, Jeff Jones called EPD to advise that he had located the 2 stolen binders in his office. I spoke with Jones on the phone and he said that he had found them and I asked if he would bring them in and he agreed. When Jones arrived, I took him into the interview room and Det. Houck and I took control over the 2 binders, which were white in color and labeled AFR SEG BINDER 2 of 2 and 3 of 3. Jones agreed to an interview and to have it recorded. When the recorded interview began, I Mirandized Jones, via my Miranda card and he agreed to continue talking to us.

Jones said that he has worked for AFLC for 10 years and he admitted to writing the letter to the planning department requesting to have the binders. Jones also said that he went to the office to get the binders and to deliver the letter on the same day it was written, which was 3-20-09. According to Jones, he spoke directly with Turnbull because Turnbull was the only employee in the building at the time. Jones also said that he did not go into Turnbull's office and that he just handed the letter to Turnbull and Turnbull gave him the 2 binders. Jones also said that he did not ask for the 1st binder back because it had already been processed, but the other 2 had not, so he thought he could get them back.

Det. Houck and I asked Jones who wanted the binders back and why and he said that the CEO of his company and their attorneys wanted them back. Jones said that he did not see any reason for the public to be able to see the binders since they had not been processed. Jones also admitted that his company wanted them back because he knew that there was going to be a lot of controversy over the binders and what his company was requesting. Jones said that his company withdrew their requests for the plans due to not wanting to go through the environmental studies that were being requested of them to do. Jones said that in the 10 years that he has worked for AFLC, he has never been asked to get plans back from planning departments. Jones said that there have been other

times when plans were withdrawn or denied, but has never been asked to get them back before. Det. Houck and I questioned Jones as to why his company would ask him to write the letter and get the binders back instead of their legal counsel and he said that he did not know and did not question the request.

Det. Houck and I also questioned Jones as to why he had the binders in his office when his company wanted them back so badly and he said that he thought he sent his company the originals, but accidentally sent copies of the binders to his company. Before Jones brought in the 2 stolen white binders, I knew that AFLC had sent 3 black binders to EPD stating that they were the binders. We knew that they were not the correct binders because AFLC only got 2 out of the 3 back and we had the 1st binder in our possession. Jones said that the binders he sent to AFLC were not black and we showed him the 3 black binders and he said that they were not the binders that he sent and that the ones he sent were also white. Jones did admit that Turnbull now works for AFLC, but claimed that he was not hired until after his position was ended at the planning department. We asked Jones when Turnbull applied for the company and Jones said that Turnbull did not apply and said that AFLC requested him. We asked Jones why and he said that AFLC wanted someone to be the "eyes and ears" of the community by attending meetings and getting public feedback to their projects. Jones admitted to recommending Turnbull, but after Turnbull's position with the planning department was over. Jone's maintained that it had nothing to do with Turnbull giving him the binders.

When asked how Jones knew Turnbull, Jones said that he knew Turnbull for a couple of years because Turnbull was on the Forest Land Advisory Committee, but said that his relationship with Turnbull was only on a professional level. Jones denied offering Turnbull anything in return for giving the binders. Jones then said that he had an appointment that he needed to be at, so the interview was ended at 1447 hours.

Det. Houck and I then traveled to Turnbull's residence to talk to him, but as we were on the way, we drove past Turnbull, who was driving in his vehicle. We followed Turnbull to Fred Meyer and contacted him in the parking lot. Turnbull agreed to come to EPD for another statement. Once at EPD, Det. Houck and I walked Turnbull into the interview room and he agreed to a recorded statement. When the recorded interview began, Det. Houck informed Turnbull that he was not under arrest at that time, but he wanted to advise him of his rights. Turnbull then told us, prior to Det. Houck advising him of his rights, that he did not want to talk without an attorney. The interview was ended and Turnbull left.

On 11-6-09 I called Turnbull and asked him if he had obtained an attorney and he

said that he had. I asked Turnbull if he would be willing to come down to EPD for a statement with his attorney and Turnbull said that his attorney advised him not to give anymore statements. I explained to Turnbull why I wanted an additional statement and he said that he would talk to his attorney about it. I then traveled to the Kittitas County Community Development Department and completed a public disclosure request to obtain all e-mails to and from Turnbull from 1-1-09 to 4-1-09. I was told by that office that they would work on the request.

On 11-6-09 I was given a copy of part of the Kittitas County Personnel Policy Manuel by Sgt. Weed. Sgt. Weed received this copy from the planning department. There is a highlighted portion on the manual from section 4-1 subsection E. This states "Employees shall be responsible for, and shall not misuse, County property, records, or other materials in their care, custody or control. County property, records, or other materials shall not be removed from the premises without permission of Department Head". According to Sgt. Weed, he was informed by the planning department that Turnbull should have been familiar with this policy.

Case remains open pending further investigation.

I declare under penalty of perjury, under the laws of the State of Washington, that the foregoing is true and correct to the best of my knowledge.

Date: Fri Nov 06 12:01:42 PST 2009

Officer Signature: _____

Approved By: _____

Officer Name/Badge #: Jason Brunk 121
FINALIZED - CB - Fri Nov 06 13:15:56 PST 2009

SUPPLEMENTAL NARRATIVE:

Name: BRUNK, JASON

Date: 11:27:39 11/10/09

ELLENSBURG POLICE DEPARTMENT
CASE REPORT/PROBABLE CAUSE AFFIDAVIT

CRIME: Theft 2nd Degree
CASE #: E09-13928
SUSPECT: Turnbull, Scott A.

NARRATIVE: On 10-29-09 Clerf came to EPD to report that records had been stolen from the Kittitas County Public Works Office. The records that had been stolen were 2 binders that had been submitted by the American Forest Land Company (AFLC). The binders entailed a 34,000 home development plan for the upper Teanaway River area. There had been 3 binders submitted to the Planning Department and were labeled AFR SEG BINDER 1 OF 3, 2 OF 3, AND 3 OF 3. There was 1 binder that was not stolen and that was binder 1 OF 1. It was believed that the binders were stolen between March and July of 2009. Ofc. Ingraham had spoken with the interim director, Kirk Holmes, and he said that once a plan is submitted to the permit center, it is a matter of public record and cannot be released. Holmes had advised that his office located a letter written by an AFLC employee, Jeff Jones, that had been given to their department that was dated March 20th, 2009 and it was a letter requesting the binders back.

The county employee that was originally working on the plans was Daryl Piercy, however, after Piercy left, Scott Turnbull took it over. Turnbull's position was ended on March 31st of 2009 due to a reduction in staff, so he is no longer employed by the county. Ofc. Ingraham contacted Turnbull and he said that he last saw the binders approximately 1 week prior to him leaving his position with the county and admitted to giving them to Jeff Jones from AFLC. Ofc. Ingraham also learned that Turnbull is currently employed by AFLC. Ofc. Ingraham contacted Jones who said that he had the binders, but had sent them to his legal office in Seattle. Ofc. Ingraham then contacted Patrick Ryan, AFLC's Lawyer in Seattle, and he said that he would send the folders to us immediately. Jones said that he wrote the letter requesting the folders back on March 20th, 2009 and he handed the letter to Turnbull and asked if it was okay to have the binders back. Jones said that Turnbull told him that it was not a problem and gave them to him. Jones denied knowing that he was not allowed to have the binders and also denied making any arraignments with Turnbull to give him a job with AFLC in return for the binders.

When Turnbull was interviewed, he again admitted to giving the binders to Jones

and said that he did not know that giving records back to customers was an issue. Turnbull also said that he has given records back to customers in the past. Turnbull said that Jones requested him and gave the letter to him asking for the binders and he gave them to Jones. AFLC sent 3 black binders to EPD advising that they were the missing binders, however, only 2 of the 3 had been taken by AFLC. I received a call from Jones stating that he had located the 2 binders, that are white in color, and he brought them to EPD and gave them to Det. Houck and I. Det. Houck and I interviewed Jones again, under miranda, and he again said that he did not know that he could not have the binders back and did not feel that he did anything wrong by asking for them. Jones said that AFLC wanted the 2 binders back because they had not been processed and he did not think that they should be public record. Jones said that AFLC knew that the plans would cause controversy in the county. Jones again denied making any deals with Turnbull to give him a job with AFLC in return for the binders.

Jones said that he thought he had sent the 2 binders to the AFLC lawyers, but realized that he sent copies to them. Det. Houck and I showed Jones the 3 black binders and asked him how he confused those for the 2 white binders. Jones said that the black binders in our possession were not the ones he sent and said that the binders he sent were white in color. Det. Houck and I attempted to re-interview Turnbull, however, he invoked his right to an attorney. It should be noted that we learned from the county that the plans were placed on a computer file as well at the county, but someone deleted the files. The county's IT department is currently working on recovering that data and determining who deleted them and when. I also put in a public disclosure request to the Community Development department to obtain Turnbull's e-mails.

Sgt. Weed was able to obtain a copy of the county's policy regarding records. In section 4-1, subsection E it clearly states "Employees shall be responsible for, and shall not misuse, County property, records, or other materials in their care, custody, or control. County property, records, or other materials shall not be removed from the premises without permission of Department Head". Based on this policy, Turnbull should have known that he was not allowed to give the binders to Jones because it was in his policy manual. Turnbull did not obtain permission from the Department Head and the records were public property. Based on this investigation, there is probable cause to arrest Scott Turnbull for Theft of Public records, which is Theft 2nd Degree. The case will remain open pending further investigation into AFLC's involvement in the theft.

Forward case to PA's office for recommended charge of Theft 2nd Degree on Scott Turnbull per RCW 9A.56.040.

I declare under penalty of perjury, under the laws of the State of Washington, that the foregoing is true and correct to the best of my knowledge.

Date: Tue Nov 10 12:10:04 PST 2009

Officer signature:_____

Approved by:_____

Officer name: Jason Brunk
Badge #: 121
FINALIZED - RM Thu Nov 12 11:54:08 PST 2009

Approval: _____

Distribution:

City Attorney: [ ]
Child Protective Services: [ ]
Detectives: [ ]
Juvenile Prosecutor: [ ]
Misdemeanant Probation: [ ]
7 Day Board: [ ]
WSP: [ ]

City Prosecutor: [ ]
Courts: [ ] _____
Juvenile Probation: [ ]
Mental Health: [ ]
Prosecutor: [ ]
Student Affairs: [ ]
Other: _____

FOREST RIDGE P.B.C.P
(LP-08-14)

Exhibit ___

Kittitas County

REQUEST FOR PUBLIC RECORDS

Date: SEPTEMBER 15, 2010	Name of person making request: Catherine Clerf
Address: 60 Moe Road	City: State: Zip Code: ~~60 Mo~~ Ellensburg, WA 98926
Phone Number: UTP: 933-4751 Email: catherine.a.clerf@hotmail.com	I wish to: ___ Inspect X Receive a hard copy of the following records
County Department/Office: CDS	Received By:
Request made : X in Person ___ by phone ___ by fax ___ by email ___ by mail	

To assist us in answering your request accurately and promptly, please identify the records you wish to inspect by referring to a title, name, date of incident, identification number and/or description. If copies are needed, please indicate which file(s) you would like copied. There is a $.15 per page copy fee for 8.5 x 14 or smaller black and white copies.

Lake shore Meadows LLC P-0809
APPLICATION G4-35385
Documents related to this land use action in the form of:
1. All incoming / outgoing emails from time of pre-application and/or application date of filing with CDS through to present time, 9-15-2010 AND ALL ATTACHMENTS to all emails.
2. All documents related to City of Cle Elum, City of Roslyn, City of South Cle Elum in digital file AND HARD COPY FILES.

Please fill in and sign your name below if applicable:

I, Catherine Anne Clerf affirm under penalty of perjury that my request is not for commercial purposes. This is only required if the request includes a list of individuals. I understand the use of public records containing lists of individuals for a commercial purpose violates Washington State law and the privacy of the individuals. "*Commercial purposes*" means contacting or affecting such individuals to facilitate, in any manner, for a profit-making activity. A request for a list of individuals where this is not signed will be denied as per RCW 42.56.070(9).

Catherine Anne Clerf
(SIGNATURE)

[Please ensure preservation / protection of all emails related to this land use issue to protect meta addresses, etc

For County Department/Office use only:

Date action taken:	Name of person taking the action:
Special Circumstances:	

NOTE: October 1, 2010
If no documented incoming via USPS, fax, email, or other means of the 1-page letter on City of Cle Elum letterhead, dated on or before September 11, 2008, can be found, please construct a letter

EX 39

October 4, 2010

Catherine Clerf
60 Moe Rd
Ellensburg, WA 98926

RE: Your Public Records Disclosure Request received September 15, 2010

Dear Catherine Clerf,

As a public disclosure officer for Kittitas County, your recent request (Lake Shore Meadows P-08-09) has been forwarded to me for action.

"Public record" is defined under RCW 42.56.010(2):

'Public record' includes any writing containing information relating to the conduct of government or the performance of any governmental or proprietary function prepared, owned, used or retained by any state or local agency regardless of physical form or characteristics.

The duty to make public records available for inspection and copying pursuant to Chapter 42.56 RCW applies only to existing writings as defined above. Municipalities have no obligation to create documents under the Public Records Act; they need only provide copies of identifiable existing records. Unfortunately, Kittitas County has no record of a one page letter on the City of Cle Elum letterhead dated on or before September 11, 2008 regarding the Lake Shore Meadows Plat that is responsive to your request.

I trust that the foregoing will be of assistance to you. Please contact me if you have any questions regarding the contents of this letter.

Sincerely,

Mandy Weed

Mandy Weed
Community Development Services
411 N Ruby ST
Ellensburg, WA 98926

City of Cle Elum
119 West First Street
Cle Elum, WA 98922

Telephone: (509) 674-2262
Fax: (509) 674-4097
www.cityofcleelum.com

October 28, 2010

Kittitas County Hearings Examiner
C/O Kittitas County CDS
411 N. Ruby Street
Ellensburg, WA 98926

RE: Forest Ridge Performance Based Cluster Plat

Dear Mr. Examiner:

I am writing to express our sincere frustration and disappointment regarding the aforementioned performance based cluster plat timeline and public process. First, we are not opposed to this development from a pragmatic standpoint. In point of fact, Messers. Northrup and Blanchard have been active and willing partners in regards to their current City Heights project within the City of Cle Elum Urban Growth Area. Throughout the City Heights project, Cle Elum has ensured that the County's concerns have had ample platform for consideration and redress through the Environmental Impact Statement Scoping process and ongoing analysis, review, etc. Herein rests the nucleus of our frustration:

First, it is inconceivable that this project is somehow exempt from the study and analysis afforded through the Environmental Impact Statement Process. This conclusion is drawn from our analysis of an MDNS issued by the county that fails to associate the rational nexus of impacts created by and related to this proposed development and therefore either fails to properly mitigate, or fails to mitigate altogether, many probable significant unavoidable adverse environmental impacts. The City of Cle Elum takes issue with the fact that we were not specifically noticed of either the intended MDNS or this public hearing tonight. This failure to properly notice is the reason for our "late" comments on these issues.

While it is true that the project proponents talked with the City of Cle Elum regarding mitigations in relation to this project, the City did not have opportunity to either craft or vet final proposed mitigations, nor was a baseline of best available science ever established by the County or the project proponent. The current mitigations as proposed in the MDNS, in our opinion, completely fail the test of WAC 197-11-660(b) which requires that *"Mitigation measures shall be related to specific, adverse environmental impacts clearly identified in an environmental document on the proposal and shall be stated in writing by the decision maker. The decision maker shall cite the agency SEPA policy that is the basis of any condition or denial under this chapter (for proposals of applicants). After its decision, each agency shall make available to the public a document that states the decision. The document shall state the mitigation measures, if any, that will be implemented as part of the decision, including any monitoring of environmental*

Ex 38

impacts. Such a document may be the license itself, or may be combined with other agency documents, or may reference relevant portions of environmental documents."

To summarize this issue, while the City does not have standing as a party of record to the actual MDNS, the City does claim standing on the "wording" of several environmental issues on the basis that they are suggested as final plat conditions made by staff and specifically within the context of tonight's public hearing [see Kittitas County Community Developments Services, Staff Report Forest Ridge Performance Based Cluster Plat, dated October 28, 2010. Pages 5-10] and pursuant to same [Page 10, Condition 45] proposes that the (now finalized) MDNS conditions become conditions of final plat approval, by notation on the face of the final recorded plat Mylar itself, as follows;

Page 6, Condition 10. Critical Areas:
This condition, as phrased, fails to set any objective, quantifiable performance standard that is related to any best available science or best management practice. This condition fails to ameliorate downstream impacts to connected hydrological features, other adjacent off site wetlands and the impacts on water quality to affected down stream parties (Cle Elum).

Page 6, Condition 11. Critical Areas:
The standard for unavoidable impacts, not defined by this report nor based off BAS in the issued MDNS relegates "unavoidable" to a developer chosen design consideration. In our opinion this condition fails to ameliorate downstream impacts to connected hydrological features, other adjacent off site wetlands and the impacts on water quality to affected down stream parties (Cle Elum).

Page 7, Condition 12. Critical Areas:
The standard for "avoided to the extent possible", not defined by this report nor based off BAS in the issued MDNS relegates "avoidance" to a developer chosen design consideration. In our opinion this condition fails to ameliorate downstream impacts to connected hydrological features, other adjacent off site wetlands and the impacts on water quality to affected down stream parties (Cle Elum).

Page 7, Condition 13-15. Critical Areas:
This condition is entirely precedent on the developer's ability to obtain, at a future undefined date, proper approvals to cross streams and their associated buffers. It is our opinion that the SEPA MDNS, or this condition require an actual environmental analysis prior to final approval of this proposed plat. Further it is our opinion this condition fails to ameliorate significant unavoidable adverse environmental impacts as failure or inability to obtain undefined "approval and permits necessary" will result in significant re-design of this preliminary plat that can render many of the proposed conditions obsolete or entirely inadequate.

Pages 7-8, Conditions 17-21. Stormwater:
This City would liked to have seen specific conditions and mitigations required to reflect the known groundwater and surface water issues that presently adversely affect Cle Elum and surrounding adjacent areas. This area has traditionally been subject to high seasonal flows of both surface and groundwater that result in downstream flooding and deposition of silts into the Cle Elum stormwater system and the Yakima River. The conditions as listed serve to advise the

develop of the requirement for other permits and approvals, but do not provide any systematic, objective, quantifiable "hard" mitigation measures or infrastructure that ameliorate Cle Elum's concerns related to stormwater.

Pages 8-9, Conditions 23-31. Transportation and Infrastructure:
This proposed development is entirely dependent on the City of Cle Elum road system for ingress and egress. Many of the municipal streets proposed for access are identified as having either failed or failing pavement conditions. None of the proposed conditions discuss Transportation Concurrency or provide reference to any data, study, analysis or deference to the Cle Elum Draft Master Transportation Plan, or the Cle Elum TIP or street condition classification ratings. Cle Elum has serious concerns about the capacity and LOS capability of its streets to handle both construction related transportation impacts and final PM Peak Hour Trip capacity counts neither of which could we locate county data or evidence of environmental review consideration in the SEPA analysis to be used as a basis for mitigation to avoid significant adverse unavoidable impacts to the Cle Elum Transportation System.

While true the developer had discussions with the Cle Elum Public Works director, these discussions were intended as a framework upon which specific mitigation measures would be crafted in consultation with Kittitas County, the City Planner, City Engineer and City EMS Responders. The City public works director remains concerned that their appears to be no specific analysis or specific traffic count forecasting or similar data that serve as the basis for ~~SPEA~~ SEPA mitigation or the Transportation and Infrastructure conditions listed in the Staff Report.

Respectfully Submitted,

Dr. Bonnie Reay
Cle Elum City Council

KITTITAS COUNTY COMMUNITY DEVELOPMENT SERVICES
411 N. Ruby St., Suite 2, Ellensburg, WA 98926
CDS@CO.KITTITAS.WA.US
Office (509) 962-7506
Fax (509) 962-7682
"Building Partnerships – Building Communities"

STAFF REPORT
FOREST RIDGE PERFORMANCE BASED CLUSTER PLAT

TO: Kittitas County Hearing Examiner
FROM: Kittitas County Community Development Services Staff
RE: Forest Ridge Performance Based Cluster Plat (LP-08-14)
DATE: October 28, 2010

I. GENERAL INFORMATION

Requested Action: Iron Snowshoe LLC, property owner, have applied for a 171-lot performance based cluster plat on approximately 479 acres of land that is zoned Rural-5. The project is proposed to be served by a Group A water system and individual or community on-site septic systems.

Location: The subject property is located northeast of the city of Cle Elum off of the extension of Columbia Street in Section 24, T.20N, R.15E, WM.; Kittitas County parcel map numbers 20-15-24000-0001, -0003, -0004, -0007, -0015, -0016, -0017, -0018, -0019, -0020, -0021, and -0022.

II. SITE INFORMATION

Total Project Size:	479 acres
Number of Lots:	171
Zoning District:	Rural-5
Domestic Water:	Group A water system
Sewage Disposal:	Individual/Community on-site septic systems
Power/Electricity:	Puget Sound Energy
Fire Protection:	Fire District #7
Irrigation District:	None

Site Characteristics:
North: Vacant
South: Vacant
East: Vacant
West: Vacant

Access: The proposed project will have access off of Columbia Avenue in Cle Elum, then a new road west on the applicant's private property. The access road will be constructed to meet Kittitas County Road Standards. All required roadway improvements will be the responsibility of the developer. A second access route is required.

Zoning and Development Standards: The purpose and intent of the Rural-5 zone is to provide areas where residential development may occur on a low density basis. A primary goal and intent in siting Rural-5 zones will be to minimize adverse effects on adjacent natural resource lands.

KCC 16.09 allows for **Performance Based Cluster Platting** to assist in the implementation of Kittitas County's policy to provide tools to foster appropriate densities, while making development economically feasible, benefits to the greater community through an effort to conserve water resources by minimizing the development of exempt wells by encouraging group water systems, to protect public health by reducing the number of septic drain fields, by concentrating urban densities in urban growth areas and by minimizing the impact of "Rural Sprawl" in rural lands, as designated in the Kittitas County Comprehensive Plan, Kittitas County finds that this "Performance

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Based Cluster Platting" technique would foster the development of urban and rural designated lands at appropriate densities, while protecting the environment and maintaining a high quality of life in Kittitas County.
Public Benefit Rating System (PBRS) elements are items that are not already required by code. When a public benefit is demonstrated then bonus density points will apply. The density bonus is limited to use in the rural designations with a 100% bonus in the Rural -3, Agriculture -3, Rural -5 and Agriculture - 5 zones. There is no limit to density bonus within the Urban Growth Areas and the Urban Growth Nodes. A minimum of twenty five percent (25%) of the area within the project boundary must be set aside in open space prior to application of the Public Benefit Rating System contained in KCC 16.09.090.
The applicant has demonstrated the Public Benefit Rating System (PBRS) with the following elements. The Hearing Examiner can further condition these elements as necessary to meet the intent of the Ordinance for Performance Based Cluster Platting. These elements will be conditions of approval for the Forest Ridge Plat in order to qualify for the density bonus allowed through Performance Based Cluster Platting.

Element	Area	Bonus Points
Open space total (48%)	230.13 acres	0
Open space density bonus (40%)	191.38 acres	40 points
Commercial Forest setback area	15.18 acres	0
Stream buffer within open space	7.05 acres	0
Wetlands & buffer within open space	4.52 acres	0
Roadway within open space	12.00 acres	
Development Area	248.32	0
Group A water system		50 points
Total	478.45 acres	**90points**

Total bonus density points = 90 points. Total bonus density percentage =90%
Density bonus limit in the Rural 5 zone for this proposal is 90%.

Calculations for project:
Current zone for project is Rural 5
Allowed density for the Rural 5 zone is 1 unit per 5 acres
Subject parcel is a total of 478.45 acres

Lots allowed under current zoning (Rural 5) = **478.45** acres/**5** acres = **95** lots
(**95** lots) x (total bonus density percentage **90%**) = **182** total lots for cluster plat

III. ADMINISTRATIVE REVIEW

Notice of Application: A complete long plat application was submitted to Community Development Services on April 24, 2008. The application was deemed complete on July 17, 2009. The Notice of Application for the preliminary plat application was issued on July 30, 2009. This notice was published in the official county paper of record and was mailed to jurisdictional government agencies, adjacent property owners and other interested parties. The last day to submit written comments was on August 14, 2009.

Posting of Site: In accordance with Kittitas County code 15A.030.110, this project was accurately posted with the "Land Use Action" sign as provided by Community Development Services. The Affidavit of Posting was signed by the applicant and returned to the planner and is included as part of the record.

IV. COMPREHENSIVE PLAN

The Kittitas County Comprehensive Plan designates the subject property as Rural. Kittitas County has established the following goals and policies to guide future housing developments. These goals and policies were developed in response to existing housing conditions and identified needs within the county, and support the

County Wide Planning Policies:

GPO 3.1 Provide a sufficient number of housing units for future populations in rural areas of Kittitas County.

GPO 3.6 Provide for future populations while protecting individual property rights.

GPO 3.17 Provide a sufficient number of housing units for future populations while maintaining the rural character of Kittitas County.

GPO 3.18 Provide sufficient housing units while maintaining environmental quality.

GPO 8.5 Kittitas County recognizes and agrees with the need for continued diversity in densities and uses on Rural Lands.

GPO 8.46 Residential development in rural lands must be in areas that can support adequate private water and sewer systems.

V. ENVIRONMENTAL REVIEW

Based upon review of the submitted application materials including an environmental checklist, correspondence received during this 15 day comment period and other information on file with Community Development Services, a Mitigated Determination of Non-Significance (MDNS) was issued on September 23, 2010. The appeal period ended on October 7, 2010 at 5:00 p.m. No appeals were filed.

VI. AGENCY AND PUBLIC COMMENTS

Applicable agencies have been given the opportunity to review this proposal. Agency comments have been included as Exhibits in the Hearing Examiner packet.

No public comments were submitted on this proposal at the time of staff review.

VII. PROJECT ANALYSIS

In review of this proposal it is important to consider the goals and policies of the comprehensive plan, applicable county code, public and agency comments, any identified environmental concerns and state and federal requirements. Identified below is planning staff's analysis and consistency review for the subject application.

Comprehensive Plan Consistency:
The proposal is consistent with the goals and policies of the Kittitas County Comprehensive Plan, including those listed above in section IV of this report. The proposed subdivision will be adequately served by rural levels of service. The lots will be served by a Group A water system and individual onsite septic systems.

Consistency with the provisions of KCC 17A Critical Areas:
Staff has conducted an administrative critical area review in accordance with KCC 17A and found wetlands, seasonal stream areas of steep slopes and potential landslide areas on the subject properties.

Consistency with the provisions of KCC 16.09: Performance Based Cluster Platting Code:
The application contained all required elements necessary to review this proposal with the exception of soil logs, which will be required prior to final plat approval. All proposed lots meet the dimensional standards of KCC 17.30A for lots zoned Rural 5. As conditioned, this proposal is consistent with the Kittitas County Subdivision Code for Performance Based Cluster Plats.

Consistency with the provisions of KCC Title 12: Roads and Bridges:
All roads are required to meet all Kittitas County Road Standards as outlined in the September 8, 2010 memorandum issued by the Department of Public Works. As conditioned, the proposal is consistent with the provisions of KCC Title 12.

Agency Comments:
The following agencies provided comments during the comment period: Department of Ecology, Washington Department of Transportation, Washington Fish & Wildlife, Kittitas County Department of Public Works, and Environmental Health. These comments have been included as conditions of approval to address these agency concerns.

Public Comments:
No letters from the public were submitted on this proposal at the time of writing of the staff report.

VIII. RECOMMENDATION

As conditioned below, the application does not appear to be detrimental to the general public health, safety or welfare and meets the basic intent and criteria associated with Title 12 and Title 16.12 of the Kittitas County Code and the Kittitas County Comprehensive Plan. Staff recommends **approval** of the Forest Ridge Performance Based Cluster Plat; file number (LP-08-14), subject to the following findings of fact and conditions:

Suggested Findings of Fact

1. Iron Snowshoe LLC, property owner, has applied for a 171-lot performance based cluster plat on approximately 479 acres of land that is zoned Rural-5. The project is proposed to be served by a Group A water system and individual or community on-site septic systems.

2. The subject property is located northeast of the city of Cle Elum off of the extension of Columbia Street in Section 24, T.20N, R.15E, WM.; Kittitas County parcel map numbers 20-15-24000-0001, -0003, -0004, -0007, -0015, -0016, -0017, -0018, -0019, -0020, -0021, and -0022.

3. The proposed lots range in size from one-acre to 4-acres in size. The project is proposed to be served by a Group A water system and individual or community on-site septic systems.

4. Site Information:

Total Project Size:	479 acres
Number of Lots:	171
Zoning district	Rural 5
Domestic Water:	Group A water system
Sewage Disposal:	Individual/Community on-site septic systems
Power/Electricity:	Puget Sound Energy
Fire Protection:	Fire District #7
Irrigation District:	None

5. Site Characteristics: The area is characterized as mountain terrain.

6. Surrounding Property:
   North: Vacant
   South: Vacant
   East: Vacant
   West: Vacant

7. The Comprehensive Plan designation is Rural.

8. The subject property is zoned Rural 5, which allows for one residential unit per 5 acres and one-half acres for platted cluster subdivisions served by public water and sewer systems. All subdivision lots under five acres in size must be served by public water and sewer systems (KCC 17.30A.040).

9. A complete long plat application was submitted to Community Development Services on April 24, 2008. The application was deemed complete on July 17, 2009. The Notice of Application for the preliminary plat application was issued on July 30, 2009. This notice was published in the official county paper of record and was mailed to jurisdictional government agencies, adjacent property owners and other interested parties. The last day to submit written comments was on August 14, 2009.

10. In accordance with Kittitas County code 15A.030.110, this project was accurately posted with the "Land Use Action" sign as provided by Community Development Services. The Affidavit of Posting was signed by the applicant and returned to the planner and is included as part of the record.

11. Based upon review of the submitted application materials including an environmental checklist, correspondence received during this 15 day comment period and other information on file with Community Development Services, a Mitigated Determination of Non-Significance (MDNS) was issued on September 23, 2010. The appeal period ended on October 7, 2010 at 5:00 p.m. No appeals were filed.

12. The proposal is consistent with the goals and policies of the Kittitas County Comprehensive Plan. The proposed subdivision will be adequately served by rural levels of service. The lots will be served by a Group A water system and individual or community septic systems. Staff has conducted and an administrative critical area review in accordance with KCC 17A and found wetlands, seasonal stream areas of steep slopes and potential landslide areas on the subject properties.

13. This proposal is consistent with the Kittitas County Subdivision Code Chapter 16.09 for Performance Based Cluster Plats.

14. All roads are required to meet all Kittitas County Road Standards as outlined in the September 8, 2010 memorandum issued by the Department of Public Works. As conditioned, the proposal is consistent with the provisions of KCC Title 12.

15. The following agencies provided comments during the comment period: Department of Ecology, Washington Department of Transportation, Washington Fish & Wildlife, Kittitas County Department of Public Works, and Environmental Health. These comments have been included as conditions of approval to address these agency concerns

Suggested Conclusions:

1. As conditioned, the development meets the goals, policies and implementation recommendations as set forth in the Kittitas County Comprehensive Plan.

2. As conditioned, this proposal is consistent with applicable federal and state laws and regulations.

3. Public use and interest will be served by approval of this proposal.

4. As conditioned, the proposal is consistent with Kittitas County Code Title 16 Subdivision, Title 17 Zoning, Title 17A Critical Areas, Title 15 Environmental, and Title 12 Roads and Bridges.

Suggested Conditions of Approval:

Platting Standards and Zoning Code:

1. Certificate of Title: A certificate of title of the property proposed to be platted shall be submitted with the final plat.

2. Lot Closures: It is the responsibility of the Professional Licensed Surveyor (PLS) to ensure the lot closures are correct and accurate.

3. Conditions, Covenants, and Restrictions: Prior to final plat approval, a copy of the proposed final Conditions, Covenants, and Restrictions shall be submitted to Community Development Services for review and approval.

4. Open Space Tracts: Prior to final plat approval, all areas not included in development lots shall be labeled as individual tracts. Tracts shall not be further subdivided or altered. All tracts, except the tract(s) containing the private road area, shall be labeled "Open Space.". All open space tracts shall be identified on the face of the final plat.

5. Open Space Tract Ownership and Maintenance: Open space tracts shall be jointly owned and maintained by the developer or legally responsible owner or homeowner's association or other legal entity made up of all benefited property owners.

6. Clustering of Lots: Lots shall be designed to meet the requirements of KCC 16.09.100.A relating to clustering requirements.

7. Performance Based Cluster Plat Open Space: The preliminary plat map states that 193.38 acres (or 40% of the total site) meets the definition of "Open Space" contained in Chapter 16.09.100.C (on the date of application). Prior to final plat approval, the applicant shall present to the County for review and approval a map demonstrating that at least 40% of the total plat area meets the open space requirements of Chapter 16.09. For purposes of calculating open space, the following areas shall not be included: Commercial Forest setback area; seasonal streams and their 15' buffer area; wetlands and buffers; areas where development is otherwise restricted, and private roadways within open space.

8. Final mylars shall be submitted in accordance to KCC 16.20: Final Plats. All applicable survey data and dedications shall be reflected pursuant to KCC 16.24: Survey Data-Dedications.

9. Both sheets shall reflect the Plat number: LP-08-00014.

Critical Areas:

10. Wetland Impacts: The proposed plat area contains ten wetlands. All wetland areas and their buffers shall be shown on the face of the final plat. The plat shall also contain the following note:

    Development involving disturbance to wetlands may require additional County review and possible mitigation. KCC 17A.04.015 requires all wetland impacts to be avoided to the extent practical. Any unavoidable wetland impacts shall be required to be replaced at a ratio of 2:1 for Category 2, 1.5:1 for Category 3, and 1:1 for Category 4 (KCC 17A.04.050).

11. Wetland J: The applicant's wetland biologist identifies Wetland J as a Category 2 high value wetland measuring 2,008 square feet in area. This wetland has a required minimum buffer of 25 feet according to 17A.04.020. The proposed design places Wetland J in Lots 152 and 156. A private road crosses through Wetland J and its buffer. KCC 17A.04.015 requires all wetland impacts to be avoided to the extent

practical. Any unavoidable wetland impacts to Category 2 wetlands shall be required to be replaced at a ratio of 2 square feet created for every 1 square foot lost (KCC 17A.04.050). Impacts to buffers may be mitigated through buffer averaging, as allowed by KCC 17A.04.050. Prior to final plat approval, the applicant shall redesign the layout to prevent unavoidable impacts to Wetland J and its buffer, and submit a wetland replacement plan and/or wetland buffer averaging plan, if necessary, for County review and approval.

12. Wetland K: The applicant's wetland biologist identifies Wetland K as a Category 2 high value wetland measuring 525 square feet. The proposed design places Wetland K in Lots 151 and 152. A private road crosses through Wetland K. KCC 17A.04.015 requires all wetland impacts to be avoided to the extent practical. Any unavoidable wetland impacts to Category 2 wetlands shall be required to be replaced at a ratio of 2 square feet created for every 1 square foot lost (KCC 17A.04.050). Prior to final plat approval, the applicant shall redesign the layout to prevent unavoidable impacts to Wetland J and its buffer, and submit a wetland replacement plan, if necessary, for County review and approval.

13. Stream Crossings: The preliminary plat map contains ten instances where private roads cross mapped streams and their buffers. It is the applicant's responsibility to obtain appropriate state permits for all stream crossings.

14. Stream Buffer Impacts: The proposed plat area contains five streams. Chapter 17A.07.010.2 establishes performance standards for buffers of streams. Type 5 streams are subject to a 15 foot building setback. All streams and their buffers shall be shown on the face of the final plat. The plat shall also contain the following note:

    A 15 foot building setback is required from seasonal streams. Stream crossings may require additional permitting from state agencies.

15. Access to Lots: Some lots contain natural conditions making access from the private roads difficult. Notes shall be placed on the face of the final plat stating:

    Access to some lots requires crossing a seasonal stream. Additional permitting may be required to access these lots from the private road.

    Access to some lots requires crossing a critical slope area. Additional technical design may be required to access these lots from the private road.

16. The following note shall be placed on the face of the final plat:

    The placement of buildings and structures on or adjacent to ascending or descending slopes steeper than 1 unit vertical in 3 units horizontal (33.3-percent slope) shall conform to the building setback requirements of current adopted building codes (IRC Section R403.1.7 and IBC Section 1805.3.1). Alternate setbacks and clearances are permitted, subject to the approval of the building official. The building official is permitted to require an investigation and recommendation of a qualified engineer to demonstrate the requirements necessary to construct a building on or adjacent to ascending or descending slopes. Such an investigation shall include consideration of material, height of slope, slope gradient, load intensity and erosion characteristics of slope material.

Stormwater and Drainage

17. This project will require a NPDES Construction Stormwater General Permit from the Washington State Department of Ecology. This permit requires that the SEPA checklist fully disclose anticipated activities, including building, road construction, and utility placements. Obtaining a permit is at least a 38 day process and may take up to 60 days if the original SEPA does not disclose all proposed activities.

18. The NPDES permit requires that a Stormwater Pollution Prevention Plan (Erosion Sediment Control Plan) is prepared and implemented for all permitted construction sites. These control measures must be able to prevent soil from being carried into surface water (this includes storm drains) by stormwater runoff. Permit coverage and erosion control measures must be in place prior to any clearing, grading, or construction.

19. Erosion control measures must be in place prior to any clearing, grading or construction. These control measures must be effective to prevent soil from being carried into surface water by storm water runoff. Sand, silt, and soil will damage aquatic habitat and are considered pollutants.

20. Any discharge of sediment-laden runoff or other pollutants to waters of the state is in violation of Chapter 90.48, Water Pollution Control, and WAC 173-201A, Water Quality Standards for Surface Waters of the State of Washington, and is subject to enforcement action.

21. Best management practices must be used to prevent any sediment, oil, gas, or other pollutants from entering surface or ground water.

Transportation and Infrastructure

22. Timing of Improvements: This application is subject to the current version of the Kittitas County Road Standards, dated 9/6/05. The following conditions apply and must be completed prior to the issuance of a building permit for any of the residences within this plat. A Performance Bond or acceptable financial guarantee may be used, in lieu of the required improvements, per the conditions outlined in the current Kittitas County Road Standards.

23. Private Road Certification: Private roads serving any of the lots within this development shall be inspected and certified by a licensed professional engineer for conformance with current Kittitas County Road Standards, 9/6/05 edition. Kittitas County Public Works shall require this road certification to be completed prior to the issuance of a building permit for any of the structures within the proposed plat.

24. Second Access: A second access is required of this project. Prior to final approval for each phase, the applicant shall conduct an analysis showing whether the threshold for a second access has been met. If a second access is required, the applicant must submit to Public Works for approval a route that has easement or other access rights secured and recorded. The second access must conform to Kittitas County Road Standards and the second access requirements as clarified by the Board of County Commissioners on April 2, 2007. The BOCC clarified KCRS 12.01.095(2) with the following requirements: 1) If the second access is restricted to emergency access only, it must meet or exceed the following requirements: 60' easement, 20' roadway width, BST/ACP surface, and a paved apron. Access restrictions such as gates or bollards must be approved by the Fire Marshall; 2) If the second access is to be used for ingress and egress, it must meet the same standards as the first access.

25. Cul-de-Sac: A cul-de-sac turn-around having an outside right-of-way or easement diameter of at least 110 feet shall be constructed at the closed end of all dead-end roads serving 3 or more lots. The driving surface shall be at least 96 feet in diameter. Cul-de-sacs must also conform to the requirements specified by the 2006 International Fire Code. Contact the Fire Marshal regarding any additional cul-de-sac requirements.

26. Joint-Use Driveway: A joint-use access shall serve no more than two tax parcels. See Kittitas County Road Standards, 9/6/05 edition.
    a. Access easements shall be a minimum of 20' wide. The roadway width shall have a minimum width of 12'.
    b. The surface requirement is for a minimum gravel surface depth of 6".

c. Maintenance of driveway approaches shall be the responsibility of the owner whose property they serve. The County will not maintain accesses.
d. Any further subdivision or lots to be served by proposed access may result in further access requirements.

27. Single-Use Driveway: A single-use access shall serve no more than one lot. See Kittitas County Road Standards, 9/6/05 edition.
    a. The roadway shall be a minimum of 8' wide with gravel surface.
    b. Maintenance of driveway approaches shall be the responsibility of the owner whose property they serve. The County will not maintain accesses.
    c. Any further subdivision or lots to be served by proposed access may result in further access requirements.

28. Private Road Maintenance Agreement: The applicant shall meet all applicable conditions of any pre-established or required Private Road Maintenance Agreements.

29. Access Permit: An approved access permit shall be required from the Department of Public Works prior to creating any new driveway access or performing work within the county road right of way.

30. Addressing: Contact the Kittitas County Rural Addressing Coordinator at (509) 962-7523 to obtain addresses prior to obtaining a building permit. A parcel cannot receive a building permit or utilities until such parcel is identified with a 911 address.

31. Mailbox Placement: The U.S. Postal Service requires that private roads with 6 or more residences install USPS approved Cluster Box Units (CBUs) at a safe location at the mouth of the private road. Contact your local Post Office for location and additional design requirements before beginning construction.

Air Quality

32. Dust, diesel emissions, and wood stove emissions are possible sources of air pollution from this project. The applicant shall comply with all state and County standards for air emissions and obtain any necessary air quality permits from applicable agencies.

33. According to County standards, a water truck shall be available during construction to minimize dust emissions.

Water and Sewer

34. The applicant has proposed a Group A Public Water System. Prior to final plat approval, the applicant shall submit a signed letter of agreement between the public water system purveyor or official and the land developer/owner granting delivery of potable water for the entire development. If the public water system is being developed specifically for the subdivision/plat, the water system must be approved by Washington State Department of Health (DOH), including issuance of a public water system ID number, prior to recommendation by Kittitas County Public Health Department for final plat approval.

35. Community septic systems with wastewater flows under 3,500 gallons/day are permitted by the Kittitas County Public Health Department. For flows exceeding 3,500 gallons/day, design review and approval will be needed from the Washington State Department of Health. For flows greater than 14,500 gallons/day, design review and approval will be needed from the Washington State Department of Ecology.

36. The maximum allowable slope for septic drain fields will depend on permitting agency. According to Kittitas County Code 13.04.150(5) no drain field disposal system may be designed for a site with a slope of greater than 30% grade. According to WAC 246-272A the maximum allowable slope is 45% grade.

37. Prior to final approval, the final Mylar must identify the wastewater disposal option for each lot and the locations of the proposed drain fields that do not exceed the maximum allowable slope.

Fire Safety

38. Design and construction must comply with Kittitas County Code, Kittitas County Zoning, the 2006 International Fire and Building Codes, and all other development agreements.

39. Given the provided pre-review documents, these residences will require fire flow of 100 gallons per minute for a duration of no less than 30 minutes. A reduction in required fire flow of 5- percent is allowed when the buildings are provided with an approved automatic sprinkler system.

40. An approved water supply capable of supplying the required fire flow for fire protection shall be provided. A standpipe or hydrant system with an adequate source of water (supply), a distribution system and adequate pressure for delivery shall be installed for this plat. Hydrant spacing shall comply with International Fire Code and its appendices' requirements.

41. A separate permit and deposit shall be required for installation of a hydrant/standpipe system.

42. The Kittitas County Fire Marshal's Office will require a minimum of three (3) complete sets of plans for full review: 1) Office Copy; 2) Permit Copy; and 3) Fire Department Copy.

43. This property is currently located outside of a fire district. As such, until such time that the development is within a Fire District, all future development must meet the International Urban Wild Land Interface Code for building construction, defensible space allocation, access, etc.

44. Roads with a slope or grade greater than 12% shall not be allowed.

SEPA Mitigation

45. A Mitigated Determination of Nonsignificance (MDNS) was issued on September 23, 2010. The mitigation measures in the MDNS shall be conditions of final plat approval.

46. The following mitigation conditions from the SEPA Mitigated Determination of Non-Significance shall be noted on the face of the final plat and included in the Covenants, Conditions, and Restrictions (CC&Rs) document recorded with the final plat:

    a. All outdoor lighting shall be shielded and directed downward to minimize the effect to nearby residential properties.

    b. The use of wood burning stoves shall be prohibited.

    c. Snow removal shall be the responsibility of the Homeowners Association. Snow storage shall be limited to those areas shown on the face of the plat and shall be located outside of wetland and stream areas and their buffers.

KITTITAS COUNTY COMMUNITY DEVELOPMENT SERVICES
411 N. Ruby St., Suite 2, Ellensburg, WA 98926
CDS@CO.KITTITAS.WA.US
Office (509) 962-7506
Fax (509) 962-7682
"Building Partnerships – Building Communities"

NOTICE OF DECISION SEPA ACTION AND PUBLIC HEARING

To: Interested County Departments & Agencies with jurisdiction
Adjacent Property Owners
Applicant

From: Dan Valoff, Staff Planner

Date: September 23, 2010

Subject: Forest Ridge Performance Based Cluster Plat (File No.: LP-08-00014)

Please find the attached Mitigated Determination of Nonsignificance (MDNS) for the above referenced project. A Notice of Application for the submitted application was mailed on July 30, 2009.

NOTICE IS HEREBY given that pursuant to 43.21(C) RCW, Kittitas County Community Development Services did on September 23, 2010 make a Mitigated Determination of Non-Significance (MDNS) for Iron Snowshoe, LLC for a preliminary plat application to subdivide approximately 479 acres into 171 single-family residential lots, with an average lot size of 1.67 acres. The subject property is zoned Rural-5. The project is proposed as a Performance Based Cluster Plat. Final plat approval and building permits will be required. The subject property is comprised of twelve tax parcels, located northeast of the City of Cle Elum off of the extension of Columbia Street in Section 24, T.20N, R.15E, W.M.; Kittitas County parcel map numbers 20-15-24000-0001, -0003, -0004, -0007, -0015, -0016, -0017, -0018, -0019, -0020, -0021, and -0022. The complete application file may be viewed at Kittitas County Community Development Services, 411 N. Ruby St. Suite 2, Ellensburg, WA 98926. Staff Planner: Dan Valoff.

Any action to set aside, enjoin, review, or otherwise challenge such administrative SEPA action on the grounds of noncompliance with the provisions of chapter 43.21RCW shall be commenced on or before October 7, 2010 at 5:00 p.m. to the Kittitas County Board of Commissioners, Rm. 108, County Courthouse, Ellensburg, WA 98926. Appeals of SEPA threshold determinations shall be consolidated with appeals of final permit approval, according to 15A.04.020, Chapter 43.21C RCW and Chapter 15.04 KCC (such as a decision to require particular mitigation measures or to deny a proposal). A single simultaneous hearing before one hearing body will consider the agency decision on a proposal and any environmental determinations made, with the exception of the appeal, if any, of a threshold determination of significance.

NOTICE IS HEREBY given that a hearing on said application before the Kittitas County Hearing Examiner has been scheduled for **October 28, 2010 at 6:00 p.m.** in the Kittitas County Courthouse Auditorium, Ellensburg, WA. 98926. Anyone with an interest in this matter is urged to attend said hearing where testimony will be taken. Written comments will be received and documents may be viewed at the above address prior to the hearing. Interested persons are encouraged to verify prior to attending.

Notice of SEPA Action and Public Hearing
Forest Ridge Performance Based Cluster Plat
(LP-08-00014)

NOTICE IS HEREBY given that pursuant to 43.21(C) RCW, Kittitas County Community Development Services did on September 23, 2010 make a Mitigated Determination of Non-Significance (MDNS) for Iron Snowshoe, LLC for a preliminary plat application to subdivide approximately 479 acres into 171 single-family residential lots, with an average lot size of 1.67 acres. The subject property is zoned Rural-5. The project is proposed as a Performance Based Cluster Plat. Final plat approval and building permits will be required. The subject property is comprised of twelve tax parcels, located northeast of the City of Cle Elum off of the extension of Columbia Street in Section 24, T.20N, R.15E, W.M.; Kittitas County parcel map numbers 20-15-24000-0001, -0003, -0004, -0007, -0015, -0016, -0017, -0018, -0019, -0020, -0021, and -0022. The complete application file may be viewed at Kittitas County Community Development Services, 411 N. Ruby St. Suite 2, Ellensburg, WA 98926. Staff Planner: Dan Valoff.

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Date: September 21, 2010
Publish: September 23th and September 30, 2010 *Daily Record* and *Northern Kittitas County Tribune*

DAILY RECORD
AD AUTHORIZATION
(CONTINUED)

Salesperson: KATHY ADAMS Printed at 09/21/10 12:29 by $LOGIN

Acct#: 84329 Ad#: 305963 Status: N

Notice of SEPA Action and Public Hearing Forest Ridge Performance Based Cluster Plat (LP-08-00014)

NOTICE IS HEREBY given that pursuant to 43.21(C) RCW, Kittitas County Community Development Services did on September 23, 2010 make a Mitigated Determination of Non-Significance (MDNS) for Iron Snowshoe, LLC for a preliminary plat application to subdivide approximately 479 acres into 171 single-family residential lots, with an average lot size of 1.67 acres. The subject property is zoned Rural-5. The project is proposed as a Performance Based Cluster Plat. Final plat approval and building permits will be required. The subject property is comprised of twelve tax parcels, located northeast of the City of Cle Elum off of the extension of Columbia Street in Section 24, T.20N, R.15E, W.M.; Kittitas County parcel map numbers 20-15-24000-0001, -0003, -0004, -0007, -0015, -0016, -0017, -0018, -0019, -0020, -0021, and -0022. The complete application file may be viewed at Kittitas County Community Development Services, 411 N. Ruby St. Suite 2, Ellensburg, WA 98926. Staff Planner: Dan Valoff.

Any action to set aside, enjoin, review, or otherwise challenge such administrative SEPA action on the grounds of non-compliance with the provisions of chapter 43.21RCW shall be commenced on or before October 7, 2010 at 5:00 p.m. to the Kittitas County Board of Commissioners, Rm. 108, County Courthouse, Ellensburg, WA 98926. Appeals of SEPA threshold determinations shall be consolidated with appeals of final permit approval, according to 15A.04.020, Chapter 43.21C RCW and Chapter 15.04 KCC (such as a decision to require particular mitigation measures or to deny a proposal). A single simultaneous hearing before one hearing body will consider the agency decision on a proposal and any environmental determinations made, with the exception of the appeal, if any, of a threshold determination of significance.

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Date: September 21, 2010
Publish: September 23th and September 30, 2010 Daily Record and Northern Kittitas County Tribune

KITTITAS COUNTY COMMUNITY DEVELOPMENT SERVICES
411 N. Ruby St., Suite 2, Ellensburg, WA 98926
CDS@CO.KITTITAS.WA.US
Office (509) 962-7506
Fax (509) 962-7682

State Environmental Policy Act

MITIGATED DETERMINATION OF NONSIGNIFICANCE

Description: Landowner Iron Snowshoe LLC has submitted a Preliminary Plat application to subdivide approximately 479 acres into 171 single-family residential lots, with an average lot size of 1.67 acres. The subject property is zoned Rural-5. The project is proposed as a Performance Based Cluster Plat. Final plat approval and building permits will be required.

Proponent: Iron Snowshoe, LLC

Location: The subject property is comprised of twelve tax parcels, located northeast of the City of Cle Elum off of the extension of Columbia Street in Section 24, T.20N, R.15E, W.M.; Kittitas County parcel map numbers 20-15-24000-0001, -0003, -0004, -0007, -0015, -0016, -0017, -0018, -0019, -0020, -0021, and -0022.

Lead Agency: Kittitas County Community Development Services

The lead agency for this proposal has determined that the proposal will not have a probable significant adverse impact on the environment. An Environmental Impact Statement (EIS) is not required under RCW 43.21C.030 (2) (c) and WAC 197-11. This decision was made after review of a SEPA environmental checklist and other information on file with the lead agency, after considering voluntary mitigation measures which the lead agency or the applicant will implement as part of the proposal, and after considering mitigation measures required by existing laws and regulations that will be implemented by the applicant as part of the Kittitas County permit process. The responsible official finds this information reasonably sufficient to evaluate the environmental impact of this proposal. This information is available to the public on request.

Based on the project specific analysis, the lead agency for this proposal has also determined that certain mitigation measures are necessary in order to issue a Determination of Non-Significance for this proposal. Failure to comply with the mitigation measures identified hereafter will result in the issuance of a Determination of Significance (DS) for this project. The mitigation measures are listed below. Also note the following:

A. This finding is based on review of the Long Plat Application submitted April 24, 2008 and the Application Supplement submitted December 29, 2009. The application includes a SEPA Environmental Checklist dated April 2008, a revised SEPA Environmental Checklist dated December 2009, correspondence with the applicant regarding voluntary mitigation measures, and the following reports or studies: *Downstream Analysis* (August 2009); a letter from Sapphire Skies to the Department of Public Health detailing water usage and status of water rights transfer (October, 2009); *Transportation Impact Analysis* (November, 2009); *Forest Ridge Streams and Wildlife Habitat Study* (December, 2009); *Forest Ridge Existing Conditions Kittitas County Critical Areas Report* (December, 2009); *Preliminary Storm Drainage Report* (December, 2009); and *Forest Ridge Geological Hazard Assessment* (August, 2010).

B. Issuance of this threshold determination does not constitute approval of the proposal for construction. This proposal will require review and approval by Kittitas County (Building Permit and associated permits/approvals) and will be reviewed for compliance with all applicable Kittitas County codes which regulate development activities, including but not limited to the Zoning Code, Uniform Fire and Building Codes, Road Standards, Surface Water Design Manual, and the Sensitive Areas Regulations. This proposal will also require approvals by other agencies as described in the SEPA Environmental Checklist. These approvals and requirements are not inclusive, as some approvals and code requirements can only be confirmed and/or reviewed upon submittal of construction permits.

C. Voluntary mitigation measures which the applicant will implement as part of the proposal are listed in the SEPA Environmental Checklist and include the following:

- Homes shall not be allowed to use wood burning stoves.
- Impervious surface area will be minimized to the extent practical, with less than 11% of the project site being impervious. Native vegetation will be retained to the maximum extent feasible.
- CCRs will be adopted to preserve native vegetation, wildlife areas, and recreational uses.
- Construction will be limited to 7am-7pm during the summer, and 8am-6pm during the winter.
- The applicant will work with a professional landscaper to design the site in such a way that the natural setting is preserved. Design standards will help maximize aesthetic suitability and the likelihood that the community blends within the surrounding environment.
- Through CCRs, residents will be required to comply with Dark Skies standards. Lighting in common areas will also comply with Dark Skies standards.
- The applicant proposes to create several pedestrian/bicycle/multi-modal trails.
- The applicant may construct a recreational/community center that will provide opportunities for active and passive recreation.

These mitigation measures are in addition to requirements that will be implemented through Kittitas County code compliance permit review. Prior to construction permit issuance, these voluntary mitigation measures will be incorporated as conditions of development.

The following SEPA mitigation conditions shall also apply based on the project specific analysis:

Geohazards and Landslide Areas

1. Additional Analysis: Prior to site construction, the applicant shall conduct additional geotechnical analysis to better understand the site conditions and projected impacts of the proposed development on the identified landslide area. Results of this additional analysis may result in changes to the plat layout, including changes to the number of lots, location of internal access roads, location of septic drain fields, location of stormwater facilities, open space calculations, and other site elements. The analysis shall include, at a minimum, the following activities:

    a. Obtain 2-foot contour interval topographic data for the entire landslide area to permit a more detailed examination of geomorphological features. This topographical data shall be used in further delineation of areas on the landslide area requiring additional study, in identification of landslide features, and will improve input for refining and confirming results of the stability analysis. If new topographic data reveals areas warranting additional study, these areas shall be examined, in addition to those areas identified in

Figure 4 of the *Forest Ridge Geological Hazard Assessment* (August 19, 2010), shown below.

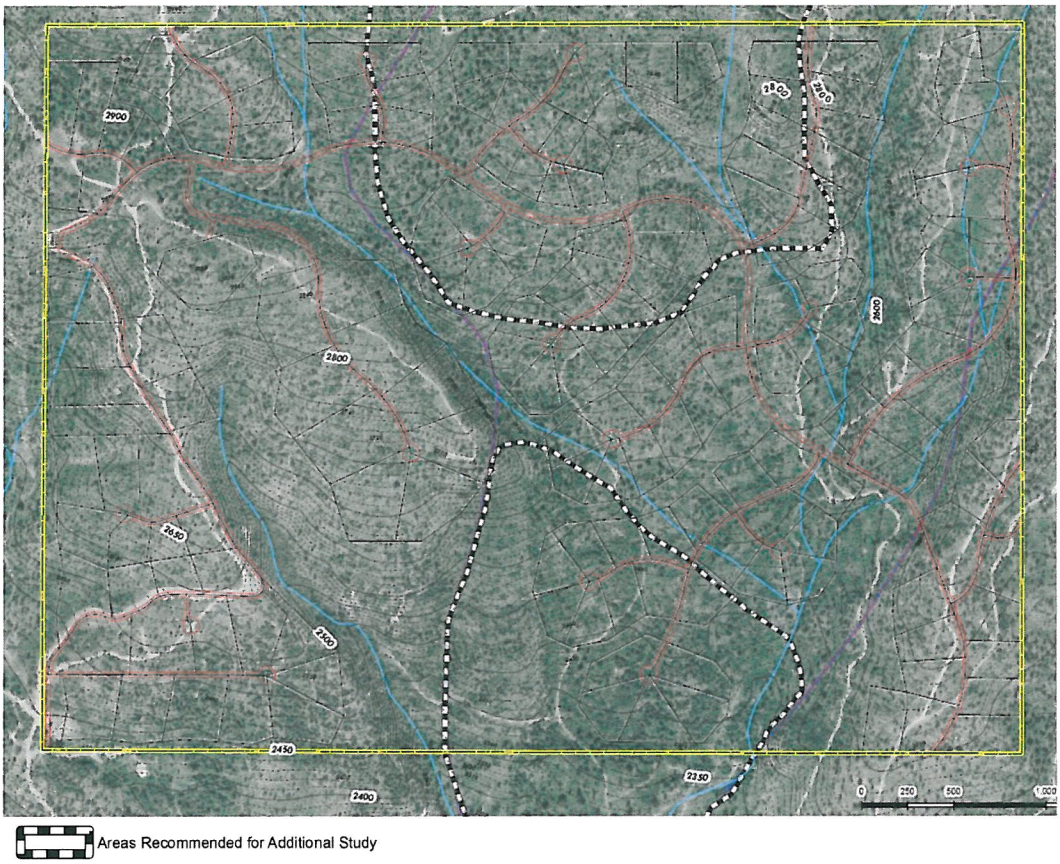

***Figure 4 from Forest Ridge Geological Hazard Assessment* (August 2010)**

b. Collect subsurface data in the north-central portion of the landslide where there is evidence of more recent slope movement and in the region near the toe of the landslide where stability analysis suggests potential instability under modeled conditions. Subsurface data should consist of a borehole drilling program observed by a qualified geotechnical engineer, in situ testing of soil strength, and sample collection and analysis by a geotechnical laboratory.
c. Using results from the two activities above refine the stability modeling for the entire mapped landslide with emphasis on the north-central portion of the landslide, where there is evidence of more recent slope movement, and in the region near the toe of the landslide, where stability analysis suggests potential instability under model conditions.
d. A design-level geotechnical study of the site should be completed prior to finalizing final plat development plans. Specific focus should be given to the results from refined slope stability analysis, those areas of the mapped landslide that are potentially sensitive to modification, those areas having steep slopes, and the presence of a mine hazard area mapped by Kittitas County in the southwest corner of the site.

2. Timing of Improvements: This application is subject to the current version of the Kittitas County Road Standards, dated 9/6/05. The following improvements shall be completed prior to final plat approval for each respective phase of development: earth movement, rough grading for

road alignment, installation of any necessary retaining structures, and any required mitigation to address areas of slope failure or instability. Portions of road construction that do not involve earth movement, slope stability, rough grading, or infrastructure, such as finished surfacing and roadside safety barriers, shall be completed prior to issuance of a building permit for any of the structure within this plat. In lieu of the improvements required prior to receiving a building permit, a performance bond or acceptable financial guarantee may be provided as allowed by KCC 12.01.050.

Stormwater

3. Stormwater Manual: On-site stormwater management that conforms to the specifications of the *Stormwater Management Manual for Eastern Washington* (2004) is required of this development. Stormwater systems shall be designed to store stormwater generated by a 24-hour, 25-year storm event. Stormwater system designs shall be prepared and stamped by a civil engineer licensed in the State of Washington. The stormwater system design shall be presented to Public Works and approved by the County Engineer prior to site construction. The stormwater system construction shall be certified by a licensed engineer. The certification shall be included with the road certification and is required prior to the issuance of a building permit. Stormwater plans shall be submitted in accordance with KCC 12.06 and 12.08.

4. Stormwater Management: The following recommendations listed in the *Preliminary Storm Drainage Report* (December 2009) shall be required:
    a. Be proactive in establishing a maintenance strategy of streams, culverts, & catch basins that convey stormwater on-site.
    b. Establish a snow removal strategy for private streets that allow the majority of the stormwater systems to still convey stormwater.
    c. At the time of civil design, perform a backwater analysis on portions of the downstream path to determine ditch and pipe velocities and capacities for the 100-yr. storm event. This analysis will determine if upgrades to the existing downstream system are necessary.
    d. Stabilize channels and outlets, and protect drain inlets.
    e. Control on-site flow rates and pollutants per DOE's Stormwater Management Manual for Eastern Washington.
    f. Maintain Best Management Practices.

5. City of Cle Elum Stormwater: The applicant shall comply with the following stormwater requirements from the City of Cle Elum:
    a. A Balmer Canyon Drainage Study shall be performed which includes recommendations for upgrades and improvements for the entire length of the drainage, including the portion within the City of Cle Elum, based on a 25-year, 24-hour storm. This study shall be submitted along with the on-site stormwater design for approval by the County Engineer.
    b. The Balmer Canyon culvert crossing Creekside Road shall be replaced to the specifications recommended by the drainage study, prior to final approval.

6. Grading Plan: A grading plan prepared by an engineer licensed in the state of Washington shall be presented to Public Works prior to site construction. Depending on the amount of fill to be removed from the site, a haul route and road condition analysis may be required prior to approval

of the grading plan. The grading plan shall be submitted in accordance with KCC 12.08, and shall be approved by the County Engineer.

7. Snow Removal: Prior to final plat approval, the applicant shall submit for review and approval by the County a snow removal plan and proposed locations for snow storage. Snow removal shall be the responsibility of the Homeowners Association. Locations for snow storage shall be located outside of wetland and stream areas and their buffers and shall be shown on the face of the final plat. In addition, the final plat shall include the following note:

   Snow removal shall be the responsibility of the Homeowners Association. Snow storage shall be limited to those areas shown on the face of the plat and shall be located outside of wetland and stream areas and their buffers.

Transportation

8. Reevaluation at Final Design: If the final design of the project changes due to the results of additional geotechnical analysis or other reasons, the project shall be reevaluated for road construction requirements. Alterations to these requirements shall be discussed and agreed upon by Public Works and the applicant.

9. City of Cle Elum Transportation: The applicant shall comply with the following construction requirements from the City of Cle Elum:
   a. Potholes must be repaired on Columbia Avenue from First Street to Fourth Street as required by the City of Cle Elum prior to receiving final plat approval.
   b. A 2-inch overlay on Columbia Avenue from First Street to Fifth Street or end of existing pavement shall be constructed prior to beginning construction of Phase 5.

10. WSDOT: The *Revised Traffic Impact Analysis* (November 2009) considers the traffic impacts from both the Forest Ridge development and the nearby City Heights development, which is proposed in the City of Cle Elum and is currently under review. Based on this analysis, upon completion of just the Forest Ridge development, the Level of Service (LOS) at the intersection of SR 903 and the SR 903 Spur will be reduced to LOS C (Note: The traffic impact study erroneously refers to the intersection of SR 903 and the SR 903 Spur as the "SR 970/SR 903" intersection). Upon completion of both the Forest Ridge development and the City Heights development, the same intersection will be reduced to either a LOS D or E, depending on the approved development scenario for City Heights. According to Kittitas County Comprehensive Plan GPO 4.26, any LOS below the adopted standard of LOS C in rural areas is unacceptable; therefore, mitigation is required if a LOS below C results. The City Heights project has not yet received approval from the City of Cle Elum, and the traffic impacts of Forest Ridge alone do not cause the intersection in question to fall below LOS C. Because it is uncertain at this time what the actual impact to the SR 903/SR 903 Spur intersection will be, prior to construction of the Forest Ridge Phase 5, the developer shall reevaluate the traffic impacts of the proposed Forest Ridge development on the SR 903/SR 903 Spur intersection. If the analysis concludes that the full build out of this project result in the SR 903/SR 903 Spur intersection operating below a LOS C, then the developer of the Forest Ridge project will be required to contribute a pro rata share of the cost to construct mitigation improvements to the SR 903/SR 903 Spur intersection, as required by WSDOT, to achieve an acceptable LOS.

Wildlife and Habitat

11. The *Forest Ridge Streams and Wildlife Habitat Study* (December 2009) states that the Forest Ridge plat has been designed to avoid and minimize impacts to existing waterways and wildlife habitats in the study area, and that "The current design and layout of the proposed developments meet the intent and requirements of the Kittitas County Code, including the provisions for protecting waterways and riparian habitat areas" (p. 10). To ensure identified project areas remain suitable habitat for wildlife, the applicant shall submit to the County an Open Space Management Plan prior to final plat approval. This Plan shall describe the types of recreational uses and improvements allowed in the open space areas, and include a statement from a professional biologist demonstrating that the proposed uses, proposed improvements, and lot layout will avoid and minimize impacts to wildlife habitats. Approved recreational uses, as well as provisions for maintenance of any improvements shall be included in the Homeowners Association CCRs.

Light and Air Impacts

12. The following note shall be placed on the face of the final plat:
All outdoor lighting shall be shielded and directed downward to minimize the effect to nearby residential properties.

13. The following note shall be placed on the face of the final plat:
The use of wood burning stoves shall be prohibited.

Responsible Official: Dan Valoff

Title: Staff Planner

Address: Kittitas County Community Development Services
411 N. Ruby Street, Suite 2
Ellensburg, WA. 98926
Phone: (509) 962-7506 Fax: (509) 962-7682

Date: September 23, 2010

This Mitigated DNS is issued under WAC 197-11-355 and WAC 197-11-390; the lead agency will not act on this proposal for 10 working days. Any action to set aside, enjoin, review, or otherwise challenge this administrative SEPA action's procedural compliance with the provisions of Chapter 197-11 WAC shall be commenced on or before 5:00 pm, October 7, 2010.

Pursuant to Chapter 15A.04.020 KCC, this MDNS may be appealed by submitting specific factual objections in writing with a fee of $500.00 to the Kittitas County Board of Commissioners, Kittitas County Courthouse Room 110, Ellensburg, WA 98926. Timely appeals must be received within 10 working days, or no later than 5:00 PM, October 7, 2010. Aggrieved parties are encouraged to contact the Board at (509) 962-7508 for more information on appeal process.

KITTITAS COUNTY
DEPARTMENT OF PUBLIC WORKS
Kirk Holmes, Director

MEMORANDUM

TO: Dan Valoff, CDS
FROM: Christina Wollman, Planner II CW
DATE: September 8, 2010
SUBJECT: Forest Ridge Cluster Plat LP-08-00014

Prior to final plat approval, the applicant shall conduct additional geotechnical analysis to better understand the site conditions and projected impacts of the proposed development on the identified landslide area. Results of this additional analysis may result in changes to the plat layout, including changes to the number of lots, location of internal access roads, location of septic drain fields, location of stormwater facilities, open space calculations, and other site elements. This additional analysis shall be completed within one year of the date of preliminary plat approval, unless an extension of time is agreed to by the County. The analysis shall include, at a minimum, the following activities:

- Obtain improved topographical data for the entire landslide to permit more detailed examination of geomorphological features. Improved topographic data will support further delineation of areas on the mapped landslide requiring additional study, identification of landslide features, and will provide input for refining and confirming results of the stability analysis. Improved topographical data comprising 2-foot contour intervals is recommended.
- Collect subsurface data in the north-central portion of the landslide where there is evidence of more recent slope movement and in the region near the toe of the landslide where stability analysis suggests potential instability under modeled conditions (Figure 4). Subsurface data should consist of a borehole drilling program observed by a qualified geotechnical engineer, in situ testing of soil strength, and sample collection and analysis by a geotechnical laboratory.
- Using results from the above recommendations refine stability modeling for the entire mapped landslide with emphasis on the north-central portion of the landslide where there is evidence of more recent slope movement and in the region near the toe of the landslide where stability analysis suggests potential instability under modeled conditions (Figure 4).
- A design level geotechnical study of the site should be completed prior to finalizing development plans with specific focus on results from refined slope stability analysis, areas of the mapped landslide that are potentially sensitive to modification, areas having steep slopes and the presence of a mine hazard area mapped by Kittitas County in the southwest corner of the site.[1]

[1] Holmson, Andrew J., Sullivan, William M., McCormack, David H., 2010, Forest Ridge Geological Hazard Assessment, Aspect Consulting, LLC, Bainbridge Island, WA, August 19, 2010.

411 North Ruby Street, Suite 1
Ellensburg, WA 98926
TEL (509) 962-7523
FAX (509) 962-7663

Public Works recommends these requirements become a condition of approval, as well as the following:

1. Second Access: A second access is required of this project. Prior to final approval, the applicant must submit a route that has easement or other access rights secured and recorded to Public Works for approval. The second access must conform to Kittitas County Road Standards and the second access requirements as clarified by the Board of County Commissioners on April 2, 2007. The BOCC clarified KCRS 12.01.095(2) with the following requirements: 1) If the second access is restricted to emergency access only, it must meet or exceed the following requirements: 60' easement, 20' roadway width, BST/ACP surface, and a paved apron. Access restrictions such as gates or bollards must be approved by the Fire Marshall; 2) If the second access is to be used for ingress and egress, it must meet the same standards of the first access.

   Kittitas County Public Works may apply additional conditions to the second access prior to approval. If the second access does not conform to Kittitas County Road Standards, the project may be required to be reopened to public comment due to changed circumstances.

2. Final Design: If the final design of the project changes because of geotechnical constraints or other reasons, the project will be re-evaluated for road construction requirements. Alterations to these requirements will be discussed and agreed upon by Public Works and the applicant.

3. Emergency Turnarounds: Provisions for temporary emergency turnarounds shall be made for all project phases, if needed. Permanent turnarounds shall be constructed wherever a road continues through the development to other properties. These locations include the roads serving lots 29-34, 35-40, 106-116, and 136-139.

4. Stormwater: On-site stormwater management that conforms to the specifications of the most current version of the Stormwater Management Manual for Eastern Washington is required of this development. Stormwater systems shall be designed to store stormwater generated by a 24-hour, 25-year storm event. Stormwater system designs shall be prepared and stamped by a civil engineer licensed in the State of Washington. The stormwater system design shall be presented to Public Works and approved by the County Engineer prior to final approval. The stormwater system construction shall be certified by a licensed engineer. The certification shall be included with the road certification and is required prior to the issuance of a building permit. Stormwater plans shall be submitted in accordance with KCC 12.06 and 12.08.

5. Grading Plan: A grading plan prepared by an engineer licensed in the state of Washington shall be presented to Public Works prior to final approval. Depending on the amount of fill to be removed from the site, a haul route and road condition analysis may be required prior

to approval of the grading plan. The grading plan shall be submitted in accordance with KCC 12.08, and shall be approved by the County Engineer.

6. Road Construction: All internal roads, Creekside Road and Forest Ridge Drive shall be constructed as a high-density road serving more than 40 lots. Engineered road plans shall be approved by the County Engineer prior to construction.

7. City of Cle Elum: The applicant shall comply with the following construction requirements from the City of Cle Elum:
   a. Potholes must be repaired on Columbia Avenue from First Street to Fourth Street as required by the City of Cle Elum prior to receiving final plat approval.
   b. A 2-inch overlay on Columbia Avenue from First Street to Fifth Street or end of existing pavement shall be construct prior to beginning construction of Phase 5.

8. WSDOT: The Revised Traffic Impact Analysis provided by the applicant studied both the Forest Ridge project and the City Heights project in Cle Elum. Based on the analysis performed by the applicant's consultant, the Level of Service (LOS) at the intersection of SR 903/SR 903 Spur will be reduced to LOS C with the Forest Ridge Development (this intersection is referred to as SR 970/SR 903 within the traffic study). The same intersection will be reduced to a LOS D with the development of just the City Heights project, or a LOS E with the City Heights and Forest Ridge projects, both unacceptable levels according to the Growth Management Act because they are below the adopted LOS standard. Therefore, the developer shall re-evalute traffic impacts of the Forest Ridge Development, including traffic impacts from other pipeline projects such as the City Heights project, on the SR 903/SR 903 Spur intersection prior to construction of the Forest Ridge Development Phase 5. If this intersection is estimated to operate below the LOS C standard, with the full build out of this project and other pipeline projects such as the City Heights project, then the developer of the Forest Ridge project will be required to contribute a proportionate share to the SR 903/SR 903 Spur intersection improvements as required by WSDOT.

9. Timing of Improvements: This application is subject to the latest revision of the Kittitas County Road Standards, dated 9/6/05. The following conditions apply and must be completed prior to the issuance of a building permit for any of the residence within this plat. A Performance Bond or acceptable financial guarantee may be used, in lieu of the required improvements, per the conditions outlined in the current Kittitas County Road Standards.
10. Private Road Certification: Private roads serving any of the lots within this development shall be inspected and certified by a licensed professional engineer for conformance with current Kittitas County Road Standards, 9/6/05 edition. Kittitas County Public Works shall require this road certification to be completed prior to the issuance of a building permit for any of the structures within the proposed plat.

11. Joint-Use Driveway: A joint-use access shall serve no more than two tax parcels. See Kittitas County Road Standards, 9/6/05 edition.
    a. Access easements shall be a minimum of 20' wide. The roadway width shall have a minimum width of 12'.
    b. The surface requirement is for a minimum gravel surface depth of 6".
    c. Maintenance of driveway approaches shall be the responsibility of the owner whose property they serve. The County will not maintain accesses.
    d. Any further subdivision or lots to be served by proposed access may result in further access requirements.

    Single-Use Driveway: A single-use access shall serve no more than one lot. See Kittitas County Road Standards, 9/6/05 edition.
    a. The roadway shall be a minimum of 8' wide with gravel surface.
    b. Maintenance of driveway approaches shall be the responsibility of the owner whose property they serve. The County will not maintain accesses.
    c. Any further subdivision or lots to be served by proposed access may result in further access requirements.

12. Cul-de-Sac: A cul-de-sac turn-around having an outside right-of-way or easement diameter of at least 110 feet shall be constructed at the closed end of all dead-end roads serving 3 or more lots. The driving surface shall be at least 96 feet in diameter. Cul-de-sacs must also conform to the requirements specified by the 2006 International Fire Code. Contact the Fire Marshal regarding any additional cul-de-sac requirements.

13. Private Road Maintenance Agreement: The applicant shall meet all applicable conditions of any pre-established or required Private Road Maintenance Agreements.

14. Lot Closure: It is the responsibility of the Professional Licensed Surveyor (PLS) to ensure the lot closures are correct and accurate.

15. Access Permit: An approved access permit shall be required from the Department of Public Works prior to creating any new driveway access or performing work within the county road right of way.

16. Addressing: Contact the Kittitas County Rural Addressing Coordinator at (509) 962-7523 to obtain addresses prior to obtaining a building permit. A parcel cannot receive a building permit or utilities until such parcel is identified with a 911 address.

17. Fire Protection: Contact the Kittitas County Fire Marshal regarding any additional access requirements for Emergency Response.

18. Mailbox Placement: The U.S. Postal Service requires that private roads with 6 or more residences install USPS approved Cluster Box Units (CBUs) at a safe location at the mouth of

the private road. Contact your local Post Office for location and additional design requirements before beginning construction.

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FOREST RIDGE
GEOLOGICAL HAZARD ASSESSMENT
Cle Elum, Washington

Prepared for: Sapphire Skies, LLC

Project No. 070207-003 • August 19, 2010

Aspect CONSULTING

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CDS

earth + water

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FOREST RIDGE
GEOLOGICAL HAZARD ASSESSMENT
Cle Elum, Washington

Prepared for: Sapphire Skies, LLC

Project No. 070207-003 • August 19, 2010

Aspect Consulting, LLC

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Executive Summary

Our geological hazards assessment of the proposed Forest Ridge development site (Site) includes a preliminary evaluation of slope stability of the mapped landslide occupying the eastern half of the Site, as well as other geological hazards consistent with the Kittitas County Code Geological Hazardous Areas chapter. To complete our geological hazards assessment, we reviewed existing data, conducted a field reconnaissance, collected subsurface data, and performed a slope stability analysis. Results of our assessment suggest slopes on a majority of the Site are stable. The region lying outside the mapped landslide is interpreted to be stable, except where small, localized slope failures are present. The central and eastern portions of the mapped landslide appear to be stable under static (non- earthquake) conditions. Two areas within the mapped landslide require additional study to ascertain the degree of slope stability: (1) an area in the north central portion of the landslide that geomorphic evidence suggests was active more recently; and (2) an area in the south central portion of the landslide that the stability model suggests may become unstable under modeled conditions. Other geological hazards addressed in this assessment do not preclude development at the Site.

1 Introduction

This report presents the results of a geological hazards assessment performed by Aspect Consulting, LLC (Aspect) for the proposed Forest Ridge development project (Site) in Kittitas County, Washington. The Site location is illustrated on Figure 1.

The purpose of this study is to identify geological hazards that can present constraints to the conceptual development plans on the Forest Ridge property (Forest Ridge) located outside the urban growth boundary (UGA), approximately one-half-mile north of Cle Elum. This report summarizes the results of our data collection and evaluations for the proposed project. Recommendations for further study are provided.

2 Scope/Authorization

This evaluation was completed in accordance with our proposal dated April 8, 2010 that was authorized on April 16, 2010. Our initial scope included this reconnaissance-level study addressing steep slopes and overall geological hazards at the Site consistent with the Kittitas County Code Geological Hazardous Areas chapter including seismic hazards, debris flows, talus slopes , snow avalanche, and volcanic activity hazards and a limited review of the presence of mine hazard areas. The initial scope did not address geological hazards, including slope stability on a site-specific or parcel-by-parcel basis, did not

include subsurface investigation or quantitative analyses, did not map engineering soils across the Site beyond existing geologic mapping efforts, and did not provide geotechnical recommendations intended for use during design.

The initial scope was amended to include evaluation of the mapped landslide located on the eastern half of the Site. Amendments include a preliminary slope stability analysis of the mapped landslide through Contract Change No. 1 authorized on May 3, 2010 and follow-on slope stability analysis incorporating results of a subsurface investigation and laboratory analysis through Contract Change No. 2 authorized on May 21, 2010.

2.1 Project Understanding

We understand the proposed development is for 170 lots on the 480-acre Forest Ridge property that will require plat approval from Kittitas County. A conceptual platting plan, including proposed lot lines and access roads, was provided by Encompass Engineering (Figure 2). We understand that due to the presence of a mapped landslide at the Site, Kittitas County has indicated a geological hazards assessment for the Site is required per Chapter 17A.06, Kittitas County Code (Geologically Hazardous Areas).

3 Site Conditions

The Site occupies the northern three-quarters of Township 20, Range 15, Section 24 (480 acres) in a forested and lightly-developed area north of Cle Elum. The northern and southern boundaries measure approximately 1 mile, and the western and eastern boundaries measure approximately 0.75 mile. The following sections describe the Site conditions in greater detail.

The Site is undeveloped, with no buildings identified on the property. The Site is accessed from Columbia Avenue in Cle Elum. Site improvements consist of a gravel-surfaced road located along the western Site boundary. All other roads on the Site are previously existing, unimproved logging, or off-road-vehicle roads.

3.1 Topography

The Site is located in an upland region above the Yakima River valley, on the south face of Cle Elum Ridge, approximately 1.5 miles north of the river. Elevation increases to the north across the Site toward Cle Elum Ridge. Ground surface elevations at the Site generally range from 2,250 to 2,950 feet. Total relief is approximately 700 feet. The western half of the Site is comprised of two south-to-southeast plunging ridges. These ridges are separated by drainages, including Steiners Canyon, that create local relief up to 100 feet with slopes up to 60 percent. The eastern half of the Site contains more subdued topography and generally slopes southeast. In the eastern half, terrain is hummocky, common consists of rounded knolls, and contains some closed depressions. A southwest plunging ridge occupies the southeast corner of the Site. Steep slopes are present at the Site and are described in *Section 5, Geological Hazards and Recommendations*. Recent

modifications to topography include cut slopes and embankments related to road construction.

3.2 Drainage

Several small drainages generally oriented south-to-southeast initiate or pass-through the Site. The deeply-incised Steiners Canyon drains much of the western portion of the Site, lying west of the mapped landslide. Several smaller, less-incised drainages (relief up to 60 feet) converge on the mapped landslide, forming a single drainage that conveys surface water from the mapped landslide. This drainage and the Steiners Canyon drainage converge approximately 1,000 feet to the south of the Site, near the southern extent of the mapped landslide. No evidence of rapid rates of erosion, including debris flows, was observed in any of the drainages present on Site or in the mapped landslide.

Small volumes of water were observed in nearly all drainages during our April 27 reconnaissance, and shallow pools of intermittent standing water were observed in some closed depressions in the eastern half of the Site.

3.3 Vegetation

Vegetation throughout the Site primarily consists of open pine and fir forests. Riparian vegetation including willows, cottonwood, and aspen is present along drainages and near closed depressions where standing water was observed. Timber has been removed during commercial harvest across much of the Site, using selective and clear cut methods. Much of the Site is covered with young trees and saplings that mostly post-date timber harvest that occurred primarily over the past three decades. Areas with little or no vegetation were observed in the north-central region of the mapped landslide and where topography has been modified along unimproved dirt roads.

3.4 Geology

The following sections describe the regional and Site-specific geologic history and soil and bedrock units.

3.4.1 Site Geology

Site geology is mapped by Tabor, et al. (1982) as bedrock and unconsolidated landslide deposits (Figure 3). Unconsolidated materials consisting of landslide deposits are mapped in the eastern half of the Site. The landslide is mapped as having a direction of movement to the southeast. Glacial deposits including till, lacustrine (glacial lake) deposits and outwash are mapped near the Site, and the field reconnaissance indicates occasional glacial deposits are locally present at the Site. Bedrock residuum, a soil-like deposit resulting from weathering of Roslyn Formation rocks, overlies bedrock to varying depths.

Bedrock at the Site is mapped as the arkosic non-marine sedimentary upper member of the Roslyn Formation, deposited during the Eocene epoch (Tabor, et al., 1982). The Roslyn Formation is generally fine- to medium-grained sandstone, thinly bedded to laminated with siltstone with occasional coal seams. Roslyn Formation bedrock is mapped in the western half and southeast corner of the Site and presumably lies beneath

the landslide deposits in the central portion of the Site. Bedrock strata generally dip to the south at angles less than 15 degrees (Walker, 1980).

Several tectonic structures are present in the Site vicinity. Cle Elum Ridge, located within the upper Kittitas Valley, is one of several large synclinal structural basins within the Yakima Fold Belt. The Site lies in the middle elevations of the south face of Cle Elum Ridge, on a limb of an asymmetric anticline in Tertiary sedimentary bedrock. Other structures mapped within 1 to 3 miles of the Site include two concealed synclines and a concealed anticline (Tabor et al., 1982) south and southwest of the Site, and one concealed syncline to the southeast.

No faults are mapped or observed on the Site. Several east-west trending faults are mapped in the Site vicinity. Faults present in the Site vicinity are associated with uplift of the Cascades and folding of the Yakima Fold Belt.

3.4.2 Site Engineering Geologic Units

Four general engineering geologic units are present at the Site. The engineering soil and rock units are distinct from the general units of Tabor, et al. (1982), are based upon material behavioral characteristics, and are described below, in order from youngest to oldest. We based our interpretations of subsurface conditions on the results of our surface reconnaissance, review of available geologic and geotechnical data, and our general experience in similar geologic settings.

Landslide Deposits

Landslide deposits formed by mass wasting processes at the Site are concealed by a layer of soil that formed after deposition and no exposures were observed during our surface reconnaissance. In the field, the presence of landslide deposits was interpreted from geomorphic landforms including hummocky terrain, slumps, and scarps. Field observations are consistent with the texture and extent of landslide deposits mapped by Tabor, et al. (1982).

Glacial Deposits

Glacial deposits are believed to have originated from Quaternary alpine glaciations in the Kittitas Valley, covering the Yakima River valley floor and portions of the slopes on both sides of the valley including Cle Elum Ridge. Glacial deposits overly bedrock and bedrock residuum. Although glacial deposits are not mapped at the Site, the proximity of mapped glacial till at elevations lying above the Site and field observations suggest glacial deposits are present in localized areas across the Site. Glacial till consisting of boulder diamicton (poorly-sorted mixtures of clay-sized through boulder-sized textures) is mapped on Cle Elum Ridge by Tabor, et al. (1982) as near as 1.5 miles east of the Site to elevations of 3,400 feet. Evidence of glacial deposits at the Site, including scattered sub-angular cobbles and boulders having diverse lithologies were observed during our surface reconnaissance. The thickness and extent of glacial deposits on the Site were not determined.

Residuum

Bedrock residuum consists of soil-like deposits formed from the in situ weathering of sedimentary bedrock. It generally becomes less weathered and harder with depth,

eventually grading to bedrock. Locally, residuum consists primarily of silty fine to medium sand and sandy silt, and may contain clay. Residuum color typically grades from brown to gray. Observations from surface reconnaissance and boreholes and well logs from water wells suggest residuum overlies bedrock across most of the Site. Borehole observations indicate the thickness of silty sand and sandy silt bedrock residuum ranges from being absent to 15 feet on the mapped landslide (Appendix A).

Sedimentary Bedrock

Observations from surface reconnaissance and boreholes and well logs for existing water wells indicate sedimentary bedrock is present across the Site (Figure 3 and Appendix B) consistent with descriptions and mapping by Tabor, et al. (1882) for the upper member of the Roslyn Formation. Sedimentary bedrock was observed cropping out at the surface in the northwest corner of the Site, in road cuts along the western side of the Site and in the north-central region of the mapped landslide. A coal seam is mapped on the mapped landslide (Walker, 1980) and coal was observed in the north-central region of the mapped landslide on the surface. A 2-foot-thick coal seam was observed in Borehole Number 3 (Appendix A) and is recorded in the well log for water well APB 228 (Appendix B). Except where exposed in outcrops, sedimentary bedrock is mantled by residuum that is overlain in places by glacial deposits to a depth up to 32 feet (Appendix B).

3.5 Groundwater

This discussion of groundwater conditions at the project Site is based on observations made during drilling of boreholes and review of water well logs on file at the Department of Ecology (Appendix B).

Groundwater originates from direct recharge to the Site and region lying upgradient of the Site extending to the crest of Cle Elum Ridge. Groundwater is expected to flow generally to the south, toward the Yakima River valley. The thin unconsolidated deposits overlying bedrock are generally unsaturated and groundwater occurrence is generally limited to the bedrock. Areas of perched groundwater may occur within unconsolidated deposits or at the contact with underlying bedrock during the wet season. Lower elevation portions of the Site including lower elevations of the mapped landslide and the bottom of the stream drainages, are more likely to contain groundwater near the surface. Groundwater was observed in Borehole Number 4. Borehole Number 4 is located near the bottom of a small surface water drainage within the mapped landslide and several groundwater seeps were observed nearby. Groundwater level measurements taken from a piezometer installed at this borehole ranged from 7.60 feet to 8.02 feet below the top of casing on June 22 and July 20, respectively, and groundwater may rise to near ground surface during the wettest periods. Evidence of groundwater was not observed in the other in any of the other boreholes. Evidence of springs including seeps and well-established cottonwood and aspen trees was observed on the mapped landslide in the drainage bottoms and on the toe of the landslide, immediately south of the Site where a pond has been established at an existing residence. A flowing spring was observed during our April 27 Site reconnaissance in the middle of the recently-improved gravel road in the southwest corner of the Site.

All water wells at the Site are completed in bedrock. Water levels recorded in water well logs taken at the time of drilling range from 35 feet to 63 feet below ground surface (bgs) for the two wells located on the mapped landslide and from 43 feet to 500 feet bgs for wells located outside the mapped landslide (Appendix B). Elevations for water levels in wells located on the mapped landslide are generally consistent with elevations of adjacent drainage bottoms, indicating groundwater mounding between drainages on the landslide is small.

4 Methodology

Our geological hazards assessment consisted of data collection, preliminary slope stability modeling guiding a targeted subsurface investigation, and follow-on stability modeling using data from the subsurface investigation.

4.1 Data Collection

Data collection consisted of a review of existing documents containing topographical, geological, air photo and well log data; discussion with the Kittitas County Engineer; surface reconnaissance; and a subsurface investigation. A listing of key references reviewed is contained in *Section 6,References*. A surface reconnaissance was conducted by Aspect staff on April 27, 2010 to characterize general Site geologic conditions, identify potential geologic hazards, and to confirm conditions identified during the document review. A follow-on surface reconnaissance was conducted on July 20, 2010, specifically to examine surface conditions at the mapped landslide and to confirm results of preliminary slope stability modeling.

Our subsurface investigation consisted of drilling four boreholes to depths of 11 feet to 35 feet, using a track-mounted hollow-stem auger (HSA) drilling rig operated by Holocene Drilling at locations determined from preliminary slope stability modeling (Figure 3). Results were used to obtain Site-specific input parameters for stability analysis and for model calibration. Aspect staff directed and observed borehole drilling on June 7 and 8, 2010 and recorded subsurface observations in borehole logs (Appendix A). Boreholes were drilled through unconsolidated soil materials and into bedrock except for Borehole Number 4 that was drilled through unconsolidated deposits and terminated upon encountering bedrock. A piezometer installed in Borehole Number 4 was completed in unconsolidated soil material and groundwater levels were measured on June 22 and July 20, 2010. In all boreholes, in situ soil strength was tested at 5-foot intervals using a drive-sampler with 3-inch outside diameter (OD) split-spoon sampler driven by a 140-pound hammer. Where sufficient geologic material was returned to the surface, free and brass-ring samples were collected.

Upon reviewing borehole logs, samples were selected and submitted for analysis to Hayre McElroy & Associates geotechnical laboratory. Laboratory testing including sieve, Atterberg Limits, and direct shear analyses were performed to classify textures and

examine the behavior and strength characteristics of geologic material comprising the landslide mass. Appendix C includes the full laboratory test results.

4.2 Geomorphic Analysis

Geomorphic analysis consisted of reviewing data collected during Site reconnaissance visits, topographical data and reviewing stereo pair aerial photographs of the Site. We selected photos from June 1990, taken shortly after much of the Site had been logged and ground features were well exposed. Features indicative of landslides were then plotted and compared to features delineated by others (Tabor, et al., 1982).

4.3 Slope Stability Modeling

Slope stability and potential failure mechanisms at the mapped landslide occupying the eastern half of the Site were examined using the SLIDE version 5.039 (Rocscience, 2009) analytical model. The SLIDE program performs slope stability computations based on the modeled slope conditions, and calculates a factor of safety against slope failure, F, defined as:

$$F = s/\tau$$

where "s" is the available shear strength of the soil and "τ" is the shear stress required for "just-stable" equilibrium. A "just-stable" equilibrium condition would result in a factor of safety of one, while an unstable condition would result in a factor of safety less than one. The SLIDE program uses multiple methods to determine the factor of safety. We selected Spencer's, Bishop's simplified, and Janbu simplified methods (Rocscience, 2009) to be used by the model in determining the factor of safety.

Our stability analysis was conducted considering slope geometry derived from a USGS digital elevation model having topographical data with 50-foot contour intervals, subsurface conditions developed based on our field explorations and surface reconnaissance, laboratory testing, and engineering analysis. The soil engineering properties assumed for the model are summarized in Table 1. Landslide thickness was assumed to range from 60 feet near the toe to 25 feet in the upper portion of the slide, based on observations from our surface reconnaissance and subsurface investigation and examination of water well logs. To model the various topographic, hydraulic, and geologic conditions at the Site, we used multiple Site cross sections and slope models and applied conditions simulating elevated groundwater levels and seismic events. Section lines that were analyzed are shown in Figure 3. The effect on stability of elevated groundwater was examined using the conservative assumption that the water table saturates ground surface across the entire landslide. Under actual field conditions, the groundwater table likely comprises a plane approximately 20 feet bgs in the upper portion of the landslide and the potential for surface saturation is likely limited to drainage bottoms and the lower portion of the landslide, where evidence of springs is more prevalent. The effects of seismic events on stability were examined using USGS seismic-hazard deaggregations for 500- and 2,500-year events, as described in *Section 5, Geological Hazards and Recommendations*.

Table 1 – Summary of Soil Engineering Properties Used in Slope Stability Analyses

Geologic Unit	Total Unit Weight		Strength Parameters	
	Moist (pcf)	Saturated (pcf)	Friction Angle (deg.)	Cohesion (psf)
LANDSLIDE DEBRIS	120	130	8.5	300
Weathered BEDROCK	130	140	35	500

Notes:
1) pcf = pounds per cubic foot and psf = pounds per square foot

The engineering properties summarized in Table 1 and used in our analyses are primarily based on laboratory strength tests performed on relatively undisturbed samples obtained during our subsurface explorations. Additionally, we used industry-reported correlations that convert 3-inch OD sampler blow counts to Standard Penetration Test (SPT) N-values, converted index test (Atterberg limits, etc.) results to develop material parameters for the model and applied our experience in similar geologic settings to generate the engineering properties. The properties were adjusted and verified to some degree by back calculation.

The results of our stability analyses for the existing conditions are summarized in Figure 3.

5 Geologic Hazards and Recommendations

Geological hazards at the Site were evaluated based on our data collection, our understanding of the proposed development, the pertinent critical areas ordinance Chapter 17A.06, Kittitas County Code and discussions with the Kittitas County Engineer. No project-specific geological hazards are present from talus slopes, snow avalanche, or volcanic activity. No evidence was observed of debris flow hazards.

5.1 Mine Hazard Areas

No evidence was observed from review of critical areas mapped by Kittitas County (Kittitas County, 2010) regarding the extent of coal mining in the Site vicinity and from our surface reconnaissance to indicate the presence of mine hazard areas on the vast majority of the Site; however, Kittitas County mapping indicates the presence of a coal mine shaft hazard on 4 acres in the southwest corner of the Site.

5.2 Seismic Hazards

Surface fault rupture, amplification of strong shaking, liquefaction and seismic slope failure were considered as potential seismic hazards that could affect the Site, and are discussed below.

5.2.1 Surface Fault Rupture

No surface faults are mapped and no evidence of surface fault rupture was observed on-site. Two faults are mapped approximately 4 miles south of the Site (Tabor, et al., 1982 and WDNR, 2009). These faults trend west-northwest and dip nearly vertically to the north. A fault of unknown age was identified in underground mine workings in the Roslyn No. 5 Mine, west of the Site (Saunders, 1914).

In our opinion, the relative risk of fault rupture at the surface of the Site is low due to the distance to known active faults, and it is unlikely that development plans will require explicit design for this risk.

5.2.2 Ground Shaking

Earthquakes are likely to occur at the Site over the design life of the project. Building codes require designing structures to a specific level of seismic risk, typically ranging from a 2 to 10 percent probability of being exceeded in a 50-year period. These probabilities of exceedance can also be expressed as 2,475- and 475-year return-period events, respectively.

Based on the United States Geologic Survey (USGS) 2002 National Seismic Hazards Mapping Project, the peak bedrock acceleration indicated for a 475-year event at the Site is 14 percent of gravitational acceleration (0.14g). A 2,475-year return period seismic design event would yield a peak bedrock acceleration of 0.27g. These events correspond to Magnitude 5.2 and 6.2 events, respectively.

5.2.3 Liquefaction

Liquefaction occurs when loose, saturated and relatively cohesionless soil deposits temporarily lose strength as a result of earthquake shaking. Potential effects of soil liquefaction include temporary loss of bearing capacity and lateral soil resistance, and liquefaction-induced settlement, any of which could result in significant structural damage. Primary factors controlling the development of liquefaction include intensity and duration of strong ground motion, characteristics of subsurface soil, in-situ stress conditions and the depth to groundwater.

Based on our characterization of Site conditions, it is our opinion that the potential for liquefaction to impact the development is low. Most of the surface conditions across the Site consist of shallow soil cover over bedrock. The region within the mapped landslide generally consists of medium dense to dense bedrock residuum and bedrock and cohesive landslide deposits. Except in drainage bottoms or near the toe of the landslide, where soils can be saturated, liquefaction potential is low. However, if development plans call

for buildings in these areas[1], specific geotechnical evaluations will be necessary to confirm the lack of liquefaction hazards.

5.2.4 Seismic Slope Failure

Seismic shaking could lead to slope failure in slopes comprised of loose, unconsolidated sediments. The greatest hazard from seismic slope failure exists in steep slopes where unconsolidated deposits overlie bedrock. Seismic slope failure hazards can be mitigated by development setbacks. Hazards from steep slopes are discussed in greater detail below.

5.3 Steep Slopes

The critical areas ordinance Chapter 17A.06, Kittitas County Code does not define a specific gradient for steep slopes. A slope gradient of 25 percent could present a moderate risk of failure where unconsolidated soils overlie bedrock. On-site slopes greater than 25 percent shown in Figure 2 are primarily located in drainages, including Steiners Canyon and along lateral scarps associated with the mapped landslide. Steep slopes are also present in the north-central region of the mapped landslide (Figure 2).

5.4 Landslides

Approximately half of the Site is mapped as a landslide (Tabor, et al., 1982). Based on observations of surface conditions and boreholes and topographic and geologic data (Walker, 1980), this landslide appears to be a deep-seated bedrock dip-slope failure that initiated along a weaker layer of the Roslyn Formation. Our observations of geomorphic features and landslide deposits from surface reconnaissance and examination of topographic maps and stereo pair air photos generally confirm the mapped extent of the slide mass. The surface of the landslide contains geomorphic features commonly associated with mass wasting landscapes including "hummocky terrain" consisting of rounded knolls and closed depressions (sags), scarps, slumps and linear troughs oriented perpendicular to slope. These features are most pronounced in the north-central region of the Site and extending off-site to the north.

The landslide mass is bounded to the east by a northeast-trending lateral scarp and to the west by a northwest-trending lateral scarp forming the boundaries of the mapped landslide (Figures 2 and 3). The headscarp lies primarily to the north and northwest of the Site and a small north-to-south trending portion of the head scarp may be present in the northwestern portion of the Site. A north-trending secondary scarp lies in the northeast corner of the Site. The toe of the landslide is located off-site, approximately 1,000 feet to the south. The toe is bulbous, relatively well-defined and is constrained on two sides by the walls of a large drainage that apparently pre-dates the landslide. The Steiners Canyon drainage and an unnamed drainage conveying water from the mapped landslide converge at the base of the landslide toe which stands approximately 60 feet above the drainage bottom (Figure 3).

[1] Refer to the Landslides section for further discussions on development limitations in these areas.

Observations from three of four boreholes drilled during our subsurface investigation (Borehole Numbers 1 through 3) indicate much of the landslide is comprised of silty sand and sandy silt interpreted as a veneer of bedrock residuum over large, in-tact bedrock landslide blocks (Appendix A). No evidence of slide debris or a failure surface was observed in these boreholes. Observations from Borehole Number 4, consisting of clayey silt with sub-angular siltstone and sandstone gravel overlying unweathered siltstone bedrock, are interpreted as collvuium and/or landslide debris over bedrock of the Roslyn Formation with the lower portion of the sheared slide debris representative of a failure surface.

Evidence that the age of initiation of the mapped landslide is likely on the order of thousands of years includes:

- Subdued topographic characteristics of scarp surfaces including rounded lateral scarps that have eroded sufficiently to a radius of approximately 40 to 50 feet at the top of the scarp;
- Well-developed drainages on the surface of the landslide lacking evidence of rapid erosion and recent incision; and
- Well-developed soils supporting native vegetation cover with density and age that are indistinguishable from areas adjacent to the landslide.

There is evidence of a more recent internal slope failure located in the north-central portion of the mapped landslide extending off-site to the north. The approximate extent of this area is shown in Figure 4. This region is characterized by landslide morphology that is more pronounced than observed on the rest of the landslide including steeper scarp surfaces, knolls and sags and closely-spaced linear troughs oriented perpendicular to slope. Soils are poorly developed and bare mineral soil is exposed on the tops of knolls and on slopes. Vegetation is relatively sparse, favoring low-lying areas where soil development proceeds more rapidly. Tree stumps harvested over the past few decades provide a minimum bounding age for slope movement in this region on the order of 200 to 300 years; however, it was not determined whether subsequent slope movement has occurred or is occurring. No boreholes were drilled within the extent of this area of more recent slope movement.

Results of our surface reconnaissance and stability modeling (Figure 3) suggest the slopes on a majority of the Site are stable under static conditions including the region lying outside the mapped landslide and most of the mapped landslide. Assuming a design criterion representing a 500-year seismic event, stability modeling indicates the overall mapped landslide is sufficiently stable to support the proposed conceptual development and the risk of the landslide reinitiating along its original failure surface is low. Additional study is required to assess the stability of two areas located within the mapped landslide (Figure 4): the area of more recent slope movement located in the north-central portion of the landslide and the area located near the toe of the landslide that stability modeling indicates could become unstable under modeled conditions for high groundwater and seismic events (Figure 3).

5.5 Other Landslides

A recent shallow slope failure in bedrock residuum over weak sedimentary bedrock occurred in a road cut located in the northwest corner of the Site, where a gravel road was constructed in 2009. Slope failure is reported by the property owner to have occurred sometime during the winter following construction. The recent excavation of the road cut likely contributed to instability of the slope during a period of high soil saturation. Additional geotechnical investigation is recommended to develop specific mitigation measures required to stabilize the slope.

Other localized slope failures of varying ages may be present at the Site, however, none are identified to substantially impact proposed development plans.

5.6 Recommendations

The following recommendations for additional study are provided to support conceptual development of the Site:

- Obtain improved topographical data for the entire landslide to permit more detailed examination of geomorphological features. Improved topographic data will support further delineation of areas on the mapped landslide requiring additional study, identification of landslide features and will provide input for refining and confirming results of the stability analysis. Improved topographical data comprising 2-foot contour intervals is recommended.
- Collect subsurface data in the north-central portion of the landslide where there is evidence of more recent slope movement and in the region near the toe of the landslide where stability analysis suggests potential instability under modeled conditions (Figure 4). Subsurface data should consist of a borehole drilling program observed by a qualified geotechnical engineer, in situ testing of soil strength, and sample collection and analysis by a geotechnical laboratory.
- Using results from the above recommendations, refine stability modeling for the entire mapped landslide with emphasis on the north-central portion of the landslide where there is evidence of more recent slope movement and in the region near the toe of the landslide where stability analysis suggests potential instability under modeled conditions (Figure 4).
- A design-level geotechnical study of the Site should be completed prior to finalizing development plans with specific focus on results from refined slope stability analysis, areas of the mapped landslide that are potentially sensitive to modification, areas having steep slopes and the presence of a mine hazard area mapped by Kittitas County in the southwest corner of the Site.

6 References

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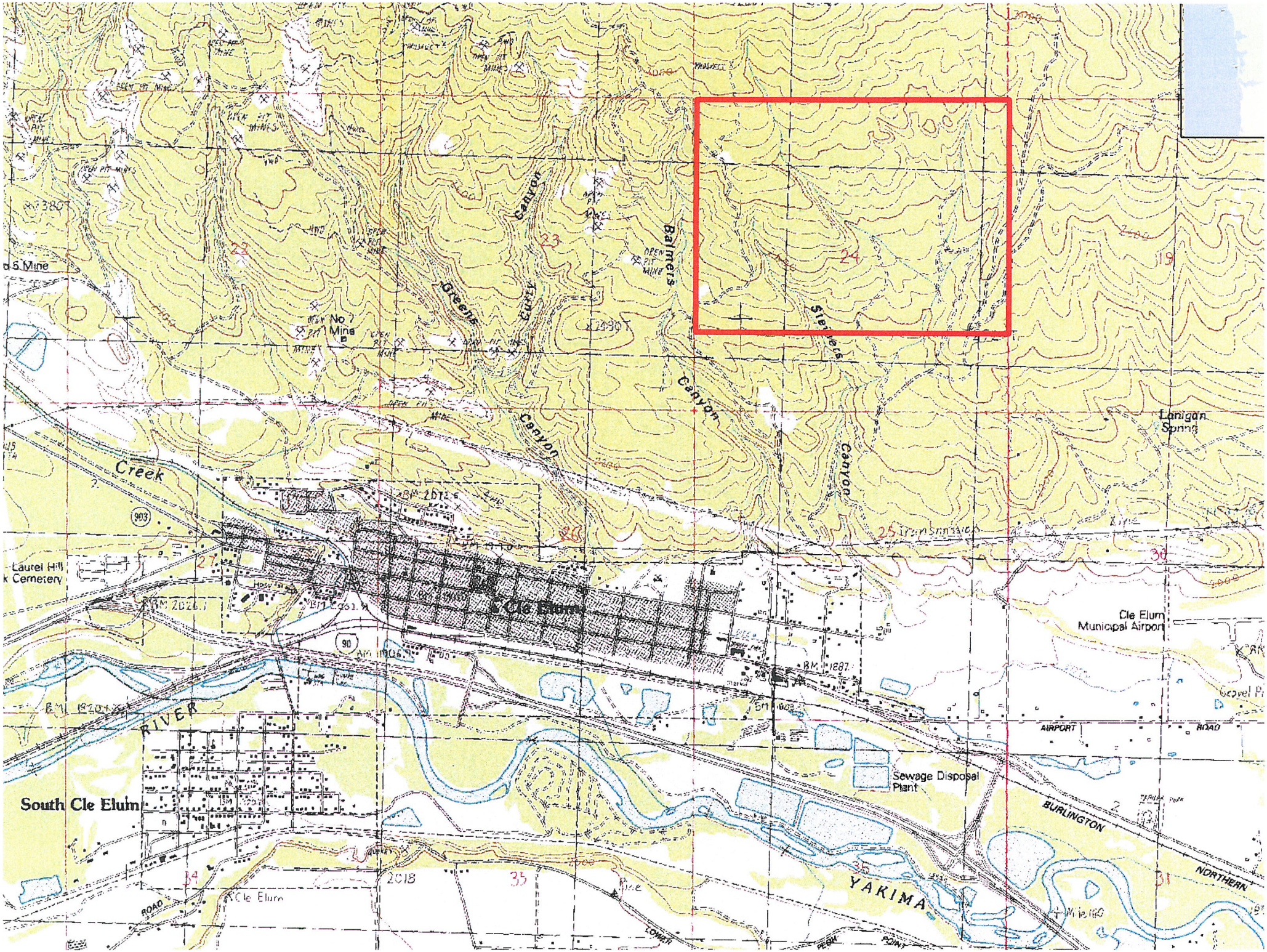
Washington DNR Division of Geology and Earth Resources (WDNR), 2009, Washington Interactive Geologic Map, 2009, online at: http://wigm.dnr.wa.gov/.

Limitations

Work for this project was performed and this report prepared in accordance with generally accepted professional practices for the nature and conditions of work completed in the same or similar localities, at the time the work was performed. It is intended for the exclusive use of Sapphire Skies, LLC for specific application to the referenced property. This report does not represent a legal opinion. No other warranty, expressed or implied, is made.



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ROAD
BURLINGTON
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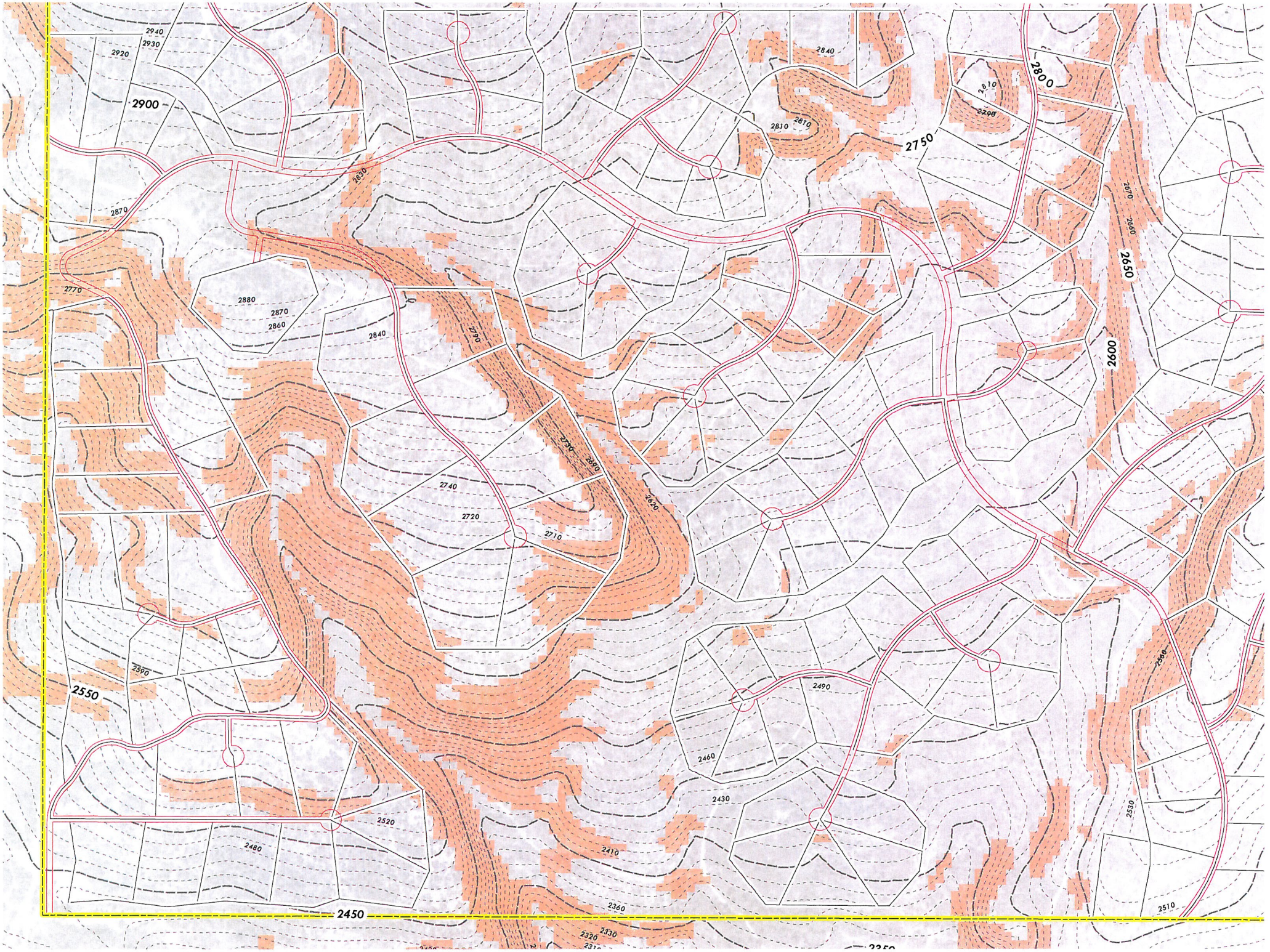
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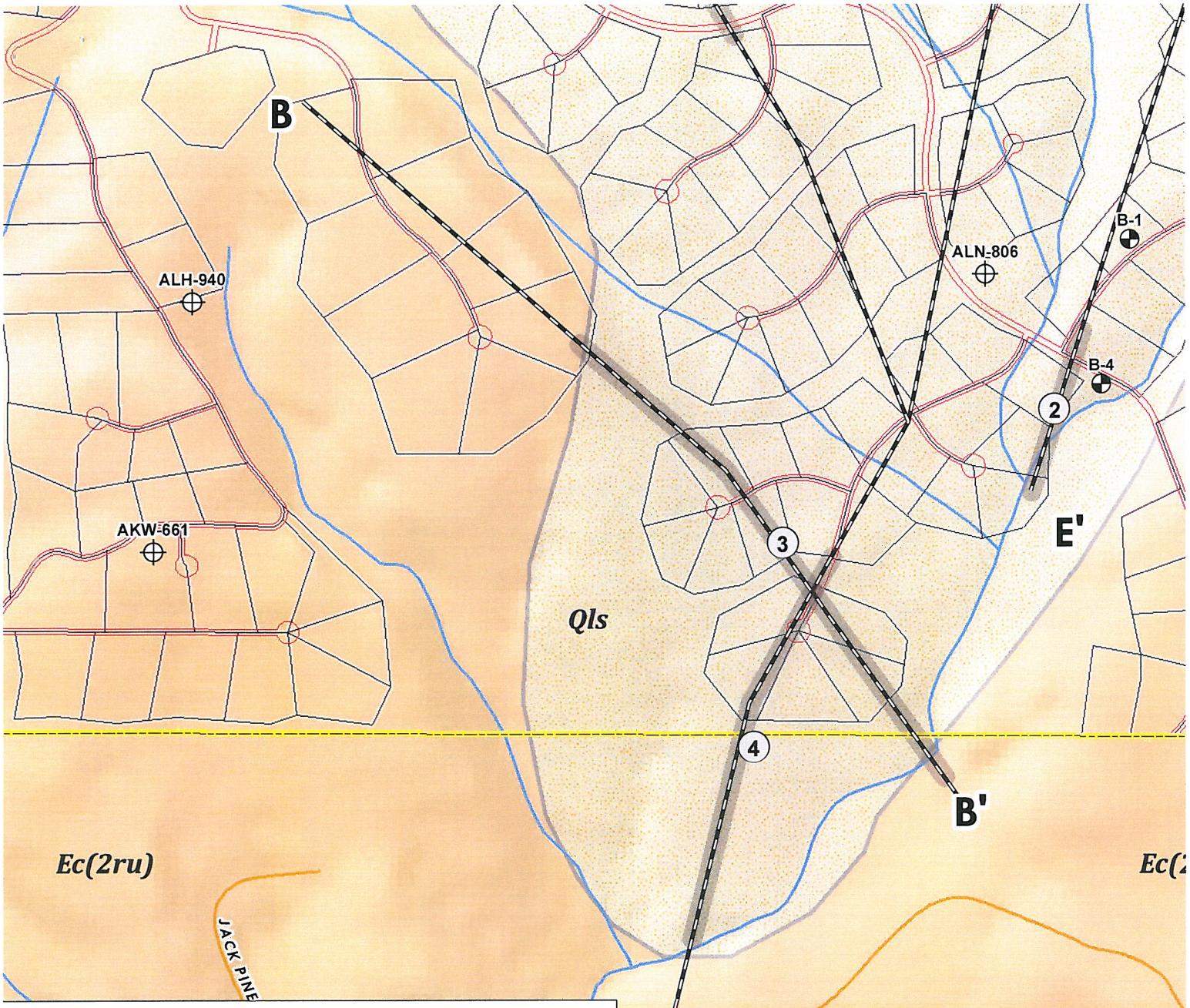


Slope Stability Analysis Results – Existing Conditions

	Minimum Factor of Safety[4]		
t*	Static†	475-year‡	2,475-year**
	1.6	1.6	1.2
	1.6	1.2	0.9
	1.6	1.0	0.8
	1.0-1.2	0.8	0.6-0.9

2600
2800
2800
2450
2500
2650
2900

APPENDIX A

Borehole Logs

Coarse-Grained Soils - More than 50% (1) Retained on No. 200 Sieve	Gravels - More than 50% (1) of Coarse Fraction Retained on No. 4 Sieve	≤ 5% Fines (5)	GW	Well-graded gravel and gravel with sand, little to no fines
			GP	Poorly-graded gravel and gravel with sand, little to no fines
		≥ 15% Fines (5)	GM	Silty gravel and silty gravel with sand
			GC	Clayey gravel and clayey gravel with sand
	Sands - 50% (1) or More of Coarse Fraction Passes No. 4 Sieve	≤ 5% Fines (5)	SW	Well-graded sand and sand with gravel, little to no fines
			SP	Poorly-graded sand and sand with gravel, little to no fines
		≥ 15% Fines (5)	SM	Silty sand and silty sand with gravel
			SC	Clayey sand and clayey sand with gravel
Fine-Grained Soils - 50% (1) or More Passes No. 200 Sieve	Silts and Clays Liquid Limit Less than 50		ML	Silt, sandy silt, gravelly silt, silt with sand or gravel
			CL	Clay of low to medium plasticity; silty, sandy, or gravelly clay, lean clay
			OL	Organic clay or silt of low plasticity
	Silts and Clays Liquid Limit 50 or More		MH	Elastic silt, clayey silt, silt with micaceous or diato-maceous fine sand or silt
			CH	Clay of high plasticity, sandy or gravelly clay, fat clay with sand or gravel
			OH	Organic clay or silt of medium to high plasticity
Highly Organic Soils			PT	Peat, muck and other highly organic soils

Terms Describing Relative Density and Consistency

	Density	SPT (2) blows/foot
Coarse-Grained Soils	Very Loose	0 to 4
	Loose	4 to 10
	Medium Dense	10 to 30
	Dense	30 to 50
	Very Dense	>50

	Consistency	SPT (2) blows/foot
Fine-Grained Soils	Very Soft	0 to 2
	Soft	2 to 4
	Medium Stiff	4 to 8
	Stiff	8 to 15
	Very Stiff	15 to 30
	Hard	>30

Test Symbols

FC = Fines Content
G = Grain Size
M = Moisture Content
A = Atterberg Limits
C = Consolidation
DD = Dry Density
K = Permeability
Str = Shear Strength
Env = Environmental
PiD = Photoionization Detector

Component Definitions

Descriptive Term	Size Range and Sieve Number
Boulders	Larger than 12"
Cobbles	3" to 12"
Gravel	3" to No. 4 (4.75 mm)
Coarse Gravel	3" to 3/4"
Fine Gravel	3/4" to No. 4 (4.75 mm)
Sand	No. 4 (4.75 mm) to No. 200 (0.075 mm)
Coarse Sand	No. 4 (4.75 mm) to No. 10 (2.00 mm)
Medium Sand	No. 10 (2.00 mm) to No. 40 (0.425 mm)
Fine Sand	No. 40 (0.425 mm) to No. 200 (0.075 mm)
Silt and Clay	Smaller than No. 200 (0.075 mm)

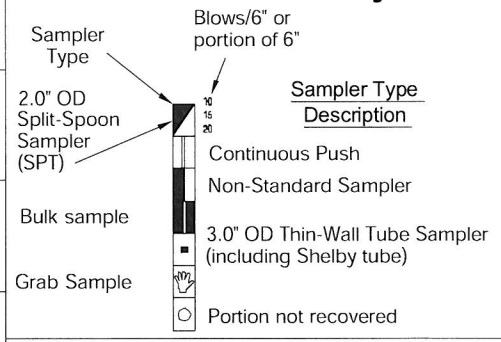
(3) Estimated Percentage

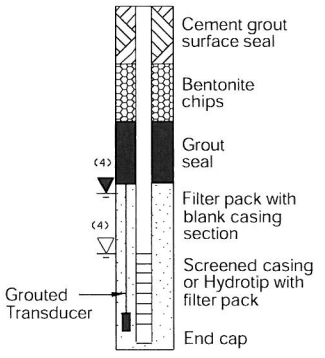
Percentage by Weight	Modifier
<5	Trace
5 to 15	Slightly (sandy, silty, clayey, gravelly)
15 to 30	Sandy, silty, clayey, gravelly)
30 to 49	Very (sandy, silty, clayey, gravelly)

Moisture Content

Dry - Absence of moisture, dusty, dry to the touch
Slightly Moist - Perceptible moisture
Moist - Damp but no visible water
Very Moist - Water visible but not free draining
Wet - Visible free water, usually from below water table

Symbols





(1) Percentage by dry weight
(2) (SPT) Standard Penetration Test (ASTM D-1586)
(3) In General Accordance with Standard Practice for Description and Identification of Soils (ASTM D-2488)
(4) Depth of groundwater — ATD = At time of drilling; Static water level (date); BGS = below ground surface
(5) Combined USCS symbols used for fines between 5% and 15% as estimated in General Accordance with Standard Practice for Description and Identification of Soils (ASTM D-2488)

Classifications of soils in this report are based on visual field and/or laboratory observations, which include density/consistency, moisture condition, grain size, and plasticity estimates and should not be construed to imply field or laboratory testing unless presented herein. Visual-manual and/or laboratory classification methods of ASTM D-2487 and D-2488 were used as an identification guide for the Unified Soil Classification System.

Aspect CONSULTING

Exploration Log Key

DATE
DESIGNED BY
DRAWN BY
REVISED BY

PROJECT NO.

FIGURE NO.
A-1

Q:\ ACAD Standards\Standard Details\Exploration Log Key A1.dwg

Aspect consulting
earth + water

Boring Log

Project Number	Boring Number	Sheet
070207	B-1	1 of 1

Project Name: Forest Ridge
Location: Cle Elum, Washington
Driller/Equipment: Holocene / Track-Mounted Drill / 6-inch O.D. HSA
Drilling Method/Hammer: 3-inch O.D. Split Spoon Sampler / 140 lbs / 30" Drop

Ground Surface Elev
Depth to Water (ft BGS)
Start/Finish Date 6/7/2010

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	Blows/ 6"	N-value ▲ Water Content % ● (0 10 20 30 40 50)	Material Type	Description	Depth (ft)
0							Moist, dark brown, clayey SILT (ML); trace sand, numerous organics [REWORKED NATIVE FILL].	0
1								1
2								2
3								3
4							Drilling becomes harder at 3.5 feet and color becomes brown to dark brown.	4
5		S-1	G,A	19 23 47	50+		Hard, moist, brown mottled orange and black, clayey SILT (ML); scattered organics.	5
6							Becomes hard, dry to slightly moist.	6
7							Hard, dry, light gray to brown, sandy SILT (MH); fine sand, scattered weak to moderate cemented subrounded siltstone gravel and fine sandstone fragments up to 1/2-inch [BEDROCK RESIDUUM].	7
8								8
9								9
10		S-2		38 48 60/3	50+			10
11							Very dense, dry, light gray, silty, gravelly SAND (SM); subangular gravel to 1-inch with moderate cemented sandstone gravel fragments.	11
12								12
13								13
14								14
15		S-3		40 70/4	50+			15
16							Very dense, dry, light brown SANDSTONE; strong cementation [WEATHERED BEDROCK].	16
17							Bottom of boring: 16 feet.	17
18							Boring backfilled with bentonite chips and cuttings.	18
19								19

Sampler Type:
- ○ No Recovery
- ◪ Standard Penetration Test (ASTM D1586)
- ▯ 3" OD Split Spoon Sampler

Drilling Method:
HSA: Hollow Stem Auger
MR: Mud Rotary

Logged by: WMS
Approved by: DHM
Figure No. A- 2

GEOTECH BORING LOG FOREST RIDGE.GPJ August 19, 2010

Aspect consulting
earth + water

Boring Log

Project Number	Boring Number	Sheet
070207	B-2	1 of 1

Project Name: Forest Ridge
Ground Surface Elev
Location: Cle Elum, Washington
Driller/Equipment: Holocene / Track-Mounted Drill / 6-inch O.D. HSA
Depth to Water (ft BGS)
Drilling Method/Hammer: 3-inch O.D. Split Spoon Sampler / 140 lbs / 30" Drop
Start/Finish Date 6/7/2010

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	Blows/ 6"	N-value ▲ / Water Content % ● (0 10 20 30 40 50)	Material Type	Description	Depth (ft)
							Moist, brown, clayey SILT (ML)	
5		S-1	G,A	9 38 60/3	50+ ▲		Hard, slightly moist, light brown, SILT (MH); slightly sandy, fine sand, slightly clayey [BEDROCK RESIDUUM].	5
10		S-2	G,Str	71 68/3	50+ ▲		Very dense, dry, light brown, silty SAND (SM); fine sand, slightly clayey, strongly cemented, slightly micaceous, weathered silty SANDSTONE [WEATHERED BEDROCK].	10
11							Bottom of boring: 11 feet.	11
							Boring backfilled with bentonite chips and cuttings.	

Sampler Type:
○ No Recovery
▯ 3" OD Split Spoon Sampler

Drilling Method:
HSA: Hollow Stem Auger
MR: Mud Rotary

Logged by: WMS
Approved by: DHM
Figure No. A- 3

GEOTECH BORING LOG FOREST RIDGE.GPJ August 19, 2010

Aspect consulting
earth + water

Boring Log

Project Number	Boring Number	Sheet
070207	B-3	1 of 2

Project Name: Forest Ridge
Location: Cle Elum, Washington
Driller/Equipment: Holocene / Track-Mounted Drill / 6-inch O.D. HSA
Drilling Method/Hammer: 3-inch O.D. Split Spoon Sampler / 140 lbs / 30" Drop

Ground Surface Elev
Depth to Water (ft BGS)
Start/Finish Date 6/8/2010

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	Blows/ 6"	N-value / Water Content % (0 10 20 30 40 50)	Material Type	Description	Depth (ft)
1							Moist, brown, clayey SILT (ML); numerous organics.	1
2								2
3								3
4								4
5		S-1		14 17 26			Becomes medium stiff, slightly moist, light brown, clayey SILT (ML); trace moderately cemented subangular gravel up to 1 inch with occaissional organics below 4.5 feet.	5
6								6
7							Becomes stiff below 6.5 feet.	7
8								8
9								9
10		S-2	G,A	23 70/3	50+		Very dense, slightly moist, light brown, silty SAND (SM); fine sand, trace moderately cemented, subangular siltstone to sandstone gravels [BEDROCK RESIDUUM].	10
11								11
12								12
13								13
14							Hard, slightly moist, light gray, sandy SILT (MH); fine sand, trace weakly cemented siltstone gravel [BEDROCK RESIDUUM].	14
15		S-3		27 48 70/3	50+		Becomes stiff at 15 feet.	15
16							Becomes hard below 16 feet.	16
17								17
18								18
19								19

Sampler Type:
○ No Recovery
▯ 3" OD Split Spoon Sampler

Drilling Method:
HSA: Hollow Stem Auger
MR: Mud Rotary

Logged by: WMS
Approved by: DHM
Figure No. A- 4

GEOTECH BORING LOG FOREST RIDGE.GPJ August 19, 2010

Aspect consulting
earth + water

Boring Log

Project Number	Boring Number	Sheet
070207	B-3	2 of 2

Project Name: Forest Ridge
Location: Cle Elum, Washington
Driller/Equipment: Holocene / Track-Mounted Drill / 6-inch O.D. HSA
Drilling Method/Hammer: 3-inch O.D. Split Spoon Sampler / 140 lbs / 30" Drop

Ground Surface Elev
Depth to Water (ft BGS)
Start/Finish Date 6/8/2010

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	Blows/ 6"	N-value / Water Content % (0 10 20 30 40 50)	Material Type	Description	Depth (ft)
21		S-4		20 35 70/3	50+			21
22								22
23							Very dense, dry, gray silty SAND (SM); weakly cemented siltstone to sandstone, low to medium strength, weakly laminated [WEATHERED BEDROCK].	23
24								24
25		S-5	G	42 70/3	50+			25
26								26
27								27
28								28
29								29
30		S-6		31 70/6	50+		Hard, slightly moist, dark gray to black SILT (ML); slightly clayey to clayey, numerous coal fragments, trace fragments of weakly cemented, dark gray siltstone.	30
31							Hard, slighlty moist, gray SANDSTONE (GM); fine sandstone to coarse siltstone, low to medium cementation, medium dry strength [BEDROCK]	31
32								32
33								33
34								34
35		S-7		70/6				35
36							Bottom of boring: 35.5 feet.	36
37							Boring backfilled with bentonite chips and cuttings.	37
38								38
39								39

Sampler Type:
- No Recovery
- 3" OD Split Spoon Sampler

Drilling Method:
HSA: Hollow Stem Auger
MR: Mud Rotary

Logged by: WMS
Approved by: DHM
Figure No. A- 4

GEOTECH BORING LOG FOREST RIDGE.GPJ August 19, 2010

Aspect consulting
earth + water

Boring Log

Project Number	Boring Number	Sheet
070207	B-4	1 of 2

Project Name: Forest Ridge
Location: Cle Elum, Washington
Driller/Equipment: Holocene / Track-Mounted Drill / 6-inch O.D. HSA
Drilling Method/Hammer: 3-inch O.D. Split Spoon Sampler / 140 lbs / 30" Drop

Ground Surface Elev
Depth to Water (ft BGS) 7.6
Start/Finish Date 6/8/2010

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	Blows/ 6"	N-value ▲ / Water Content % ● (0 10 20 30 40 50)	Material Type	Description	Depth (ft)
1							Moist, dark brown, sandy, clayey SILT (ML); fine sand.	1
2								2
3								3
4								4
5		S-1		4			Medium stiff, very moist, light brown to light gray mottled orange, sandy, silty CLAY (CH); fine sand, numerous organics.	5
6				9				6
7	▼ 6/14/2010		G,Str	10				7
8		S-2		5			Very stiff, moist, light brown to yellow brown mottled orange and black, sandy, clayey SILT (ML); fine sand, trace subrounded siltstone gravel up to 1/2 inch [COLLUVIUM].	8
9				11				9
10				22				10
11								11
12								12
13								13
14								14
15							Dense to very dense, moist, light gray to brown, SAND (SM); fine sand, slightly clayey and silty, laminated texture.	15
16		S-3		21				16
17				30				17
18				24				18
19								19

Sampler Type:
○ No Recovery
‖ 3" OD Split Spoon Sampler

Drilling Method:
HSA: Hollow Stem Auger
MR: Mud Rotary

Logged by: WMS
Approved by: DHM
Figure No. A- 5

GEOTECH BORING LOG FOREST RIDGE.GPJ August 19, 2010

Aspect consulting
earth + water

Boring Log

Project Number	Boring Number	Sheet
070207	B-4	2 of 2

Project Name: Forest Ridge
Location: Cle Elum, Washington
Driller/Equipment: Holocene / Track-Mounted Drill / 6-inch O.D. HSA
Drilling Method/Hammer: 3-inch O.D. Split Spoon Sampler / 140 lbs / 30" Drop

Ground Surface Elev
Depth to Water (ft BGS) 7.6
Start/Finish Date 6/8/2010

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	Blows/ 6"	N-value / Water Content % (0 10 20 30 40 50)	Material Type	Description	Depth (ft)
21		S-4	G,A	25 38			Numerous weakly cemented siltstone to sandstone gravel below 20 feet.	21
22								22
23		S-5	G,Str				Very dense, moist, light gray to brown, silty, sandy GRAVEL (GM); fine to coarse, angular gravel, fine sand, siltstone and sandstone fragments [COLLUVIUM].	23
24								24
25		S-6		70/5.5			Very dense, slightly moist, gray GRAVEL (GM); subangular, siltstone gravel [BEDROCK].	25
26							Bottom of boring: 25.5 feet.	26
27							Boring backfilled with bentonite chips and cuttings.	27
28								28
29								29
30								30
31								31
32								32
33								33
34								34
35								35
36								36
37								37
38								38
39								39

Sampler Type:
- ○ No Recovery
- ▯ 3" OD Split Spoon Sampler

Drilling Method:
HSA: Hollow Stem Auger
MR: Mud Rotary

Logged by: WMS
Approved by: DHM
Figure No. A- 5

GEOTECH BORING LOG FOREST RIDGE.GPJ August 19, 2010

APPENDIX B

Water Well Logs

(1)

WATER WELL REPORT

Original & 1st copy - Ecology, 2nd copy - owner, 3rd copy - driller

Construction/Decommission ("x" in circle) 2803602

[X] Construction

[ ] Decommission *ORIGINAL INSTALLATION*

Notice of Intent Number _____

PROPOSED USE: [X] Domestic [ ] Industrial [ ] Municipal [ ] DeWater [ ] Irrigation [ ] Test Well [ ] Other _____

TYPE OF WORK: Owner's number of well (if more than one) _____

[X] New well [ ] Reconditioned *Method:* [ ] Dug [ ] Bored [ ] Driven [ ] Deepened [ ] Cable [X] Rotary [ ] Jetted

DIMENSIONS: Diameter of well 6 inches, drilled 680 ft

Depth of completed well 680 ft.

CONSTRUCTION DETAILS

Casing Installed: [X] Welded 6 " Diam. from +1 ft. to 38 ft

[X] Liner installed 5 " Diam from 10 ft. to 680 ft

[ ] Threaded _____ " Diam From _____ ft. to _____ ft

Perforations: [X] Yes [ ] No

Type of perforator used PRE-SLOTTED LINER (.020 SLOT)

SIZE of perfs _____ in. by _____ in. and no. of perfs _____ from 480 ft to 680 ft.

Screens: [ ] Yes [X] No [ ] K-Pac Location _____

Manufacturer's Name _____

Type _____ Model No. _____

Diam _____ Slot size _____ from _____ ft. to _____ ft

Diam _____ Slot size _____ from _____ ft. to _____ ft

Gravel/Filter packed: [ ] Yes [X] No Size of gravel/sand _____

Materials placed from _____ ft to _____ ft

Surface Seal: [X] Yes [ ] No To what depth? 20 ft

Material used in seal BENTONITE CHIPS

Did any strata contain unusable water? [ ] Yes [X] No

Type of water? _____ Depth of strata _____

Method of sealing strata off _____

PUMP: Manufacturer's Name _____

Type: _____ H.P _____

WATER LEVELS: Land-surface elevation above mean sea level _____ ft.

Static level 500 ft below top of well Date 11/6/07

Artesian pressure _____ lbs. per square inch Date _____

Artesian water is controlled by _____ (cap, valve, etc.)

WELL TESTS: Drawdown is amount water level is lowered below static level

Was a pump test made? [ ] Yes [X] No If yes, by whom? _____

Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs

Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs

Yield _____ gal./min. with _____ ft. drawdown after _____ hrs

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test _____

Bailer Test _____ gal./min. with _____ ft. drawdown after _____ hrs.

Airtest 5 gal./min. with stem set at 678 ft for 1 hrs

Artesian flow _____ g.p.m. Date _____

Temperature of water 51 Was a chemical analysis made? [ ] Yes [X] No

CURRENT

Notice of Intent No. WE07673

Unique Ecology Well ID Tag No. ALH940

Water Right Permit No. EXEMPT WELL

Property Owner Name DUSTIN LEE FIELDS

Well Street Address CLE ELUM RIDGES

City CLE ELUM County KITTITAS

Location NW 1/4-1/4 SW 1/4 Sec 24 Twn 20N R 15E [ ] WWM Or [X] Check One

(s, t, r Still REQUIRED)

Lat/Long Lat Deg _____ Lat Min/Sec _____

Long Deg _____ Long Min/Sec _____

Tax Parcel No. (Required) 2015240000018

CONSTRUCTION OR DECOMMISSION PROCEDURE

Formation: Describe by color, character, size of material and structure, and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information (USE ADDITIONAL SHEETS IF NECESSARY.)

MATERIAL	FROM	TO
BROWN DRY CLAY	0	32
GRAY DENSE SHALE	32	65
GRAY SANDSTONE, SOFT	65	125
BLACK SANDSTONE, DENSE	125	142
GRAY SHALE, SOFT	142	178
BROWN SHALE, DENSE	178	193
GRAY SHALE, MEDIUM, DENSE	193	280
GRAY SHALE, FRACTURED, MOIST	280	295
GRAY SANDSTONE, HARD	295	540
BROWN SANDSTONE, FRACTURED	540	560
GRAY MEDIUM HARD SANDSTONE,	560	
FRACTURED		580
GRAY HARD SANDSTONE	580	665
COAL	665	667
GRAY HARD FRACTURED SANDSTONE	667	680

RECEIVED
DEC 14 2007
Washington State
Department of Ecology

Start Date 11/5/07 Completed Date 11/6/07

WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

[X] Driller [ ] Engineer [ ] Trainee Name (Print) BRANDON HICKS

Driller/Engineer/Trainee Signature _____

Driller or trainee License No 2785

IF TRAINEE: Driller's License No: _____

Driller's Signature _____

Drilling Company ARCADIA DRILLING INC.

Address PO BOX 1790

City, State, Zip SHELTON , WA , 98584

Contractor's Registration No ARCADDI098K1 Date 11/7/07

ECY 050-1-20 (Rev 4/07)

Ecology is an Equal Opportunity Employer

The Department of Ecology does NOT warrant the data and/or the interpretation on this well report.

(2)

Please print, sign and return to the Department of Ecology

Water Well Report

Original – Ecology, 1st copy – owner, 2nd copy – driller

ECOLOGY

Construction/Decommission

☐ Construction 203266

☐ Decommission *ORIGINAL INSTALLATION Notice of Intent Number* _____

Current Notice of Intent No. W187033

Unique Ecology Well ID Tag No. AKW 661

Water Right Permit No. Sapphire Skies

Property Owner Name ER BI Iron Snowshoe LLC

Well Street Address lot B1 off of Creekside Pl.

City Cle Elum County Kittitas

Location SW 1/4-1/4 SW 1/4 Sec 24 Twn 20 R 15 E/W/M or W/M ☐ crdr drc

Lat/Long (s, t, r still REQUIRED) Lat Deg _____ Lat Min/Sec _____ Long Deg _____ Long Min/Sec _____ N

Tax Parcel No 20152400000 3

PROPOSED USE: ☒ Domestic ☐ Industrial ☐ Municipal ☐ DeWater ☐ Irrigation ☐ Test Well ☐ Other _____

TYPE OF WORK: Owner's number of well (if more than one) _____

☒ New well ☐ Reconditioned ☐ Deepened Method ☐ Dug ☐ Bored ☐ Driven ☐ Cable ☒ Rotary ☐ Jetted

DIMENSIONS: Diameter of well 10 inches, drilled 500 ft. Depth of completed well 502 ft.

CONSTRUCTION DETAILS

Casing ☒ Welded 6" Diam. from +2 ft. to 60 ft.

Installed: ☒ Liner installed ~~200~~ Diam. from ~~200~~ ft. to _____ ft.

☐ Threaded 4" Diam. from -10 ft. to 500 ft.

Perforations: ☒ Yes ☐ No

Type of perforator used Skill saw

SIZE of perfs 6 in. by 3/8 in. and no. of perfs _____ from _____ ft. to _____ ft.

Screens: ☐ Yes ☒ No ☐ K-Pac Location _____

Manufacturer's Name _____

Type _____ Model No. _____

Diam _____ Slot size _____ from _____ ft. to _____ ft.

Diam _____ Slot size _____ from _____ ft. to _____ ft.

Gravel/Filter packed: ☐ Yes ☒ No ☐ Size of gravel/sand _____

Materials placed from _____ ft. to _____ ft.

Surface Seal: ☒ Yes ☐ No To what depth? 50 ft.

Material used in seal Bentonite

Did any strata contain unusable water? ☐ Yes ☒ No

Type of water? _____ Depth of strata _____

Method of sealing strata off _____

PUMP: Manufacturer's Name _____

Type _____ H.P. _____

WATER LEVELS: Land-surface elevation above mean sea level _____ ft

Static level 83' ft. below top of well Date _____

Artesian pressure _____ lbs. per square inch Date _____

Artesian water is controlled by _____ (cap, valve, etc.)

WELL TESTS: Drawdown is amount water level is lowered below static level

Was a pump test made? ☐ Yes ☒ No If yes, by whom? _____

Yield: _____ gal/min. with _____ ft. drawdown after _____ hrs

Yield: _____ gal/min. with _____ ft. drawdown after _____ hrs

Yield: _____ gal/min. with _____ ft. drawdown after _____ hrs.

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test Air Lift

Bailer test _____ gal/min. with _____ ft. drawdown after _____ hrs

Airtest _____ gal/min. with stem set at _____ ft. for 1½ hrs.

Artesian flow _____ g.p.m. Date _____

Temperature of water _____ Was a chemical analysis made? ☐ Yes ☐ No

CONSTRUCTION OR DECOMMISSION PROCEDURE

Formation: Describe by color, character, size of material and structure, and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information. Indicate all water encountered. (USE ADDITIONAL SHEETS IF NECESSARY.)

MATERIAL	FROM	TO
Topsoil S	0	3
clay tan br. m.s	3	10
Clay shale bl grey m/f	10	19
Sandstone grey br. m/f	19	29
Sandstone grey coal seam m/f	29	34
Sandston br m/f	34	62
Sandstone clay len blue m/f	62	105
Sandstone multi color m/f	105	108
sandstone fgrac dr grey m/f	108	112
Sandstone clay len m.s/gr	112	137
Shale clay len bl. m/f	137	150
Sandstone clay le grebl	150	156
Sandstone bl wh m/f	156	185
Sandstone clay d grey m/f	185	237
Coal m.s	237	238
Sandstone clay le blg m/f	238	258
Sandstone med grey m/f	258	260
sandstone clay d.grey m/f	260	285
Sandstone clay bl.grey m/f	285	309
Sandstone clay coa d.grey m/f	309	380
Sandstone wh lt grey m/f	380	384
sandstone clay lens blgrey	384	390
sandstone clay le m/f blgrey	390	408
sandstone clay bl.grey m/f	408	471
sandstone clay le med grey m/f	471	505

Received JUN 8 2006 CENTRAL REGIONAL OFFICE

Start Date 5/8/06 Completed Date 5/10/06

WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

Driller/Engineer/Trainee Name (Print) Steve Bailis

Driller/Engineer/Trainee Signature _____

Driller or trainee License No 1335

Drilling Company Water Man Well Drilling Inc

Address P.O. Box 246

City, State, Zip Selah Wa 98942

Contractor's Registration WATERWW022DB Date 5/15/06

IF TRAINEE, Driller's Licensed No. _____ Driller's Signature _____

Ecology is an Equal Opportunity Employer. ECY 050-1-20 (Rev 2/03)

The Department of Ecology does NOT warranty the data and/or the information on this well report.

(3)

WATER WELL REPORT

State of Washington Date Printed: 19-Oct-2007 Log No. 0

Construction / Decommission: Original Construction Notice

Construction 275433

PROPOSED USE: DOMESTIC

TYPE OF WORK: Owners's Well Number (If more than one well) 1

NEW WELL Method: ROTARY

DIMENSIONS Diameter of well: 6 inches

Drilled 120 ft. Depth of completed well 60 ft.

CONSTRUCTION DETAILS: Casing installed WELDED

6 " Dia from +2 ft. to 58 ft.

Liner installed: " Dia from ft. to ft.

" Dia from ft. to ft.

" Dia from ft. to ft.

Perforations: Yes Used In: CASING

Type of perforator used STAR

SIZE of perforations 3/8 in. by 1 in.

16 Perforation from 37 ft. to 41 ft.

Perforation from ft. to ft.

Perforation from ft. to ft.

Screens: No K-Pac Location

Manufacture's Name

Type: Model No

Diam. slot size from ft. to ft

Diam. slot size from ft. to ft.

Gravel/Filter packed: No Size of Gravel

Material placed fro ft. to ft.

Surface seal: Yes To what depth 21 ft.

Seal method: Material used in seal BENTONITE

Did any strata contain unusable water No

Type of water Depth of strata

Method of sealing strata off

PUMP: Manufacture's name

Type: H.P. 0

WATER LEVELS Land-surface elevation above mean sea level: 0 ft.

Static level 35 ft. below top of well Date 08/15/2007

Artesian Pressure lbs per square inch Date

Artesian water controlled by

WELL TESTS: Drawdown is amount water level is lowered below static level.

Was a pump test made No If yes, by whom

Yield gal/min with ft drawdown after

Yield gal/min with ft drawdown after

Yield gal/min with ft drawdown after

Recovery data (time taken as zero when pump turned off)(water level measured from well top to water level

Time:	Water Level	Time:	Water Level	Time:	Water Level

Date of test:

Bailer test gal/min ft drawdown after hrs.

Air test 15 gal/min w/ stem set at 57 ft for 2 hours

Artesian flow gpm Date

Temperature of water Was a chemical analysis made No

CURRENT

Notice of Intent No.: W250589

Unique Ecology Well I.D. No ALN806

Water Right Permit Number

OWNER: GALE, TRICIA

OWNER ADD IRON SNOWSHOE LLC 206 WEST FIRST STREET CLE ELUM, WA 98922

Well Add LITTLE CREEK FSRD-4517 A

City. Cle Elum, WA 98922 County: Kittitas

Location: NE 1/4 NE 1/4 Sec 24 T 20 R 15E EW

Lat/Long: (s, t, r still REQUIRED) Lat Deg Lat Min/Sec Long Deg Long Min/Se

Tax Parcel No.. 2015240000015

CONSTRUCTION OR DECOMMISSION PROCEDURE

Formation. Describe by color, character, size of material and structure. Show thickness of aquifers and the kind and nature of the material in each stratum penetrated. Show at least one entry for each change in formation.

Material	From	To
TOP SOIL	0	2
CLAY BROWN BOLDERS	2	22
SANDSTONE GRAY	22	37
CONGLOMERATE BROKEN W/ WATER	37	41
SANDSTONE GRAY SOFT	41	116
CLAY STONE BLUE SOFT	116	120

DEPT OF ECOLOGY Received OCT 29 2007 CENTRAL REGION OFFICE

Notes:

BOTTOM 60' OF WELL HAD CAVED IN

Work starte 08/14/2007 Complete 08/15/2007

WELL CONSTRUCTION CERTIFICATION:

I constructed and/or accept responsibility for construction of this well and its compliance with all Washington well construction standards. Materials used and the information reported are true to my best knowledge and belief

☑ Driller ☐ Engineer ☐ Trainee

Name: DAVID MEYER License No : 2427

Signature:

Trainee Licensed driller is License No.:

Licensed Driller Signature

Drilling Company:

NAME: FOGLE PUMP & SUPPLY, INC. Shop: COLVILLE

ADDRESS: 316 W. 5TH Colville, WA 99114

Phone: 509-684-2569 Toll Free: 800-533-6518

E-Mail: jeanne@foglepump.com

FAX: 509-684-3032 WEB Site: www.foglepump.com

Contractor's Registration No.: FOGLEPS095L4 Date Log Created: 08/24/2007

The Department of Ecology does NOT warranty the data and/or the information on this well report.

(15)

* Amended

WATER WELL REPORT

State of Washington Date Printed: 16-Apr-2008 Log No. 0

Construction / Decommission: Original

Construction 255996 Construction Notice

PROPOSED USE: DOMESTIC

TYPE OF WORK: Owners's Well Number. (If more than one well) LOT A-3 *

NEW WELL Method: ROTARY

DIMENSIONS Diameter of well: 6 inches

Drilled 300 ft Depth of completed well 300 ft.

CONSTRUCTION DETAILS: Casing installed WELDED

Liner installed: PVC

4 " Dia from 8 ft. to 300 ft.

6 " Dia from +2 ft. to 18 ft.

" Dia from ft. to ft.

" Dia from ft. to ft.

Perforations: Yes Used In: Liner

Type of perforator used SKILL SAW

SIZE of perforations 7 in. b 1/8 in.

100 Perforation from 200 ft. to 300 ft.

Perforation from ft. to ft.

Perforation from ft. to ft.

Screens: No K-Pac Location

Manufacture's Name

Type: Model No

Diam. slot size from ft. to ft.

Diam. slot size from ft. to ft.

Gravel/Filter packed: No Size of Gravel

Material placed fro ft. to ft.

Surface seal: Yes To what depth 18 ft.

Seal method: Material used in seal BENTONITE

Did any strata contain unusable water No

Type of water Depth of strata

Method of sealing strata off

PUMP: Manufacture's name

Type: H.P. 0

WATER LEVELS Land-surface elevation above mean sea level: 0 ft

Static level 63 ft. below top of well Date 02/06/2007

Artesian Pressure lbs per square inch Date

Artesian water controlled by

WELL TESTS: Drawdown is amount water level is lowered below static level.

Was a pump test made No If yes, by whom

Yield gal/min with ft drawdown after

Yield gal/min with ft drawdown after

Yield gal/min with ft drawdown after

Recovery data (time taken as zero when pump turned off)(water level measured from well top to water level

Time:	Water Level	Time:	Water Level	Time:	Water Level

Date of test:

Bailer test gal/min ft drawdown after hrs.

Air test 6.5 gal/min w/ stem set at 299 ft. for 1 hours

Artesian flow gpm Date

Temperature of water Was a chemical analysis made No

CURRENT

Notice of Intent No.: W250591

Unique Ecology Well I.D. No APB228

Water Right Permit Number:

OWNER: OSIADACZ, SKYE

OWNER ADD PO BOX 232 *

ROSLYN, WA 98941

Well.Add LITTLE CREEK FSRD 4517

City: Cle Elum, WA 98922 County: Kittitas

Location: NE 1/4 NE 1/4 Sec 4 T 20 R 15E EW

Lat/Long: (s, t, r still REQUIRED) Lat Deg Lat Min/Sec Long Deg Long Min/Se

Tax Parcel No.: 20.15.24000.0016 A

CONSTRUCTION OR DECOMMISSION PROCEDURE

Formation: Describe by color, character, size of material and structure Show thickness of aquifiers and the kind and nature of the material in each stratum penetrated. Show at least one entry for each change in formation

Material	From	To
CLAY BROWN	0	7
CLAY GRAVEL BROWN	7	12
SANDSTONE BROWN MEDIUM	12	22
COAL SANDSTONE BLACK MEDIUM	22	23
SANDSTONE GRAY MEDIUM	23	32
SANDSTONE GRAY MEDIUM DAMP	32	33
SANDSTONE GRAY MEDIUM	33	56
COAL SANDSTONE BLACK MEDIUM	56	57
SANDSTONE GRAY MEDIUM	57	72
SANDSTONE GRAY SOFT W/WATER	72	73
SANDSTONE GRAY MEDIUM	73	98
SANDSTONE GRAY FILITE MEDIUM	98	143
CONTINUED	143	143

Notes:

Work starte 02/02/2007 Complete 02/06/2007

WELL CONSTRUCTION CERTIFICATION:

I constructed and/or accept responsibility for construction of this well and its compliance with all Washington well construction standards Materials used and the information reported are true to my best knowledge and belief

☑ Driller ☐ Engineer ☐ Trainee

Name: AUDIE MCCURDY License No.: 2690

Signature: Audie McCurdy

If trainee, Licensed driller is License No.:

Licensed Driller Signature

Drilling Company:

NAME: FOGLE PUMP & SUPPLY, INC. Shop: COLVILLE

ADDRESS: 316 W. 5TH

Colville, WA 99114

Phone: 509-684-2569 Toll Free: 800-533-69[illegible]

E-Mail: jeanne@foglepump.com

FAX: 509-684-3032 WEB Site: www.foglepump.com

Contractor's Registration No.: FOGLEPS095L4 Date Log Created: 02/22/200

DEPT. OF ECOLOGY Received APR 28 2008 CENTRAL REGION OFFICE

The Department of Ecology does NOT warranty the data and/or the information on this well report.

(6) 7 6

WATER WELL REPORT

55994

State of Washington Date Printed: 22-Feb-2007 Log No 0

Construction / Decommission: Original Construction Notice

Construction

PROPOSED USE: DOMESTIC

TYPE OF WORK: Owners Well Number (If more than one well) 1PG1

NEW WELL Method: ROTARY

DIMENSIONS Diameter of well: 6 inches

Drilled 800 ft. Depth of completed well 780 ft

CONSTRUCTION DETAILS: Casing Installed WELDED

6 " Dia from +2 ft. to 36 ft

" Dia from ft. to ft.

" Dia from ft to ft.

Liner installed PVC

4 " Dia from 0 ft to 780 ft

Perforations: Yes Used In: Liner

Type of perforator used SKILL SAW

SIZE of perforations 7 in. b 1/8 in.

100 Perforation from 440 ft. to 780 ft.

Perforation from ft to ft

Perforation from ft to ft.

Screens: No K-Pac Location

Manufacture's Name

Type: Model No

Diam. slot size from ft. to ft

Diam. slot size from ft. to ft.

Gravel/Filter packed: No Size of Gravel

Material placed fro ft. to ft.

Surface seal: Yes To what depth 36 ft

Seal method: Material used in seal BENTONITE

Did any strata contain unusable water No

Type of water Depth of strata

Method of sealing strata off

PUMP: Manufacture's name

Type: H P. 0

WATER LEVELS Land-surface elevation above mean sea level 0 ft.

Static level 43 ft. below top of well Date 01/30/2007

Artesian Pressure lbs per square inch Date

Artesian water controlled by

WELL TESTS: Drawdown is amount water level is lowered below static level

Was a pump test made No If yes, by whom

Yield gal/min with ft drawdown after

Yield gal/min with ft drawdown after

Yield gal/min with ft drawdown after

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level

Time: Water Level Time: Water Level Time: Water Level

Date of test.

Bailer test gal/min ft drawdown after hrs.

Air test 1 gal/min w/ stem set at 799 ft. for 1 hours

Artesian flow gpm Date

Temperature of water Was a chemical analysis made No

CURRENT

Notice of Intent No.: W250587

Unique Ecology Well I.D. No APB226

Water Right Permit Number:

OWNER: ANGELINI, HELENE

OWNER ADD IRON SHOWSHOE 301 WEST FIRST ST

CLE ELUM, WA 98922

Well Add LITTLE CREEK FSRD 4517

City: Cle Elum, WA 98922 County: Kittitas A

Location. NE 1/4 NE 1/4 Sec 24 T 20 R 15E EW

Lat/Long (s, t, r still REQUIRED) Lat Deg Lat Min/Sec

Long Deg Long Min/Se

Tax Parcel No.: 20.15.24000.0024

CONSTRUCTION OR DECOMMISSION PROCEDURE

Formation. Describe by color, character, size of material and structure. Show thickness of aquifers and the kind and nature of the material in each stratum penetrated. Show at least one entry for each change in formation

Material	From	To
CLAY BROWN	0	18
CLAY GRAVEL BROWN	18	26
SANSTONE BROWN SOFT	26	35
SANDSTONE GRAY MEDIUM	35	73
SANDSTONE BROWN MEDIUM	73	85
COAL SANSTONE BLACK SOFT	85	86
SANDSTONE GRAY MEDIUM	86	146
SANDSTONE BROWN MEDIUM	146	175
COAL SANDSTONE BLACK MEDIUM	175	178
SANDSTONE GRAY MEDIUM	178	190
SANSTONE GRAY MED MOIST W/WATER	190	198
SANSTONE GRAY MEDIUM	198	259
CONTINUED	259	259

Notes:

HOLE WAS KICKING CUT ROCKS FROM 260 TO 800; LOST 20' OF THE HOLE

Work starte 01/17/2007 Complete 01/30/2007

WELL CONSTRUCTION CERTIFICATION:

I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

✔ Driller Engineer Trainee

Name: AUDIE MCCURDY License No.: 2690

Signature:

STATE OF WASHINGTON Received MAR 0 6 2007 WATER RESOURCES CENTRAL REGION OFFICE

If trainee, Licensed driller is License No.:

Licensed Driller Signature

Drilling Company:

NAME: FOGLE PUMP & SUPPLY, INC. Shop: COLVILLE

ADDRESS: 316 W. 5TH

Colville, WA 99114

Phone: 509-684-2569 Toll Free: 800-533-8518

E-Mail: jeanne@foglepump.com

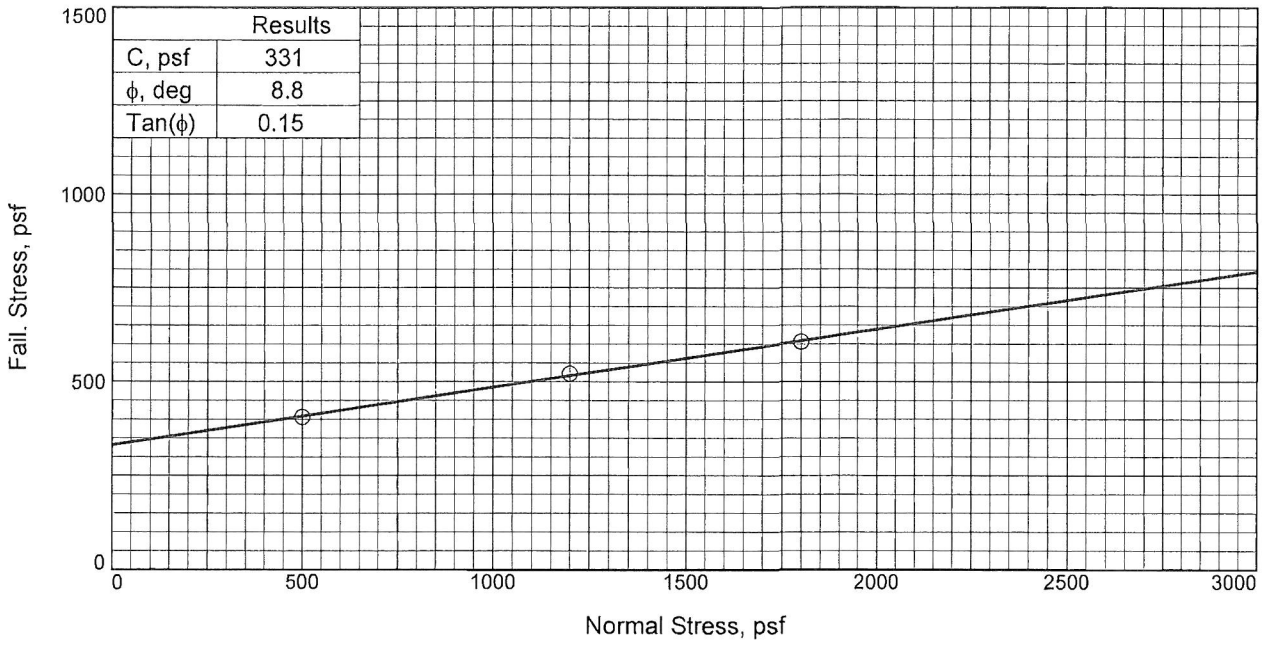
FAX: 509-684-3032 WEB Site. www.foglepump.com

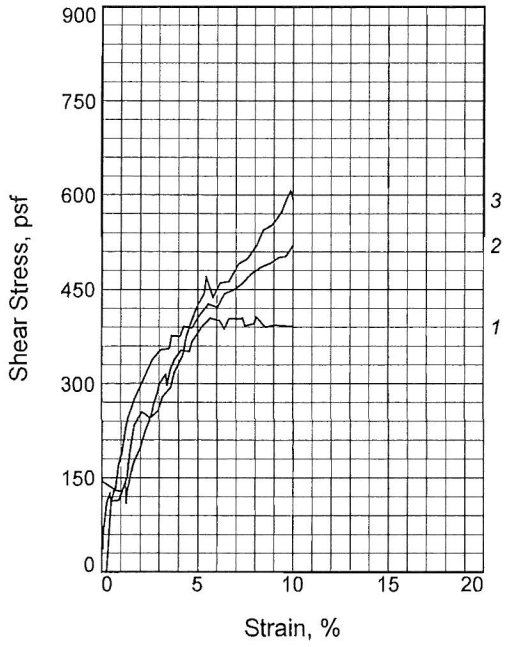
Contractor's Registration No.: FOGLEPS095L4 Date Log Created: 02/22/200

The Department of Ecology does NOT warranty the data and/or the information on this well report.

APPENDIX C

Laboratory Testing Results





Sample No.		1	2	3
Initial	Water Content, %	9.4	9.4	9.4
	Dry Density, pcf	113.9	114.9	115.7
	Saturation, %	52.9	54.4	55.6
	Void Ratio	0.4805	0.4668	0.4569
	Diameter, in.	2.50	2.50	2.50
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	17.8	17.8	17.8
	Dry Density, pcf	114.1	116.8	119.5
	Saturation, %	100.6	108.3	117.1
	Void Ratio	0.4775	0.4433	0.4103
	Diameter, in.	2.50	2.50	2.50
	Height, in.	1.00	0.98	0.97
Normal Stress, psf		500	1200	1800
Fail. Stress, psf		406	521	606
Strain, %		8.1	10.0	9.9
Ult. Stress, psf				
Strain, %				
Strain at peak, %		8.1	10.0	9.9

Sample Type:
Description: Brown Silt with clay

Assumed Specific Gravity= 2.7
Remarks:

Figure _____

Client: Aspect Consulting

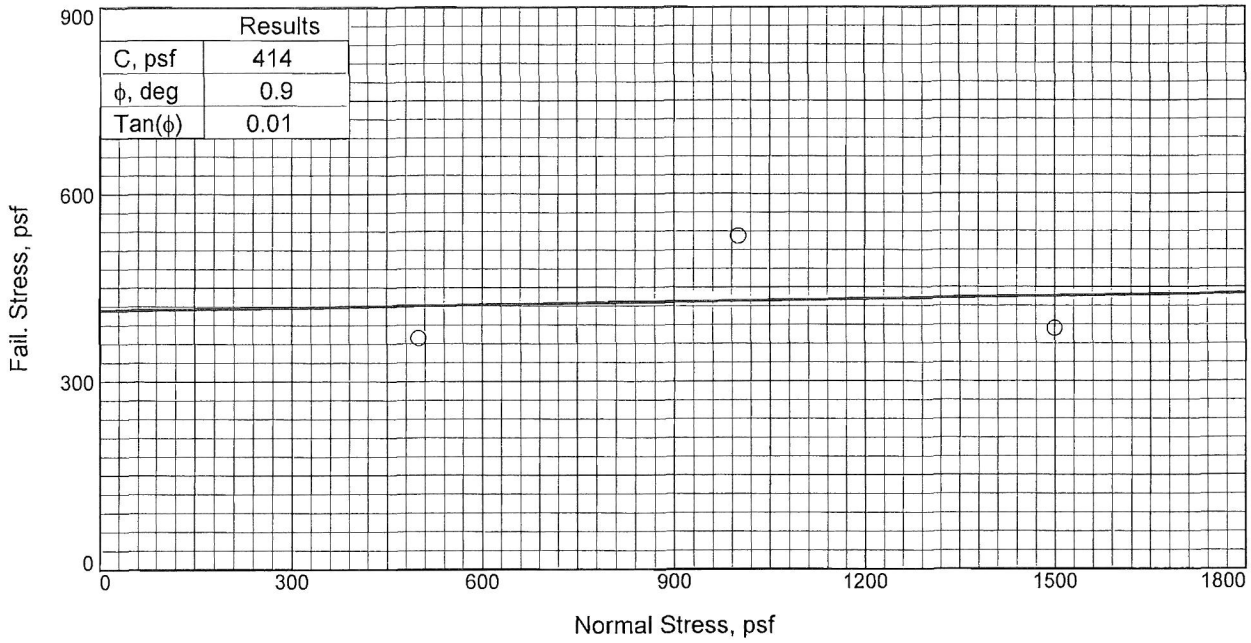
Project: Aspect-Forest Ridge

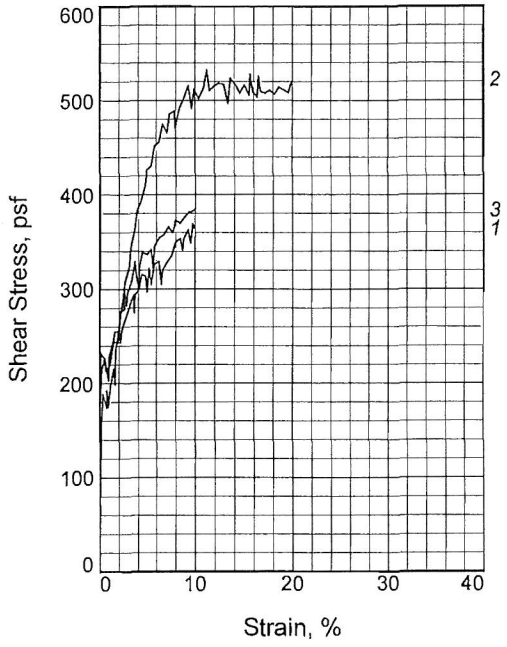
Location: B-2
Depth: 10-11
Proj. No.: 08-175 **Date Sampled:** 7/14/10

DIRECT SHEAR TEST REPORT

Hayre McElroy & Associates, LLC

Tested By: JMiller **Checked By:** JAM





Sample No.		1	2	3
Initial	Water Content, %	21.5	21.5	21.5
	Dry Density, pcf	86.9	88.5	89.5
	Saturation, %	61.7	64.2	65.7
	Void Ratio	0.9401	0.9037	0.8833
	Diameter, in.	2.50	2.50	2.50
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	24.7	25.9	22.9
	Dry Density, pcf	87.4	89.0	90.8
	Saturation, %	71.8	78.1	72.2
	Void Ratio	0.9285	0.8942	0.8570
	Diameter, in.	2.50	2.50	2.50
	Height, in.	0.99	1.00	0.99
Normal Stress, psf		500	1000	1500
Fail. Stress, psf		369	532	384
Strain, %		9.8	11.2	10.0
Ult. Stress, psf				
Strain, %				
Strain at peak, %		9.8	11.2	10.0

Sample Type:
Description: Brown Silty Clay (CL)

LL= 37 **PL=** 20 **PI=** 17
Assumed Specific Gravity= 2.7
Remarks: Sample not consistent. Portions of sample varied in level of plasticity and incresed organics, likely leading to poor consistency in data points.

Figure _____

Client: Aspect Consulting

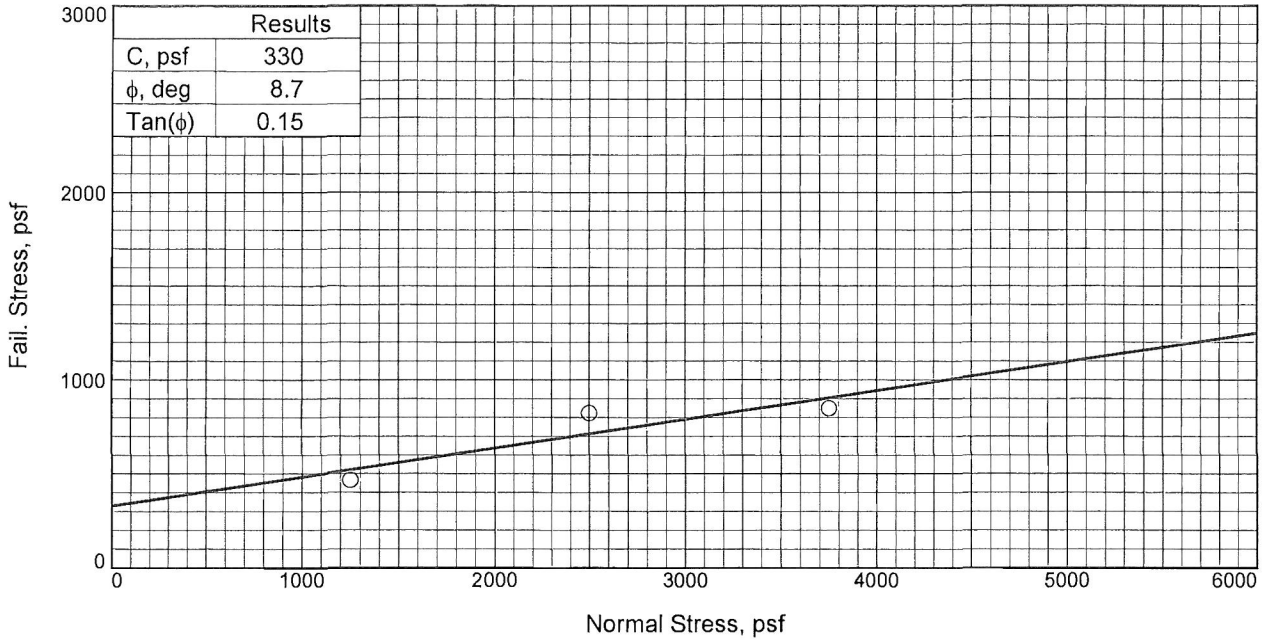
Project: Aspect-Forest Ridge

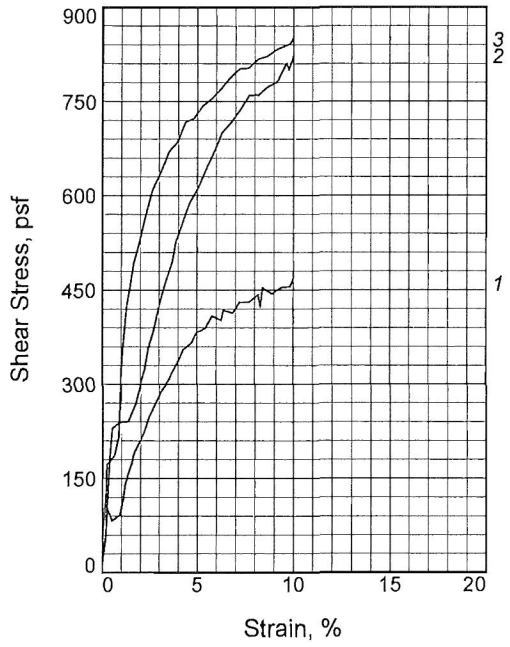
Location: B-4
Depth: 7-9
Proj. No.: 08-175 **Date Sampled:** 7/14/10

DIRECT SHEAR TEST REPORT

Hayre McElroy & Associates, LLC

Tested By: JMiller **Checked By:** JAM





Sample No.		1	2	3
Initial	Water Content, %	21.5	21.5	21.5
	Dry Density, pcf	100.8	95.4	89.1
	Saturation, %	86.3	75.7	65.0
	Void Ratio	0.6721	0.7661	0.8928
	Diameter, in.	2.50	2.50	2.50
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	22.4	22.4	22.4
	Dry Density, pcf	107.2	108.5	102.4
	Saturation, %	105.9	109.2	93.6
	Void Ratio	0.5717	0.5542	0.6467
	Diameter, in.	2.50	2.50	2.50
	Height, in.	0.94	0.88	0.87
Normal Stress, psf		1250	2500	3750
Fail. Stress, psf		466	823	849
Strain, %		10.0	10.0	10.0
Ult. Stress, psf				
Strain, %				
Strain at peak, %		10.0	10.0	10.0

Sample Type: 6-inch Brass Tube
Description: Brown Silty Clay (CL)

LL= 35 **PL=** 18 **PI=** 17
Assumed Specific Gravity= 2.7
Remarks:

Figure _____

Client: Aspect Consulting

Project: Aspect-Forest Ridge

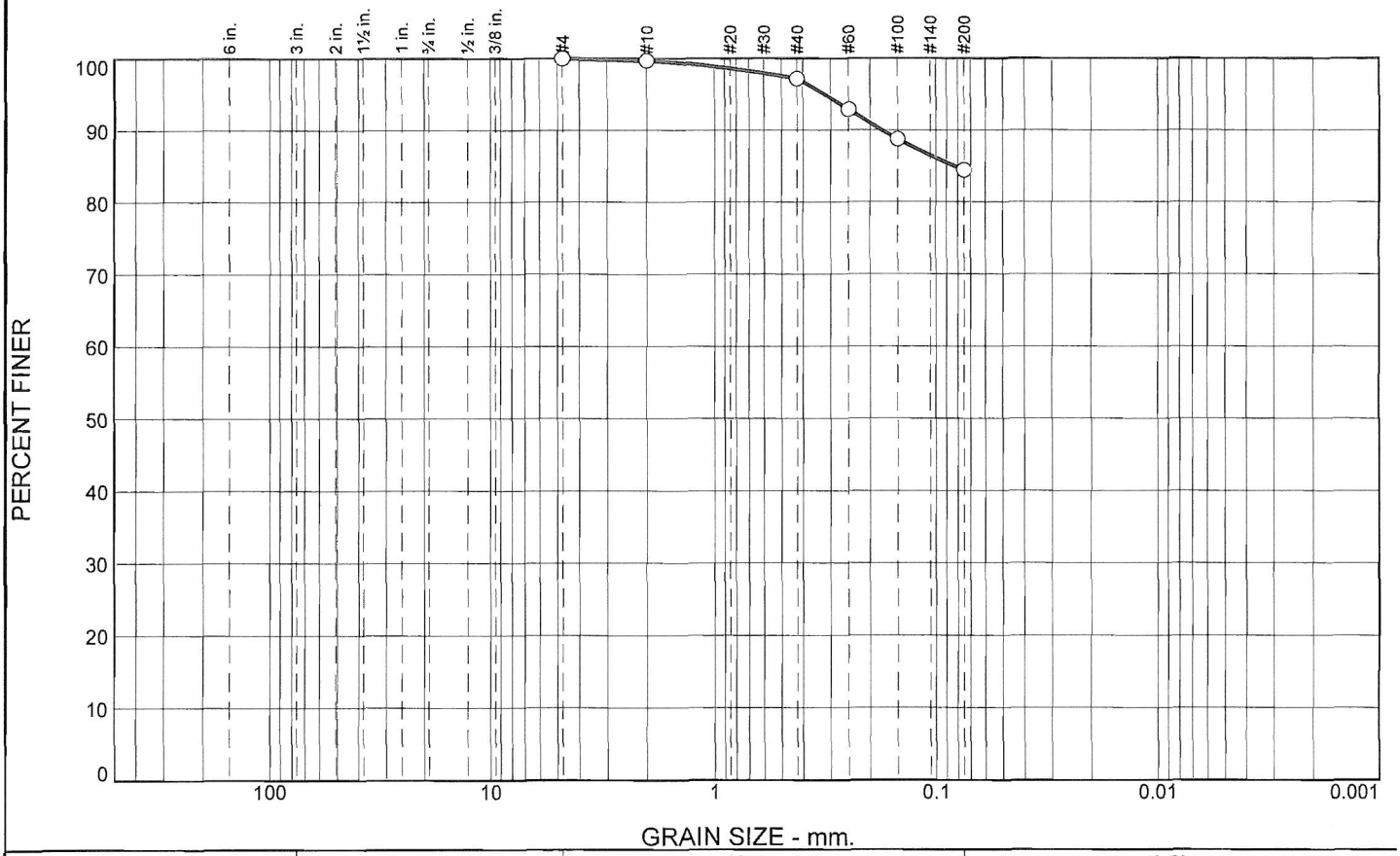
Location: B-4
Sample Number: 6986-f **Depth:** 20'-21' & 22'-23'
Proj. No.: 08-175 **Date Sampled:** 07/14/2010

DIRECT SHEAR TEST REPORT

Hayre McElroy & Associates, LLC

Tested By: JMiller **Checked By:** JAM

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.3	2.5	12.8	84.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.7		
#40	97.2		
#60	92.9		
#100	88.7		
#200	84.4		

* (no specification provided)

Material Description

Brown Clay With Sand

Atterberg Limits

PL= 18 LL= 40 PI= 22

Coefficients

D_{90}= 0.1772 D_{85}= 0.0826 D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-6(18)

Remarks

Source of Sample: B-1 **Depth:** 5'-7'
Sample Number: 6986-B

Date: 07/14/2010

Hayre McElroy & Associates, LLC	**Client:** Aspect Consulting
Redmond, WA	**Project:** Aspect-Forest Ridge
	Project No: 08-175 **Figure**

Tested By: GW/RF **Checked By:** JAM

GRAIN SIZE DISTRIBUTION TEST DATA

7/21/2010

Client: Aspect Consulting
Project: Aspect-Forest Ridge
Project Number: 08-175
Location: B-1
Depth: 5'-7'
Sample Number: 6986-B
Material Description: Brown Clay With Sand
Date: 07/14/2010 **PL:** 18 **LL:** 40 **PI:** 22
USCS Classification: CL **AASHTO Classification:** A-6(18)
Tested by: GW/RF **Checked by:** JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 154.80
Tare Wt. = 114.60
Minus #200 from wash = 84.6%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
375.00	114.60	#4	1358.50	1358.50	100.0
		#10	1175.50	1174.70	99.7
		#40	953.90	947.30	97.2
		#60	890.10	878.90	92.9
		#100	854.70	844.00	88.7
		#200	1026.30	1015.10	84.4

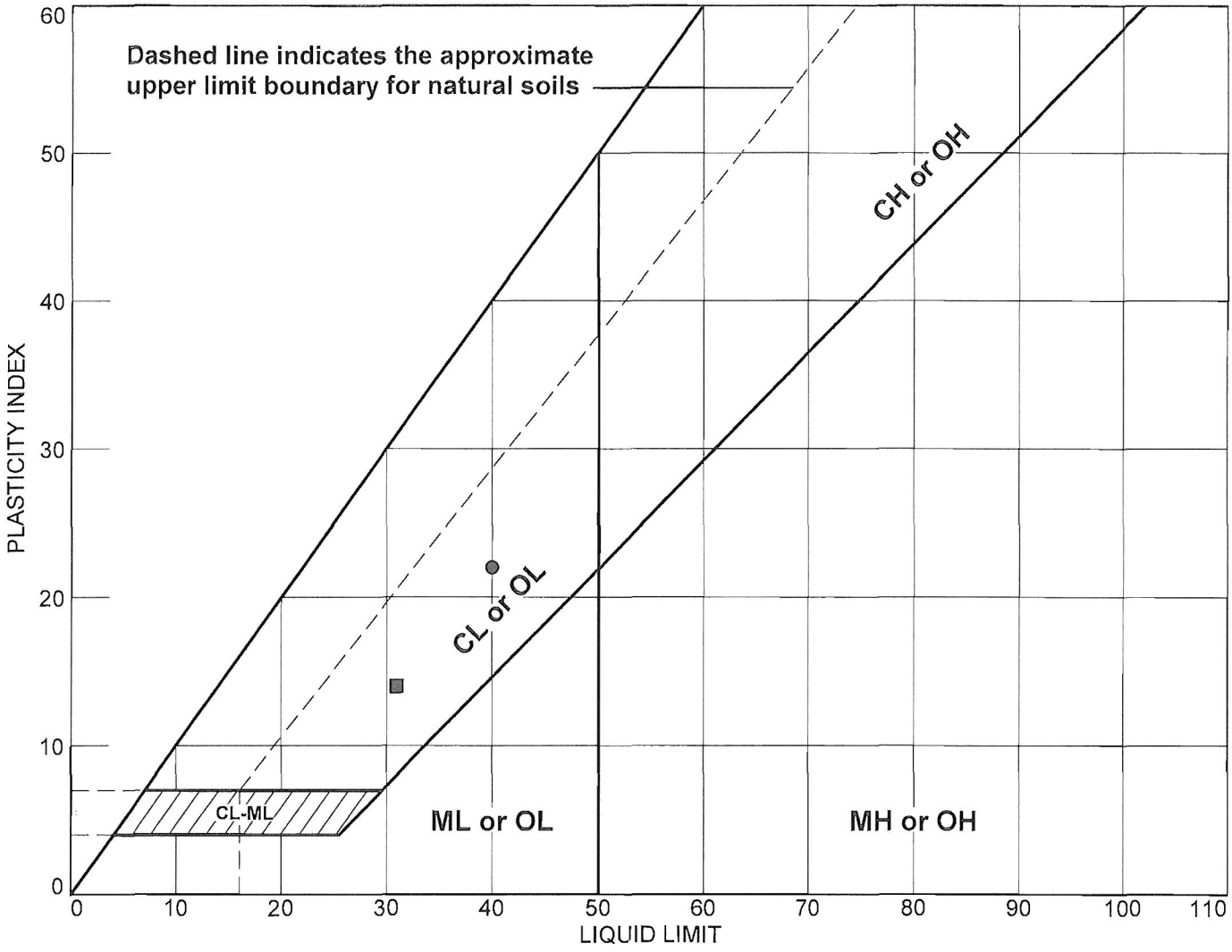
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.3	2.5	12.8	15.6			84.4

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
							0.0826	0.1772	0.3200

Fineness Modulus
0.20

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	B-1	6986-B	5'-7'	19.3	18	40	22	CL
■	B-1	6986-c	25'-26'	5.7	17	31	14	CL-ML

Hayre McElroy & Associates, LLC **Redmond, WA**	**Client:** Aspect Consulting **Project:** Aspect-Forest Ridge **Project No.:** 08-175 **Figure**

Tested By: GW **Checked By:** JAM

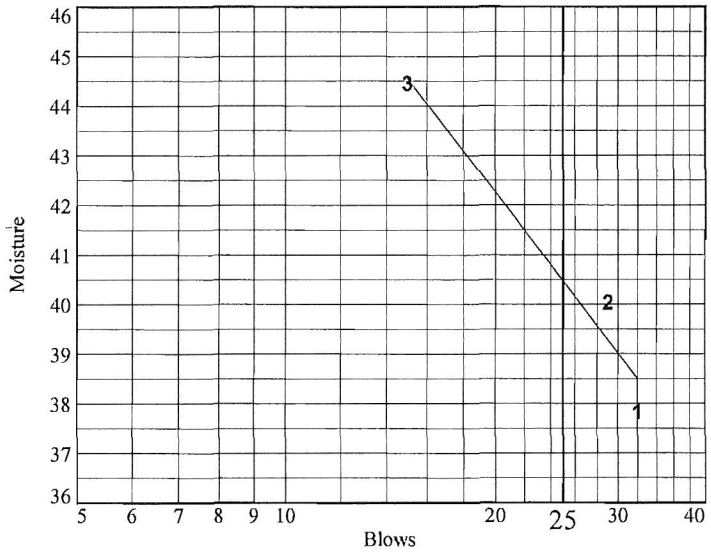
LIQUID AND PLASTIC LIMIT TEST DATA

7/21/2010

Client: Aspect Consulting
Project: Aspect-Forest Ridge
Project Number: 08-175
Location: B-1
Depth: 5'-7'
Sample Number: 6986-B
Material Description: Brown Clay With Sand
USCS: CL
AASHTO: A-6(18)
Tested by: GW
Checked by: JAM

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	11.89	10.49	12.19			
Dry+Tare	9.79	8.70	9.74			
Tare	4.24	4.23	4.23			
# Blows	32	29	15			
Moisture	37.8	40.0	44.5			



Liquid Limit= 40
Plastic Limit= 18
Plasticity Index= 22
Natural Moisture= 19.3
Liquidity Index= 0.1

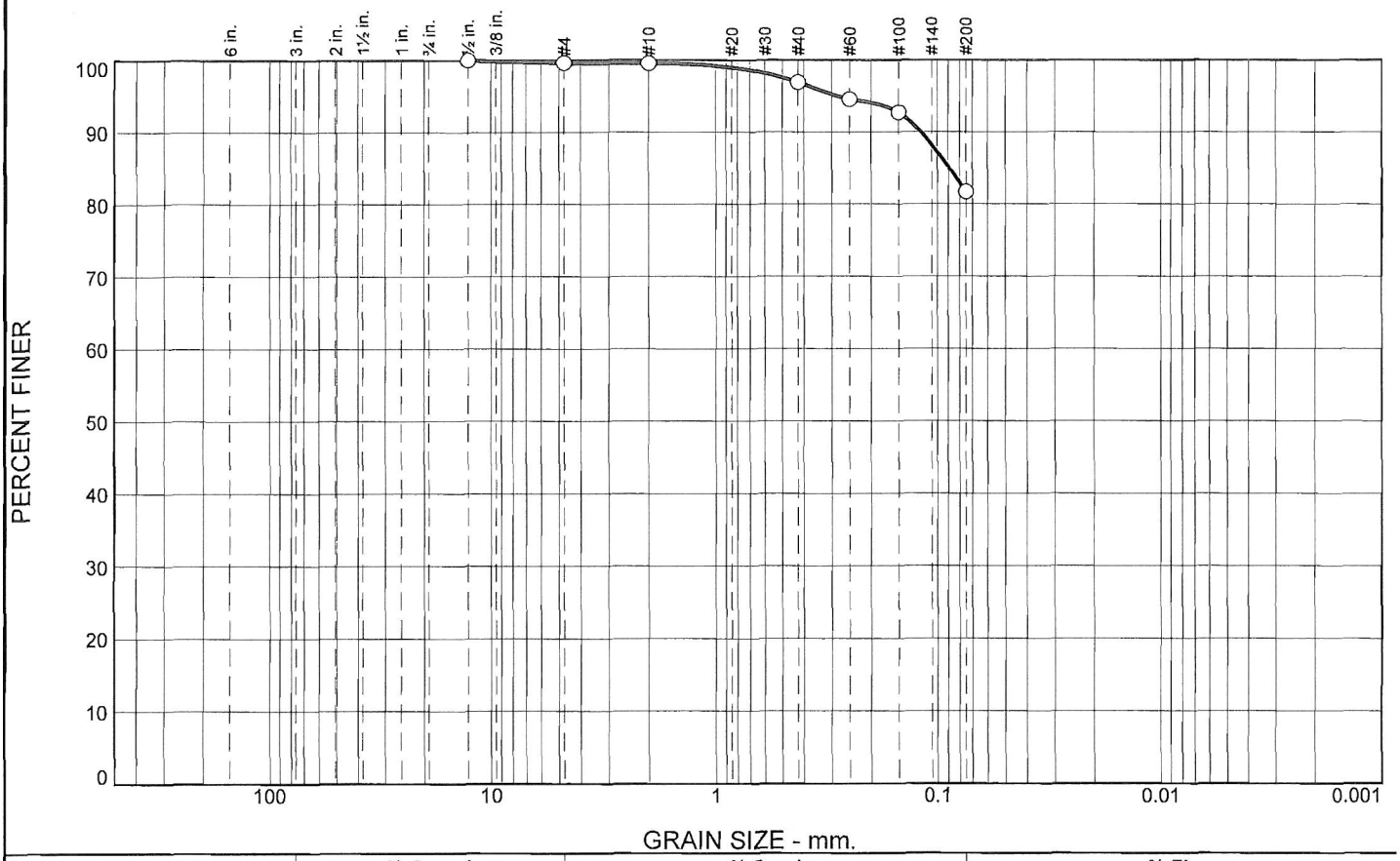
Plastic Limit Data

Run No.	1	2	3	4	
Wet+Tare	13.70	13.56	13.79		
Dry+Tare	13.32	13.20	13.40		
Tare	11.15	11.23	11.20		
Moisture	17.5	18.3	17.7		

Natural Moisture Data

Wet+Tare	Dry+Tare	Tare	Moisture
425.2	375.0	114.6	19.3

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.3	0.1	2.7	15.2	81.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1/2"	100.0		
#4	99.7		
#10	99.6		
#40	96.9		
#60	94.6		
#100	92.7		
#200	81.7		

* (no specification provided)

Material Description

Brown Clay with Silt

Atterberg Limits

PL= 19 LL= 34 PI= 15

Coefficients

D_{90}= 0.1189 D_{85}= 0.0889 D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-6(11)

Remarks

Source of Sample: B-2 **Depth:** 6'-8'
Sample Number: 6986-a

Date: 07/14/2010

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Aspect Consulting
Project: Aspect-Forest Ridge

Project No: 08-175 **Figure**

Tested By: GW **Checked By:** JAM

GRAIN SIZE DISTRIBUTION TEST DATA

7/21/2010

Client: Aspect Consulting
Project: Aspect-Forest Ridge
Project Number: 08-175
Location: B-2
Depth: 6'-8'
Sample Number: 6986-a
Material Description: Brown Clay with Silt
Date: 07/14/2010 **PL:** 19 **LL:** 34 **PI:** 15
USCS Classification: CL **AASHTO Classification:** A-6(11)
Tested by: GW **Checked by:** JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 379.60
Tare Wt. = 212.50
Minus #200 from wash = 81.3%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
1106.60	212.50	1/2"	1420.10	1420.10	100.0
		#4	1361.70	1358.60	99.7
		#10	1175.40	1174.80	99.6
		#40	971.00	947.10	96.9
		#60	899.90	878.90	94.6
		#100	860.50	843.90	92.7
		#200	1113.60	1015.10	81.7

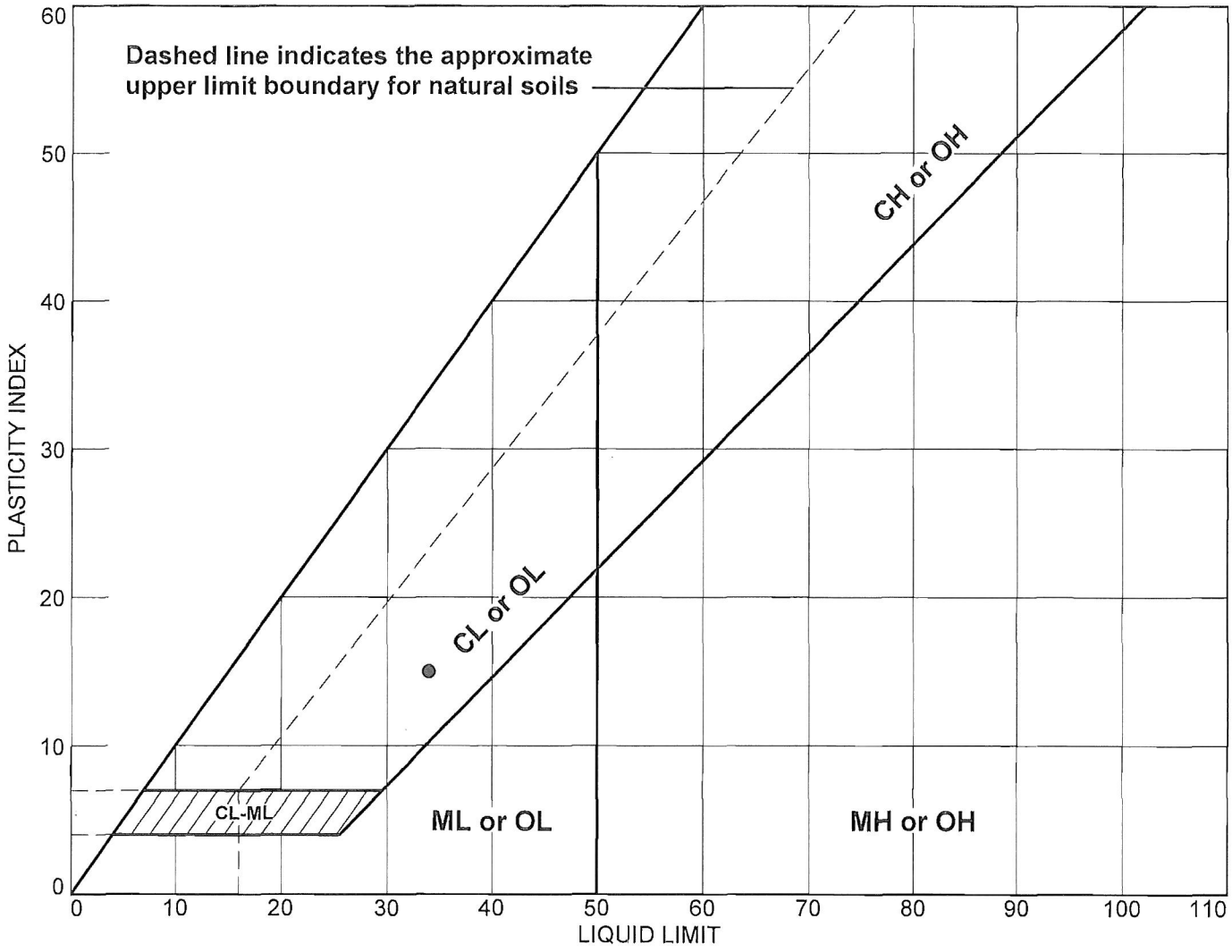
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.3	0.3	0.1	2.7	15.2	18.0			81.7

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
							0.0889	0.1189	0.2835

Fineness Modulus
0.15

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	B-2	6986-a	6'-8'	11.6	19	34	15	CL

Hayre McElroy & Associates, LLC **Redmond, WA**	**Client:** Aspect Consulting **Project:** Aspect-Forest Ridge **Project No.:** 08-175 **Figure**

Tested By: GW **Checked By:** JAM

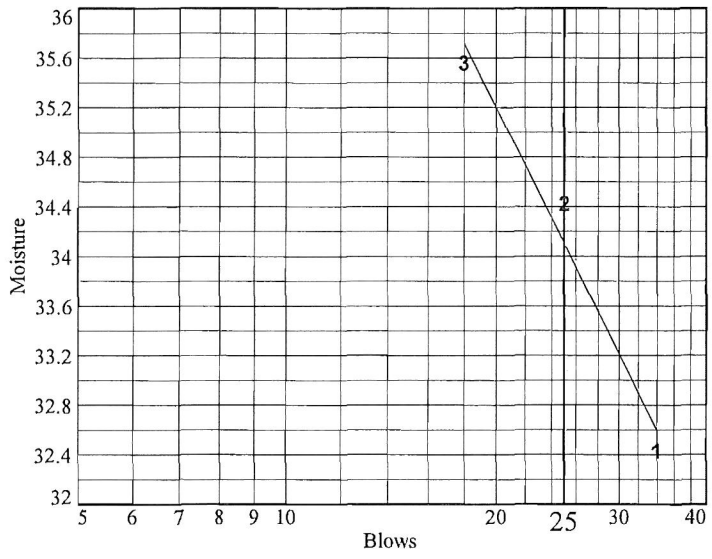
LIQUID AND PLASTIC LIMIT TEST DATA

7/21/2010

Client: Aspect Consulting
Project: Aspect-Forest Ridge
Project Number: 08-175
Location: B-2
Depth: 6'-8'
Sample Number: 6986-a
USCS: CL
AASHTO: A-6(11)
Tested by: GW
Checked by: JAM

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	7.65	10.80	9.91			
Dry+Tare	6.81	9.12	8.42			
Tare	4.22	4.24	4.23			
# Blows	34	25	18			
Moisture	32.4	34.4	35.6			



Liquid Limit= 34
Plastic Limit= 19
Plasticity Index= 15
Natural Moisture= 11.6
Liquidity Index= -0.5

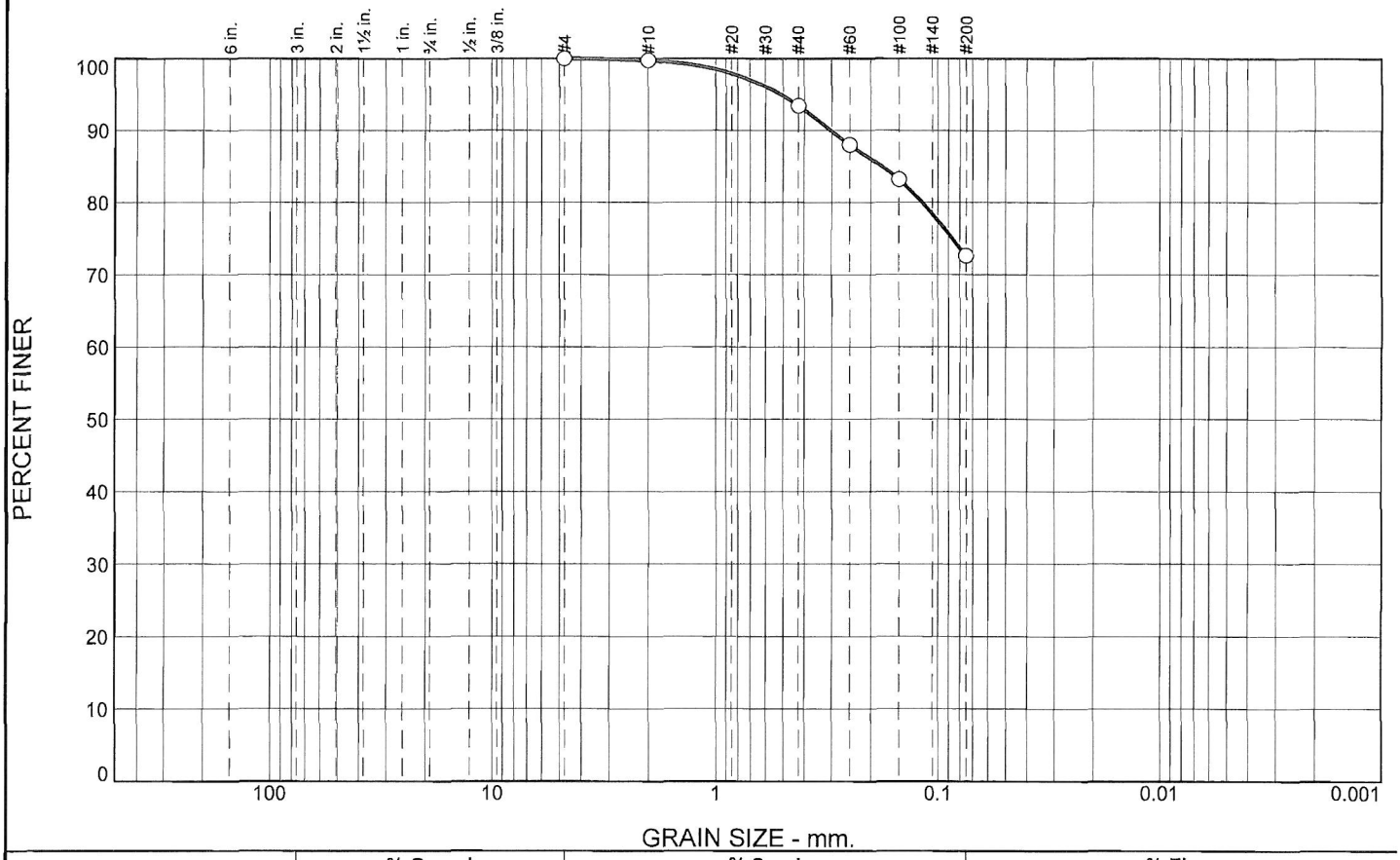
Plastic Limit Data

Run No.	1	2	3	4	
Wet+Tare	12.97	13.17	13.29		
Dry+Tare	12.67	12.85	12.96		
Tare	11.14	11.20	11.20		
Moisture	19.6	19.4	18.7		

Natural Moisture Data

Wet+Tare	Dry+Tare	Tare	Moisture
1210.0	1106.0	212.5	11.6

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.3	6.3	20.8	72.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.7		
#40	93.4		
#60	88.0		
#100	83.2		
#200	72.6		

* (no specification provided)

Material Description

Brown Silty Clay with Sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.3041 D_{85}= 0.1789 D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL-ML AASHTO=

Remarks

Source of Sample: B-2 **Depth:** 10'-11'
Sample Number: 6986-e

Date: 07/14/2010

Hayre McElroy & Associates, LLC **Redmond, WA**	**Client:** Aspect Consulting **Project:** Aspect-Forest Ridge **Project No:** 08-175 **Figure**

Tested By: GW **Checked By:** JAM

GRAIN SIZE DISTRIBUTION TEST DATA

7/21/2010

Client: Aspect Consulting
Project: Aspect-Forest Ridge
Project Number: 08-175
Location: B-2
Depth: 10'-11'
Sample Number: 6986-e
Material Description: Brown Silty Clay with Sand
Date: 07/14/2010
USCS Classification: CL-ML
Tested by: GW
Checked by: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 158.70
Tare Wt. = 116.30
Minus #200 from wash = 72.7%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
271.50	116.30	#4	1358.60	1358.60	100.0
		#10	1175.20	1174.80	99.7
		#40	956.90	947.10	93.4
		#60	887.30	878.90	88.0
		#100	851.40	843.90	83.2
		#200	1031.50	1015.10	72.6

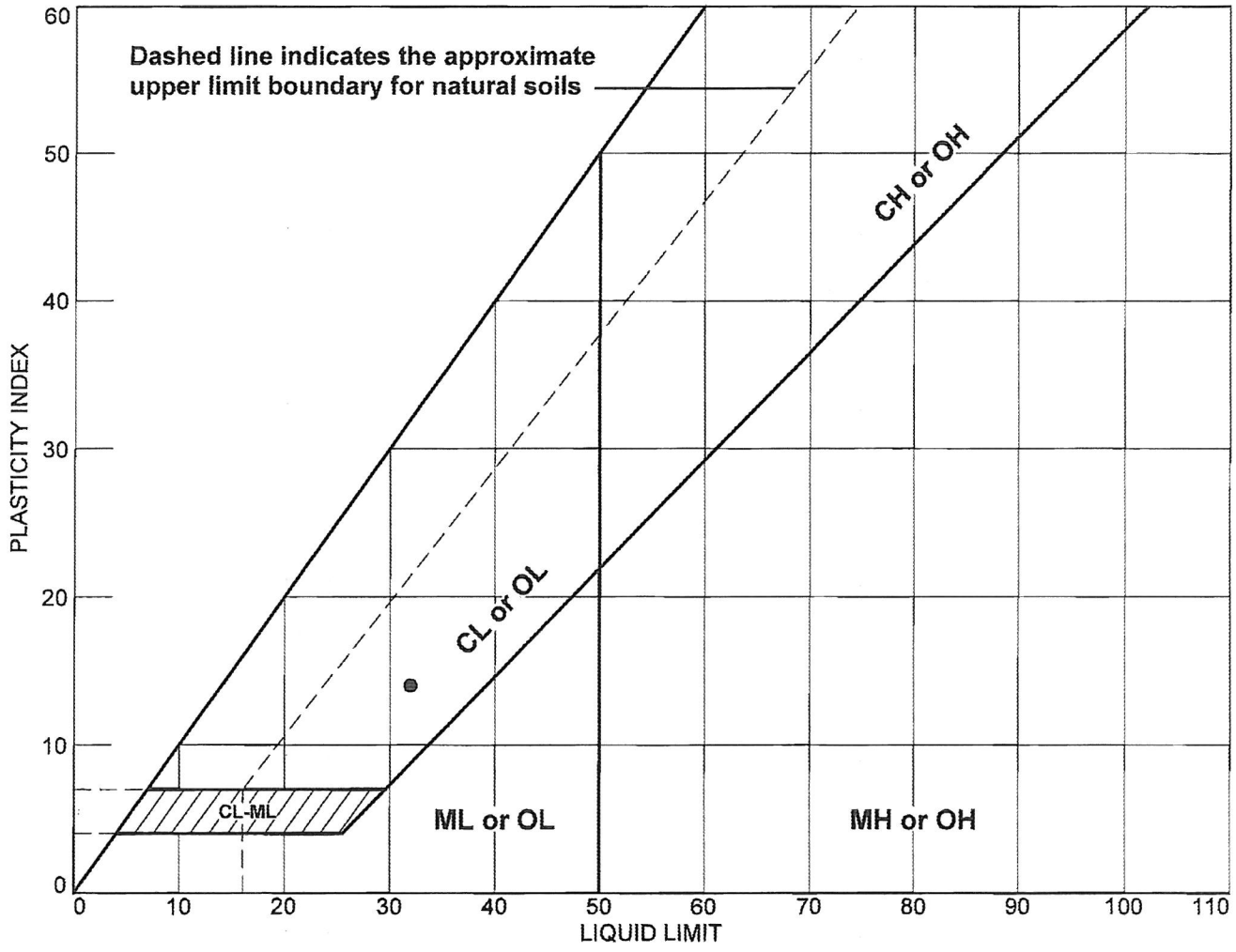
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.3	6.3	20.8	27.4			72.6

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
						0.1179	0.1789	0.3041	0.5116

Fineness Modulus
0.32

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	B-3	6986-d	10'-12'	7.1	18	32	14	SC

Hayre McElroy & Associates, LLC **Redmond, WA**	**Client:** Aspect Consulting **Project:** Aspect-Forest Ridge **Project No.:** 08-175 **Figure**

Tested By: GW **Checked By:** JAM

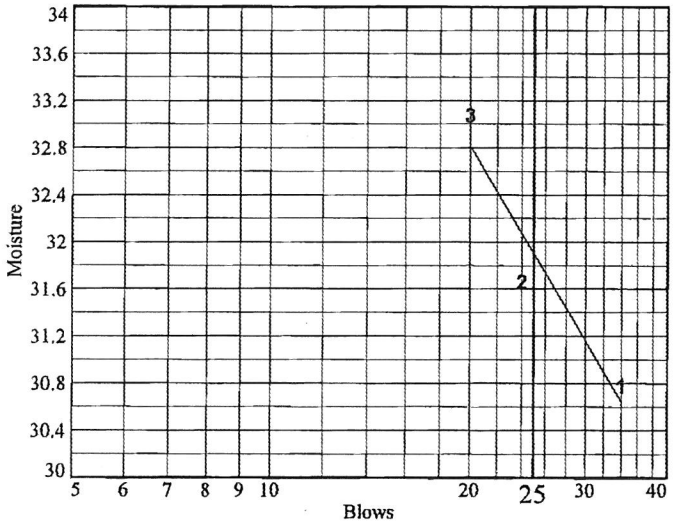
LIQUID AND PLASTIC LIMIT TEST DATA

7/21/2010

Client: Aspect Consulting
Project: Aspect-Forest Ridge
Project Number: 08-175
Location: B-3
Depth: 10'-12'
Sample Number: 6986-d
Material Description: Clayey Sand with Gravel
USCS: SC
AASHTO: A-6(2)
Tested by: GW
Checked by: JAM

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	12.98	10.82	12.98			
Dry+Tare	10.93	9.24	10.81			
Tare	4.27	4.25	4.25			
# Blows	34	24	20			
Moisture	30.8	31.7	33.1			



Liquid Limit= 32
Plastic Limit= 18
Plasticity Index= 14
Natural Moisture= 7.1
Liquidity Index= -0.8

Plastic Limit Data

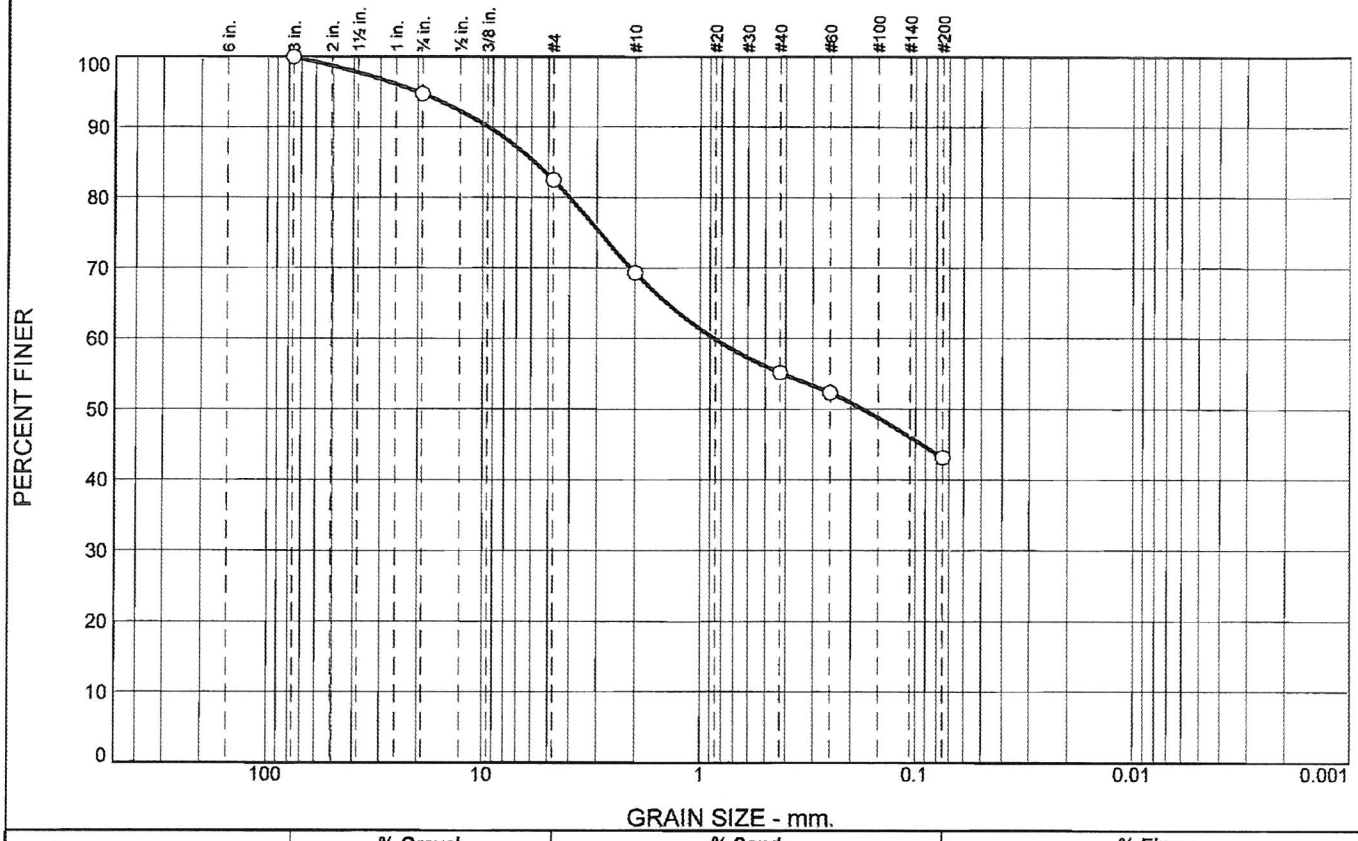
Run No.	1	2	3	4	
Wet+Tare	14.04	14.88	14.76		
Dry+Tare	13.59	14.32	14.24		
Tare	11.10	11.23	11.16		
Moisture	18.1	18.1	16.9		

Natural Moisture Data

Wet+Tare	Dry+Tare	Tare	Moisture
647.0	611.8	114.6	7.1

Hayre McElroy & Associates, LLC

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	5.3	12.2	13.2	14.2	12.0	43.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3"	100.0		
3/4"	94.7		
#4	82.5		
#10	69.3		
#40	55.1		
#60	52.3		
#200	43.1		

* (no specification provided)

Material Description

Clayey Sand with Gravel

Atterberg Limits

PL= 18 LL= 32 PI= 14

Coefficients

D_{90}= 9.4200 D_{85}= 5.7738 D_{60}= 0.8642
D_{50}= 0.1757 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SC AASHTO= A-6(2)

Remarks

Source of Sample: B-3 **Depth:** 10'-12'
Sample Number: 6986-d

Date: 07/14/2010

Hayre McElroy & Associates, LLC	Client: Aspect Consulting
Redmond, WA	Project: Aspect-Forest Ridge
	Project No: 08-175 Figure

Tested By: GW **Checked By:** JAM

GRAIN SIZE DISTRIBUTION TEST DATA

7/21/2010

Client: Aspect Consulting
Project: Aspect-Forest Ridge
Project Number: 08-175
Location: B-3
Depth: 10'-12'
Sample Number: 6986-d
Material Description: Clayey Sand with Gravel
Date: 07/14/2010 **PL:** 18 **LL:** 32 **PI:** 14
USCS Classification: SC
AASHTO Classification: A-6(2)
Tested by: GW
Checked by: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 396.00
Tare Wt. = 114.60
Minus #200 from wash = 43.4%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
611.80	114.60	3"	1250.10	1250.10	100.0
		3/4"	1531.60	1505.40	94.7
		#4	1419.40	1358.50	82.5
		#10	1240.10	1174.70	69.3
		#40	1017.70	947.20	55.1
		#60	892.90	878.80	52.3
		#200	1060.80	1015.10	43.1

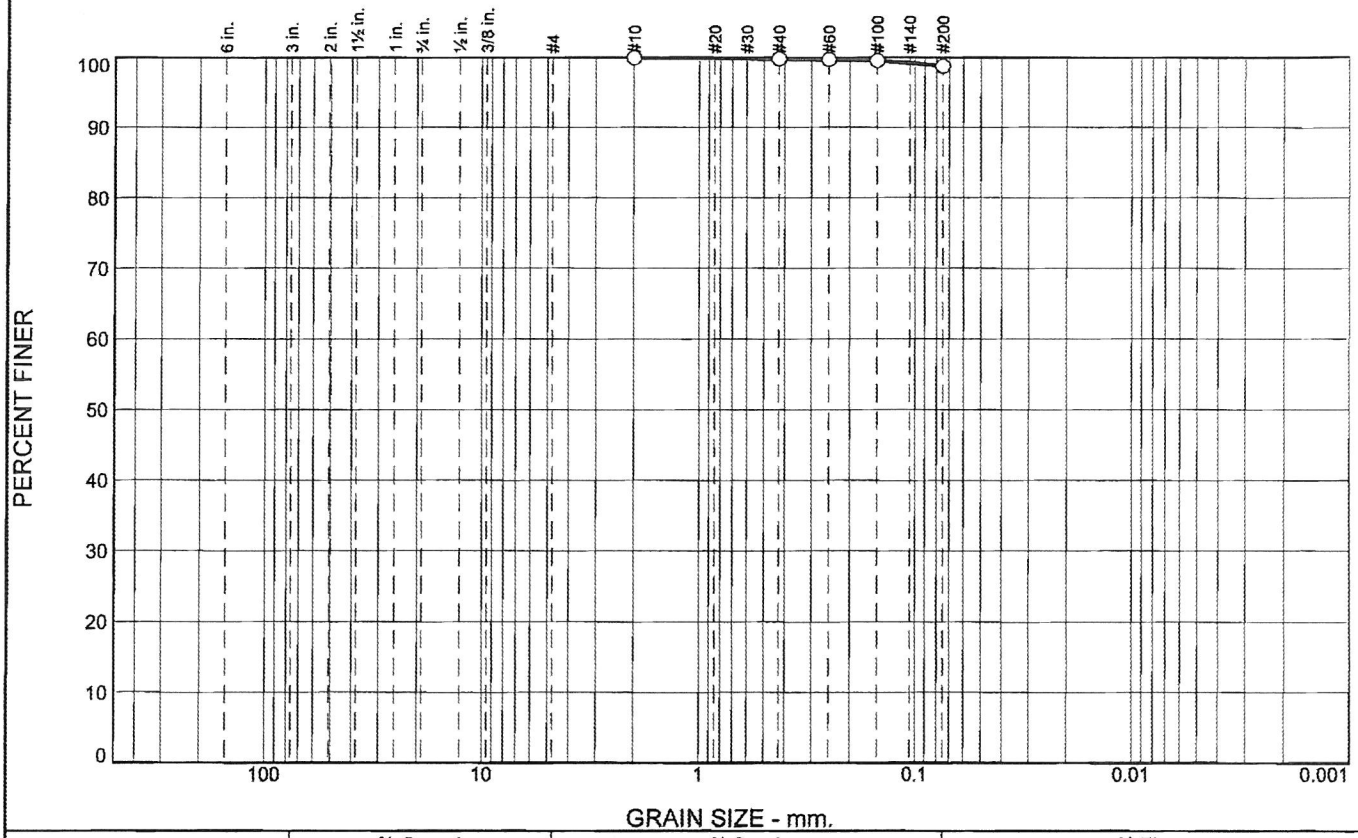
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	5.3	12.2	17.5	13.2	14.2	12.0	39.4			43.1

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
				0.1757	0.8642	4.0002	5.7738	9.4200	20.0686

Fineness Modulus
2.41

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
				0.2	1.0	98.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#40	99.8		
#60	99.7		
#100	99.5		
#200	98.8		

* (no specification provided)

Material Description

Gray Silty Clay

Atterberg Limits

PL= 17 LL= 31 PI= 14

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL-ML AASHTO= A-6(13)

Remarks

Source of Sample: B-3 **Depth:** 25'-26'
Sample Number: 6986-c

Date: 07/14/2010

Hayre McElroy & Associates, LLC **Redmond, WA**	**Client:** Aspect Consulting **Project:** Aspect-Forest Ridge **Project No:** 08-175 **Figure**

Tested By: GW **Checked By:** JAM

GRAIN SIZE DISTRIBUTION TEST DATA

7/21/2010

Client: Aspect Consulting
Project: Aspect-Forest Ridge
Project Number: 08-175
Location: B-3
Depth: 25'-26'
Sample Number: 6986-c
Material Description: Gray Silty Clay
Date: 07/14/2010 **PL:** 17 **LL:** 31 **PI:** 14
USCS Classification: CL-ML
AASHTO Classification: A-6(13)
Tested by: GW
Checked by: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 130.90
Tare Wt. = 124.30
Minus #200 from wash = 98.7%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
628.40	124.30	#10	1174.80	1174.70	100.0
		#40	948.00	947.30	99.8
		#60	879.60	878.90	99.7
		#100	844.80	844.00	99.5
		#200	1019.10	1015.10	98.8

Fractional Components

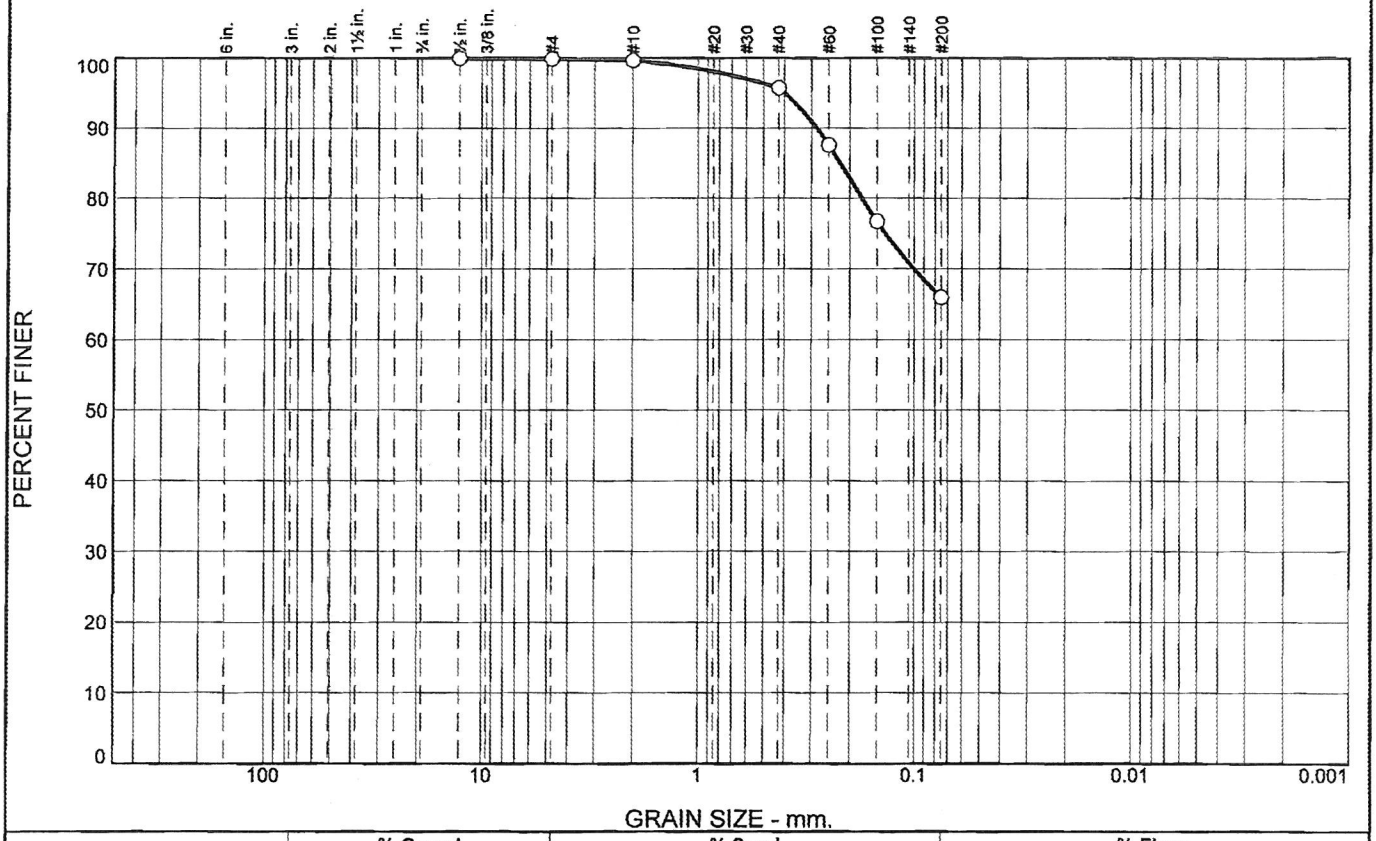
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
					0.2	1.0				98.8

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}

Fineness Modulus
0.01

Hayre McElroy & Associates, LLC

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.1	0.2	3.9	29.8	66.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1/2'	100.0		
#4	99.9		
#10	99.7		
#40	95.8		
#60	87.6		
#100	76.7		
#200	66.0		

* (no specification provided)

Material Description

Brown Clay with Sand

Atterberg Limits

PL= 20 LL= 37 PI= 17

Coefficients

D_{90}= 0.2843 D_{85}= 0.2209 D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-6(9)

Remarks

Source of Sample: B-4 **Depth:** 7'-9'
Sample Number: 6986-g

Date: 07/14/2010

Hayre McElroy & Associates, LLC

Redmond, WA

Client: Aspect Consulting
Project: Aspect-Forest Ridge

Project No: 08-175 **Figure**

Tested By: GW **Checked By:** JAM

GRAIN SIZE DISTRIBUTION TEST DATA

7/21/2010

Client: Aspect Consulting
Project: Aspect-Forest Ridge
Project Number: 08-175
Location: B-4
Depth: 7'-9'
Sample Number: 6986-g
Material Description: Brown Clay with Sand
Date: 07/14/2010 **PL:** 20 **LL:** 37 **PI:** 17
USCS Classification: CL
AASHTO Classification: A-6(9)
Tested by: GW
Checked by: JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 451.80
Tare Wt. = 198.90
Minus #200 from wash = 66.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
941.70	198.90	1/2'	1420.10	1420.10	100.0
		#4	1358.90	1358.50	99.9
		#10	1176.90	1174.80	99.7
		#40	976.10	947.10	95.8
		#60	939.70	878.90	87.6
		#100	924.60	843.90	76.7
		#200	1095.00	1015.10	66.0

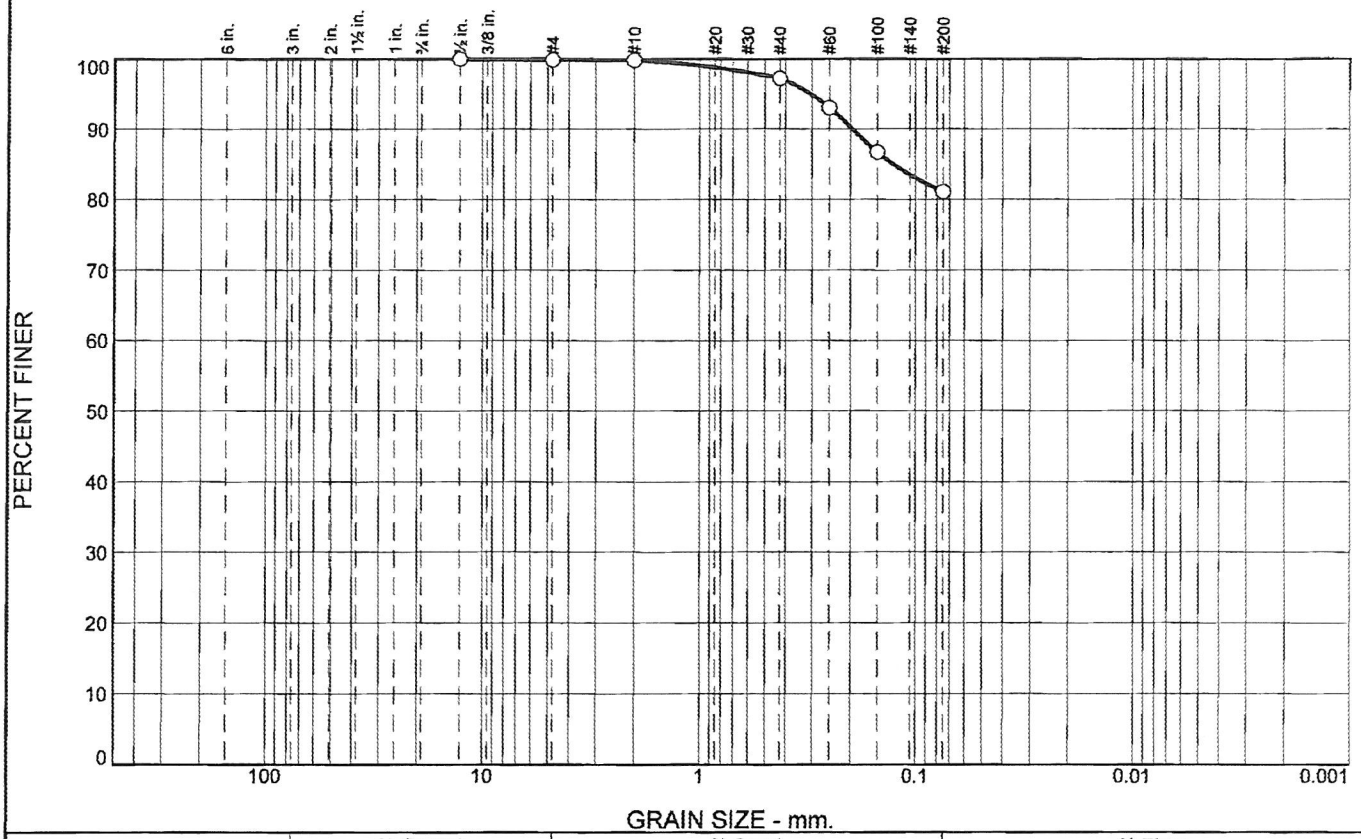
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.1	0.1	0.2	3.9	29.8	33.9			66.0

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
						0.1757	0.2209	0.2843	0.3976

Fineness Modulus
0.37

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.1	0.1	2.6	16.1	81.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1/2"	100.0		
#4	99.9		
#10	99.8		
#40	97.2		
#60	93.1		
#100	86.7		
#200	81.1		

* (no specification provided)

Material Description

Brown Clay with Sand

Atterberg Limits

PL= 18 LL= 35 PI= 17

Coefficients

D_{90}= 0.1954 D_{85}= 0.1275 D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-6(13)

Remarks

Source of Sample: B-4 **Depth:** 20'-23'
Sample Number: 6986-f

Date: 07/14/2010

Hayre McElroy & Associates, LLC	**Client:** Aspect Consulting
Redmond, WA	**Project:** Aspect-Forest Ridge
	Project No: 08-175 **Figure**

Tested By: GW **Checked By:** JAM

GRAIN SIZE DISTRIBUTION TEST DATA

7/21/2010

Client: Aspect Consulting
Project: Aspect-Forest Ridge
Project Number: 08-175
Location: B-4
Depth: 20'-23'
Sample Number: 6986-f
Material Description: Brown Clay with Sand
Date: 07/14/2010 **PL:** 18 **LL:** 35 **PI:** 17
USCS Classification: CL **AASHTO Classification:** A-6(13)
Tested by: GW **Checked by:** JAM

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 215.00
Tare Wt. = 118.60
Minus #200 from wash = 80.8%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
620.00	118.60	1/2"	1420.10	1420.10	100.0
		#4	1359.00	1358.50	99.9
		#10	1175.30	1175.00	99.8
		#40	960.80	947.70	97.2
		#60	899.80	878.90	93.1
		#100	876.20	844.20	86.7
		#200	1043.90	1015.73	81.1

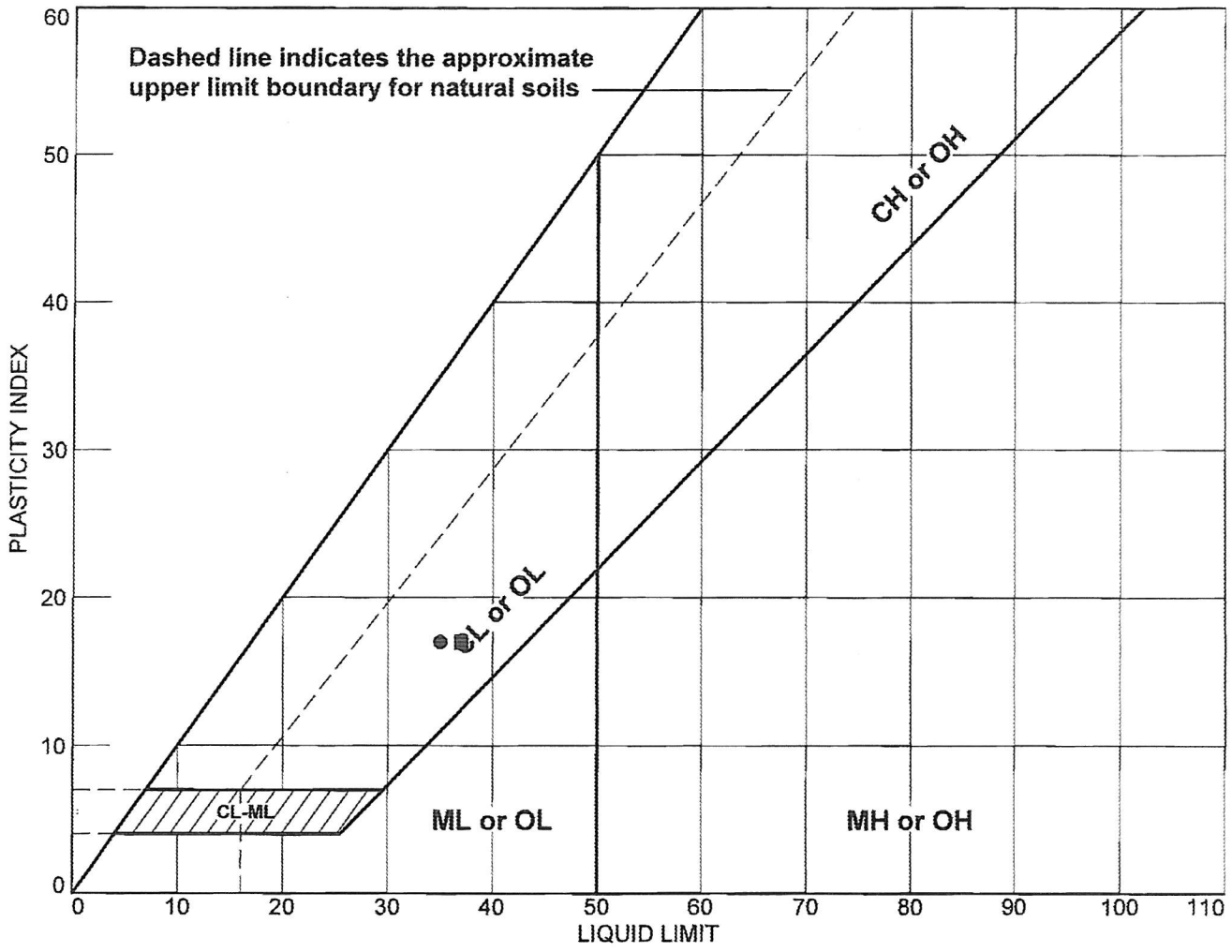
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.1	0.1	0.1	2.6	16.1	18.8			81.1

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
							0.1275	0.1954	0.3051

Fineness Modulus
0.21

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	B-4	6986-f	20'-23'	22.0	18	35	17	CL
■	B-4	6986-g	7'-9'	21.5	20	37	17	CL

Hayre McElroy & Associates, LLC **Redmond, WA**	**Client:** Aspect Consulting **Project:** Aspect-Forest Ridge **Project No.:** 08-175 **Figure**

Tested By: GW **Checked By:** JAM

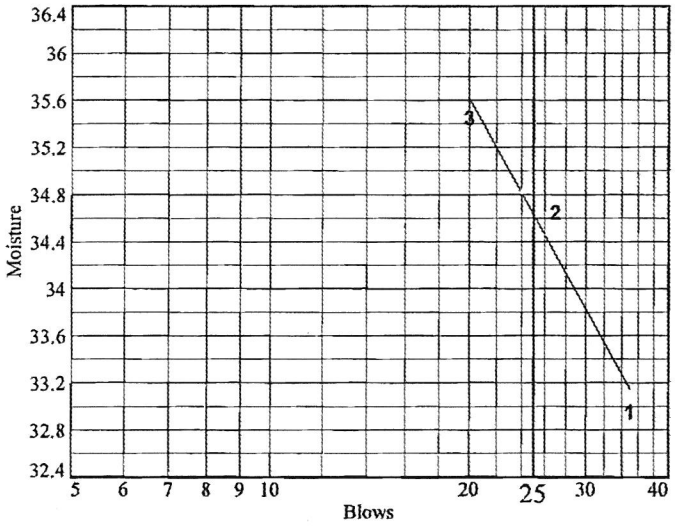
LIQUID AND PLASTIC LIMIT TEST DATA

7/21/2010

Client: Aspect Consulting
Project: Aspect-Forest Ridge
Project Number: 08-175
Location: B-4
Depth: 20'-23'
Sample Number: 6986-f
Material Description: Brown Clay with Sand
USCS: CL
AASHTO: A-6(13)
Tested by: GW
Checked by: JAM

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	8.91	8.65	9.35			
Dry+Tare	7.75	7.51	8.01			
Tare	4.23	4.22	4.23			
# Blows	35	27	20			
Moisture	33.0	34.7	35.4			



Liquid Limit= 35
Plastic Limit= 18
Plasticity Index= 17
Natural Moisture= 22.0
Liquidity Index= 0.2

Plastic Limit Data

Run No.	1	2	3	4	
Wet+Tare	13.20	13.52	12.55		
Dry+Tare	12.90	13.17	12.33		
Tare	11.19	11.183	11.16		
Moisture	17.5	17.6	18.8		

Natural Moisture Data

Wet+Tare	Dry+Tare	Tare	Moisture
730.43	620.0	118.6	22.0

Hayre McElroy & Associates, LLC

Washington State Department of Transportation
Paula J. Hammond
Secretary of Transportation

South Central Region
2809 Rudkin Road, Union Gap
P.O. Box 12560
Yakima, WA 98909-2560

(509) 577-1600
TTY: 1-800-833-6388
www.wsdot.wa.gov

April 26, 2010

Kittitas County Department of Public Works
411 N Ruby Suite 1
Ellensburg WA 98926

RECEIVED
APR 27 2010
KITTITAS COUNTY
DEPT OF PUBLICWORKS
COPY

Attention: Christina Wollman, Department of Public Works

Subject: Forest Ridge mitigation – SR903

WSDOT met with the proponent at their request on April 5, 2010, to discuss the project and the project impacts to the existing transportation network. Neither the County nor the City of Cle Elum were represented. Our response letter to the County dated February 4, 2010, contained mitigation language which apparently has not been supported by the County (verified in 4/21/10 email –attached). The purpose of the meeting was to determine what other means of mitigation could be achieved to mitigate their project impacts.

We discussed the project's Traffic Impact Analysis (TIA) and its conclusion and proposed mitigation. We addressed only the intersection impacted by this development that is within the jurisdiction of the WSDOT. Specifically, this is the intersection of SR903/SR903 Spur (erroneously stated as 970/903 in the TIA). Today, this intersection operates at an acceptable level of service (LOS B) as shown on page 11. At build-out with the addition of the Forest Ridge traffic, the intersection deteriorates to a LOS E. The WSDOT LOS threshold for this highway segment is LOS C and, if crossed, is no longer a proportionate share contribution as indicated in #4 Mitigation shown on page 18. Although pro-rata share contributions have been recommended by WSDOT for past developments affecting this and other adjacent intersections, to our knowledge no contributions have been received. For this development, Forest Ridge development is responsible for all costs associated for the improvements to this intersection to restore the minimum intersection LOS.

As a condition of development approval, the proponent is required to construct a speed change lane at the SR903/SR903 Spur intersection, as shown in the WSDOT Design Manual Chapter 1310.07 (4). The construction of this acceleration lane from the northbound stop condition to the westbound movement into Cle Elum on SR 903 will improve the intersection LOS to an acceptable level for the project traffic. This improvement is shown in the attached exhibit and must be designed in accordance with our Design Manual. If the development is approved, the proponent will be required to enter into a development agreement with WSDOT, prepare an intersection plan for approval, and develop the construction plans for the noted improvement.

If you have any questions, please contact Rick Holmstrom at 509-577-1633.

Sincerely,

Bill Preston, P.E.
Regional Materials and Planning Engineer

BP: rh
cc: File #1, SR 903
Terry Kukes, Area 1 Maintenance Superintendent
Matt Morton – City of Cle Elum
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KITTITAS COUNTY
DEPARTMENT OF PUBLIC WORKS
Kirk Holmes, Director

MEMORANDUM

TO: Allison Kimball, Brookside Consulting
FROM: Christina Wollman, Planner II
DATE: March 26, 2010
SUBJECT: Forest Ridge Cluster Plat LP-08-00014

1. A memo from Doug D'Hondt is attached in reply to your letter dated March 4, 2010, addressing issues that must be resolved prior to preliminary approval and SEPA determination.

2. A letter from WSDOT is attached that directs the developer to contact WSDOT to determine what traffic mitigation will be required. This determination must be made prior to preliminary approval and SEPA determination.

3. The City of Cle Elum shall also be contacted to discuss traffic and stormwater concerns. We suggest a meeting be set up which includes all stakeholders. I will try to set up a meeting with everyone during the week of April 5th. Currently, April 7th appears to be the best day. Please let me know if this date works for you and your clients.

411 North Ruby Street, Suite 1
Ellensburg, WA 98926
TEL (509) 962-7523
FAX (509) 962-7663

31

KITTITAS COUNTY
DEPARTMENT OF PUBLIC WORKS
Kirk Holmes

MEMORANDUM

TO: File
FROM: Douglas D'Hondt
DATE: March 25, 2010
SUBJECT: Surface Water Issues for Forest Ridge Development

My reply to the Brookside Consulting memo to the Forest Ridge development follows:

1. It is true the storm water volume and flow rates may be discharged to natural drainages in the same manner as currently exists. Volume and flow rate in addition to what is naturally generated must be addressed. Flow rate is addressed. Total volume of additional storm water is not. Please reference item 4 herein.

2. WSDOT issued concerns regarding the additional traffic loading to State Route 903. These concerns shall be addressed. City of Cle Elum comments shall also be addressed.

3. The Younger Ditch flows at nearly capacity. It is not a natural watercourse that can be used indiscriminately for storm water disposal. While it may be true the ditch is 2 miles from the site, any discharge to the ditch is not allowed regardless of conveyance length. Younger Ditch is an irrigation ditch that is privately owned and maintained. Entities wishing to use this canal for storm water disposal must first obtain expressed permission from the ditch owners. This requirement is no different than for any irrigation canal.

4. Flow rates are addressed. Mitigation for additional storm water volume is not. All additional post development generated storm water volume shall be retained onsite.

5. Fifty-percent of the storm water is not proposed to be dispersed on-site as indicated by Brookside Consulting memo. Fifty-percent of the storm water is assumed to be disposed of on-site with no mitigation or justification (page 6, drainage report). The drainage report analysis includes storm water generated on the roads within the development which results in overall developed area per residential lot less than that indicated by Brookside Consulting memo. The area of residential development is not as conservative as indicated in the Brookside memo. A complete engineering justification for the assumptions shall be offered to the County for further review. We are currently reviewing issues associated with this SEPA process to determine if mitigation requirements are necessary. Therefore, all pertinent information including complete documentation outlined in this memo is needed prior to SEPA determination.

411 North Ruby Street, Suite 1
Ellensburg, WA 98926
TEL (509) 962-7523
FAX (509) 962-7663

6. There is no regulatory requirement with the statement offered in item 6 of the previous KCPW memo. The statement was offered for informational purposes. There is no documentation known to KCPW the flood event was a 100-year event. Should the developer or his consultants have documentation proving the flooding is deemed to be a 100-year event, please provide it. Furthermore, major flooding events such as that occurred in January 2009 occur in Kittitas County with a return period ranging from 10 to 14 years.

   Rain on snow methodology is identified in WDOE Eastern Washington Storm Water Manual 4.2.7. Therefore, rain on snow methods shall be addressed in storm water analysis as required by the storm water manual.

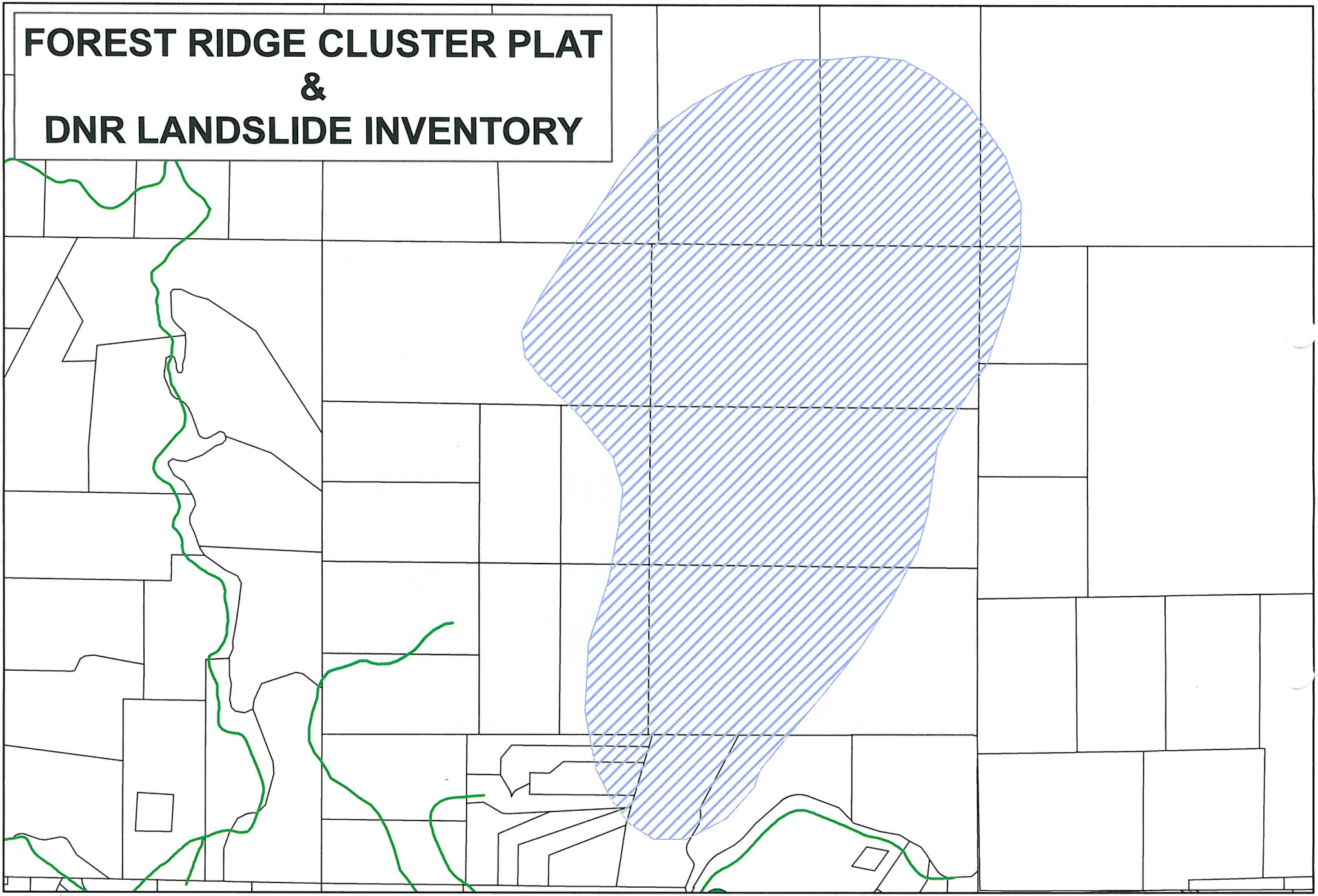
7. Maps must be accurately scaled to provide the reviewing agency and others to properly analyze a report. Improper scaling may result in confusion that unnecessarily delays analysis and associated correspondence. Figures D.1 and D.2 are not properly scaled. The scale for both of these maps is depicted at 1 inch = 2,000 feet. The actual appears closer to 1 inch = 500 feet. The design engineer is capable of determining actual scale of all figures and correcting the documentation.

8. Information from Washington Department of Natural Resources recently obtained by the County illustrating a landslide located over a large portion of the development site. Existence of this slide shall be confirmed through appropriate investigation. Reporting from the geotechnical investigation shall be submitted to the County and DNR prior to SEPA determination.

205 West 5th, Rm 108
Ellensburg, WA 98926

TEL (509) 962-7523
FAX (509) 962-7663

FOREST RIDGE CLUSTER PLAT
&
DNR LANDSLIDE INVENTORY



0 0.25 0.5 1 Miles

Disclaimer: Kittitas County makes every effort to produce and publish the most current and accurate information possible. No warranties, expressed or implied, are provided for the data provided, its use, or its interpretation. Kittitas County does not guarantee the accuracy of the material contained herein and is not responsible for any misuse or representations by others regarding this information or its derivatives.

N
W E
S

LHZ -- Final A-1 Map -- Landslide Inventory -- West Fork Teanaway Watershed

Lorraine Powell -- July 2005

Miles
0 0.5 1 2 3 4
1 inch equals 2,000 feet

Landslide polygons are labeled with the LSI_UNIQID from the LSI coverage and Slide_id from LSI_DATA data table in the format "LSI_UNIQID(SLIDE_ID)". Only state and private lands are shown in their entirety. Tom Boyd, 12-15-2006, wfteam_a1_final.pdf & .mxd.

DISCLAIMER
Care was used during the compilation of this map to ensure accuracy. However, due to changes in ownership and the need to rely on outside information, the Department of Natural Resources cannot accept responsibility for errors or omissions on this map and therefore, there are no warranties which accompany this material. Neither the State of Washington, nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not constitute or imply its endorsement, recommendation, or favoring by the State of Washington or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the State of Washington or any agency thereof.

Krogstad, F., 1997,Draft Mass Wasting Assessment, West Fork Teanaway River Watershed Analysis, prepared for the Plum Creek Timber Co.

Important Note:
This stamp certification applies only to modifications of the original study.

State of Washington
Engineering Geologist
524
Licensed Geologist
Lorraine Powell

Landslides from LSI Database
LSI Landslide Arcs
Interstate
U.S.
State
Local
Roads
Trail
Railroad
Railroad Grade
Ferry Crossing
Open Saltwater
Open Freshwater
Ponds, Impoundments, etc.
Marsh / Bog / Wetland
Flats, Shoals, etc.
Glacier / Snowfield
Unknown
Streams
Watershed Boundary
Non LHZ Project Lands
Public Land Survey Townships
Public Land Survey Sections
200 ft. Contours
master10k tic

Washington State Department of Transportation
Paula J. Hammond
Secretary of Transportation

South Central Region
2809 Rudkin Road, Union Gap
P.O. Box 12560
Yakima, WA 98909-2560

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TTY: 1-800-833-6388
www.wsdot.wa.gov

RECEIVED
FEB 05 2010
KITTITAS COUNTY
DEPT OF PUBLIC WORKS

February 4, 2010

Kittitas County Department of Public Works
411 N Ruby Suite 1
Ellensburg WA 98926

Attention: Christina Wollman, Department of Public Works

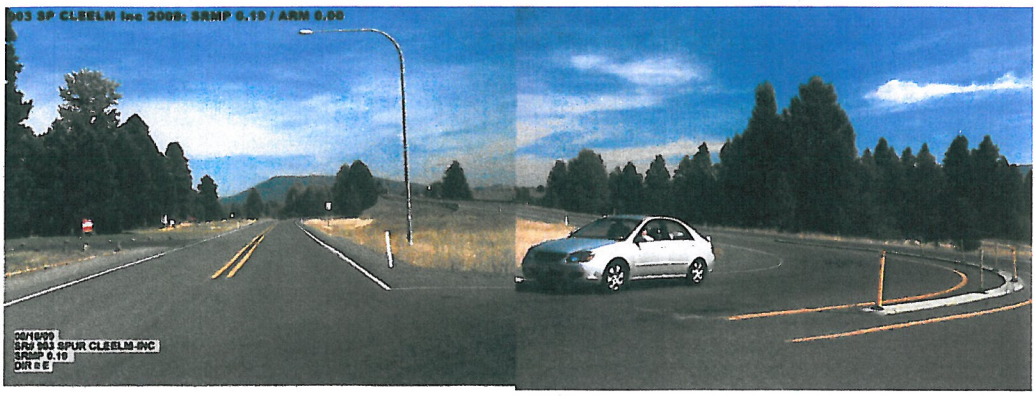
Subject: Forest Ridge Residential Project – Cle Elum area

We have reviewed the proposed project Traffic Impact Analysis, including the revised TIA dated November 19, 2009. This TIA will have implications for the City of Cle Elum, but this response is to the County. The following are our comments:

SR 903 is a Class 5 Managed Access Highway with a posted speed limit of 30 MPH within the city limits of Cle Elum, and a Class 3 Managed Access Highway with a posted speed limit of 45 MPH east the city limits. This development along with the future Cle Elum North Hills development will affect SR 903 both within and to the east of the city limits.

Affects on SR 903 within City limits:
The additional traffic generated will likely adversely affect the operation of the intersections of SR 903 with Columbia and Montgomery Avenues. The Cle Elum Transportation Plan 2009 (Draft) proposes to improve these intersections. It is the City's jurisdiction and responsibility per RCW 47.24.020 for any improvements to any intersection on SR 903 within the city limits which would require widening, channelization, or signalization. However, the WSDOT would need to review all construction and traffic control plans associated with these improvements. If signalization is contemplated, it would need to meet warrants. Any mitigation by the developer for improvements to these intersections will be at the City's discretion.

Affects to the East Cle Elum Interchange:
The Traffic Impact Analysis performed by the developer shows that with the combination of this project and the North Hills development, there will be a significant adverse affect to the operation of the SR 903/SR 903 Spur intersection. The operational deficiency is for the left (westbound) turning traffic at the stop sign.



The Cle Elum Transportation Plan 2009 (Draft) proposes a new bridge over the SR 903 Spur and a road to link up with the Airport Rd./White Rd. intersection. The WSDOT strongly supports this link, since it will significantly alleviate the problems associated with the SR 903/SR 903 Spur intersection, and relieve some of the traffic volumes at the City intersections. Therefore we propose that any mitigation the County or City requires be applied to this link. However, if the County and/or City do not require any mitigation by the developer to be applied to this linkage, the WSDOT will require some mitigation for the SR 903/SR 903 Spur. The developer will need to contact Rick Holmstrom at 509-577-1633 to determine what mitigation will be required.

Sincerely,

Bill Preston, P.E.
Regional Materials and Planning Engineer

BP: rh/dje

cc: File #1, SR 903
Terry Kukes, Area 1 Maintenance Superintendent
Matt Morton – City of Cle Elum

p:\459005\devrev\sr903\KittCo_Cle Elum - Forest Ridge Residential Project.doc

Brookside Consulting

RECEIVED
MAR 05 2010
Kittitas County
CDS

March 4, 2010

Mr. Dan Valoff, Staff Planner
Kittitas County Community Development Services
411 N. Ruby Street, Suite 2
Ellensburg, WA 98926

Re: Forest Ridge Performance Based Cluster Plat Application (LP-08-00014)

Dear Dan:

This letter is to confirm receipt of an email from you dated February 18, 2010. This email was entitled "Forest Ridge 2 week comment period" and was in response to an inquiry regarding the status of the issuance of the MDNS for the Forest Ridge plat application (LP-08-00014). Included in your email response was a copy of a memorandum from Christina Wollman in Kittitas County Department of Public Works which included an attachment from Doug D'Hondt addressed to "File" and the subject identified issues related to surface water (copies attached). In accordance with the comment period (two weeks) identified by Anna Nelson in her email of January 6, 2010 where she requested electronic submittal of the Critical Areas Report and Streams and Wildlife Habitat Study, combined with your confirmation of the dissemination of the documents, I assume that your email correspondence of February 18, 2010, confirms the completion of the comment period and also concludes the submission of comments under the review period and that the Public Works memo is the only remaining comment to address. If there were any additional comments please forward them immediately so that we may review them.

With respect to the memorandum from the Kittitas County Department of Public Works, we have some questions and comments and respectfully request your clarifications, as soon as possible, in order for us to appropriately address the points raised in the subject memo. The numbered points below correlate to the topics as listed within the Department of Public Works' memorandum.

1) In order for us to applicably respond, please provide the comments submitted by the City of Cle Elum and any other documentation from the City that describes any concerns associated with storm water runoff from the project. Without detailed comments we do not have the ability to reply with any specificity. However, in the spirit of providing what was encouraged during our pre-application meeting and what was communicated by HDR from your peer review to our engineer, we have done preliminary calculations that meet or exceed what was requested. For example, stormwater from this site currently drains into natural ravines. DOE regulations (particularly Core Element #4 of the Eastern Washington Stormwater Design Manual) require developments to discharge stormwater runoff to their natural location – in the same manner, at the same location and at the same flow and volume as under conditions that existed prior development. That is exactly what is proposed in the preliminary calculations and the engineering will be done to that standard upon preliminary approval of the plat and prior to construction.

PO Box 1036, Cle Elum, WA 98922 • (509) 859-3421 • brooksideconsulting@gmail.com

30

2) A comment regarding traffic impacts was included in the memo regarding stormwater runoff. A thorough Traffic Impact Analysis was submitted, in conformance with the request from the Kittitas County Department of Public Works. This study has already addressed impacts and mitigations associated with City of Cle Elum streets. If there are further comments, then please provide specifics.

3) The Younger Ditch is nearly two miles away from the development. We have found no reasons or regulatory basis for the request. In fact, stormwater from this site currently drains into natural ravines and DOE regulations (Core Element #4 of the Eastern Washington Stormwater Design Manual) require developments to discharge stormwater runoff to their natural location – in the same manner, at the same location and at the same flow and volume as under conditions that existed prior development. Therefore, development of the proposed project and the related stormwater control system will not result in an increase in storm water flows to the Younger Ditch than currently exists and this request would seem to be irrelevant to the project.

4) The submitted stormwater information was prepared in conformance with the request of the County's Consultant and using the most recent DOE Eastern Washington design manual. Additionally, final stormwater designs must be submitted prior to construction and prior to final plat approval. Therefore, we believe this is not an issue that needs to be resolved prior to a preliminary plat approval. As outlined above and in conformance with Eastern Washington DOE regulations, stormwater control systems associated with this development will be designed to insure that no increase in stormwater flows will occur as a result of the development.

5) A conservative average lot coverage was used to provide quantities for the preliminary calculations. Using an average would yield some lower than expected estimates for small lots and some larger than expected estimates for larger lots; however, this method provides sufficiently accurate estimates prior to final design. In fact, these numbers, when taken in total, equal 1,805,126 sq feet of impervious, and an average of 4,839 sq feet per lot. The system will be designed to accommodate the actual amount of impervious surface during final design work prior to construction. Additionally, 50% of the impervious surface runoff is anticipated and proposed to be dispersed on site. These are issues for final design and should not need to be resolved prior to preliminary plat approval.

6) Please provide some scientific or regulatory support for this statement. The stormwater work was prepared in accordance with DOE guidelines and at the County Consultant's direction. Although not required, our engineers included a rain on snow event in the calculations that were submitted to the County to take such an occurrence into account.

7) Several of the maps were reduced in size to accommodate the submittal package, therefore, please identify specific maps that are of concern, in order for our engineers to confirm the scale.

We respectfully request that after you review the information provided and, in turn, provide the information requested, that we meet to discuss the items in the memorandum from Public Works in order to reach a prompt conclusion. Please suggest some convenient times that we can meet with you and representatives from Public Works as we look forward to resolving the subject issues as soon as possible. Your time and input is very much appreciated.

Sincerely,

Allison Kimball
Authorized Agent

Cc: Sean Northrop, Iron Snowshoe LLC
Marc Kirkpatrick, Encompass Engineering & Surveying
Christina Wollman, Kittitas County Dept of Public Works

KITTITAS COUNTY
DEPARTMENT OF PUBLIC WORKS

Kirk Holmes, Director

RECEIVED
FEB 16 2010
KITTITAS COUNTY
CDS

MEMORANDUM

TO: Dan Valoff, CDS
FROM: Christina Wollman, Planner II
DATE: February 16, 2010
SUBJECT: Forest Ridge Plat LP-08-00014

Please find the attached comments from the County Engineer, Doug D'Hondt. The items of concern shall be addressed prior to preliminary approval.

411 North Ruby Street, Suite 1
Ellensburg, WA 98926

TEL (509) 962-7523
FAX (509) 962-7663

29

G:\Eng\Development\Cluster Plats\Forest Ridge\memo_dougs comments.docx

KITTITAS COUNTY
DEPARTMENT OF PUBLIC WORKS
Kirk Holmes

MEMORANDUM

TO: File
FROM: Douglas D'Hondt
DATE: February 16, 2010
SUBJECT: Surface Water Issues for Forest Ridge Development

My concerns for the Forest Ridge development follow:

1. Post development generated storm water is proposed to be transported through the City of Cle Elum. Permission to do so from the City must first be obtained.

2. Additional traffic impacts to the City of Cle Elum shall be addressed.

3. Storm water shall not be transported to the Younger Ditch.

4. Flow rates are addressed somewhat. Duration of the flow is not. Discharge of flow longer than what currently exists will lengthen the flooding event. Therefore, additional damage may occur resulting from the extended flooding time. All additional post development generated storm water shall be retained onsite.

5. Several values for impervious areas are less than 2,000 square feet. Please justify residential and out-building roof top areas and driveway areas will be of this value.

6. The flooding of January 2009 was not designated a 100-year event. Therefore, it is likely flooding experienced on-site and transported off-site will be greater in the future than what was observed during the January 2009 flood.

7. The scale depicted on the maps appears to be inaccurate and should be verified.

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Washington State Department of Transportation
Paula J. Hammond
Secretary of Transportation

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FEB 05 2010
KITTITAS COUNTY
DEPT OF PUBLIC WORKS

February 4, 2010

Kittitas County Department of Public Works
411 N Ruby Suite 1
Ellensburg WA 98926

Attention: Christina Wollman, Department of Public Works

Subject: Forest Ridge Residential Project – Cle Elum area

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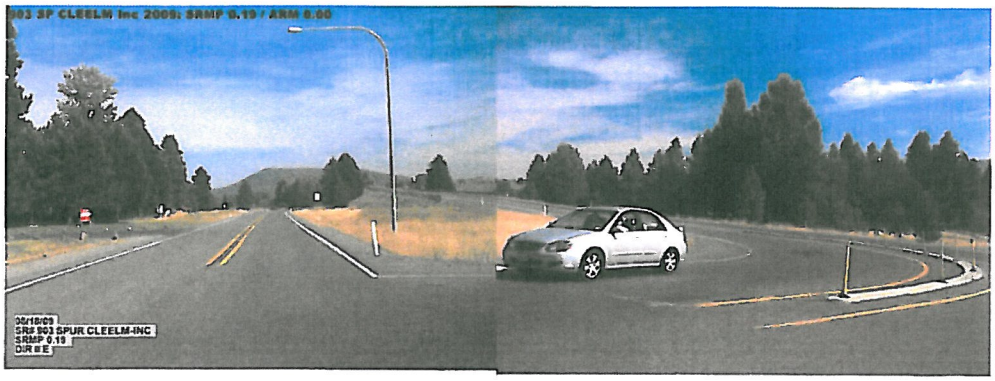

28

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Sincerely,

Bill Preston, P.E.
Regional Materials and Planning Engineer

BP: rh/dje

cc: File #1, SR 903
Terry Kukes, Area 1 Maintenance Superintendent
Matt Morton – City of Cle Elum

p:\459005\devrev\sr903\KittCo_Cle Elum - Forest Ridge Residential Project.doc

CLE ELUM'S SAPPHIRE SKIES

December 28, 2009

RECEIVED
DEC 29 2009
KITTITAS COUNTY
CDS

Anna Nelson, Contract Planner
Kittitas County Community Development Services
411 N. Ruby St, Suite 2
Ellensburg, WA 98926

RE: Forest Ridge Performance Based Cluster Plat (LP-08-00014)

Dear Ms. Nelson:

Pursuant to your letter dated October 28, 2009, enclosed you will find two sets of the following supplemental information:

- Updated SEPA checklist
- Narrative Analysis demonstrating conformance with KCC 16.09
- Revised calculations in accordance with KCC 16.09.090
- Letter of request to cancel the Boundary Line Adjustment BLA-07-136
- Abandoned Mine Lands Report
- October 11, 2009 letter to Cathy Bambrick, Kittitas County Department of Public Health, containing the requested information from her letter dated September 30, 2009.
- Road Plan & Profile
- Updated Plat Drawings
- Streams and Wildlife Habitat Study
- Revised Traffic Impact Analysis
- Critical Areas Report
- Storm Drainage Report

Please contact Allison Kimball of Brookside Consulting if there are any questions.

Sincerely,

for Dave Blanchard

Dave Blanchard
Authorized Agent
Iron Snowshoe LLC

Cc: ✓Dan Valoff, Kittitas County CDS
Allison Kimball, Brookside Consulting
Marc Kirkpatrick, Encompass Engineering

"Forest Ridge"
Performance Based Cluster Plat – Narrative

The proposed development includes a subdivision of approximately 478.45 acres into 171 single-family residential lots pursuant to KCC Chapter 16.09 Performance Based Cluster Platting. Lot sizes will range from approximately 1.0 acre to 4.0 acres and will be developed in four phases as follows:

Phase	Estimated Timeline
Phase I – 14 lots	2010 – 2011
Phase II – 32 lots	2011 – 2012
Phase III – 14 lots	2012 – 2013
Phase IV – 22 lots	2013 – 2014
Phase V – 21 lots	2014 - 2015
Phase VI – 29 lots	2015 – 2016
Phase VII – 16 lots	2016 – 2017
Phase VIII – 23 lots	2017 - 2018

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KITTITAS COUNTY
CDS

Total: 51 lots 8 years

- A Non-Expanding Group A water system is proposed to serve the development and either each lot will be provided sanitary sewage disposal by individual on-site septic systems or community systems will be designed where feasible.
- Interior roadways will be private roads, connecting to Columbia Street.
- Approximately 191.38 acres of open space will be provided and may include private trails.
- Please refer to the attached spreadsheet for a complete summary of the Performance Based Cluster Plat Ratings Systems Chart.

PUBLIC BENEFIT RATINGS SYSTEMS CHART

Base Acreage:	478.45	Open Space Required (40%):	191.38 ac.
Base Lot Yield:	96	Net Open Space Provided (40%):	230.13 ac.
Max. Bonus Lots:	86	Water Supply:	Group A
Max. Lot Yield:	182	Sanitary Sewer:	Individual/Community Septic
Proposed Lot Yield:	171	Zoning:	Rural-5

Element	Points Available	Points Awarded	Comments
Transportation			
Additional ROW Width	0	0	Not applicable for Rural lands
Connectivity	25	0	Connectivity of easements is pre-existing
Multi-Modal Access	25	0	Site is not adjacent to public recreation lands
Streetscape Design Standards	0	0	Not applicable for Rural lands
Open Space			
50% of site for 25 years	0	0	Not applicable for Rural lands
40% - 80% in perpetuity	40	40	191.38 minimum
Wildlife Habitat			
Connectivity to Wildlife Corridors	15	0	Site is not adjacent to existing corridors
Critical Areas Enhancement	10	0	None proposed
Health and Safety			
Connection to Municipal Water	0	0	Not applicable for Rural lands
Connection to Group A	50	50	A Group A system is proposed
Connection to Group B	25	0	
Connection to Sewage System	0	0	Not applicable for Rural lands
Community Septic System	10	0	Combination of individual and community
Reclaimed Water System	50	0	None proposed
Recreation			
Passive (private or public)	5 or 10	0	No passive recreation facilities are proposed
Active (private or public)	10 or 20	0	Trails may be constructed within the open space area
Formal (private or public)	10 or 25	0	Community Area proposed
	TOTAL	**90**	Of 100 total points scored, only 80 have been applied to the bonus.

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KITTITAS COUNTY
CDS

SubTerra, Inc.

Civil & Mining Engineering
Engineering Geology
Tunnel Engineering & Construction Management
Rapid Excavation/Support Systems
Active/Abandoned Mine Subsidence
Quality Assurance / Quality Control
Safety Monitoring of Structures
Blast Optimization / Vibration Monitoring
Mine & Quarry Permitting
Material Science / Laboratory Testing

Tuesday, November 17, 2009

RECEIVED
DEC 2 9 2009
KITTITAS COUNTY
CDS

Mr. David Blanchard.
President and Project Manager
Sapphire Skies, LLC
206 West First Street
Cle Elum, WA 98922
T: (509)-674-6828
F: (509)-674-6836
E: dblanchard@SapphireSkies.net

Re: Forest Ridge, Cle Elum, WA, Very Preliminary Abandoned Mine Lands (AML) Report

Dear Mr. Blanchard:

Please find attached a plot of your Forest Ridge project site made using the AUTOCAD file received from Marc which contained a raw survey data file from the surveyor. We inputted the received file using the NAD 83 datum and added data in our files for Kt-1 and Kt-31 to produce the Figure.

It appears that the Forest Ridge parcels plot at a location offset from the actual T20, R15E, Section 24 NW Corner location. Please note, we have not checked this out as it has only a small impact on the issue at hand - the relative location of the abandoned mine workings.

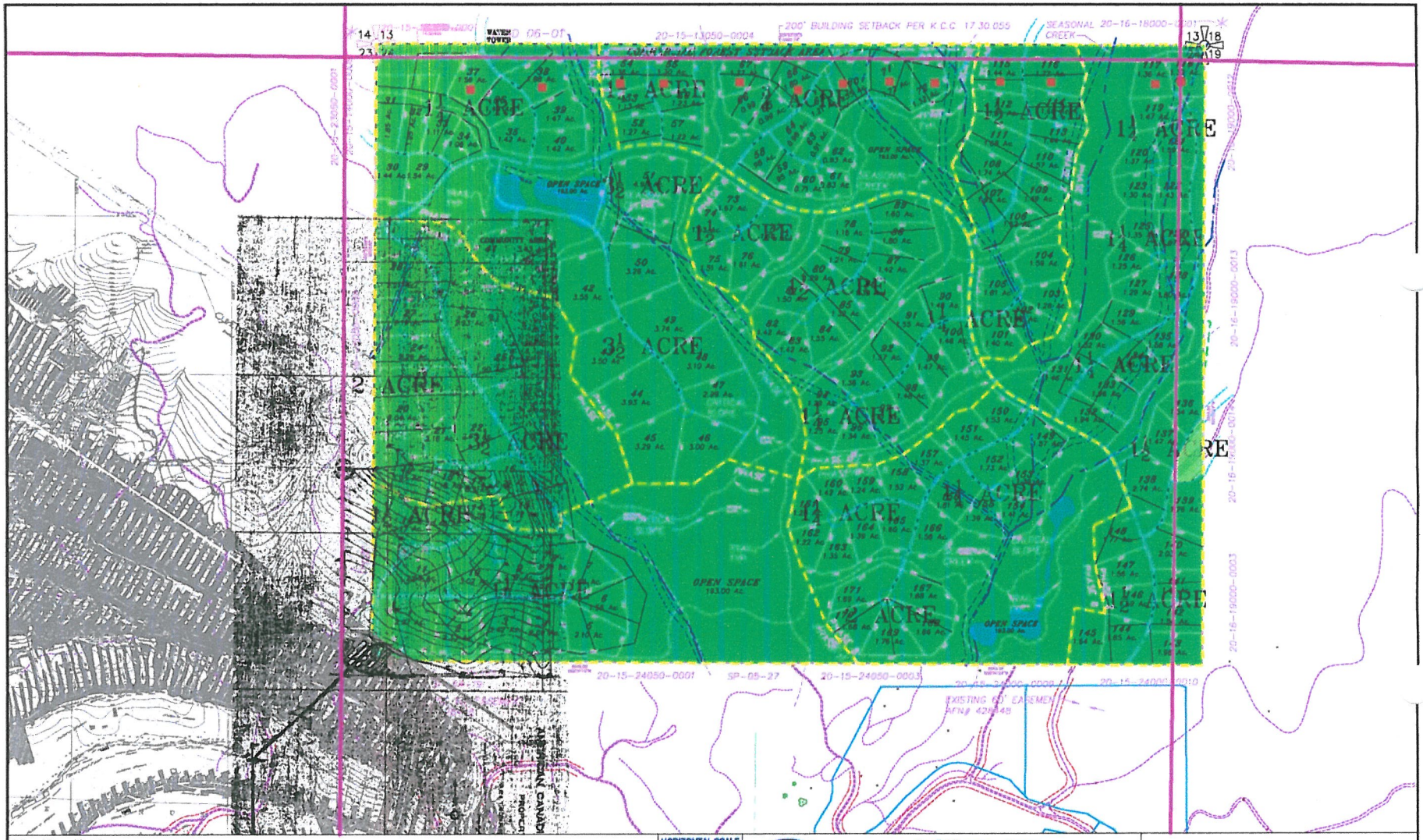
The SW corner of the Forest Ridge property is underlain by abandoned mine workings in the Rosalyn Bed (primarily affects the 2.27 acre parcel) based on the available information. There is at least one documented shaft elswhere on the property which is most likely a prospect shaft. There is also a lower bed of coal underlying the property but no mining records in the data we have available. At some point you would need to confirm (i.e., through field reconnaissance) that this bed was not mined (legally or illegally).

The enclosed and attached work products were prepared for Sapphire Skies, LLC as input to their preliminary planning and EIS preparations for the Forest Ridge project and for no other purpose. The work was performed under SubTerra, Inc.'s General Terms and Conditions and in a manner consistent with the level of care and skill ordinarily exercised by other professional contractors in similar circumstances at the time the Services were performed. No other warranty, express or implied is made.

If you have any questions please do not hesitate to call us at 425-888-5425.

Sincerely,

Chris D. Breeds, PE, PhD
President, SubTerra, Inc.



Mine Maps Used

- wa coal mine map KT28_B
- wa coal mine map KT28_C
- wa coal mine map KT28_D
- wa coal mine map KT30_A
- wa coal mine map KT30_B
- wa coal mine map KT30_C
- wa coal mine map KT32_F

Datum: nad 83 WA state plane south feet

Source:

Base Map: Site boundary, Easements, Offsets and (topo, roads, creeks, vegetation and other site data from a Flown Aerial Map) supplied by client.
Surrounding Data: (parcel lines, road names etc.) acquired from Cle Elum GIS and is only for general reference and orientation.
Mine Maps: Washington State Department of Natural Resources.

HORIZONTAL SCALE	1"=600'
VERTICAL SCALE	Same
DESIGNED	DATE 07 02 2009 / BY BDJ
DRAWN	DATE 07 02 2009 / BY BDJ

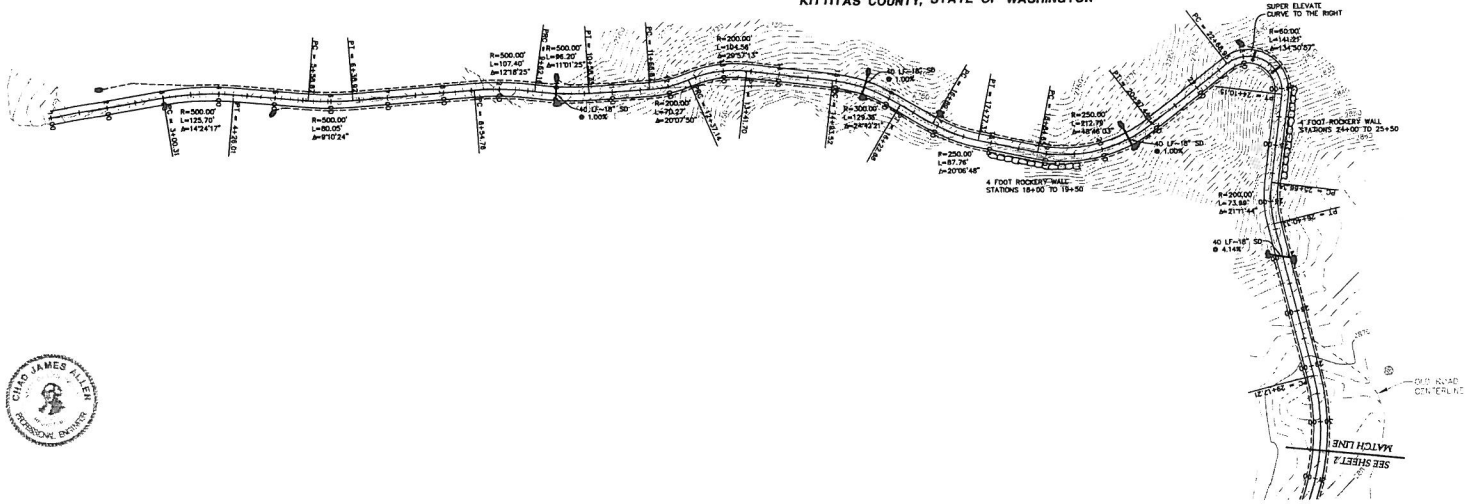
SubTerra, Inc.
P.O. Box 620, 218 East North Bend Way, North Bend WA 98045
Telephone: (425) 888-5422 E-mail: SubTerra@subterra.us Fax: (425) 888-3725

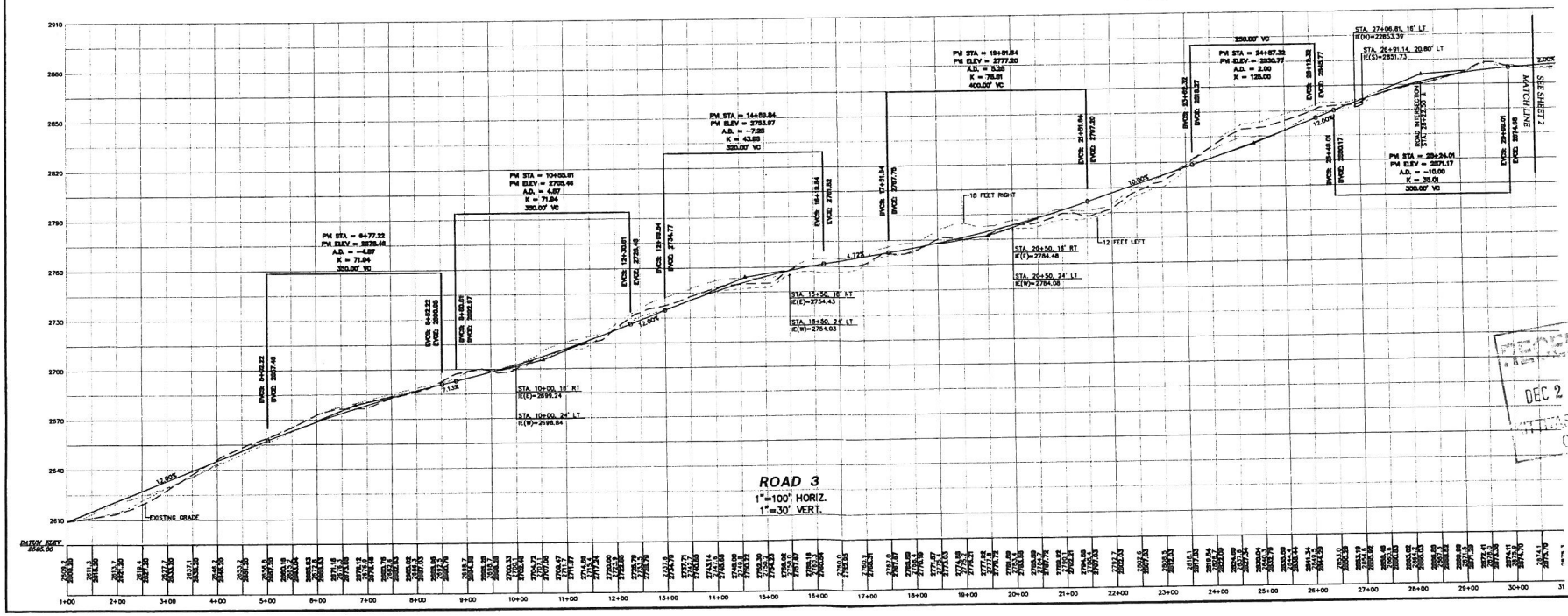
NOTE: This Map is a compilation of several maps electronic and paper. Original maps were recorded in different datums. Best effort was applied to retify co-ordinate systems.

Figure 1
Sapphire Skies LLC - Forest Ridge
Site Layout with
Historic Mine Workings

Z:\Active Projects\2009_Projects\2009-19 SAPPHIRE SKIES - City Heights AML\AutoCad\subt\AML study.dwg 7/2/2009 2:02:05 PM PST

A PORTION OF THE NW 1/4 OF SECTION 24, T.20N., R.15E., W.M.
KITTITAS COUNTY, STATE OF WASHINGTON





GRAPHIC SCALE
(IN FEET)
1 inch = 100 ft.

NOTES:

1) ROCK LINE DITCHES FROM STATIONS 1+00 TO 16+20 AND STATIONS 17+50 TO 29+50
2) PROVIDE SEDIMENT TRAPS AT INLETS TO ALL CULVERTS
3) ROCK ARMOR STORM INLETS AND OUTLETS
4) LARGER CUT AREAS MAY REQUIRE NEW ELECTRICAL, COMMUNICATIONS, ETC.
5) CONSTRUCT FOUR FOOT ROCKERY FROM STATIONS 18+00 TO 19+50 AND 24+00 TO 25+50

NOTE: THE EXISTING UTILITIES AS SHOWN ARE ONLY APPROXIMATE. OTHER EXISTING UTILITIES MAY EXIST ALONG THIS PROPOSED ALIGNMENT. IT SHALL BE THE CONTRACTOR AND/OR OWNERS RESPONSIBILITY TO VERIFY THE SIZE, TYPE, LOCATION AND DEPTH OF ALL EXISTING UTILITIES PRIOR TO STARTING CONSTRUCTION, AND INFORM THE DESIGN ENGINEER OF ANY DISCREPANCIES.

Call Before You Dig
1-800-424-5555

CHAD JAMES ALLEN
REGISTERED ENGINEER

RECEIVED
DEC 29 2009
KITTITAS COUNTY
CDS

REVISIONS	BY	DATE

© THE PLANS SET FORTH ON THIS SHEET ARE AND SHALL REMAIN THE PROPERTY OF ENCOMPASS ENG. AND SURV.

FOREST RIDE N/S
PLAN & PROFILE

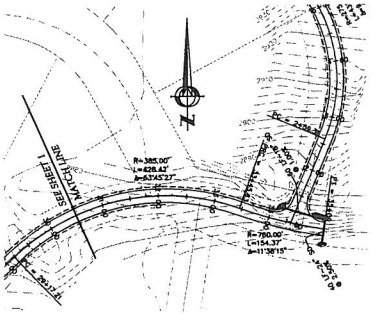
PREPARED FOR
IRON SNOWSHOE, LLC

Encompass
ENGINEERING & SURVEYING
108 EAST 2ND STREET
CLE ELUM, WA 98922
PHONE: (509) 674-7433
FAX: (509) 674-7438

JOB NO.	08008
DATE	06/2009
SCALE	AS-NOTED
DESIGNED	TDR
DRAWN	TDR
CHECKED	MKK
APPROVED	CJA
SHEET	1 OF 2

24

A PORTION OF THE NW 1/4 OF SECTION 24, T.20N., R.15E., W.M.
KITTITAS COUNTY, STATE OF WASHINGTON



GRAPHIC SCALE

(IN FEET)
1 inch = 100 ft.

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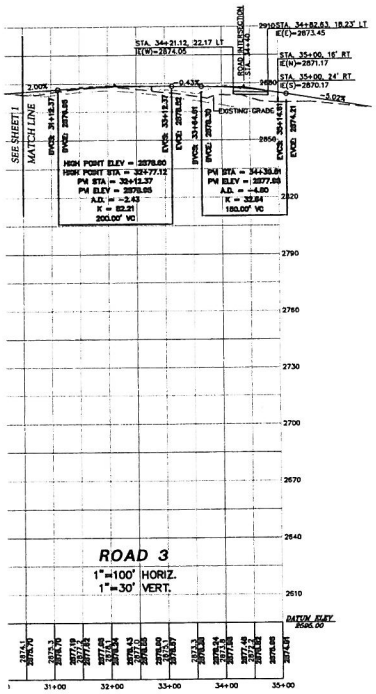
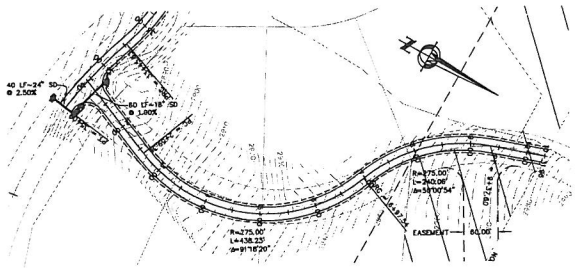
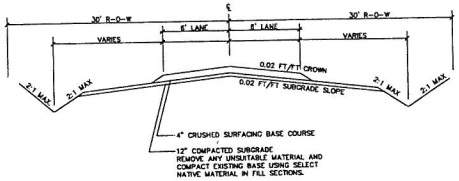
Call Before You Dig
1-800-424-5555

NOTES:

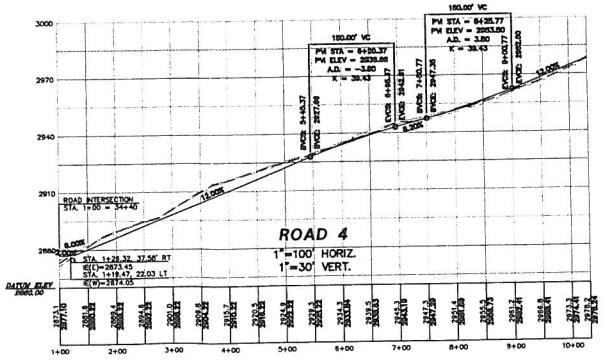
1) ROCK LINE DITCHES FROM STATIONS 1+12 TO 10+32
2) PROVIDE SEDIMENT TRAPS AT INLETS TO ALL CULVERTS
3) ROCK ARMOR STORM INLETS AND OUTLETS
4) LARGER CUT AREAS MAY REQUIRE NEW ELECTRICAL, COMMUNICATIONS, ETC.







ROAD SECTION
N.T.S.





REVISIONS	BY	DATE

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FOREST RIDGE N/S
PLAN & PROFILE

PREPARED FOR
IRON SNOWSHOE, LLC

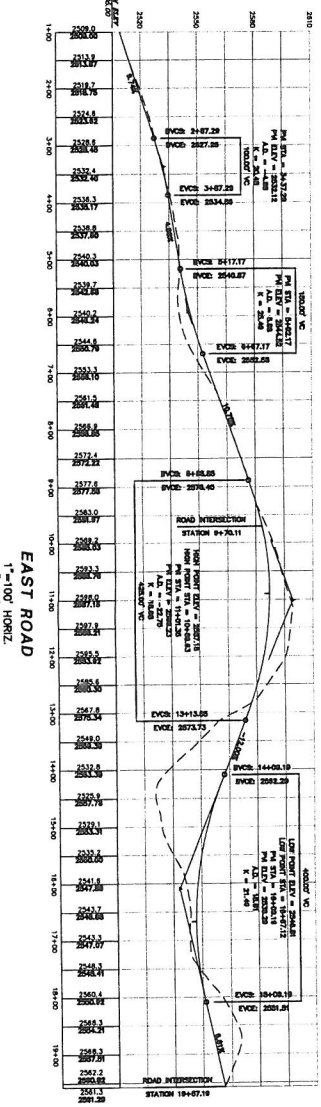
Encompass
ENGINEERING & SURVEYING
108 EAST 2ND STREET
CLE ELUM, WA 98922
PHONE (509) 674-4113
FAX (509) 674-7419

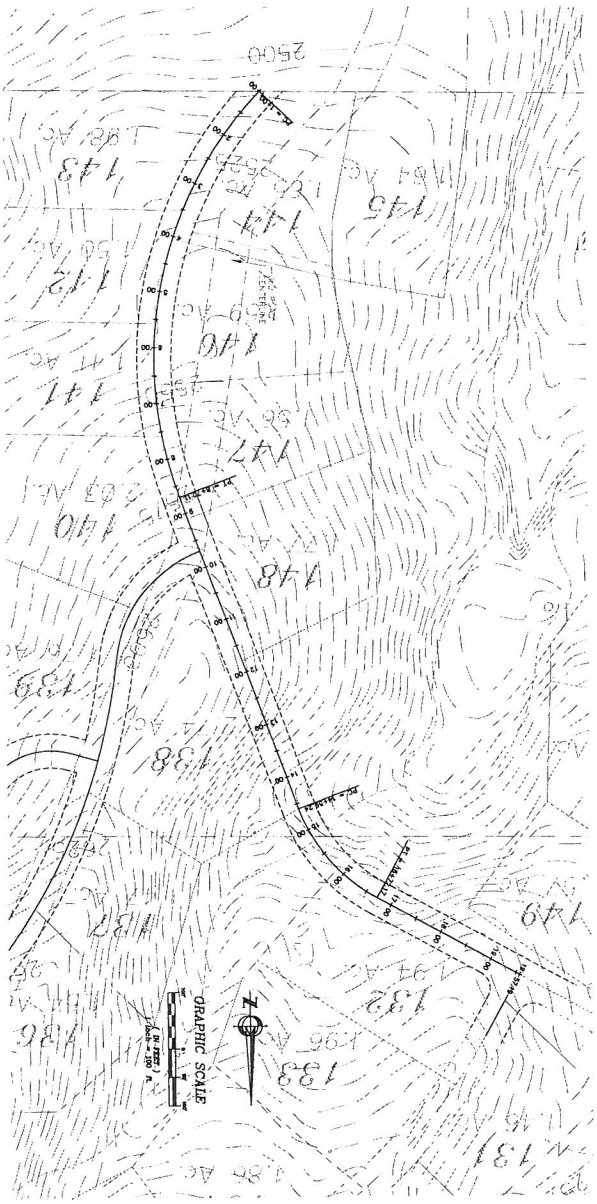
JOB NO.	03008
DATE	06/2009
SCALE	AS-NOTED
DESIGNED	TDR
DRAWN	TDR
CHECKED	MKK
APPROVED	CJA

SHEET 2 OF 2

CONCEPTUAL EAST ROAD

A PORTION OF THE EAST 1/2 OF SECTION 24, T.20N., R.15E., W.M.
KITTITAS COUNTY, STATE OF WASHINGTON





NOTE: THE EXISTING UTILITIES AS SHOWN ARE ONLY APPROXIMATE. OTHER EXISTING UTILITIES MAY EXIST ALONG THIS PROPOSED ALIGNMENT. IT SHALL BE THE CONTRACTOR AND/OR OWNERS RESPONSIBILITY TO LOCATE ALL UTILITIES AND TO VERIFY THE SIZE, TYPE, LOCATION AND DEPTH OF ALL UTILITIES PRIOR TO STARTING CONSTRUCTION, AND INFORM THE DESIGN ENGINEER OF ANY DISCREPANCIES.

CALL BEFORE YOU DIG
1-800-424-5555

RECEIVED
DEC 29 2009
KITTITAS COUNTY

JOB NO.	09008
DATE	12/2009
SCALE	AS NOTED
DESIGNED	TGK
DRAWN	TGK
CHECKED	MRK
APPROVED	CJA
SHEET	1 OF 1

Encompass ENGINEERING & SURVEYING
108 EAST 2ND STREET
CLE ELUM, WA 98922
PHONE (509) 674-7433
FAX (509) 674-7419

PREPARED FOR
IRON SNOWSHOE, LLC

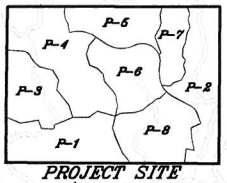
FOREST RIDE N/S
PLAN & PROFILE

REVISIONS	BY	DATE

© THE PLANS SET FORTH ON THIS SHEET ARE AND SHALL REMAIN THE PROPERTY OF ENCOMPASS ENG. AND SURV.

FOREST RIDGE
PERFORMANCE BASED CLUSTER PLAT
LOCATED IN SECTION 24, T.20N., R.15E., W.M.
KITTITAS COUNTY, STATE OF WASHINGTON

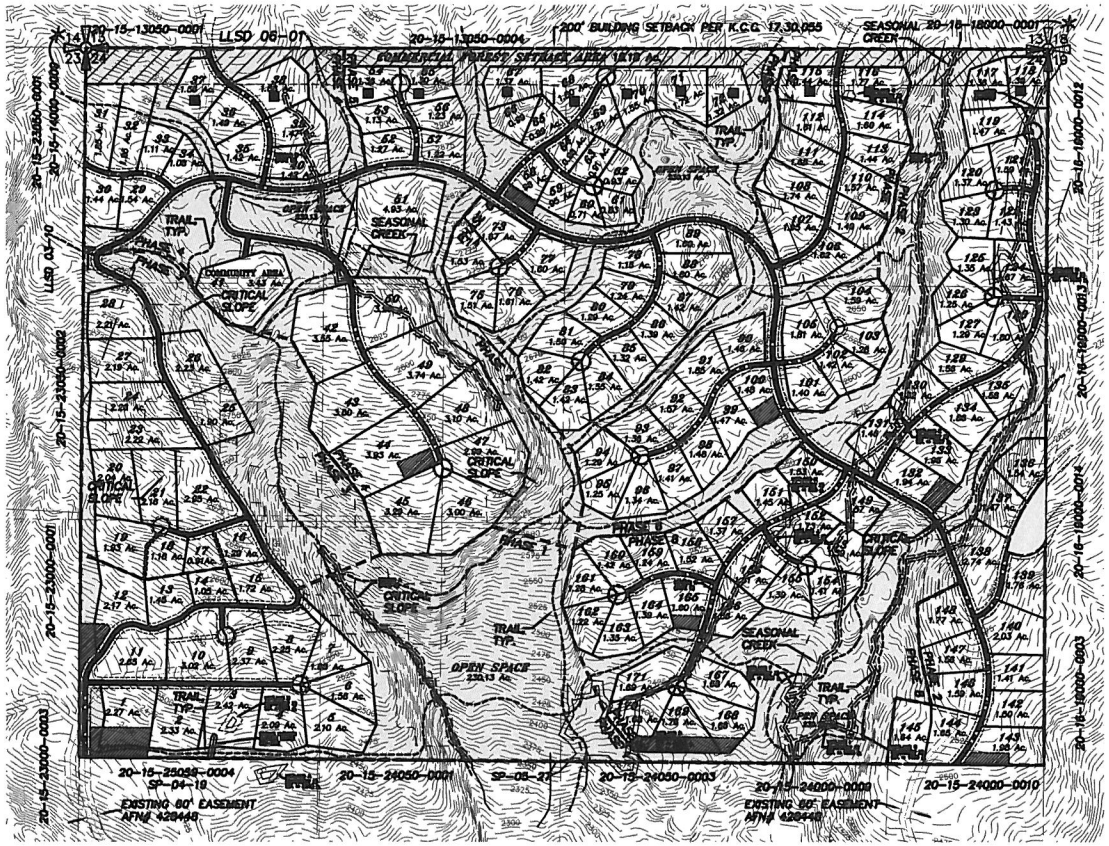
P-09-



OWNER:

IRON SNOWSHOE, LLC
206 WEST 1ST STREET
CLE ELUM, WA 98922

PARCEL #20-15-24000-0001, -0003, 0004, -0007, -0015, -0016, -0017, -0018 -0019, -0020, -0021, -0022
ACREAGE: 478.45 ACRES
171 LOTS
WATER SOURCE: GROUP A SYSTEM
SEWER SOURCE: INDIVIDUAL & COMMUNITY SEPTIC
STORMWATER: DETENTION/RETENTION
ZONE: R-5



SURVEY NOTES:

1. BASIS OF BEARINGS AND SECTION BREAKDOWN ARE PER A SURVEY BY ESM CONSULTING ENGINEERS, LLC AS FILED IN BOOK 31 OF SURVEYS AT PAGES 224 THRU 226 UNDER AUDITOR'S FILE NUMBER 200510270006, RECORDS OF KITTITAS COUNTY, STATE OF WASHINGTON.

2. THE PURPOSE OF THIS DOCUMENT IS TO CLUSTER PLAT PARCELS A-1, A-2, A-3, A-4, B-1, B-2, B-3, B-4, C-1, C-2, D-1 AND D-2 OF THAT CERTAIN SURVEY AS RECORDED BY ESM CONSULTING ENGINEERS, LLC AS FILED IN BOOK 31 OF SURVEYS AT PAGES 224 THRU 226 UNDER AUDITOR'S FILE NUMBER 200510270006, RECORDS OF KITTITAS COUNTY, STATE OF WASHINGTON INTO THE CONFIGURATION SHOWN HEREON.

3. THE APPROVAL OF THIS DIVISION OF LAND INCLUDES NO GUARANTEE THAT THERE IS A LEGAL RIGHT TO WITHDRAW GROUNDWATER WITHIN THE LAND DIVISION. THE APPROVAL OF THIS DIVISION OF LAND PROVIDES NO GUARANTEE THAT USE OF WATER UNDER THE GROUND WATER EXEMPTION (RCW 90.44.050) FOR THIS PLAT OR ANY PORTION THEREOF WILL NOT BE SUBJECT TO CURTAILMENT BY THE DEPARTMENT OF ECOLOGY OR A COURT OF LAW.

4. THE CRITICAL SLOPES AND STREAMS SHOWN ON THIS SURVEY WERE TAKEN FROM THE CRITICAL AREA MAP PROVIDED BY KITTITAS COUNTY COMMUNITY DEVELOPMENT SERVICES AND OVERLAID ONTO THE BOUNDARY.

5. ALL ROADS SHOWN ON THIS PLAT WILL BE WITHIN A 60-FT WIDE EASEMENT AND CONSTRUCTED TO KITTITAS COUNTY PRIVATE ROAD STANDARDS.

GRAPHIC SCALE
500' 0 250' 500'
(IN FEET)
1 inch = 500' ft.

DAVID P. NELSON
STATE OF WASHINGTON
LS 18092
REGISTERED
PROFESSIONAL LAND SURVEYOR

APPROVALS

KITTITAS COUNTY DEPARTMENT OF PUBLIC WORKS

EXAMINED AND APPROVED THIS _____ DAY OF _____, A.D., 200__

KITTITAS COUNTY ENGINEER

KITTITAS COUNTY HEALTH DEPARTMENT

I HEREBY CERTIFY THAT THE FOREST RIDGE PBCP PLAT HAS BEEN EXAMINED BY ME AND I FIND THAT THE SEWAGE AND WATER SYSTEM HEREIN SHOWN DOES MEET AND COMPLY WITH ALL REQUIREMENTS OF THE COUNTY HEALTH DEPARTMENT.

DATED THIS ___ DAY OF _____ A.D., 200__

KITTITAS COUNTY HEALTH OFFICER

CERTIFICATE OF COUNTY PLANNING DIRECTOR

I HEREBY CERTIFY THAT THE FOREST RIDGE PBCP HAS BEEN EXAMINED BY ME AND FIND THAT IT CONFORMS TO THE COMPREHENSIVE PLAN OF THE KITTITAS COUNTY PLANNING COMMISSION.

DATED THIS ___ DAY OF _____ A.D., 200__

KITTITAS COUNTY PLANNING DIRECTOR

CERTIFICATE OF KITTITAS COUNTY TREASURER

I HEREBY CERTIFY THAT THE TAXES AND ASSESSMENTS ARE PAID FOR THE PRECEDING YEARS AND FOR THIS YEAR IN WHICH THE PLAT IS NOW TO BE FILED. PARCEL NO. #20-15-24000-0001, -0003, 0004, -0007, -0015, -0016, -0017, -0018, -0019, -0020, -0021, -0022 (893034, 163034, 173034, 203034, 22020, 22021, 22022, 22023, 22024, 22025, 22026 & 22027)

DATED THIS ___ DAY OF _____ A.D., 200__

KITTITAS COUNTY TREASURER

CERTIFICATE OF KITTITAS COUNTY ASSESSOR

I HEREBY CERTIFY THAT THE FOREST RIDGE PBCP HAS BEEN EXAMINED BY ME AND I FIND THE PROPERTY TO BE IN AN ACCEPTABLE CONDITION FOR PLATTING. PARCEL NO. #20-15-24000-0001, -0003, 0004, -0007, -0015, -0016, -0017, -0018, -0019, -0020, -0021, -0022

DATED THIS ___ DAY OF _____ A.D., 200__

KITTITAS COUNTY ASSESSOR

KITTITAS COUNTY BOARD OF COMMISSIONERS

EXAMINED AND APPROVED THIS _____ DAY OF _____, A.D., 200__

BOARD OF COUNTY COMMISSIONERS
KITTITAS COUNTY, WASHINGTON

BY: _____
CHAIRMAN

ATTEST:
_____ CLERK OF THE BOARD

NOTICE: THE APPROVAL OF THIS PLAT IS NOT A GUARANTEE THAT FUTURE PERMITS WILL BE GRANTED.

RECORDER'S CERTIFICATE .....

Filed for record this.....day of ..... 20.....at.....M in book.....of.....at page.....at the request of .....DAVID P. NELSON..... Surveyor's Name

County Auditor ..... Deputy County Auditor .....

SURVEYOR'S CERTIFICATE

This map correctly represents a survey made by me or under my direction in conformance with the requirements of the Survey Recording Act at the request of...IRON SNOWSHOE, LLC..... in..APRIL....2008.

DAVID P. NELSON ..... DATE

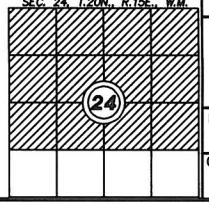
Certificate No....18092.....

PERFORMANCE BASED CLUSTER PLATTING TABLE		
DESCRIPTION	AREA	BONUS POINTS
OPEN SPACE TOTAL (48%)	230.13 AC.	
OPEN SPACE DENSITY BONUS (40%)	191.38 AC.	40 POINTS
COMMERCIAL FOREST SETBACK AREA	15.18 AC.	0 POINTS
SEASONAL STREAM & 15' BUFFERS WITHIN O/S	7.05 AC.	0 POINTS
WETLANDS & BUFFERS WITHIN OPEN SPACE	4.52 AC.	0 POINTS
ROADWAY WITHIN OPEN SPACE	12.00 AC.	0 POINTS
DEVELOPMENT AREA	248.32 AC.	
GROUP A WATER SYSTEM		50 POINTS
TOTAL	478.45 AC.	90 POINTS

LEGEND

- PROPOSED OPEN SPACE AREA (230.13 ACRE TOTAL)
- COMMERCIAL FOREST SETBACK AREA (15.18 ACRE TOTAL)
- CRITICAL SLOPES (30% AND GREATER)
- POSSIBLE STORM DETENTION & TREATMENT AREA
- A SECTION CORNER, AS NOTED
- PHASING LINE

INDEX LOCATION
SEC. 24, T.20N., R.15E., W.M.



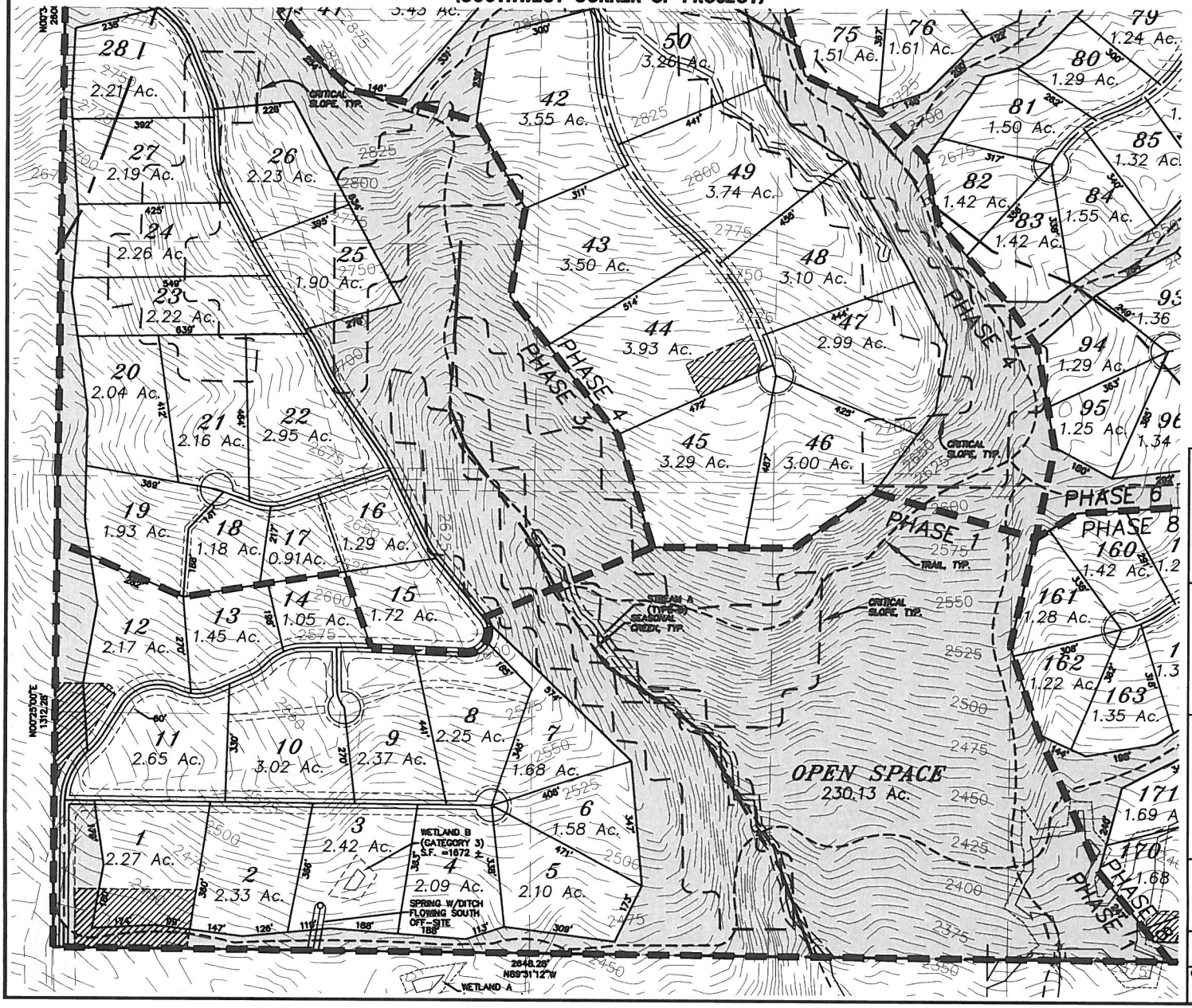
Encompass
ENGINEERING & SURVEYING
108 EAST 2ND STREET
CLE ELUM, WA 98922
PHONE: (509) 674-7433
FAX: (509) 674-7419

FOREST RIDGE
PERFORMANCE BASED CLUSTER PLAT
LOCATED IN SECTION 24, T. 20N., R. 15E., W.M.
KITTITAS COUNTY, STATE OF WASHINGTON

DWN BY	DATE	JOB NO.
MRN/GW	12/09	08008
CHKD BY	SCALE	SHEET
D. NELSON	1"=500'	1 OF 6

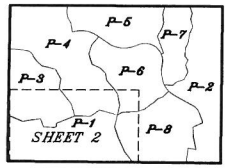
FOREST RIDGE
PERFORMANCE BASED CLUSTER PLAT
LOCATED IN SECTION 24, T.20N., R.16E., W.M.
KITTITAS COUNTY, STATE OF WASHINGTON

(SOUTHWEST CORNER OF PROJECT)



LEGEND

- PROPOSED OPEN SPACE AREA (230.13 ACRE TOTAL)
- COMMERCIAL FOREST SETBACK AREA (15.18 ACRE TOTAL)
- CRITICAL SLOPES (30% AND GREATER)
- POSSIBLE STORM DETENTION & TREATMENT AREA
- A SECTION CORNER, AS NOTED
- PHASING LINE



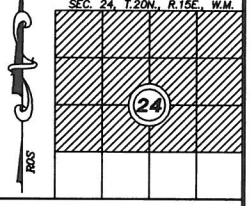
PHASING INDEX

GRAPHIC SCALE

200' 0 100' 200'

(IN FEET)
1 inch = 200' ft.

DAVID P. NELSON
STATE OF WASHINGTON
LS 18092
REGISTERED
PROFESSIONAL LAND SURVEYOR



RECORDER'S CERTIFICATE .....

Filed for record this.....day of ..... 20.....at.....M
in book.....of.....at page.....at the request of
.....DAVID P. NELSON.....
Surveyor's Name

County Auditor ..... Deputy County Auditor .....

SURVEYOR'S CERTIFICATE

This map correctly represents a survey made by me or under my direction in conformance with the requirements of the Survey Recording Act at the request of...IRON SNOWSHOE, LLC.....
in...APRIL....2008.

DAVID P. NELSON ..... DATE .....
Certificate No....18092.....

Encompass
ENGINEERING & SURVEYING
108 EAST 2ND STREET
CLE ELUM, WA 98922
PHONE: (509) 674-7433
FAX: (509) 674-7419

FOREST RIDGE
PERFORMANCE BASED CLUSTER PLAT
LOCATED IN SECTION 24, T. 20N., R. 15E., W.M.
KITTITAS COUNTY, STATE OF WASHINGTON

DWN BY	DATE	JOB NO.
MRN/GW	12/09	08008
CHKD BY	SCALE	SHEET
D. NELSON	1"=200'	2 OF 6

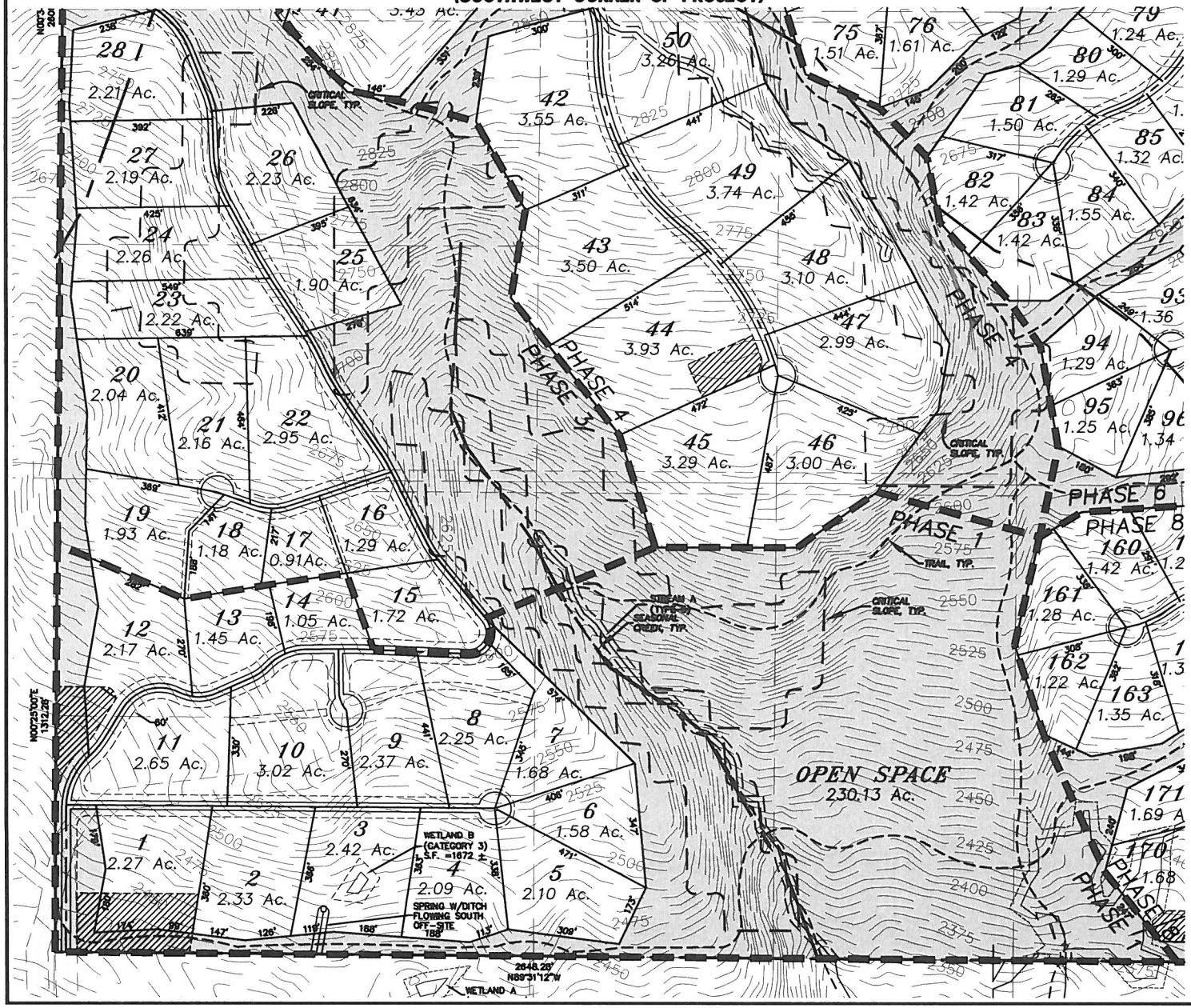
FOREST RIDGE

PERFORMANCE BASED CLUSTER PLAT

LOCATED IN SECTION 24, T.20N., R.15E., W.M.
KITTITAS COUNTY, STATE OF WASHINGTON

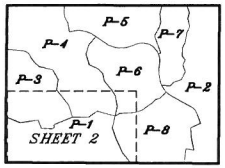
P-09-

(SOUTHWEST CORNER OF PROJECT)



LEGEND

- PROPOSED OPEN SPACE AREA (230.13 ACRE TOTAL)
- COMMERCIAL FOREST SETBACK AREA (15.18 ACRE TOTAL)
- CRITICAL SLOPES (30% AND GREATER)
- POSSIBLE STORM DETENTION & TREATMENT AREA
- A SECTION CORNER, AS NOTED
- PHASING LINE



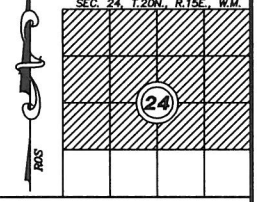
PHASING INDEX

GRAPHIC SCALE

200' 0 100' 200'

(IN FEET)
1 inch = 200' ft.

INDEX LOCATION
SEC. 24, T.20N., R.15E., W.M.



DAVID P. NELSON
STATE OF WASHINGTON
LS 18092
REGISTERED
PROFESSIONAL LAND SURVEYOR

RECORDER'S CERTIFICATE .....

Filed for record this.....day of ..... 20.....at.....M
in book.....of.....at page.....at the request of
.....DAVID P. NELSON.....
Surveyor's Name

County Auditor ..... Deputy County Auditor .....

SURVEYOR'S CERTIFICATE

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in...APRIL.....2008.

DAVID P. NELSON DATE

Certificate No.....18092.....

Encompass
ENGINEERING & SURVEYING
108 EAST 2ND STREET
CLE ELUM, WA 98922
PHONE: (509) 674-7433
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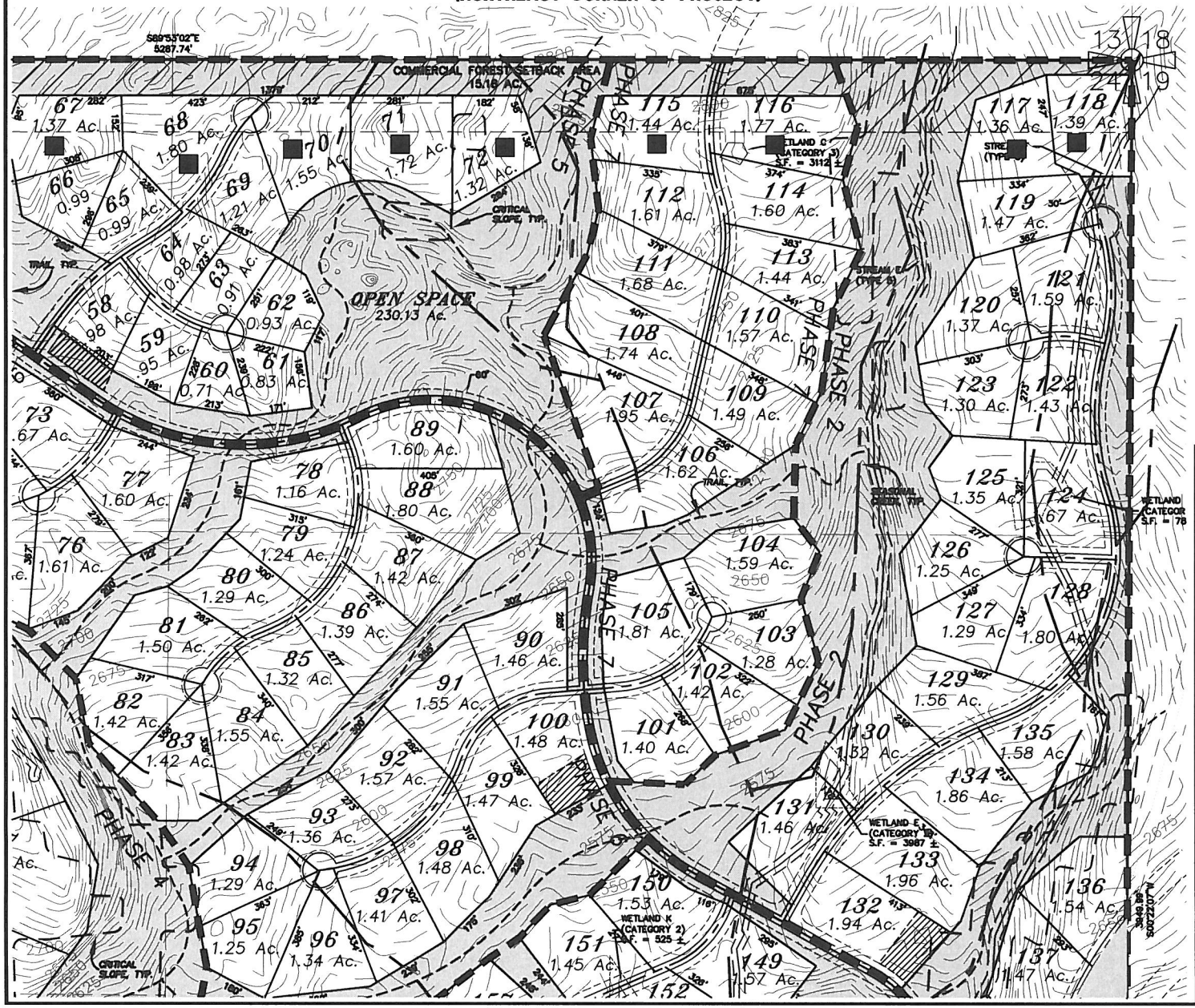
FOREST RIDGE
PERFORMANCE BASED CLUSTER PLAT
LOCATED IN SECTION 24, T. 20N., R. 15E., W.M.
KITTITAS COUNTY, STATE OF WASHINGTON

DWN BY	DATE	JOB NO.
MRN/GW	12/09	08008
CHKD BY	SCALE	SHEET
D. NELSON	1"=200'	2 OF 6

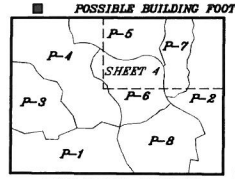
FOREST RIDGE
PERFORMANCE BASED CLUSTER PLAT
LOCATED IN SECTION 24, T.20N., R.15E., W.M.
KITTITAS COUNTY, STATE OF WASHINGTON

(NORTHEAST CORNER OF PROJECT)



LEGEND

- PROPOSED OPEN SPACE AREA (193.00 ACRE TOTAL)
- COMMERCIAL FOREST SETBACK AREA (15.18 ACRE TOTAL)
- CRITICAL SLOPES (30% AND GREATER)
- POSSIBLE STORM DETENTION & TREATMENT AREA
- A SECTION CORNER, AS NOTED
- PHASING LINE
- POSSIBLE BUILDING FOOTPRINT 60'X60'



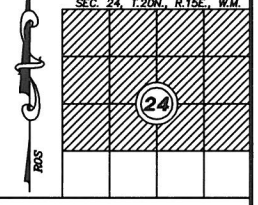
GRAPHIC SCALE

200' 0 100' 200'

(IN FEET)
1 inch = 200' ft.

PHASING INDEX

INDEX LOCATION
SEC. 24, T.20N., R.15E., W.M.



DAVID P. NELSON
STATE OF WASHINGTON
LS 18092
REGISTERED
PROFESSIONAL LAND SURVEYOR

ROS

RECORDER'S CERTIFICATE .....

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in book.....of.....at page.....at the request of
DAVID P. NELSON
Surveyor's Name

County Auditor ..... Deputy County Auditor .....

SURVEYOR'S CERTIFICATE

This map correctly represents a survey made by me or under my direction in conformance with the requirements of the Survey Recording Act at the request of IRON SNOWSHOE, LLC in APRIL 2008.

DAVID P. NELSON DATE

Certificate No. 18092

Encompass
ENGINEERING & SURVEYING
108 EAST 2ND STREET
CLE ELUM, WA 98922
PHONE: (509) 674-7433
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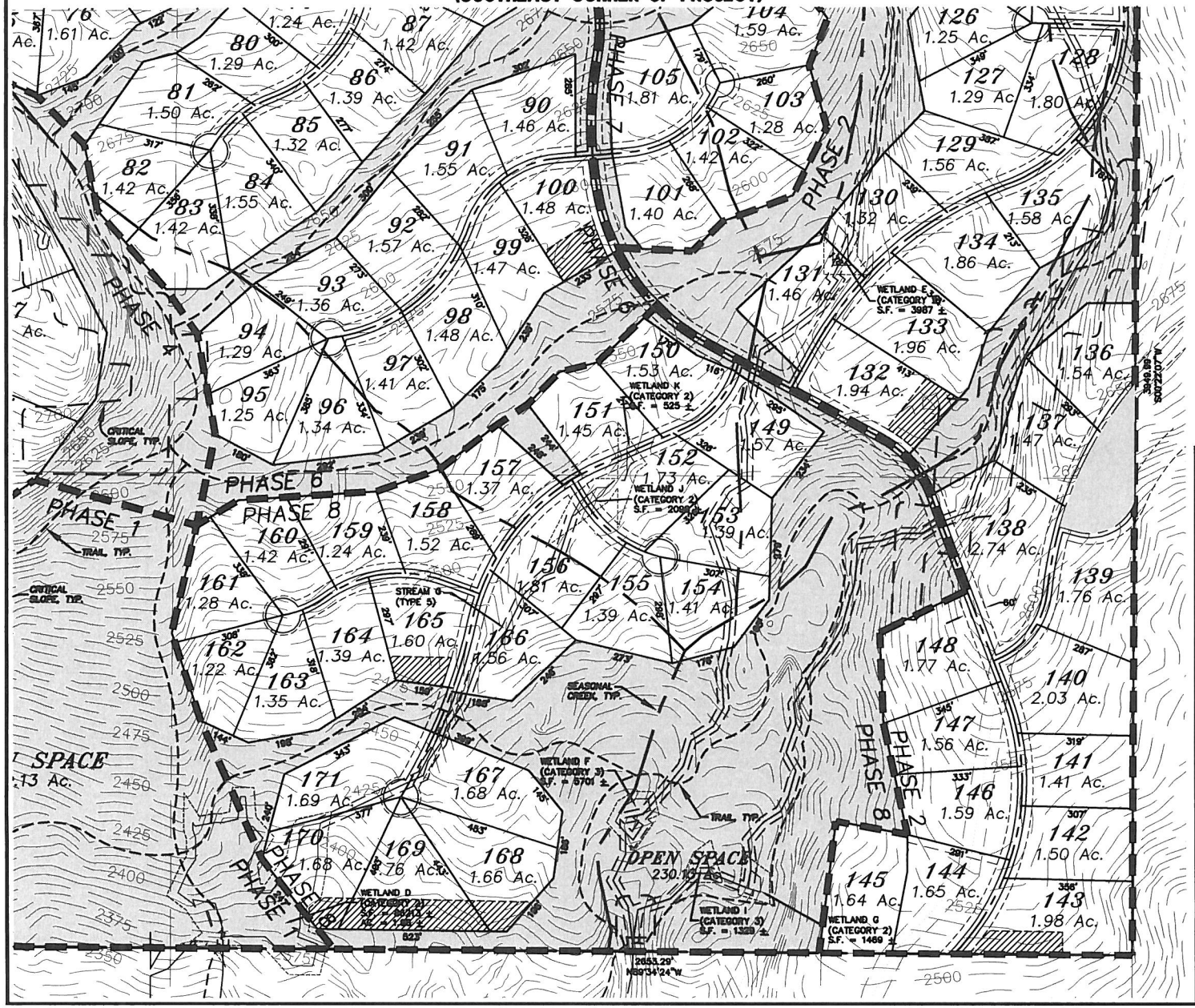
FOREST RIDGE
PERFORMANCE BASED CLUSTER PLAT
LOCATED IN SECTION 24, T. 20N., R. 15E., W.M.
KITTITAS COUNTY, STATE OF WASHINGTON

DWN BY	DATE	JOB NO.
MRN/GW	12/09	08008
CHKD BY	SCALE	SHEET
D. NELSON	1"=200'	4 OF 6

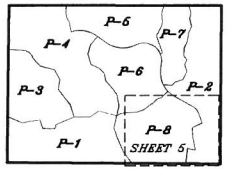
FOREST RIDGE
PERFORMANCE BASED CLUSTER PLAT
LOCATED IN SECTION 24, T.20N., R.15E., W.M.
KITTITAS COUNTY, STATE OF WASHINGTON

(SOUTHEAST CORNER OF PROJECT)



LEGEND

- PROPOSED OPEN SPACE AREA (230.13 ACRE TOTAL)
- COMMERCIAL FOREST SETBACK AREA (15.18 ACRE TOTAL)
- CRITICAL SLOPES (30% AND GREATER)
- POSSIBLE STORM DETENTION & TREATMENT AREA
- A SECTION CORNER, AS NOTED
- PHASING LINE

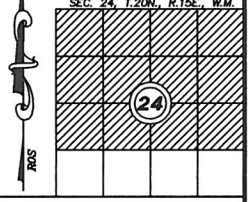


PHASING INDEX

GRAPHIC SCALE

200' 0 100' 200'

(IN FEET)
1 inch = 200' ft.



DAVID P. NELSON
STATE OF WASHINGTON
LS 18092
REGISTERED
PROFESSIONAL LAND SURVEYOR

ROS

RECORDER'S CERTIFICATE .....

Filed for record this.....day of ..... 20.....at.....M
in book.....of.....at page.....at the request of
DAVID P. NELSON
Surveyor's Name

County Auditor ..... Deputy County Auditor .....

SURVEYOR'S CERTIFICATE

This map correctly represents a survey made by me or under my direction in conformance with the requirements of the Survey Recording Act at the request of IRON SNOWSHOE, LLC in APRIL 2008.

DAVID P. NELSON DATE

Certificate No. 18092

Encompass
ENGINEERING & SURVEYING
108 EAST 2ND STREET
CLE ELUM, WA 98922
PHONE: (509) 674-7433
FAX: (509) 674-7419

FOREST RIDGE
PERFORMANCE BASED CLUSTER PLAT
LOCATED IN SECTION 24, T. 20N., R. 15E., W.M.
KITTITAS COUNTY, STATE OF WASHINGTON

DWN BY	DATE	JOB NO.
MRN/GW	12/09	08008
CHKD BY	SCALE	SHEET
D. NELSON	1"=200'	5 OF 6

FOREST RIDGE
PERFORMANCE BASED CLUSTER PLAT
LOCATED IN SECTION 24, T.20N., R.15E., W.M.
KITTITAS COUNTY, STATE OF WASHINGTON

DEDICATION

KNOW ALL MEN BY THESE PRESENTS THAT IRON SNOWSHOE, LLC., A WASHINGTON LIMITED LIABILITY COMPANY, THE UNDERSIGNED OWNER IN FEE SIMPLE OF THE HEREIN DESCRIBED REAL PROPERTY, DOES HEREBY DECLARE, SUBDIVIDE AND PLAT AS HEREIN DESCRIBED.

IN WITNESS WHEREOF, WE HAVE SET OUR HANDS THIS ___ DAY OF _____, A.D., 200_.

_____ NAME / TITLE

_____ NAME / TITLE

ACKNOWLEDGEMENT

STATE OF WASHINGTON)
) S.S.
COUNTY OF _____

ON THIS _____ DAY OF _____, 200_, BEFORE ME, THE UNDERSIGNED, A NOTARY PUBLIC IN AND FOR THE STATE OF _____, DULY COMMISSIONED AND SWORN, PERSONALLY APPEARED _____ AND _____, TO ME KNOWN TO BE THE _____ AND _____ RESPECTIVELY, OF _____ THE LIMITED LIABILITY COMPANY THAT EXECUTED THE FOREGOING INSTRUMENT, AND ACKNOWLEDGE THE SAID INSTRUMENT TO BE THE FREE AND VOLUNTARY ACT AND DEED OF SAID LIMITED LIABILITY COMPANY, FOR THE USES AND PURPOSES THEREIN MENTIONED, AND ON OATH STATED THAT _____ AUTHORIZED TO EXECUTE THE SAID INSTRUMENT.

WITNESS MY HAND AND OFFICIAL SEAL HERETO AFFIXED THE DAY AND YEAR FIRST ABOVE WRITTEN.

_____
NOTARY PUBLIC IN AND FOR THE STATE OF
WASHINGTON, RESIDING AT _____
MY APPOINTMENT EXPIRES _____

DEDICATION

KNOW ALL MEN BY THESE PRESENTS THAT AMERICAN STRATEGIC INCOME PORTFOLIO, INC.-II, A MINNESOTA CORPORATION, THE UNDERSIGNED BENEFICIARY OF A DEED OF TRUST DOES HEREBY DECLARE, SUBDIVIDE AND PLAT AS HEREIN DESCRIBED.

IN WITNESS WHEREOF, WE HAVE SET OUR HANDS THIS ___ DAY OF _____, A.D., 200_.

_____ NAME / TITLE

_____ NAME / TITLE

ACKNOWLEDGEMENT

STATE OF WASHINGTON)
) S.S.
COUNTY OF _____

ON THIS _____ DAY OF _____ 20_____, BEFORE ME, THE UNDERSIGNED, A NOTARY PUBLIC IN AND FOR THE STATE OF WASHINGTON, DULY COMMISSIONED AND SWORN, PERSONALLY APPEARED _____ TO ME KNOWN TO BE THE _____ PRESIDENT AND _____ SECRETARY, RESPECTIVELY, OF _____ THE CORPORATION THAT EXECUTED THE FOREGOING INSTRUMENT, AND ACKNOWLEDGED THE SAID INSTRUMENT TO BE THE FREE AND VOLUNTARY ACT AND DEED OF SAID CORPORATION, FOR THE USES AND PURPOSES THEREIN MENTIONED, AND ON OATH STATED THAT _____ AUTHORIZED TO EXECUTE THE SAID INSTRUMENT AND THAT THE SEAL AFFIXED (IF ANY) IS THE CORPORATE SEAL OF SAID CORPORATION.

WITNESS MY HAND AND OFFICIAL SEAL HERETO AFFIXED THE DAY AND YEAR FIRST ABOVE WRITTEN.

_____
NOTARY PUBLIC IN AND FOR THE STATE OF
WASHINGTON, RESIDING AT _____
MY APPOINTMENT EXPIRES _____

EXISTING LEGAL DESCRIPTION:

PARCELS A-1, A-2, A-3, A-4, B-1, B-2, B-3, B-4, C-1, C-2, D-1 AND D-2, OF THAT CERTAIN SURVEY RECORDED OCTOBER 27, 2005 IN BOOK 31 OF SURVEYS, PAGES 224 AND 225, UNDER AUDITOR'S FILE NO. 200510270006, BEING A PORTION OF SECTION 24, TOWNSHIP 20 NORTH, RANGE 15 EAST, W.M., IN THE COUNTY OF KITTITAS, STATE OF WASHINGTON.

NOTES:

1. THIS SURVEY WAS PERFORMED USING A NIKON DTM-521 TOTAL STATION. THE CONTROLLING MONUMENTS AND PROPERTY CORNERS SHOWN HEREON WERE LOCATED, STAKED AND CHECKED FROM A CLOSED FIELD TRAVERSE IN EXCESS OF 1:10,000 LINEAR CLOSURE AFTER AZIMUTH ADJUSTMENT.

2. A PUBLIC UTILITY EASEMENT 10 FEET IN WIDTH IS RESERVED ALONG ALL LOT LINES. THE 10 FOOT EASEMENT SHALL ABUT THE EXTERIOR PLAT BOUNDARY AND SHALL BE DIVIDED 5 FEET ON EACH SIDE OF INTERIOR LOT LINES. SAID EASEMENT SHALL ALSO BE USED FOR IRRIGATION.

3. PER RCW 17.10.140 LANDOWNERS ARE RESPONSIBLE FOR CONTROLLING AND PREVENTING THE SPREAD OF NOXIOUS WEEDS. ACCORDINGLY, THE KITTITAS COUNTY NOXIOUS WEED BOARD RECOMMENDS IMMEDIATE RESEEDING OF AREAS DISTURBED BY DEVELOPMENT TO PRECLUDE THE PROLIFERATION OF NOXIOUS WEEDS.

4. ANY FURTHER SUBDIVISION OR LOTS TO BE SERVED BY PROPOSED ACCESS MAY RESULT IN FURTHER ACCESS REQUIREMENTS. SEE KITTITAS COUNTY ROAD STANDARDS.

5. AN APPROVED ACCESS PERMIT WILL BE REQUIRED FROM THE DEPARTMENT OF PUBLIC WORKS PRIOR TO CREATING ANY NEW DRIVEWAY ACCESS OR PERFORMING WORK WITHIN THE COUNTY ROAD RIGHT-OF-WAY.

6. THIS SURVEY DOES NOT PURPORT TO SHOW ALL EASEMENTS OF RECORD OR OTHERWISE.

7. MAINTENANCE OF THE ACCESS IS THE RESPONSIBILITY OF THE PROPERTY OWNERS WHO BENEFIT FROM ITS USE.

8. METERING WILL BE REQUIRED ON ALL NEW RESIDENTIAL WELL CONNECTIONS AND METERING RESULTS SHALL BE RECORDED IN A MANNER CONSISTENT WITH KITTITAS COUNTY AND WASHINGTON STATE DEPARTMENT OF ECOLOGY REQUIREMENTS.

9. ENTIRE PRIVATE ROAD SHALL ACHIEVE 95% COMPACTION AND SHALL BE INSPECTED AND CERTIFIED BY A LICENSED ENGINEER IN THE STATE OF WASHINGTON SPECIFYING THAT THE ROAD MEETS CURRENT KITTITAS COUNTY ROAD STANDARDS, 9/6/05 EDITION, PRIOR TO THE ISSUANCE OF A BUILDING PERMIT FOR THIS PLAT.

10. KITTITAS COUNTY WILL NOT ACCEPT PRIVATE ROADS FOR MAINTENANCE AS PUBLIC STREETS OR ROADS UNTIL SUCH STREETS OR ROADS ARE BROUGHT INTO CONFORMANCE WITH CURRENT COUNTY ROAD STANDARDS. THIS REQUIREMENT WILL INCLUDE THE HARD SURFACE PAVING OF ANY STREET OR ROAD SURFACED ORIGINALLY WITH GRAVEL.

11. PROPOSED TRAIL SYSTEM IS FOR POSSIBLE FUTURE CONSTRUCTION AT THE DISCRETION OF THE OWNER.

NOTE:
THE EXISTING UTILITIES AS SHOWN ARE ONLY APPROXIMATE AND ARE BASED ON THE BEST AVAILABLE INFORMATION. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO VERIFY THE SIZE, TYPE, LOCATION, AND DEPTH OF ALL EXISTING UTILITIES PRIOR TO STARTING CONSTRUCTION, AND INFORM THE DESIGN ENGINEER OF ANY DISCREPANCIES.

Call Before You Dig
1-800-553-4344

ADJACENT PROPERTY OWNERS:

20-15-23000-0003
MICHAEL W. ROSS
1300 SKYWALL DRIVE
SULTAN, WA 98294

20-15-23000-0004
ALAN K PERSON
12023 434TH AVE SE
NORTH BEND, WA 98045

20-15-23000-0001
KEVIN DALY
5626 126TH AVE SE
BELLEVUE, WA 98006

20-15-23050-0002 & 0001
CHARLES A PETERSON
16954 151ST AVE SE
RENTON, WA 98055

20-15-14000-0009
DALE G MAXFIELD
9605 FIRDALE AVE
EDMONDS, WA 98020

20-15-13-050-0001
PINE VIEW ESTATES, LLC
PO BOX 750
ROSLYN, WA 98941

20-15-13050-0004
ALPINE MEADOWS, LLC
114 17TH PL
KIRKLAND, WA 98033

20-16-18000-0001
AMERICAN FOREST HOLDINGS, LLC
660 MADISON AVE 14TH FL
NEW YORK, NY 10065

20-16-19000-0012
CREEKSIDE ACRES, LLC
16954 151ST AVE SE
RENTON, WA 98058

20-16-19000-0013
BROOKS R MCBETH
17915 LULL ST
RESDA, CA 91335

20-16-19000-0014
ASP PROPERTIES, LLC
507 WELLS AVE N
RENTON, WA 98057

20-16-19000-0003
JAY W PEPPIN
PO BOX 910
CLE ELUM, WA 98922

20-16-19000-0001
AUTUMN FRANCESCA
8626 217TH ST SW
EDMONDS, WA 98026

20-15-24000-0013
MARK A LEHNERT
PO BOX 957
CLE ELUM, WA 98922

20-15-24000-0010 & 0009
JOHN JOHNSON
821 E LK SAMMAMISH SHORE LN SE
SAMMAMISH, WA 98057

20-15-24050-0003
JOHN M HUISH
7300 FUN CENTER WAY
TUKWILA, WA 98188

20-15-24050-0002
ASHLEY PIPER, LLC
1703 NW GREENBRIER WAY
SEATTLE, WA 98177

20-15-24050-0001
JNG, LLC
PO BOX 454
MUKILTEO, WA 98275

20-15-25059-0004
P SQUARED, LLC
1501 35TH AVE S
SEATTLE, WA 98144

RECORDER'S CERTIFICATE .....

Filed for record this.....day of ..... 20.....at.....M in book.....of.....at page.....at the request of .....DAVID P. NELSON..... Surveyor's Name

..... County Auditor ..... Deputy County Auditor

SURVEYOR'S CERTIFICATE

This map correctly represents a survey made by me or under my direction in conformance with the requirements of the Survey Recording Act at the request of IRON SNOWSHOE, LLC in APRIL 2008.

..... DAVID P. NELSON DATE

Certificate No. 18092

DAVID P. NELSON — STATE OF WASHINGTON — LS 18092 REGISTERED PROFESSIONAL LAND SURVEYOR

Encompass
ENGINEERING & SURVEYING
108 EAST 2ND STREET
CLE ELUM, WA 98922
PHONE: (509) 674-7433
FAX: (509) 674-7419

FOREST RIDGE
PERFORMANCE BASED CLUSTER PLAT
LOCATED IN SECTION 24, T. 20N., R. 15E., W.M.
KITTITAS COUNTY, STATE OF WASHINGTON

DWN BY	DATE	JOB NO.
MRN/GW	12/09	08008
CHKD BY	SCALE	SHEET
D. NELSON	N.T.S.	6 OF 6

Copy

KITTITAS COUNTY COMMUNITY DEVELOPMENT SERVICES
411 N. Ruby St., Suite 2, Ellensburg, WA 98926
CDS@CO.KITTITAS.WA.US
Office (509) 962-7506
Fax (509) 962-7682

PLEASE NOTE: This is a fill-in-and-print PDF form. It cannot be edited and saved to your hard drive unless you have the full version of Adobe Acrobat. If you are not using the full version you must complete this form and then print it, or print it and complete it by hand.

SEPA ENVIRONMENTAL CHECKLIST
FEE $400.00

PURPOSE OF CHECKLIST:

The State Environmental Protection Act (SEPA), chapter 43.21C RCW, Requires all governmental agencies to consider the environmental impacts of a proposal before making decisions. An environmental impact statement (EIS) must be prepared for all proposals with probable significant adverse impacts on the quality of the environment. The purpose of this checklist is to provide information to help you and the agency identify impacts from your proposal (and to reduce or avoid impacts from the proposal, if it can be done) and to help the agency decide whether an EIS is required.

INSTRUCTIONS FOR APPLICANTS:

This environmental checklist asks you to describe some basic information about your proposals. Governmental agencies use this checklist to determine whether the environmental impacts or your proposal are significant, requiring preparation if an EIS. Answer the questions briefly, with the most precise information known, or give the best description you can.

You must answer each question accurately and carefully, to the best of your knowledge. In most cases, you should be able to answer the questions from your own observations or project plans without the need to hire experts. If you really do not know the answer, or if a question does not apply to your proposal, write "don not know" or "does not apply". Complete answers to the questions now may avoid unnecessary delays later.

Some questions ask about governmental regulations, such as zoning, shoreline and landmark designations. Answer these questions if you can. If you have problems, the governmental agencies can assist you.

The checklist questions apply to all parts of your proposal, even if you plan to do them over a period of time or on different parcels of land. Attach any additional information that will help describe your proposal or its environmental effects. The agency to which you submit this checklist may ask you to explain your answers or provide additional information reasonably related to determining if there may be significant adverse impact.

Use of checklist for nonproject proposals:

Complete this checklist for nonproject proposals, even though questions may be answered "does not apply." IN ADDITION, complete the SUPPLEMENTAL SHEET FOR NONPROJECT ACTIONS (part D).

For nonproject actions, the references in the checklist to the words "project," "applicant," and "property or site" should be read as "proposal," "proposer," and "affected geographic area," respectively.

A. BACKGROUND

1. Name of proposed project, if applicable:

Forest Ridge Performance Based Cluster Plat

RECEIVED
DEC 2 9 2009
KITTITAS COUNTY
CDS

2. Name of applicant:

Iron Snowshoe, LLC, a Washington limited liability company

3. Address and phone number of applicant and contact person:

206 W. First St., Cle Elum, WA 98922
(509) 674-6828
Contact: David Blanchard

4. Date checklist prepared:

April 21, 2008

22

5. Agency requesting checklist:

Kittitas County Community Development Services

6. Proposed timing or schedule (including phasing, if applicable):

Project to be completed in up to eight (8) phases of construction. Phases will be designed primarily to enable the applicant to complete infrastructure in phases and to time construction to match market conditions. All requisite infrastructure (including two means of access where a road will serve more than 40 lots) for each phase will be constructed prior to obtaining approval to release that phase.

Timing for completion of each phase may depend upon market, but expectation is to release one to two phases each year.

Approximately 50% of the proposed trails and associated amenities will be completed prior to the completion of the fourth (4th) phase, with the remainder being completed by the end of the seventh (7th) phase.

A community recreation center may be completed prior to the end of the seventh phase.

7. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain.

No.

8. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal.

A SEPA Checklist was prepared in conjunction with rezoning of the property in 2006 from Forest and Range 20 to R-5.

A Transportation Analysis of the impacts of the project is being undertaken by the applicant in an effort to assist the County with the SEPA analysis.

9. Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain.

None known.

10. List any government approvals or permits that will be needed for your proposal, if known.

- **Kittitas County preliminary plat approval**
- **Kittitas County/State Department of Health approval of Septic Systems**
- **Kittitas County/State Department of Health approval of Group A water system**

- **Kittitas County Conservancy Board Approval of Change Application for Water Right once we exceed 14 lots served by an exempt groundwater well**
- **(Potentially) Hydraulic Project Approval from Dept. of Fish and Wildlife for construction of bridge/culvert allowing crossing over seasonal creeks.**
- **Franchise Agreement from Kittitas County for installation of water transmission line.**

11. Give brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page. (Lead agencies may modify this form to include additional specific information on project description.)

The property consists of approximately 480 acres located in Section 24, T20N, R15 E, in Kittitas County. The proposed cluster plat would provide 171 single family residential homesites (avg of 1.46 acre homesite), preserve critical areas, and set aside over 230 acres of the property as open space for perpetuity. The proposal will provide for numerous passive recreational opportunities including multi-modal trails, large open expanses for passive and active recreation, critical area enhancement, and a private community recreation center.

12. Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist.

Parcels A-1 through A-4, B-1 through B-4, C-1, C-2, D-1, and D-2 of the survey recorded Oct. 27, 2005 under Auditors File No. 20051027005, in Book 31 of Surveys, pages 224-225, Kittitas County, all in Section 24, T20N, R15 E., W.M. Kittitas County, Washington.

B. ENVIRONMENTAL ELEMENTS

1. **Earth**

a. General description of the site (circle one): Flat, rolling, hilly, steep slopes, mountainous, other . . . . . .

The site is hilly with varied terrain with it generally sloping up from southeast to northwest . Approximately 8% of the site contains slopes that are 30% or greater.

b. What is the steepest slope on the site (approximate percent slope)?

Approximately 35%

c. What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any prime farmland.

Glacial till, sandy loam, cobbles

d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe.

None observed.

e. Describe the purpose, type, and approximate quantities of any filling or grading proposed. Indicate source of fill.

Cut and fill will generally be balanced on-site. Fill material related to final road surfacing will be imported. Estimated quantity will be 13,000cy – 20,000cy.

f. Could erosion occur as a result of clearing, construction, or use? If so, generally describe.

No, the area appears stable, and best management practices will be undertaken in conjunction with all clearing and construction activities.

g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)?

Approximately 50 acres will be impervious or semi-impervious surface. This estimate assumes 8,000 square feet of impervious improvements on each lot and 15 acres of roadway improvements.

h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any:

Best management practices will be employed, and a storm water pollution prevention plan will be prepared and implemented prior to and during construction activities. Erosion control likely will include silt fence, straw check dams, retention/detention and covering of exposed soils.

2. Air

a. What types of emissions to the air would result from the proposal (i.e., dust, automobile, odors, industrial wood smoke) during construction and when the project is completed? If any, generally describe and give approximate quantities if known.

Dust and noise typically associated with construction of private roads and infrastructure for residential plats. All dust and noise will be within limits of applicable County regulations.

b. Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe.

None known.

c. Proposed measures to reduce or control emissions or other impacts to air, if any:

Compliance with State and County standards for emissions. The applicant proposes to prohibit the use of wood burning appliances. A water truck will be available during construction to minimize dust emissions according to County standards.

3. **Water**

a. Surface:

1) Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands)? If yes, describe type and provide names. If appropriate, state what stream or river it flows into.

Two unnamed seasonal creeks Creeks/ditches are dry in late summer, and do not appear to be connected to any stream or river within a ¼ mile.

2) Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans.

Two to three crossings over the seasonal creeks for Trail and Road access

3) Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material.

Culverts may be placed in seasonal creeks in order to allow construction of private road across ditch. Up to 2000 cubic yards of fill may be needed for such improvement.

4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known.

A permitted surface water withdrawal will be made offsite and piped to the property.

5) Does the proposal lie within a 100-year floodplain? If so, note location on the site plan.

No.

6) Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge.

No.

b. Ground:

1) Will ground water be withdrawn, or will water be discharged to ground water? Give general description, purpose, and approximate quantities if known.

Yes. Iron Snowshoe, LLC will serve the project with a Group A water system. The first fourteen lots (14) may be served by an exempt groundwater well with any lots not served by an exempt well supported by a surface water right from an offsite location. With approval of the preliminary plat, Iron Snowshoe will prepare a Comprehensive Water plan to identify the total water need for the project.

2) Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: Domestic sewage; industrial, containing the following chemicals. . . ; agricultural; etc.). Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve.

Each homesite will be served by a combination of on-site septic system, and community systems, constructed and permitted in accordance with applicable regulations.

c. Water runoff (including stormwater):

1) Describe the source of runoff (including storm water) and method of collection and disposal, if any (include quantities, if known). Where will this water flow? Will this water flow into other waters? If so, describe.

An approved stormwater system complying with all applicable County regulations will be constructed to handle runoff from the project. Most runoff likely will be associated with the creation of impervious surface. The stormwater system will be designed to infiltrate or discharge into an appropriate source. The stormwater system will be designed to insure no adverse impact on adjacent properties or infrastructure.

2) Could waste materials enter ground or surface waters? If so, generally describe.

Waste materials will only enter water through approved septic systems.

d. Proposed measures to reduce or control surface, ground, and runoff water impacts, if any:

Impervious surface area will be minimized to the extent practical, with less than 11% of the project site being impervious. Native vegetation will be retained to the maximum extent feasible. If needed, a professionally engineered storm water system will be designed and constructed to serve the project and eliminate potential impacts of runoff.

4. **Plants**

a. Check or circle types of vegetation found on the site:

X deciduous tree: alder, maple, aspen, other
X evergreen tree: fir, cedar, pine, other
X shrubs
X grass
———— pasture
———— crop or grain
———— wet soil plants: cattail, buttercup, bullrush, skunk cabbage, other
———— water plants: water lily, eelgrass, milfoil, other
———— other types of vegetation

b. What kind and amount of vegetation will be removed or altered?

Vegetation will be removed in order to construct infrastructure, including storm drainage and private roadways. 25% of the proposed roadway prisms already exist from old logging roads. The remaining 75% will need to be cleared in order to provide adequate safe zones from traveled lanes. An average of 45-ft in width will need to be cleared for road construction. Some vegetation may be removed in conjunction with constructing recreational trails, but the trails will primarily wind through the trees and retain native vegetation and topography as much as feasible.

c. List threatened or endangered species known to be on or near the site.

None known.

d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any:

The applicant, with the assistance of a landscaping firm knowledgeable about native plants in the area, will assist in the design and planning for the project. The concept for Forest Ridge is one that embraces nature and seeks to create a feel where homes are nestled within the natural surroundings.

5. **Animals**

a. Circle any birds and animals which have been observed on or near the site or are known to be on or near the site:

birds: **hawk, songbirds**
mammals: **deer**, **bear**, **elk**,
fish: **none.**

b. List any threatened or endangered species known to be on or near the site.

None.

c. Is the site part of a migration route? If so, explain.

No.

d. Proposed measures to preserve or enhance wildlife, if any:

More than 230 acres will be dedicated as perpetual open space and left substantially in their natural state.

6. **Energy and natural resources**

a. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc.

Electric, natural gas, solar, and propane energy all are potential sources for serving residential units. It is expected that the majority of energy will be provided by electric and propane sources.

b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe.

No.

c. What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any:

None.

7. **Environmental health**

a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur as a result of this proposal? If so, describe.

None known. The property is subject to common fire danger just as other rural property in Upper Kittitas County. Requisite fire access, including secondary accesses will be provided for the development.

1) Describe special emergency services that might be required.

The project does not present any unique needs in terms of emergency services. Standard emergency services for rural areas will be appropriate.

2) Proposed measures to reduce or control environmental health hazards, if any:

CCRs will be adopted to preserve native vegetation, wildlife areas, and recreational uses. The applicant will provide its own water right to serve the project. Low-impact septic systems will serve the project.

b. **Noise**

1) What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)?

None

2) What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, operation, other)? Indicate what hours noise would come from the site.

Short term noise associated with installation of infrastructure will occur, but will be well within acceptable noise thresholds as established by the County. Construction noise typically associated with single family residential construction will occur over time. The applicant will include in its CCRs and impose upon its contractors restrictions on the hours of construction (i.e. 7am-7pm in

summer; 8am-6pm in winter). Residential traffic traveling at speeds under 35 mph, and passive recreational uses will present negligible noise once houses are constructed.

3) Proposed measures to reduce or control noise impacts, if any:

All noise associated with the proposal will comply with applicable County noise standards. Construction will be restricted to 7am-7pm during the summer, and 8am-6 pm during the winter.

Significant buffering will exist through preservation of open space and native vegetation.

8. **Land and shoreline use**

a. What is the current use of the site and adjacent properties?

The property is zoned R-5, but generally undeveloped. Commercial Forest to the North and Forest and Range to the East and West.

b. Has the site been used for agriculture? If so, describe.

No.

c. Describe any structures on the site.

None.

d. Will any structures be demolished? If so, what?

No.

e. What is the current zoning classification of the site?

R-5.

f. What is the current comprehensive plan designation of the site?

Rural.

g. If applicable, what is the current shoreline master program designation of the site?

Not applicable.

h. Has any part of the site been classified as an "environmentally sensitive" area? If so, specify.

Some steep slopes. See Critical Areas Checklist and attachments.

i. Approximately how many people would reside or work in the completed project?

171 single family homes at full build-out. (Assuming an average of 2.5 people per home: 475 people)

j. Approximately how many people would the completed project displace?

None.

k. Proposed measures to avoid or reduce displacement impacts, if any:

Not applicable.

1. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any:

The applicant has engaged a highly respected, environmentally conscientious landscaping and land planning consultant to assist in the design elements and layout of the project.

Additionally, with assistance from the land planner, the applicant will adopt CCRs designed to maximize compatibility of the project with the surrounding land uses and environment.

9. **Housing**

a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing.

171 single-family units are anticipated. The applicant's goal is to create a range of housing, but it is expected that the housing will generally be geared towards a livable, middle income community.

At this time, we would like to reserve the right for either future landowners or the current landowner, to apply for a Zoning Structural Setback Variance. This would concern those parcels within the 200' setback of the Commercial Forest Zone per KCC 17.30A.055. Where the setback is not feasible, all development will comply with KCC 17.57.050(2).

b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing.

None/NA.

c. Proposed measures to reduce or control housing impacts, if any:

The project will create housing opportunities for people living and recreating in to Upper Kittitas County.

10. **Aesthetics**

a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed?

The CCRs will establish a maximum height of 35 feet.
Exterior building materials will be primarily wood, stone, and other products that are aesthetically pleasing and blend with the surrounding environment.

b. What views in the immediate vicinity would be altered or obstructed?

The entire ~480 acres is, and for years has been, privately owned and occasionally logged. Construction of a single-family residential community within this area will modify the viewshed for

people living south of the property/south of Cle Elum. The development, however, would not obstruct any views.

c. Proposed measures to reduce or control aesthetic impacts, if any:

Impacts will be insignificant, given the enactment of CCRs, a professionally designed landscape and site plan intended to preserve the natural setting, designation of buffers, and most importantly, the perpetual preservation of more than 140 acres of natural or open space in perpetuity. Design standards will help maximize aesthetic suitability and the likelihood that the community blends within the surrounding environment.

11. **Light and glare**

a. What type of light or glare will the proposal produce? What time of day would it mainly occur?

Basic residential night lighting for pathfinding and safety.

b. Could light or glare from the finished project be a safety hazard or interfere with views?

No.

c. What existing off-site sources of light or glare may affect your proposal?

City lights and surrounding lights are not likely to adversely impact the residential development.

d. Proposed measures to reduce or control light and glare impacts, if any:

Through CCRs, residences will be required to comply with Dark Skies standards. Lighting in common areas will also comply with Dark Skies standards.

12. **Recreation**

a. What designated and informal recreational opportunities are in the immediate vicinity?

Hiking, mountain biking, walking, and snowmobiling are common recreational activities in the immediate vicinity. No formal recreational opportunities exist. Much of the recreational activities that occur within the vicinity are on private property/commercial forest.

The Roslyn Ridge is relatively near, subject to a conservation easement, and provides recreational opportunities. Suncadia is also within close proximity and provides numerous recreational opportunities. National Forest is also nearby, providing recreational opportunities.

b. Would the proposed project displace any existing recreational uses? If so, describe.

No.

c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any:

The proposal will create perpetual recreational opportunities within the 480-acre project. Over 190 acres will be set aside in perpetuity as open space, for residents and guests to enjoy.

The applicant also proposes to create several pedestrian/bicycle/ multi-modal trails.

The applicant may construct a recreational/community center that will provide opportunities for active and passive recreation.

13. **Historic and cultural preservation**

a. Are there any places or objects listed on, or proposed for, national, state, or local preservation registers known to be on or next to the site? If so, generally describe.

No.

b. Generally describe any landmarks or evidence of historic, archaeological, scientific, or cultural importance known to be on or next to the site.

None.

c. Proposed measures to reduce or control impacts, if any:

N/A.

14. **Transportation**

a. Identify public streets and highways serving the site, and describe proposed access to the existing street system. Show on site plans, if any.

The project will be accessible via Columbia Street. The extension of Columbia St. will be improved to City Standards up to the circled area as shown on the attached Secondary Access exhibit. This will eliminate any need to access the site via Montgomery St.

A Transportation Study of proposed traffic impacts at the proposed intersections is underway.

b. Is site currently served by public transit? If not, what is the approximate distance to the nearest transit stop?

No.

c. How many parking spaces would the completed project have? How many would the project eliminate?

Each single-family residence would be required to provide its own parking on the homesite. A small parking area, consistent with County parking requirements would be provided to serve the planned community/recreational center. No other parking would be permitted within the development.

d. Will the proposal require any new roads or streets, or improvements to existing roads or streets, not including driveways? If so, generally describe (indicate whether public or private).

At least two accesses for the proposal will be improved to meet the County's private road standards. Internal roads with the project would be constructed to applicable standards for private roads serving more than 40 units.

e. Will the project use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe.

No.

f. How many vehicular trips per day would be generated by the completed project? If known, indicate when peak volumes would occur.

Up to 1,710 trips per day may be associated with the project at full build-out. Full-build out is not expected to occur, however, for four to ten years.

The applicant is undertaking a traffic study of the impacts of the proposed development.

g. Proposed measures to reduce or control transportation impacts, if any:

Internal road design and access points will be designed, with the help of a traffic engineer, to maximize efficiency and safety. Roads will be improved to applicable County standards for private roads. The applicant will engage in mitigation that is reasonably necessary to mitigate, and reasonably proportional to, the impacts that the transportation study reveals that the development will actually cause.

15. **Public services**

a. Would the project result in an increased need for public services (for example: fire protection, police protection, health care, schools, other)? If so, generally describe.

Somewhat. The need for fire protection exists even in the predevelopment condition, and the presence of residences is unlikely to increase significantly the fire danger. The need for emergency medical services will increase slightly given the additional residents, but the added expense of such services likely will be offset with the tax revenues. The same can be said with respect to police protection and schools.

b. Proposed measures to reduce or control direct impacts on public services, if any.

Payment of taxes and assessments.

16. **Utilities**

a. Circle utilities currently available at the site: electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system, other.

No utilities currently exist at the site. Telephone and electric will be extended to the site. Water will be provided by the applicant. Refuse collection will be provided by contract with private refuse companies. Individual septic systems, or a group septic system/drainfield will serve each home.

b. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed.

Each homesite will be served by an individual or group septic system, and will receive water through a Group A water system. The applicant will handle extending the electric and telephone services to the residences, with service to be provided by local utility companies.

C. SIGNATURE

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

Signature: .....

Date Submitted: 12/29/08

REVISED

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KITTITAS COUNTY
CDS

TRANSPORTATION IMPACT ANALYSIS
for the
Forest Ridge Residential Project



Prepared for:

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NOVEMBER 19, 2009

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1. INTRODUCTION

This report summarizes the transportation impact analysis for the Forest Ridge residential project to be developed by Sapphire Skies, LLC in Kittitas County, Washington. This analysis supports the permitting process, including review under the State Environmental Policy Act (SEPA). The transportation issues addressed by this report include the project's impacts to the roadway system, intersection operations, and traffic safety. This transportation analysis was revised per comments received from Kittitas County on October 22, 2009[1]. This version of the report supersedes the prior report.

1.1. Project Description

The proposed project would construct up to 171 single-family residential units. The lots range in size from 0.75 acres to 3.5 acres. Each unit will have its own off-street parking. Primary access would occur via extensions of Creekside Drive and Jack Pines Drive from Columbia Avenue. The extension of Jack Pines Drive would serve as the primary access; the Creekside Road extension would provide a second access route. The proponent would improve the extensions of Creekside Road and Jack Pine Drive to Kittitas County private road standards. Inside the development, the roads would be constructed to County private road standards, and would not have curb, gutter or sidewalk. However, there would be some trails and walkways within the project site.

The site is bounded by a combination of single-ownership and residential development plats. The Forest Ridge site would connect to the City street system via Columbia Avenue. North of 4th Street E, Columbia Avenue is unpaved. The road currently provides access to a few existing homes and a limited number of proposed residential developments. The site location and vicinity are shown on Figure 1. Figure 2 shows the proposed site plan.

1.2. Methodology

This study was performed in accordance with standard practice for transportation impact analyses, and all analyses were performed under the direction of Marni Heffron, who is a registered Professional Engineer in Washington State. Key assumptions used in the transportation analysis were confirmed with Jan Ollivier, Transportation and Planning Manager, and Christina Wollman, Planner 2, Kittitas County Public Works Department.[2]

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1 Comments transmitted by e-mail through Anna Nelson of Gordon Derr, October 22, 2009.

2 Personal communications with Jan Ollivier, June 10, 2009; Christina Wollman, September 20, 2009.



SAPPHIRE SKIES
FOREST RIDGE

Figure 1
STUDY AREA

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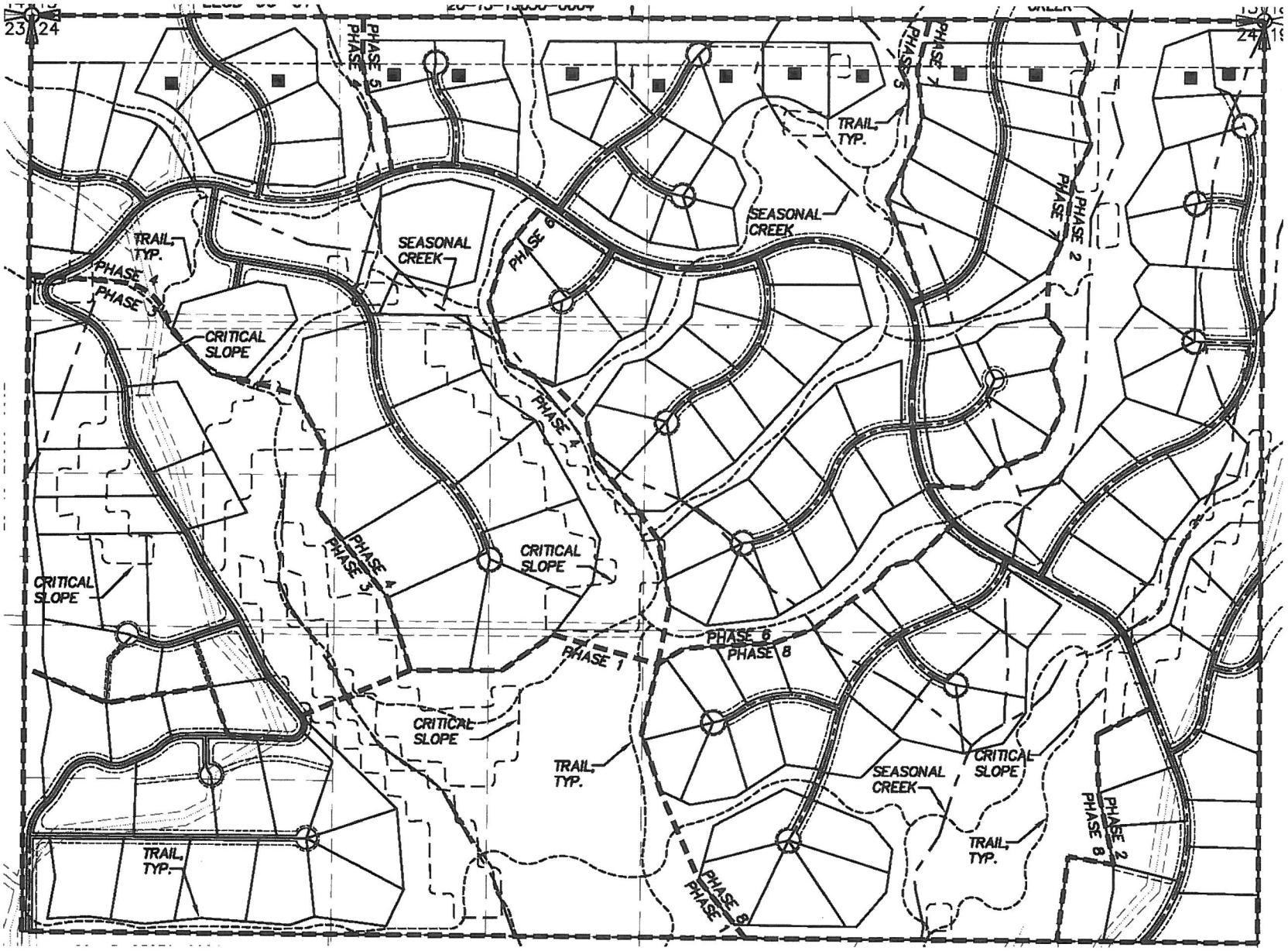

SAPPHIRE SKIES
FOREST RIDGE

Figure 2
SITE PLAN

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1.3. Study Area

The study area for this analysis includes roadways and intersections in the site vicinity that would experience the highest increases in traffic associated with the project and/or are located at the junction of arterial streets where existing traffic volumes in Cle Elum are the highest. [3]The following intersections were analyzed:

- E 1st Street/Columbia Avenue
- E 2nd Street/Columbia Avenue
- E 3rd Street /Columbia Avenue
- W 1st Street/Oakes Avenue.
- W 2nd Street/Oakes Avenue
- SR 907/SR 903 (west intersection)

The intersection analyses evaluated the existing, future-without-project, and future-with-project operating conditions of these intersections during the commuter PM peak hour.

2. BACKGROUND CONDITIONS

This section of the report presents the existing and future conditions without the proposed Forest Ridge project. These are the base conditions against which the impacts of the project are evaluated. The proposed project is scheduled to be constructed and occupied by about 2020. A significant amount of analysis has been performed for the City Heights project, a proposed project within the Cle Elum UGA in coordination with the City of Cle Elum to determine future-without-project conditions in Year 2022. An Environmental Impact Statement is being completed for the City Heights project. To simplify the analysis for the Forest Ridge project, those future-without-project data from the City Heights analysis are used to determine traffic volumes for the horizon year. Therefore, all future condition analyses in this report are based on a Year 2022.

2.1. Transportation Network

The following describes the existing roadway network that serves the project site area.

State Route 970 (SR 970) connects I-90 at Exit 85 to SR 903; to the east, it connects to US 97. The roadway is aligned generally in a northeast to southwest configuration. SR 970 has two travel lanes. Most of the road is undivided. There are paved shoulders varying in width from 4 to 7 feet. Part of the National Highway System, SR 970 is designated as a Highway of Statewide Significance (HSS). The road connects I-90, Cle Elum, Ellensburg and other communities to US 97 and Blewett Pass and the towns and recreational areas along US 2 (e.g., Leavenworth, Cashmere, and Wenatchee). The intersection with I-90 and SR 903 is accessed via two ramps that connect to a bridge over the adjacent railroad tracks. Each ramp, east and west of the bridge, is controlled by a stop sign where it intersection SR 970.

State Route 903 (SR 903) (also E 1st Street) connects from the I-90/SR 970/SR 903 interchange to Roslyn and the Suncadia Resort area. SR 903 is a two-lane paved roadway. SR 903 has some areas of very wide paved shoulders (up to 16 feet), and some areas with no shoulders. From SR 970 to Montgomery Avenue, the road has wide travel lanes, wide shoulders, on-street parking and only a few block faces with sidewalks, curb or gutter. The posted speed limit in this section is 30 mph.

[3] The *Cle Elum Draft Master Transportation Plan (City of Cle Elum, May 2009)* stated that "Average annual volumes range from 2,800 to 11,200. The heaviest are in the downtown – at Oakes and Pennsylvania Avenues." Therefore, two intersections on Oakes Avenue were included in the study area.

Columbia Avenue is a local access street under the City of Cle Elum's jurisdiction, with one travel lane in each direction and a posted speed limit of 25 mph. Like many roads in Cle Elum, Columbia Avenue has a very wide right of way, with wide travel lanes and gravel shoulders. On-street parallel and angle parking are located in the gravel shoulder areas on most blocks. Columbia Avenue is stop-sign controlled at 1st, 2nd, 3rd and 4th Streets. There are narrow (four to five feet wide) sidewalks along most block faces south of 4th Street.

Creekside Road and Jack Pines Road are unimproved local access roadways, extending from the north end of Columbia Avenue up into the North Hills area of Cle Elum. The roads provide access to a limited number of single and multiple-ownership plats. One study area roadway improvement is listed in the *2009 – 2014 Six-Year Transportation Improvement Plan* (Kittitas County Department of Public Works, Fall 2008). Airport Road is scheduled for shoulder widening in 2009, from the airport to mile post 2.73. The *Kittitas County Long Range Transportation Plan* (Kittitas County Department of Public Works, June 3, 2008) also lists the following two projects in the general study area: possible construction of a new roadway connecting Alliance Road to Dakota Road, parallel to SR 903, to improve connectivity to Roslyn; and, construction of a second Yakima River crossing at I-90 Exit 85 to Lower Peoh Point Road. These projects are not fully detailed in the long-range plan, and are not yet listed on the *Six-Year Transportation Plan.* Therefore, potential schedule and funding are not known. If these projects do proceed, they will likely not change traffic patterns associated with the proposed project.

WSDOT has plans to improve the intersection of SR 970/SR 903 at the eastern end of the City of Cle Elum.[4] Two *Route Development Plans* discuss several improvements to the corridor. The intersection of SR 970/SR 903 would be realigned and improved; other sections of SR 970 and SR 903 roadways would be widened to a consistent standard. Some of the elements of each *Route Development Plan* have already been constructed. All of these improvements should provide additional capacity in the study area. However, as the specifics of these projects are unknown, no changes to the laneage or traffic controls at SR 970/SR 903 were assumed for the analyses in this report.

One project in the City of Cle Elum was assumed for the future 2022 condition: installation of a signal at the W 2nd Street/Oakes Avenue intersection. This improvement is listed in the City's *Draft Transportation Plan*, and would be needed to attain better than LOS E conditions in the year 2022.

2.2. Traffic Volumes

Existing (2009) traffic volumes were primarily obtained from the City of Cle Elum's *Draft Transportation Plan* (City of Cle Elum, May 2009). The plan's PM peak hour traffic volumes, which represent the highest one hour volumes during the day and typically occur in a one-hour period between 4:00 and 6:00 P.M., were collected in April 2008. Based on analysis in the City's plan, these were then increased by 30% to represent summer average weekday conditions.[5] Field data were collected in July 2009 at the intersection of E 3rd Street/ Columbia Avenue, as no specific data were available for that intersection. Figure 3 shows the existing PM peak hour traffic volumes at study area intersections.

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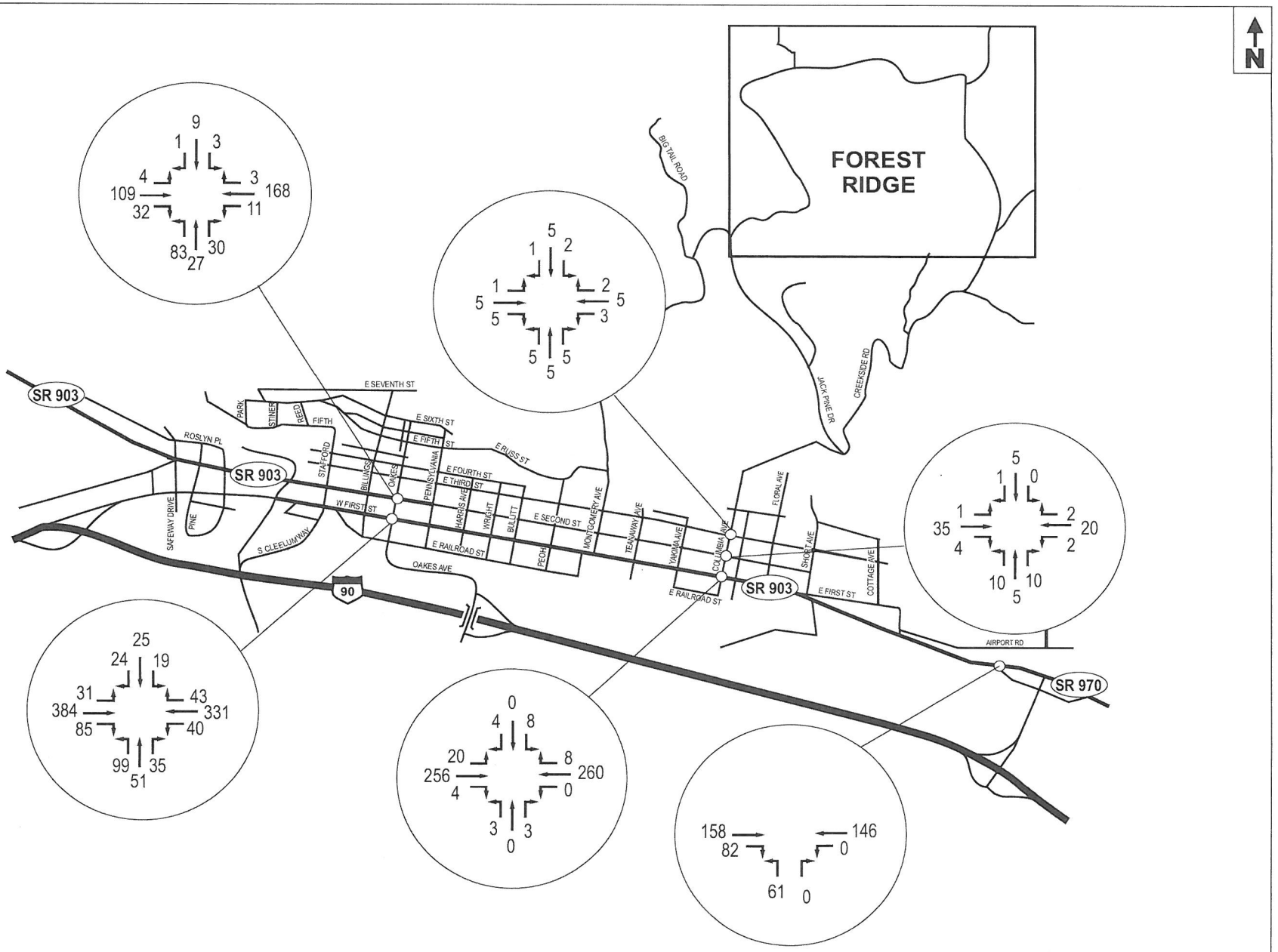
4 *Route Development Plan, State Route 903 and State Route 903 Spur*, Washington State Department of Transportation, South Central Regional Office; January 2004; and, *Route Development Plan, State Route 970,* Washington State Department of Transportation South Central Regional Office, June 2003.

5 City of Cle Elum's *Draft Transportation Plan* stated, "the turning movement counts were converted into Average Annual Daily Traffic(AADT) PM peak hour volumes using the seasonal factor of 1.33, as identified for April in the Washington State DOT *Annual Daily Traffic Count Report, 2006*.



SAPPHIRE SKIES
FOREST RIDGE

Figure 3
EXISTING (2009)
PM PEAK TRAFFIC VOLUMES

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10/24/09

The Forest Ridge Residential Development is expected to be constructed and occupied by 2020. To determine future-without-project traffic volumes for Forest Ridge, information developed for the City Heights project was used. The ongoing City Heights analyses include a detailed analysis of Year 2022 traffic volumes, including a background growth rate and specific pipeline project traffic. The following methodology, which was coordinated with the City of Cle Elum, was used:

- By 2022, an additional 1,836 residential units would be developed not including the City Heights project or Forest Ridge (which was excluded to estimate the without-project condition).

- Commercial development within the City of Cle Elum as a whole would occur at an industry standard ratio of about 80 square feet per additional dwelling unit, and therefore would result in a total of about 220,000 square feet of new commercial space by 2022. This commercial development ratio could be supported by projected new residential development as well as tourist traffic to the area, including pass-by visitors traveling on I-90.

- All of the light industrial and industrial land uses assumed in the *Draft Transportation Plan* within the City as a whole would be built and occupied by 2022.

- Background traffic volumes, which include tourist trips, would grow at a rate of approximately 1.3 percent per year. This assumption is consistent with the *Draft Transportation Plan* (May 2009).

- Future conditions for Forest Ridge were evaluated both without and with full development of the City Heights project. This was done because the size of the City Heights project has not yet been approved, and is subject to a detailed EIS analysis. In addition, it is expected that development of City Heights would lag behind Forest Ridge, in which case, any mitigation that might be needed to accommodate City Heights would occur after Forest Ridge is complete. The analyses both without and with City Heights shows how the Forest Ridge project would affect traffic operations under either condition. For the purpose of analysis, the largest development alternative for City Heights—Alternative 1 with 985 residential units (70% attached, 30% detached)—was evaluated.

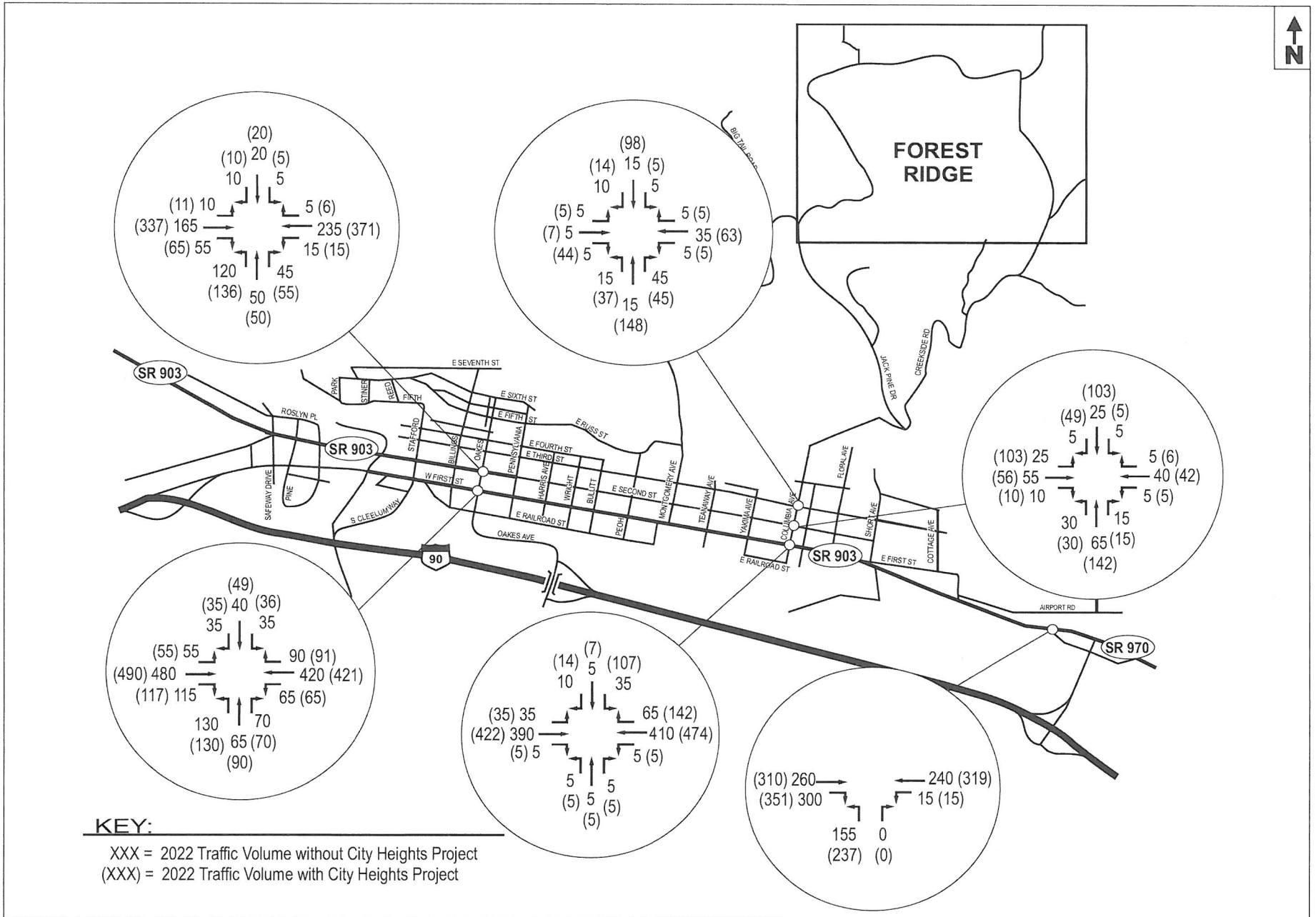
Table 1 summarizes the background growth land use program assumed for the Year 2022 forecasts described above. In total, the pipeline projects are expected to generate over 3,300 trips per hour, of which about 840 would be associated with City Heights Alternative 1. The growth rate associated with these pipeline projects varies depending on the location, the proximity to large pipeline projects, and the magnitude of the existing volumes. For example, at the east end of the study area, near the SR 903/SR970 intersection, the forecast volumes associated with all growth would represent a 8.1% per year compound growth rate over existing volumes. At the W Second Street/Oakes Avenue intersection in the center of Cle Elum, where existing traffic volumes are higher, the future traffic volumes represent a growth rate of 6.6% per year. Figure 4 shows the year 2022 without-project traffic volumes for the study area intersections; volumes without and with the potential City Heights project are shown.

Table 1. Estimate of Future Development in Cle Elum Without Forest Ridge (Year 2022)

General Area	Estimated Build-Out by Horizon Year 2022 "Pipeline" Projects			
	Industrial (sf)	Retail (sf)	Detached Units	Attached Units
UGA Projects				
Highway Commercial		10,000		
Light Industrial	96,000			
MP Resort (all residential)			17	28
Rural 3 (residential)			121	
Suburban (residential)			3	
Suburban 2 (residential)			2	
Agricultural 3 (residential)			40	
Sphere of Interest Projects				
Industrial Park	548,000			
North Residential [1]			112	
Mix Comm/High Residential				129
Bullfrog Bus/Comm (UGA)		210,000		
Suncadia-Bullfrog PMU District				
Residential			810	574
City Heights (Alternative 1 from EIS)[2]			690	295
Totals	**644,000**	**220,000**	**1,795**	**1,026**

Sources: City of Cle Elum Draft Transportation Plan, Tables 28 and 29; Heffron Transportation; August 2009

1. *The Draft Transportation Plan includes a location called "North Residential", which presumably includes Forest Ridge and City Heights. We have included the known platted or subdivided lots, which include Ponderosa Pines, Section 32 lots and others in the North Residential area. These properties have the potential for 112 detached dwelling units. Forest Ridge units are not included in the Horizon Year 2022, as it will be the action, not a pipeline project.*
2. *Number of units associated with City Heights Alternative 1. This is the worst-case alternative being evaluated.*



SAPPHIRE SKIES
FOREST RIDGE

Figure 4

FUTURE-WITHOUT-PROJECT (2022)
PM PEAK TRAFFIC VOLUMES

heffron transportation, inc.

10/24/09

2.3. Level of Service

Level of service (LOS) is a qualitative measure used to characterize traffic operating conditions. Six letter designations, "A" through "F," are used to define level of service. LOS A is the best and represents good traffic operations with little or no delay to motorists. LOS F is the worst and indicates poor traffic operations with long delays. Levels of service (LOS) for the study area intersections were determined using the Synchro 7.0 analysis model. Levels of service were calculated using the *Highway Capacity Manual*[6] methodology. Further information about level of service is provided in Appendix A.

Kittitas County considers a number of factors in determining roadway sufficiency including accident rates, roadway cross section (e.g., travel lane widths, shoulder widths and composition, curvature), traffic volumes and roadway alignment. In Kittitas County, LOS C is generally acceptable for rural traffic operations.[7] The Washington State Department of Transportation generally prefers LOS C for rural locations and LOS D for urban locations.

Input data for this analysis, including geometric conditions and traffic controls, were obtained during a site visit. Future year 2022 conditions assume that existing lane geometry and traffic controls remain the same as existing conditions, with one exception. The City of Cle Elum's *Draft Transportation Plan* includes, among other improvements, a proposed signal at the intersection of W 2nd Street/Oakes Avenue. This signal is assumed to be in place by 2022.

Table 2 summarizes the existing (2009) and year 2022 levels of service without the project. Conditions without and with the potential City Heights project are listed. This shows that future growth associated with the pipeline projects would degrade the level of service to below LOS C at two intersections: at E 1st Street/Columbia Avenue, where the northbound and southbound movements would operate at LOS D and LOS F, respectively with all of the pipeline projects, including City Heights. Northbound left turns at the SR 970/SR 903 intersection would also operate at LOS D by 2022 with this future growth. The two signalized intersections would not be affected by future growth because the vehicle delay is related to the signal timing rather than traffic volumes.

---

6 Transportation Research Board [TRB], 2000.
7 Long-Range Transportation Plan, page 37.

Table 2. Level of Service Summary – Background Conditions – PM Peak Hour

Signalized Intersection	Existing (2009) Conditions		Year 2022 Without Forest Ridge			
			Without City Heights		With City Heights	
	LOS [1]	Delay [2]	LOS [1]	Delay [2]	LOS [1]	Delay [2]
W 1st Street/Oakes Avenue	B	12.2	B	12.6	B	12.6
W 2nd Street/Oakes Avenue	N/A – unsignalized in 2009		A	7.2	A	7.6
Unsignalized Intersections						
W 2nd Street/Oakes Avenue			N/A – signalized by 2022		N/A – signalized by 2022	
Eastbound Left Turns	A	0.2				
Westbound Left Turns	A	0.5				
Northbound Left Turns	B	11.6				
Southbound Movements	B	11.6				
E 1st Street /Columbia Avenue						
Eastbound Left Turns	A	0.7	A	1.1	A	1.2
Westbound Left Turns	A	0.0	A	0.1	A	0.1
Northbound Movements	B	12.0	C	20.1	C	23.0
Southbound Movements	B	12.9	C	24.6	F	73.3
E 2nd Street/Columbia Avenue						
Eastbound Left Turns	A	0.2	A	2.1	A	4.8
Westbound Left Turns	A	0.6	A	0.8	A	0.7
Northbound Movements	A	9.0	B	10.8	C	16.4
Southbound Movements	A	9.3	B	10.3	B	13.1
E 3rd Street/Columbia Avenue						
Eastbound Left Turns	A	0.7	A	2.5	A	0.7
Westbound Left Turns	A	2.2	A	0.8	A	0.5
Northbound Movements	A	8.8	A	9.1	B	11.7
Southbound Movements	A	9.0	A	9.3	B	10.8
SR 970/SR 903 (west intersection)						
Westbound Left Turns	A	0.0	A	0.6	A	0.5
Northbound Movements	B	11.0	B	16.8	D	30.2

Source: Heffron Transportation, August 2009.

1. *LOS = Level of service.*
2. *Delay = Average seconds of delay per vehicle. Note that the delay in the future could decrease since it is measured on a per-vehicle basis and the overall delay would be averaged over a higher number of vehicles.*

2.4. Traffic Safety

The *Kittitas County Long Range Transportation Plan* identifies roadways, bridges and intersections throughout the County that are considered deficient with regard to safety. In the area near the project site, the *Long Range Transportation Plan* does not identify any roads, bridges or intersections in the immediate study area as high accident locations or corridors.

At the SR 903/SR 970 interchange, five incidents were reported in the three year period from January 1, 2006 through December 31, 2008 (*State of Washington, Department of Transportation, Standard Accident History Detail Report,* printed July 1, 2009). Of these, three were single-vehicle accidents. Two of these incidents involved injuries. No fatalities were reported. One incident was related to operating a cell phone while driving, one was caused by a driver under the influence, and one was caused by excessive speeding. The remaining two accidents were the result of drivers failing to yield the right-of-way.

2.5. Transit

Outside of Ellensburg, there are no fixed-route transit services in Kittitas County. A variety of not-for-profit and private enterprises offer specialized service. HopeSource provides pre-arranged transportation for persons with disabilities and special needs. Those headed for an airport can make use of the Central Washington Airporter Shuttle (a for-profit operation) in Cle Elum. The BNSF rail line that runs parallel to SR 970 does not carry passenger trains, and there are no stops in the study area.

2.6. Non-Motorized Transportation

The study area has sidewalks along most block faces south of E 4th Street. However, there are no sidewalks on SR 903 east of Airport Road. The *Kittitas County Transportation Plan* (2008) identifies Bullfrog Road and Airport Road as bicycle routes.

Although technically motorized transportation, numerous snowmobile trails exist in the Cle Elum area. Snowmobiling is a popular recreational activity in and around Cle Elum. There are Sno-Parks with associated parking in several locations in Upper Kittitas County. These are used by snowshoers, cross-country skiers, and hikers in addition to snowmobile riders.

3. PROJECT IMPACTS

This section of the report describes the conditions that would exist with the Forest Ridge project, which would construct up to 171 single-family ownership units. Although some of these units are expected to be recreational homes, for the purpose of this analysis, all of the homes were evaluated as primary residences that are occupied year round.

3.1. Roadway System

The Forest Ridge project would improve the extensions of Jack Pine Drive and Creekside Road to Kittitas County private road standards to the site. Columbia Avenue will require improvement north of E 4th Street for not only Forest Ridge, but also for a limited number of other proposed developments in the area. Forest Ridge would participate in those improvements as necessary. Internal access roads would also be built to Kittitas County private road standards including providing adequate sight lines at intersections.

3.2. Trip Generation

Trip generation for the residential uses of the proposed project was determined using rates in *Trip Generation* (Institute of Transportation Engineers [ITE], 8th Edition, 2008). Trip generation was determined based on the average rates for Single-Family Residential (Land Use Code 210).

Table 3 summarizes the proposed project's total vehicle trip generation. As shown, the proposed project is anticipated to generate 1,640 vehicle trips per day, 128 vehicle trips during the AM peak hour, and 173 vehicle trips during the PM peak hour.

Table 3. Vehicle Trips Generated by the Proposed Project

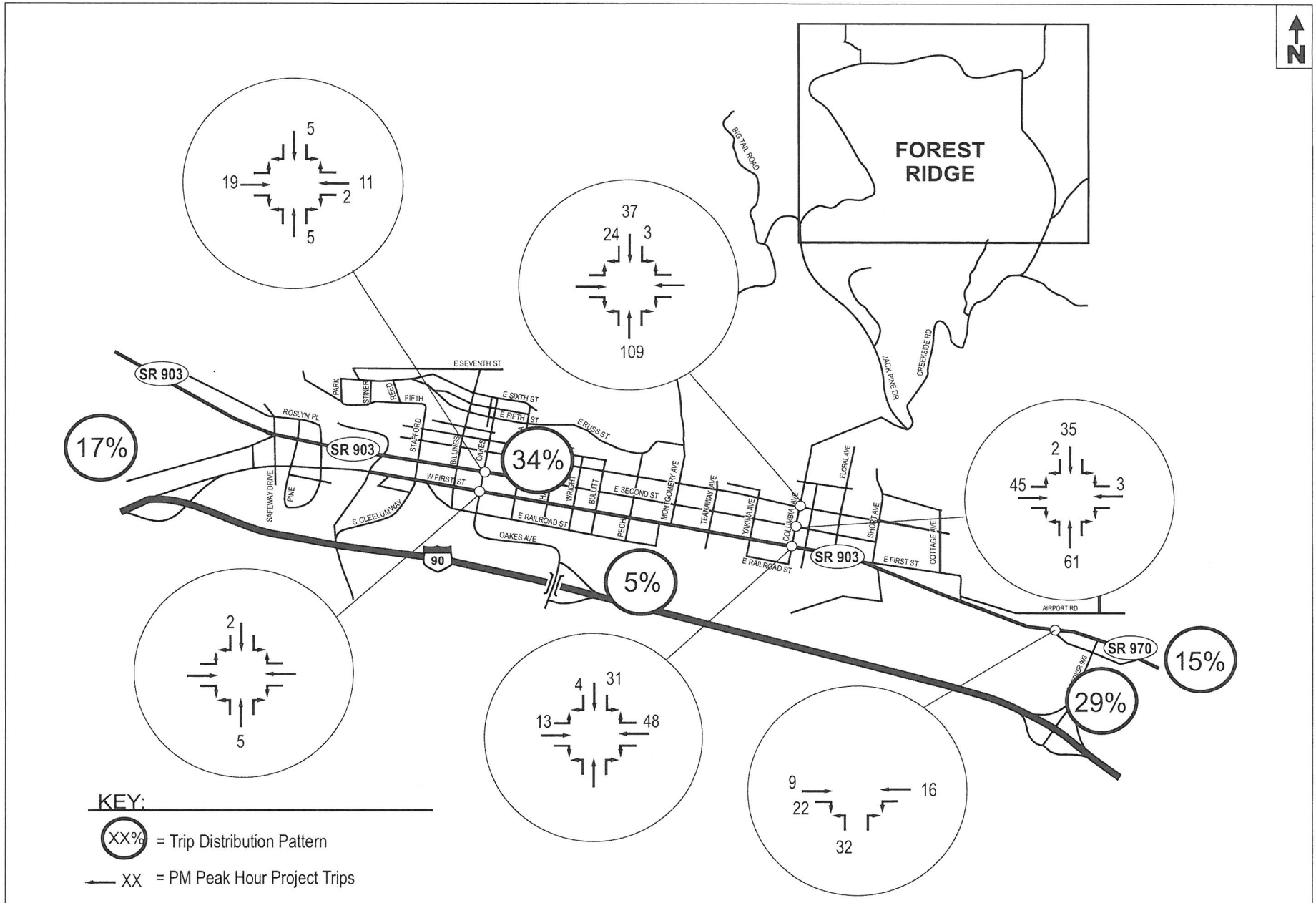
Land Use	Dwelling Units	Daily Trips	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
Single Family Residential (LU 210)	171	1,640	32	96	128	109	64	173

Source: Heffron Transportation, Inc., August 2009.

3.3. Trip Distribution and Assignment

The trip distribution pattern for this project was estimated based on the site's location relative to the commercial and retail activities in South Cle Elum and Cle Elum; and access to I-90. During the PM peak hour, most residential trips are related to residents returning from work; however, some could also be shopping trips or other non-work activities. Since many residents could work in locations beyond Cle Elum, such as in the Puget Sound region or further east in Kittitas County, the distribution pattern assumes that two-thirds of the PM peak hour traffic will use I-90, and that one-third will be to or from shops and services in downtown Cle Elum. Some of the trips would exit I-90 on the west side of town and drive through town, possibly to make a secondary trip such as stopping by a store. These assumptions result in a worst-case condition with longer trips affecting more intersections than if a higher percentage of the trips had assumed to be local. The distribution pattern is shown on Figure 5.

The PM peak hour traffic was assigned to the local roadway network using these patterns. Figure 5 shows the total PM peak hour project trip assignment. The project traffic was added to the 2022 without-project traffic forecasts described previously. The resulting year 2022 with-Forest Ridge traffic volumes are shown on Figure 6. These volumes show the future with and without the potential City Heights project.

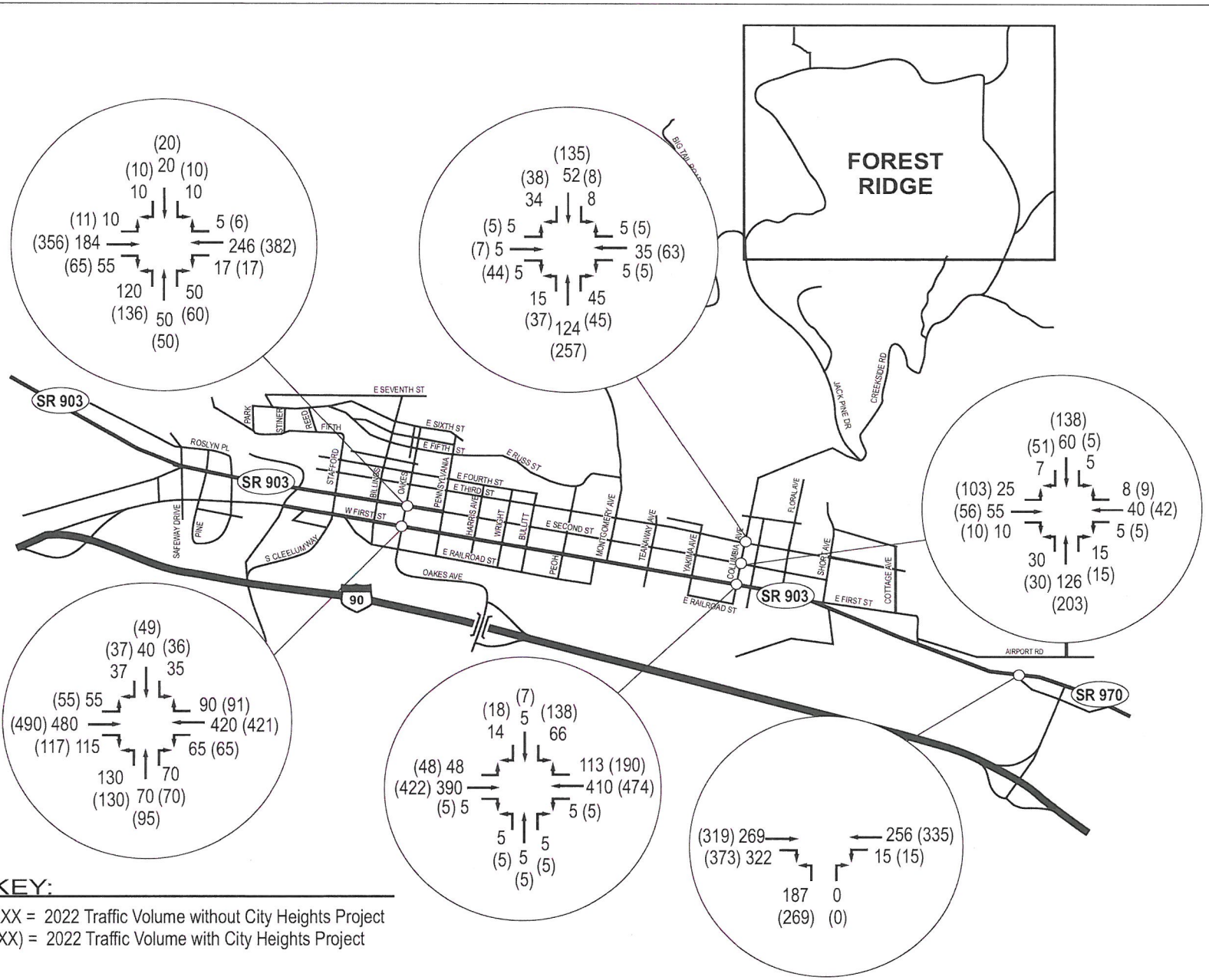


SAPPHIRE SKIES
FOREST RIDGE

Figure 5
TRIP DISTRIBUTION AND ASSIGNMENT
PM PEAK HOUR

heffron transportation, inc.

10/24/09



SAPPHIRE SKIES
FOREST RIDGE

Figure 6
FUTURE-WITH-FOREST RIDGE (2022)
PM PEAK HOUR TRAFFIC VOLUMES

heffron transportation, inc.

10/24/09

3.4. Level of Service

Levels of service for study area intersections were calculated using the 2022-with-project traffic volumes and the methodology described earlier in this report. Table 4 shows the results of the analysis. As previously discussed, year 2022 conditions were evaluated both without and with the potential City Heights project. This was done so that the specific impact associated with Forest Ridge could be determined.

The analysis shows that if the Forest Ridge project were to be built before the City Heights project, it would not degrade any of the intersections to a level that would require mitigation. One intersection movement would operate at a LOS D condition: the southbound movements from Columbia Avenue to E 1st Street. All other movements would operate at LOS C or better with the project.

If Forest Ridge were to occur after the City Heights development, however, movements at two intersections would operate at worse than LOS D. The southbound movements from Columbia Avenue to E 1st Street would operate at LOS F. The northbound left turn at the SR 970/SR 903 intersection would operate at LOS E with both Forest Ridge and City Heights. For both intersections, the majority of the degraded operation would be attributed to the City Heights project. It should be noted that the trip assignments and resulting with-project levels of service are conservative. Cle Elum roads are arranged in a grid system, and drivers could take any of several routes to and from the site. These analyses assume the majority of trips would use Columbia Avenue south of E 4th Street. If side street left turns at the E 1st Street/Columbia Avenue intersection did become congested in the future, motorists could choose to use other routes to E 1st Street.

Because it would not be the sole cause of the level of service degradation, it is recommended that the Forest Ridge project contribute a pro-rate share to any future improvements that may be needed at the two affected intersections. At both intersections, operations could be improved to LOS C with the addition of a center turn lane on the major street that could be used by turning traffic to make a two-step turn. Forest Ridge's traffic would represent about 8% of the traffic at the E 1st Street/Columbia Avenue intersection and about 6% of the traffic at the SR 970/SR 903 intersection.

Table 4. Level of Service Summary – Future (Year 2022) Conditions

	Year 2022 without City Heights				Year 2022 with City Heights			
	Without Forest Ridge		With Forest Ridge		Without Forest Ridge		With Forest Ridge	
Signalized Intersection	LOS [1]	Delay [2]	LOS [1]	Delay [2]	LOS [1]	Delay [2]	LOS [1]	Delay [2]
W 1st Street/Oakes Avenue	B	12.6	B	12.6	B	12.6	B	12.7
W 2nd Street/Oakes Avenue[3]	A	7.2	A	7.3	A	7.6	A	7.8
Unsignalized Intersections								
E 1st Street /Columbia Avenue								
Eastbound Left Turns	A	1.1	A	1.5	A	1.2	A	1.6
Westbound Left Turns	A	0.1	A	0.1	A	0.1	A	0.1
Northbound Movements	C	20.1	C	20.6	C	23.0	D	25.3
Southbound Movements	C	24.6	D	34.2	F	73.3	F	>100.0
E 2nd Street/Columbia Avenue								
Eastbound Left Turns	A	2.1	A	4.0	A	4.8	A	3.9
Westbound Left Turns	A	0.8	A	0.7	A	0.7	A	0.7
Northbound Movements	B	10.8	B	13.5	C	16.4	C	20.9
Southbound Movements	B	10.3	B	11.8	B	13.1	C	15.3
E 3rd Street/Columbia Avenue								
Eastbound Left Turns	A	2.5	A	2.5	A	0.7	A	0.7
Westbound Left Turns	A	0.8	A	0.8	A	0.5	A	0.5
Northbound Movements	A	9.1	B	10.5	B	11.7	B	14.1
Southbound Movements	A	9.3	A	9.8	B	10.8	B	11.4
SR 970/SR 903 (west intersection)								
Westbound Left Turns	A	0.6	A	0.6	A	0.5	A	0.5
Northbound Movements	B	16.8	C	19.1	D	30.2	E	40.7

Source: Heffron Transportation, October 2009

1. *LOS = Level of service.*
2. *Delay = Average seconds of delay per vehicle. Note that the delay in the future could decrease since it is measured on a per-vehicle basis and the overall delay would be averaged over a higher number of vehicles.*
3. *Assumed to be signalized by the year 2022.*

3.5. Traffic Safety

The project would result in a small increase in vehicular traffic in the study area. The additional vehicular traffic that would be generated by the project is not expected to result in any new adverse impacts to safety conditions in the study area.

3.6. Transit

Although there is no fixed-route transit in the study area, any resident needs for specialized transit could likely be met through existing, not-for-profit or for-profit transit services.

3.7. Non-Motorized Facilities

The internal roadway system would not have sidewalks, as they would be built to Kittitas County private roadway standards. There will be hiking and walking trails within the project located primarily in the open space areas.

4. MITIGATION

The project would not result in significant adverse impacts to traffic conditions in the site vicinity or larger project study area. However, it would contribute to the degradation of level of service at two intersections. If all of the expected growth occurs in Cle Elum and surrounding area, including the potential City Heights project, two intersection movements could operate at below LOS D conditions. The southbound movements from Columbia Avenue to E 1st Street would operate at LOS F. The northbound left turn at the SR 970/SR 903 intersection would operate at LOS E. Because it would not be the sole cause of the level of service degradation, it is recommended that the Forest Ridge project contribute a pro-rate share to improve the two affected intersections. At both intersections, operations could be improved to LOS C with the addition of a center turn lane on the major street that could be used by turning traffic to make a two-step turn. Forest Ridge's traffic would represent about 8% of the traffic at the E 1st Street/Columbia Avenue intersection and about 6% of the traffic at the SR 970/SR 903 intersection.

If the future growth does not occur as planned, for example, if City Heights is not built at the expected density, then no mitigation would be needed to accommodate the proposed Forest Ridge project.

REFERENCES

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APPENDIX A

LEVEL OF SERVICE DEFINITIONS
&
LEVEL OF SERVICE CALCULATIONS

Levels of service (LOS) are qualitative descriptions of traffic operating conditions. These levels of service are designated with letters ranging from LOS A, which is indicative of good operating conditions with little or no delay, to LOS F, which is indicative of stop-and-go conditions with frequent and lengthy delays. Levels of service for this analysis were developed using procedures presented in the *Highway Capacity Manual* (Transportation Research Board, 2000).

Level of service for signalized intersections is defined in terms of delay. Delay can be a cause of driver discomfort, frustration, inefficient fuel consumption, and lost travel time. Specifically, level-of-service criteria are stated in terms of the average delay per vehicle in seconds. Delay is a complex measure and is dependent on a number of variables including: the quality of progression, cycle length, green ratio, and a volume-to-capacity ratio for the lane group or approach in question. Table A-1 shows the level of service criteria for signalized intersections from the *Highway Capacity Manual.*

Table A-1. Level of Service for Signalized Intersections

Level of Service	Average Delay Per Vehicle	General Description
A	Less than 10.0 Seconds	Free flow
B	10.1 to 20.0 seconds	Stable flow (slight delays)
C	20.1 to 35.0 seconds	Stable flow (acceptable delays)
D	35.1 to 55.0 seconds	Approaching unstable flow (tolerable delay—occasionally wait through more than one signal cycle before proceeding.
E	55.1 to 80.0 seconds	Unstable flow (approaching intolerable delay)
F	Greater than 80.0 seconds	Forced flow (jammed)

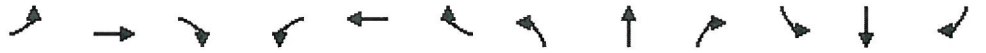
Source: Transportation Research Board, Highway Capacity Manual, 2000.

For unsignalized intersections, level of service is based on the average delay per vehicle for each turning movement. The level of service for a two-way, stop-controlled intersection is determined by the computed or measured control delay and is defined for each minor movement. Delay is related to the availability of gaps in the main street's traffic flow, and the ability of a driver to enter or pass through those gaps. Table A-2 shows the level of service criteria for unsignalized intersections from the *Highway Capacity Manual.*

Table A-2. Level of Service Criteria for Unsignalized Intersections

Level of Service	Average Delay (seconds per vehicle)
A	Less than 10.0
B	10.1 to 15.0
C	15.1 to 25.0
D	25.1 to 35.0
E	35.1 to 50.0
F	Greater than 50.0

Source: Transportation Research Board, Highway Capacity Manual, 2000



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	31	384	85	40	331	43	99	51	35	19	25	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.98		1.00	0.94		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1812		1770	1830		1770	1749		1770	1726	
Flt Permitted	0.40	1.00		0.29	1.00		0.72	1.00		0.70	1.00	
Satd. Flow (perm)	742	1812		532	1830		1346	1749		1298	1726	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	34	417	92	43	360	47	108	55	38	21	27	26
RTOR Reduction (vph)	0	17	0	0	10	0	0	21	0	0	15	0
Lane Group Flow (vph)	34	492	0	43	397	0	108	72	0	21	38	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	18.0	18.0		18.0	18.0		20.4	20.4		20.4	20.4	
Effective Green, g (s)	18.0	18.0		18.0	18.0		20.4	20.4		20.4	20.4	
Actuated g/C Ratio	0.39	0.39		0.39	0.39		0.44	0.44		0.44	0.44	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	288	703		206	710		592	769		571	759	
v/s Ratio Prot		c0.27			0.22			0.04			0.02	
v/s Ratio Perm	0.05			0.08			c0.08			0.02		
v/c Ratio	0.12	0.70		0.21	0.56		0.18	0.09		0.04	0.05	
Uniform Delay, d1	9.1	11.9		9.5	11.1		7.9	7.6		7.4	7.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	3.1		0.5	1.0		0.7	0.2		0.1	0.1	
Delay (s)	9.3	15.0		10.0	12.1		8.6	7.8		7.5	7.6	
Level of Service	A	B		A	B		A	A		A	A	
Approach Delay (s)		14.6			11.9			8.2			7.6	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	12.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	46.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	4	109	32	11	168	3	83	27	30	3	9	1
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	118	35	12	183	3	90	29	33	3	10	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	186			153			359	354	136	400	370	184
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	186			153			359	354	136	400	370	184
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			85	95	96	99	98	100
cM capacity (veh/h)	1389			1427			583	564	913	514	553	858

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1
Volume Total	158	198	90	62	14
Volume Left	4	12	90	0	3
Volume Right	35	3	0	33	1
cSH	1389	1427	583	706	559
Volume to Capacity	0.00	0.01	0.15	0.09	0.03
Queue Length 95th (ft)	0	1	14	7	2
Control Delay (s)	0.2	0.5	12.3	10.6	11.6
Lane LOS	A	A	B	B	B
Approach Delay (s)	0.2	0.5	11.6		11.6
Approach LOS			B		B

Intersection Summary				
Average Delay	4.0			
Intersection Capacity Utilization	32.0%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	35	4	2	20	2	10	5	10	0	5	1
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	38	4	2	22	2	11	5	11	0	5	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	24			42			73	71	40	83	72	23
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	24			42			73	71	40	83	72	23
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			99	99	99	100	99	100
cM capacity (veh/h)	1591			1567			910	818	1031	888	817	1054

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	43	26	27	7
Volume Left	1	2	11	0
Volume Right	4	2	11	1
cSH	1591	1567	933	849
Volume to Capacity	0.00	0.00	0.03	0.01
Queue Length 95th (ft)	0	0	2	1
Control Delay (s)	0.2	0.6	9.0	9.3
Lane LOS	A	A	A	A
Approach Delay (s)	0.2	0.6	9.0	9.3
Approach LOS			A	A

Intersection Summary			
Average Delay	3.2		
Intersection Capacity Utilization	18.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	20	256	4	0	260	8	3	0	3	8	0	4
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	278	4	0	283	9	3	0	3	9	0	4
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	291			283			615	615	280	614	613	287
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	291			283			615	615	280	614	613	287
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			100			99	100	100	98	100	99
cM capacity (veh/h)	1270			1280			396	399	758	397	401	752

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	304	291	7	13
Volume Left	22	0	3	9
Volume Right	4	9	3	4
cSH	1270	1280	520	471
Volume to Capacity	0.02	0.00	0.01	0.03
Queue Length 95th (ft)	1	0	1	2
Control Delay (s)	0.7	0.0	12.0	12.9
Lane LOS	A		B	B
Approach Delay (s)	0.7	0.0	12.0	12.9
Approach LOS			B	B

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	40.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	1	5	5	3	5	2	5	5	5	2	5	1
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	5	5	3	5	2	5	5	5	2	5	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	8			11			27	24	8	32	26	7
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	8			11			27	24	8	32	26	7
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			99	99	99	100	99	100
cM capacity (veh/h)	1613			1608			975	867	1074	965	865	1076

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	12	11	16	9
Volume Left	1	3	5	2
Volume Right	5	2	5	1
cSH	1613	1608	964	911
Volume to Capacity	0.00	0.00	0.02	0.01
Queue Length 95th (ft)	0	0	1	1
Control Delay (s)	0.7	2.2	8.8	9.0
Lane LOS	A	A	A	A
Approach Delay (s)	0.7	2.2	8.8	9.0
Approach LOS			A	A

Intersection Summary			
Average Delay	5.3		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	158	82	0	146	61	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	172	89	0	159	66	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			172		330	172
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			172		330	172
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		90	100
cM capacity (veh/h)			1405		664	872

Direction, Lane #	EB 1	EB 2	WB 1	NB 1
Volume Total	172	89	159	66
Volume Left	0	0	0	66
Volume Right	0	89	0	0
cSH	1700	1700	1405	664
Volume to Capacity	0.10	0.05	0.00	0.10
Queue Length 95th (ft)	0	0	0	8
Control Delay (s)	0.0	0.0	0.0	11.0
Lane LOS				B
Approach Delay (s)	0.0		0.0	11.0
Approach LOS				B

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	19.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	165	55	15	235	5	120	50	45	5	20	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0			4.0	
Lane Util. Factor		1.00			1.00		1.00	1.00			1.00	
Frt		0.97			1.00		1.00	0.93			0.96	
Flt Protected		1.00			1.00		0.95	1.00			0.99	
Satd. Flow (prot)		1798			1853		1770	1730			1778	
Flt Permitted		0.98			0.97		0.73	1.00			0.97	
Satd. Flow (perm)		1758			1799		1364	1730			1732	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	179	60	16	255	5	130	54	49	5	22	11
RTOR Reduction (vph)	0	24	0	0	1	0	0	30	0	0	7	0
Lane Group Flow (vph)	0	226	0	0	275	0	130	73	0	0	31	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		7.5			7.5		10.2	10.2			10.2	
Effective Green, g (s)		7.5			7.5		10.2	10.2			10.2	
Actuated g/C Ratio		0.29			0.29		0.40	0.40			0.40	
Clearance Time (s)		4.0			4.0		4.0	4.0			4.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)		513			525		541	687			687	
v/s Ratio Prot								0.04				
v/s Ratio Perm		0.13			c0.15		c0.10				0.02	
v/c Ratio		0.44			0.52		0.24	0.11			0.05	
Uniform Delay, d1		7.4			7.6		5.2	4.9			4.8	
Progression Factor		1.00			1.00		1.00	1.00			1.00	
Incremental Delay, d2		0.6			0.9		0.2	0.1			0.0	
Delay (s)		8.0			8.5		5.4	5.0			4.8	
Level of Service		A			A		A	A			A	
Approach Delay (s)		8.0			8.5			5.2			4.8	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	7.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	25.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	38.2%	ICU Level of Service	A
Analysis Period (min)	15		

Description: Removed FR trips from City Heights analysis to get FR Fut Without project, rounded to nearest 5.

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	55	480	115	65	420	90	130	65	70	35	40	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.97		1.00	0.92		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1809		1770	1813		1770	1718		1770	1732	
Flt Permitted	0.30	1.00		0.22	1.00		0.70	1.00		0.66	1.00	
Satd. Flow (perm)	557	1809		405	1813		1312	1718		1236	1732	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	60	522	125	71	457	98	141	71	76	38	43	38
RTOR Reduction (vph)	0	18	0	0	16	0	0	47	0	0	24	0
Lane Group Flow (vph)	60	629	0	71	539	0	141	100	0	38	57	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	22.5	22.5		22.5	22.5		18.4	18.4		18.4	18.4	
Effective Green, g (s)	22.5	22.5		22.5	22.5		18.4	18.4		18.4	18.4	
Actuated g/C Ratio	0.46	0.46		0.46	0.46		0.38	0.38		0.38	0.38	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	256	832		186	834		494	646		465	652	
v/s Ratio Prot		c0.35			0.30			0.06			0.03	
v/s Ratio Perm	0.11			0.18			c0.11			0.03		
v/c Ratio	0.23	0.76		0.38	0.65		0.29	0.15		0.08	0.09	
Uniform Delay, d1	8.0	10.9		8.6	10.1		10.7	10.1		9.8	9.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	4.0		1.3	1.7		1.4	0.5		0.3	0.3	
Delay (s)	8.5	14.9		10.0	11.9		12.1	10.6		10.2	10.1	
Level of Service	A	B		A	B		B	B		B	B	
Approach Delay (s)		14.3			11.7			11.3			10.1	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM Average Control Delay	12.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	48.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	60.6%	ICU Level of Service	B
Analysis Period (min)	15		

Description: Removed FR trips from City Heights analysis, rounded to nearest 5 for fut without 2022.

c Critical Lane Group

Year 2022 without Forest Ridge (Without City Heights)
57: 2nd Street & N Columbia Ave

10/25/2009

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	25	55	10	5	40	5	30	65	15	5	25	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	27	60	11	5	43	5	33	71	16	5	27	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	49			71			196	179	65	228	182	46
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	49			71			196	179	65	228	182	46
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			100			96	90	98	99	96	99
cM capacity (veh/h)	1558			1530			725	699	999	649	697	1023

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	98	54	120	38
Volume Left	27	5	33	5
Volume Right	11	5	16	5
cSH	1558	1530	737	722
Volume to Capacity	0.02	0.00	0.16	0.05
Queue Length 95th (ft)	1	0	14	4
Control Delay (s)	2.1	0.8	10.8	10.3
Lane LOS	A	A	B	B
Approach Delay (s)	2.1	0.8	10.8	10.3
Approach LOS			B	B

Intersection Summary			
Average Delay	6.2		
Intersection Capacity Utilization	27.3%	ICU Level of Service	A
Analysis Period (min)	15		
Description: Removed FR trips from City Heights analysis, rounded to nearest 5, to det Fut Without for Forest Ridge			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	35	390	5	5	410	65	5	10	5	35	5	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	38	424	5	5	446	71	5	11	5	38	5	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	516			429			1008	1030	427	1005	997	481
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	516			429			1008	1030	427	1005	997	481
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			100			97	95	99	81	98	98
cM capacity (veh/h)	1049			1130			205	224	628	204	234	585

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	467	522	22	54
Volume Left	38	5	5	38
Volume Right	5	71	5	11
cSH	1049	1130	260	238
Volume to Capacity	0.04	0.00	0.08	0.23
Queue Length 95th (ft)	3	0	7	21
Control Delay (s)	1.1	0.1	20.1	24.6
Lane LOS	A	A	C	C
Approach Delay (s)	1.1	0.1	20.1	24.6
Approach LOS			C	C

Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	56.7%	ICU Level of Service	B
Analysis Period (min)	15		
Description: Removed FR trips from City Heights analysis, rounded to nearest 5, to determine fut without for Forest Ridge project			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	5	5	5	35	5	15	15	45	5	15	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	5	5	5	38	5	16	16	49	5	16	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	43			11			90	73	8	128	73	41
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	43			11			90	73	8	128	73	41
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			98	98	95	99	98	99
cM capacity (veh/h)	1565			1608			868	811	1074	791	811	1030

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	16	49	82	33
Volume Left	5	5	16	5
Volume Right	5	5	49	11
cSH	1565	1608	965	869
Volume to Capacity	0.00	0.00	0.08	0.04
Queue Length 95th (ft)	0	0	7	3
Control Delay (s)	2.5	0.8	9.1	9.3
Lane LOS	A	A	A	A
Approach Delay (s)	2.5	0.8	9.1	9.3
Approach LOS			A	A

Intersection Summary			
Average Delay	6.3		
Intersection Capacity Utilization	16.3%	ICU Level of Service	A
Analysis Period (min)	15		
Description: Removed FR trips from City Heights analysis to det Fut Without for FR; rounded to nearest5.			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	260	300	15	240	155	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	283	326	16	261	168	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			283		576	283
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			283		576	283
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		64	100
cM capacity (veh/h)			1280		473	756

Direction, Lane #	EB 1	EB 2	WB 1	NB 1
Volume Total	283	326	277	168
Volume Left	0	0	16	168
Volume Right	0	326	0	0
cSH	1700	1700	1280	473
Volume to Capacity	0.17	0.19	0.01	0.36
Queue Length 95th (ft)	0	0	1	40
Control Delay (s)	0.0	0.0	0.6	16.8
Lane LOS			A	C
Approach Delay (s)	0.0		0.6	16.8
Approach LOS				C

Intersection Summary			
Average Delay	2.8		
Intersection Capacity Utilization	40.2%	ICU Level of Service	A
Analysis Period (min)	15		
Description: Removed FR trips from City Heights analysis, rounded to nearest 5, to determine Forest Ridge Fut Without volumes			

Year 2022 Without Forest Ridge (With City Heights)
9: 2nd Street (SR 903) & N Oakes Ave 10/25/2009

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	11	337	65	15	371	6	136	50	55	5	20	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0			4.0	
Lane Util. Factor		1.00			1.00		1.00	1.00			1.00	
Frt		0.98			1.00		1.00	0.92			0.96	
Flt Protected		1.00			1.00		0.95	1.00			0.99	
Satd. Flow (prot)		1821			1855		1770	1716			1778	
Flt Permitted		0.99			0.98		0.73	1.00			0.96	
Satd. Flow (perm)		1797			1817		1364	1716			1725	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	12	366	71	16	403	7	148	54	60	5	22	11
RTOR Reduction (vph)	0	11	0	0	1	0	0	41	0	0	8	0
Lane Group Flow (vph)	0	438	0	0	425	0	148	73	0	0	30	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		13.3			13.3		9.5	9.5			9.5	
Effective Green, g (s)		13.3			13.3		9.5	9.5			9.5	
Actuated g/C Ratio		0.43			0.43		0.31	0.31			0.31	
Clearance Time (s)		4.0			4.0		4.0	4.0			4.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)		776			785		421	529			532	
v/s Ratio Prot								0.04				
v/s Ratio Perm		c0.24			0.23		c0.11				0.02	
v/c Ratio		0.56			0.54		0.35	0.14			0.06	
Uniform Delay, d1		6.6			6.5		8.3	7.7			7.5	
Progression Factor		1.00			1.00		1.00	1.00			1.00	
Incremental Delay, d2		0.9			0.8		0.5	0.1			0.0	
Delay (s)		7.5			7.3		8.8	7.8			7.5	
Level of Service		A			A		A	A			A	
Approach Delay (s)		7.5			7.3			8.4			7.5	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	7.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	30.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	47.7%	ICU Level of Service	A
Analysis Period (min)	15		

Description: Removed FR trips from City Heights analysis to get FR Fut Without project, rounded to nearest 5.

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	55	490	117	65	421	91	130	90	70	36	49	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.97		1.00	0.93		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1809		1770	1813		1770	1741		1770	1746	
Flt Permitted	0.30	1.00		0.21	1.00		0.70	1.00		0.65	1.00	
Satd. Flow (perm)	561	1809		395	1813		1300	1741		1206	1746	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	60	533	127	71	458	99	141	98	76	39	53	38
RTOR Reduction (vph)	0	18	0	0	16	0	0	41	0	0	24	0
Lane Group Flow (vph)	60	642	0	71	541	0	141	133	0	39	67	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	23.1	23.1		23.1	23.1		18.4	18.4		18.4	18.4	
Effective Green, g (s)	23.1	23.1		23.1	23.1		18.4	18.4		18.4	18.4	
Actuated g/C Ratio	0.47	0.47		0.47	0.47		0.37	0.37		0.37	0.37	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	262	844		184	846		483	647		448	649	
v/s Ratio Prot		c0.36			0.30			0.08			0.04	
v/s Ratio Perm	0.11			0.18			c0.11			0.03		
v/c Ratio	0.23	0.76		0.39	0.64		0.29	0.20		0.09	0.10	
Uniform Delay, d1	7.9	10.9		8.6	10.0		11.0	10.6		10.1	10.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	4.1		1.3	1.6		1.5	0.7		0.4	0.3	
Delay (s)	8.3	15.0		9.9	11.6		12.5	11.3		10.5	10.5	
Level of Service	A	B		A	B		B	B		B	B	
Approach Delay (s)		14.4			11.4			11.8			10.5	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM Average Control Delay	12.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	49.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	62.2%	ICU Level of Service	B
Analysis Period (min)	15		

Description: Removed FR trips from City Heights analysis, rounded to nearest 5 for fut without 2022.

c Critical Lane Group

Year 2022 Without Forest Ridge (With City Heights)
57: 2nd Street & N Columbia Ave 10/25/2009

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	103	56	10	5	42	6	30	142	15	5	103	49
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	112	61	11	5	46	7	33	154	16	5	112	53
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	52			72			459	353	66	443	355	49
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	52			72			459	353	66	443	355	49
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	93			100			91	71	98	99	79	95
cM capacity (veh/h)	1554			1528			383	529	997	378	527	1020

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	184	58	203	171
Volume Left	112	5	33	5
Volume Right	11	7	16	53
cSH	1554	1528	517	612
Volume to Capacity	0.07	0.00	0.39	0.28
Queue Length 95th (ft)	6	0	46	28
Control Delay (s)	4.8	0.7	16.4	13.1
Lane LOS	A	A	C	B
Approach Delay (s)	4.8	0.7	16.4	13.1
Approach LOS			C	B

Intersection Summary			
Average Delay	10.6		
Intersection Capacity Utilization	44.6%	ICU Level of Service	A
Analysis Period (min)	15		
Description: Removed FR trips from City Heights analysis, rounded to nearest 5, to det Fut Without for Forest Ridge			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	35	422	5	5	474	142	5	5	5	107	7	14
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	38	459	5	5	515	154	5	5	5	116	8	15
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	670			464			1160	1218	461	1149	1143	592
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	670			464			1160	1218	461	1149	1143	592
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			100			97	97	99	29	96	97
cM capacity (veh/h)	921			1097			157	172	600	164	191	506

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	502	675	16	139
Volume Left	38	5	5	116
Volume Right	5	154	5	15
cSH	921	1097	216	178
Volume to Capacity	0.04	0.00	0.08	0.78
Queue Length 95th (ft)	3	0	6	129
Control Delay (s)	1.2	0.1	23.0	73.3
Lane LOS	A	A	C	F
Approach Delay (s)	1.2	0.1	23.0	73.3
Approach LOS			C	F

Intersection Summary			
Average Delay	8.4		
Intersection Capacity Utilization	66.7%	ICU Level of Service	C
Analysis Period (min)	15		
Description: Removed FR trips from City Heights analysis, rounded to nearest 5, to determine fut without for Forest Ridge project			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	7	44	5	63	5	37	148	45	5	98	14
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	8	48	5	68	5	40	161	49	5	107	15
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	74			55			193	127	32	254	148	71
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	74			55			193	127	32	254	148	71
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			94	79	95	99	86	98
cM capacity (veh/h)	1526			1549			668	758	1042	555	738	991

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	61	79	250	127
Volume Left	5	5	40	5
Volume Right	48	5	49	15
cSH	1526	1549	783	750
Volume to Capacity	0.00	0.00	0.32	0.17
Queue Length 95th (ft)	0	0	34	15
Control Delay (s)	0.7	0.5	11.7	10.8
Lane LOS	A	A	B	B
Approach Delay (s)	0.7	0.5	11.7	10.8
Approach LOS			B	B

Intersection Summary			
Average Delay	8.5		
Intersection Capacity Utilization	30.7%	ICU Level of Service	A
Analysis Period (min)	15		
Description: Removed FR trips from City Heights analysis to det Fut Without for FR; rounded to nearest5.			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	310	351	15	319	237	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	337	382	16	347	258	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			337		716	337
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			337		716	337
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		34	100
cM capacity (veh/h)			1222		391	705

Direction, Lane #	EB 1	EB 2	WB 1	NB 1
Volume Total	337	382	363	258
Volume Left	0	0	16	258
Volume Right	0	382	0	0
cSH	1700	1700	1222	391
Volume to Capacity	0.20	0.22	0.01	0.66
Queue Length 95th (ft)	0	0	1	114
Control Delay (s)	0.0	0.0	0.5	30.2
Lane LOS			A	D
Approach Delay (s)	0.0		0.5	30.2
Approach LOS				D

Intersection Summary			
Average Delay	5.9		
Intersection Capacity Utilization	48.8%	ICU Level of Service	A
Analysis Period (min)	15		
Description: Removed FR trips from City Heights analysis, rounded to nearest 5, to determine Forest Ridge Fut Without volumes			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	184	55	17	246	5	120	50	50	10	20	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0			4.0	
Lane Util. Factor		1.00			1.00		1.00	1.00			1.00	
Frt		0.97			1.00		1.00	0.92			0.97	
Flt Protected		1.00			1.00		0.95	1.00			0.99	
Satd. Flow (prot)		1803			1853		1770	1723			1778	
Flt Permitted		0.98			0.96		0.73	1.00			0.93	
Satd. Flow (perm)		1765			1792		1357	1723			1680	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	200	60	18	267	5	130	54	54	11	22	11
RTOR Reduction (vph)	0	22	0	0	1	0	0	33	0	0	7	0
Lane Group Flow (vph)	0	249	0	0	289	0	130	75	0	0	37	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		7.6			7.6		10.0	10.0			10.0	
Effective Green, g (s)		7.6			7.6		10.0	10.0			10.0	
Actuated g/C Ratio		0.30			0.30		0.39	0.39			0.39	
Clearance Time (s)		4.0			4.0		4.0	4.0			4.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)		524			532		530	673			656	
v/s Ratio Prot								0.04				
v/s Ratio Perm		0.14			c0.16		c0.10				0.02	
v/c Ratio		0.48			0.54		0.25	0.11			0.06	
Uniform Delay, d1		7.4			7.5		5.3	5.0			4.9	
Progression Factor		1.00			1.00		1.00	1.00			1.00	
Incremental Delay, d2		0.7			1.1		0.2	0.1			0.0	
Delay (s)		8.1			8.7		5.5	5.0			4.9	
Level of Service		A			A		A	A			A	
Approach Delay (s)		8.1			8.7			5.3			4.9	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	7.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	25.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	39.8%	ICU Level of Service	A
Analysis Period (min)	15		

Description: Removed FR trips from City Heights analysis to get FR Fut Without project, rounded to nearest 5.

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	55	480	115	65	420	90	130	70	70	35	40	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.97		1.00	0.92		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1809		1770	1813		1770	1723		1770	1728	
Flt Permitted	0.30	1.00		0.22	1.00		0.70	1.00		0.66	1.00	
Satd. Flow (perm)	557	1809		405	1813		1310	1723		1230	1728	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	60	522	125	71	457	98	141	76	76	38	43	40
RTOR Reduction (vph)	0	18	0	0	16	0	0	47	0	0	25	0
Lane Group Flow (vph)	60	629	0	71	539	0	141	105	0	38	58	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	22.5	22.5		22.5	22.5		18.4	18.4		18.4	18.4	
Effective Green, g (s)	22.5	22.5		22.5	22.5		18.4	18.4		18.4	18.4	
Actuated g/C Ratio	0.46	0.46		0.46	0.46		0.38	0.38		0.38	0.38	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	256	832		186	834		493	648		463	650	
v/s Ratio Prot		c0.35			0.30			0.06			0.03	
v/s Ratio Perm	0.11			0.18			c0.11			0.03		
v/c Ratio	0.23	0.76		0.38	0.65		0.29	0.16		0.08	0.09	
Uniform Delay, d1	8.0	10.9		8.6	10.1		10.7	10.1		9.8	9.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	4.0		1.3	1.7		1.5	0.5		0.3	0.3	
Delay (s)	8.5	14.9		10.0	11.9		12.1	10.7		10.2	10.1	
Level of Service	A	B		A	B		B	B		B	B	
Approach Delay (s)		14.3			11.7			11.4			10.1	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM Average Control Delay	12.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	48.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	60.8%	ICU Level of Service	B
Analysis Period (min)	15		

Description: Removed FR trips from City Heights analysis, rounded to nearest 5 for fut without 2022.

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	70	55	10	5	40	8	30	126	15	5	60	7
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	76	60	11	5	43	9	33	137	16	5	65	8
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	52			71			316	280	65	361	282	48
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	52			71			316	280	65	361	282	48
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	95			100			94	77	98	99	89	99
cM capacity (veh/h)	1554			1530			556	595	999	463	594	1021

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	147	58	186	78
Volume Left	76	5	33	5
Volume Right	11	9	16	8
cSH	1554	1530	609	607
Volume to Capacity	0.05	0.00	0.31	0.13
Queue Length 95th (ft)	4	0	32	11
Control Delay (s)	4.0	0.7	13.5	11.8
Lane LOS	A	A	B	B
Approach Delay (s)	4.0	0.7	13.5	11.8
Approach LOS			B	B

Intersection Summary			
Average Delay	8.7		
Intersection Capacity Utilization	36.6%	ICU Level of Service	A
Analysis Period (min)	15		
Description: Removed FR trips from City Heights analysis, rounded to nearest 5, to det Fut Without for Forest Ridge			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	48	390	5	5	410	113	5	5	5	66	5	14
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	52	424	5	5	446	123	5	5	5	72	5	15
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	568			429			1067	1110	427	1057	1052	507
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	568			429			1067	1110	427	1057	1052	507
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	95			100			97	97	99	62	97	97
cM capacity (veh/h)	1004			1130			182	197	628	188	214	566

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	482	574	16	92
Volume Left	52	5	5	72
Volume Right	5	123	5	15
cSH	1004	1130	247	213
Volume to Capacity	0.05	0.00	0.07	0.43
Queue Length 95th (ft)	4	0	5	51
Control Delay (s)	1.5	0.1	20.6	34.2
Lane LOS	A	A	C	D
Approach Delay (s)	1.5	0.1	20.6	34.2
Approach LOS			C	D

Intersection Summary			
Average Delay	3.7		
Intersection Capacity Utilization	69.5%	ICU Level of Service	C
Analysis Period (min)	15		
Description: Removed FR trips from City Heights analysis, rounded to nearest 5, to determine fut without for Forest Ridge project			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	5	5	5	35	5	15	124	45	8	52	34
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	5	5	5	38	5	16	135	49	9	57	37
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	43			11			136	73	8	187	73	41
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	43			11			136	73	8	187	73	41
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			98	83	95	99	93	96
cM capacity (veh/h)	1565			1608			758	811	1074	641	811	1030

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	16	49	200	102
Volume Left	5	5	16	9
Volume Right	5	5	49	37
cSH	1565	1608	858	858
Volume to Capacity	0.00	0.00	0.23	0.12
Queue Length 95th (ft)	0	0	23	10
Control Delay (s)	2.5	0.8	10.5	9.8
Lane LOS	A	A	B	A
Approach Delay (s)	2.5	0.8	10.5	9.8
Approach LOS			B	A

Intersection Summary			
Average Delay	8.6		
Intersection Capacity Utilization	23.1%	ICU Level of Service	A
Analysis Period (min)	15		
Description: Removed FR trips from City Heights analysis to det Fut Without for FR; rounded to nearest5.			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	269	322	15	256	187	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	292	350	16	278	203	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			292		603	292
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			292		603	292
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		55	100
cM capacity (veh/h)			1269		456	747

Direction, Lane #	EB 1	EB 2	WB 1	NB 1
Volume Total	292	350	295	203
Volume Left	0	0	16	203
Volume Right	0	350	0	0
cSH	1700	1700	1269	456
Volume to Capacity	0.17	0.21	0.01	0.45
Queue Length 95th (ft)	0	0	1	56
Control Delay (s)	0.0	0.0	0.6	19.1
Lane LOS			A	C
Approach Delay (s)	0.0		0.6	19.1
Approach LOS				C

Intersection Summary			
Average Delay	3.5		
Intersection Capacity Utilization	42.8%	ICU Level of Service	A
Analysis Period (min)	15		
Description: Removed FR trips from City Heights analysis, rounded to nearest 5, to determine Forest Ridge Fut Without volumes			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	11	356	65	17	382	6	136	50	60	10	20	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0			4.0	
Lane Util. Factor		1.00			1.00		1.00	1.00			1.00	
Frt		0.98			1.00		1.00	0.92			0.97	
Flt Protected		1.00			1.00		0.95	1.00			0.99	
Satd. Flow (prot)		1822			1855		1770	1710			1778	
Flt Permitted		0.99			0.97		0.73	1.00			0.93	
Satd. Flow (perm)		1800			1812		1357	1710			1668	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	12	387	71	18	415	7	148	54	65	11	22	11
RTOR Reduction (vph)	0	11	0	0	1	0	0	45	0	0	8	0
Lane Group Flow (vph)	0	459	0	0	439	0	148	74	0	0	36	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		13.8			13.8		9.6	9.6			9.6	
Effective Green, g (s)		13.8			13.8		9.6	9.6			9.6	
Actuated g/C Ratio		0.44			0.44		0.31	0.31			0.31	
Clearance Time (s)		4.0			4.0		4.0	4.0			4.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)		791			796		415	523			510	
v/s Ratio Prot								0.04				
v/s Ratio Perm		c0.26			0.24		c0.11				0.02	
v/c Ratio		0.58			0.55		0.36	0.14			0.07	
Uniform Delay, d1		6.6			6.5		8.5	7.9			7.7	
Progression Factor		1.00			1.00		1.00	1.00			1.00	
Incremental Delay, d2		1.1			0.8		0.5	0.1			0.1	
Delay (s)		7.7			7.3		9.0	8.0			7.8	
Level of Service		A			A		A	A			A	
Approach Delay (s)		7.7			7.3			8.6			7.8	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	7.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	31.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	49.3%	ICU Level of Service	A
Analysis Period (min)	15		

Description: Removed FR trips from City Heights analysis to get FR Fut Without project, rounded to nearest 5.

c Critical Lane Group

Year 2022 With Forest Ridge (Including City Heights)
14: 1st Street & N Oakes Ave 10/25/2009

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	55	490	117	65	421	91	130	95	70	36	49	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.97		1.00	0.94		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1809		1770	1813		1770	1744		1770	1743	
Flt Permitted	0.30	1.00		0.21	1.00		0.70	1.00		0.64	1.00	
Satd. Flow (perm)	561	1809		395	1813		1298	1744		1200	1743	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	60	533	127	71	458	99	141	103	76	39	53	40
RTOR Reduction (vph)	0	18	0	0	16	0	0	40	0	0	25	0
Lane Group Flow (vph)	60	642	0	71	541	0	141	139	0	39	68	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	23.1	23.1		23.1	23.1		18.4	18.4		18.4	18.4	
Effective Green, g (s)	23.1	23.1		23.1	23.1		18.4	18.4		18.4	18.4	
Actuated g/C Ratio	0.47	0.47		0.47	0.47		0.37	0.37		0.37	0.37	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	262	844		184	846		482	648		446	648	
v/s Ratio Prot		c0.36			0.30			0.08			0.04	
v/s Ratio Perm	0.11			0.18			c0.11			0.03		
v/c Ratio	0.23	0.76		0.39	0.64		0.29	0.22		0.09	0.10	
Uniform Delay, d1	7.9	10.9		8.6	10.0		11.0	10.6		10.1	10.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	4.1		1.3	1.6		1.5	0.8		0.4	0.3	
Delay (s)	8.3	15.0		9.9	11.6		12.5	11.4		10.5	10.5	
Level of Service	A	B		A	B		B	B		B	B	
Approach Delay (s)		14.4			11.4			11.9			10.5	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM Average Control Delay	12.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	49.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	62.4%	ICU Level of Service	B
Analysis Period (min)	15		

Description: Removed FR trips from City Heights analysis, rounded to nearest 5 for fut without 2022.

c Critical Lane Group

Year 2022 With Forest Ridge (Including City Heights)
57: 2nd Street & N Columbia Ave 10/25/2009

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	103	56	55	5	42	9	30	203	15	5	138	51
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	112	61	60	5	46	10	33	221	16	5	150	55
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	55			121			507	381	91	503	406	51
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	55			121			507	381	91	503	406	51
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	93			100			90	57	98	98	70	95
cM capacity (veh/h)	1549			1467			326	510	967	295	494	1018

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	233	61	270	211
Volume Left	112	5	33	5
Volume Right	60	10	16	55
cSH	1549	1467	490	560
Volume to Capacity	0.07	0.00	0.55	0.38
Queue Length 95th (ft)	6	0	82	44
Control Delay (s)	3.9	0.7	20.9	15.3
Lane LOS	A	A	C	C
Approach Delay (s)	3.9	0.7	20.9	15.3
Approach LOS			C	C

Intersection Summary			
Average Delay	12.7		
Intersection Capacity Utilization	52.0%	ICU Level of Service	A
Analysis Period (min)	15		
Description: Removed FR trips from City Heights analysis, rounded to nearest 5, to det Fut Without for Forest Ridge			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	48	422	5	5	474	190	5	5	5	138	7	18
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	52	459	5	5	515	207	5	5	5	150	8	20
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	722			464			1218	1298	461	1203	1198	618
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	722			464			1218	1298	461	1203	1198	618
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	94			100			96	96	99	0	96	96
cM capacity (veh/h)	880			1097			139	151	600	148	174	489

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	516	727	16	177
Volume Left	52	5	5	150
Volume Right	5	207	5	20
cSH	880	1097	194	161
Volume to Capacity	0.06	0.00	0.08	1.10
Queue Length 95th (ft)	5	0	7	230
Control Delay (s)	1.6	0.1	25.3	157.1
Lane LOS	A	A	D	F
Approach Delay (s)	1.6	0.1	25.3	157.1
Approach LOS			D	F

Intersection Summary			
Average Delay	20.3		
Intersection Capacity Utilization	78.3%	ICU Level of Service	D
Analysis Period (min)	15		
Description: Removed FR trips from City Heights analysis, rounded to nearest 5, to determine fut without for Forest Ridge project			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	7	44	5	63	5	37	257	45	8	135	38
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	8	48	5	68	5	40	279	49	9	147	41
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	74			55			239	127	32	313	148	71
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	74			55			239	127	32	313	148	71
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			93	63	95	98	80	96
cM capacity (veh/h)	1526			1549			577	758	1042	433	738	991

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	61	79	368	197
Volume Left	5	5	40	9
Volume Right	48	5	49	41
cSH	1526	1549	760	755
Volume to Capacity	0.00	0.00	0.49	0.26
Queue Length 95th (ft)	0	0	67	26
Control Delay (s)	0.7	0.5	14.1	11.4
Lane LOS	A	A	B	B
Approach Delay (s)	0.7	0.5	14.1	11.4
Approach LOS			B	B

Intersection Summary			
Average Delay	10.7		
Intersection Capacity Utilization	42.2%	ICU Level of Service	A
Analysis Period (min)	15		
Description: Removed FR trips from City Heights analysis to det Fut Without for FR; rounded to nearest5.			

Year 2022 With Forest Ridge (Including City Heights)
91: 1st Street (SR 903) & SR 970 10/25/2009

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	319	373	15	335	269	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	347	405	16	364	292	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			347		743	347
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			347		743	347
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		22	100
cM capacity (veh/h)			1212		377	696

Direction, Lane #	EB 1	EB 2	WB 1	NB 1
Volume Total	347	405	380	292
Volume Left	0	0	16	292
Volume Right	0	405	0	0
cSH	1700	1700	1212	377
Volume to Capacity	0.20	0.24	0.01	0.78
Queue Length 95th (ft)	0	0	1	161
Control Delay (s)	0.0	0.0	0.5	40.7
Lane LOS			A	E
Approach Delay (s)	0.0		0.5	40.7
Approach LOS				E

Intersection Summary			
Average Delay	8.5		
Intersection Capacity Utilization	51.4%	ICU Level of Service	A
Analysis Period (min)	15		
Description: Removed FR trips from City Heights analysis, rounded to nearest 5, to determine Forest Ridge Fut Without volumes			

FOREST RIDGE-EXISTING CONDITIONS
KITITTAS COUNTY
CRITICAL AREAS REPORT

Prepared For:

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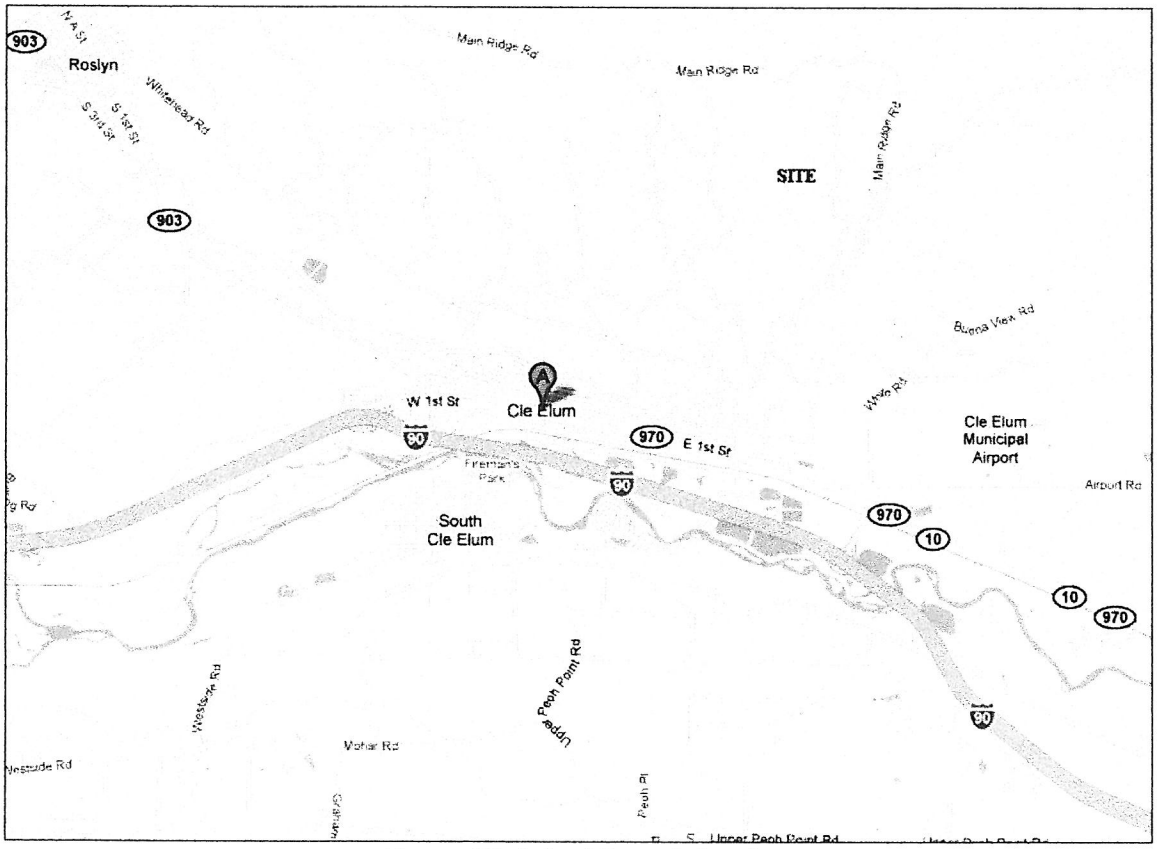
FOREST RIDGE-EXISTING CONDITIONS
KITITTAS COUNTY
CRITICAL AREAS REPORT

1.0 INTRODUCTION

This report describes our observations of jurisdictional wetlands, streams and buffers as well as a review of listed plant and animal species on the proposed Forest Ridge project, located in the Cle Elum area of unincorporated Kittitas County, Washington (the "site").



Above: Vicinity Map of the site.

Specifically, the site is a 478.45 acre (comprised of 12 parcels), rectangular shaped property located in Section 24, Township 20 North, Range 15 East of the W.M. in Kittitas County Washington. The site is generally defined by undeveloped forestland on

the north, west and east and large lot developments on the south. The site includes the following parcels; #20-15-24000-0001, #0003, #0004, #0007, #0015, #0016, #0017, #0018, #0019, #0020, #0021, and #0022.

The site consists of thinned and logged forest land. Numerous gravel roads pass through the site and there is evidence of significant historic soils disturbance, probably associated with logging and possibly mining.

The site contains 5 upper forks of a stream as well as 10 wetlands.

The proposed project is the development of a 171 performance based cluster plat known as Forest Ridge, as well as associated infrastructure.

2.0 METHODOLOGY

2.1 Wetlands

Ed Sewall and Aaron Will of Sewall Wetland Consulting, Inc. inspected the site over multiple days in November of 2009. The site was reviewed using methodology described in the ***Washington State Wetlands Identification Manual*** (WADOE, March 1997). This is the methodology currently recognized by Kittitas County and the State of Washington for wetland determinations and delineations. The site was also reviewed using the ***Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)*** (USACOE September 2008) as required by the US Army Corps of Engineers starting in June of 2009. Soil colors were identified using the 1990 Edited and Revised Edition of the ***Munsell Soil Color Charts*** (Kollmorgen Instruments Corp. 1990.

The *Washington State Wetlands Identification and Delineation Manual* and the *Regional Supplement to the Corps of Engineers Wetlands Delineation Manual* all require the use of the three-parameter approach in identifying and delineating wetlands. A wetland should support a predominance of hydrophytic vegetation, have hydric soils and display wetland hydrology. To be considered hydrophytic vegetation, over 50% of the dominant species in an area must have an indicator status of facultative (FAC), facultative wetland (FACW), or obligate wetland (OBL), according to the National List of Plant Species That Occur in Wetlands: Northwest (Region 9) (Reed, 1988). A hydric soil is "a soil that is saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part". Anaerobic conditions are indicated in the field by soils with low chromas (2 or less), as determined by using the Munsell Soil Color Charts; iron oxide mottles; hydrogen sulfide odor and other indicators. Generally, wetland hydrology is defined by inundation or saturation to the surface for a consecutive period of 12.5% or greater of the growing season. Areas that contain indicators of

wetland hydrology between 5%-12.5% of the growing season may or may not be wetlands depending upon other indicators. Field indicators include visual observation of soil inundation, saturation, oxidized rhizospheres, water marks on trees or other fixed objects, drift lines, etc. Under normal circumstances, indicators of all three parameters will be present in wetland areas.

Wetlands were flagged with pink "WETLAND DELINEATION" flagging and numbered and lettered sequentially. All flags were located by Sewall Wetland Consulting, inc. using a Garmin 60CSx gps unit, and subsequently placed upon the site plan by Encompass Engineering & Surveying.

2.2 Streams

The ordinary high water mark (OHWM) of the streams on the site was located based upon the criteria used by Washington Department of Ecology and defined in the WAC.

The OHWM is defined as *the mark on all lakes, streams, and tidal water that will be found by examining the bed and banks and ascertaining where the presence and action of waters are so common and usual, and so long continued in all ordinary years, as to mark upon the soil a character distinct from that of the abutting upland, in respect to vegetation as that condition exists on June 1, 1971, as it may naturally change thereafter, or as it may change thereafter in accordance with permits issued by a local government or the department: PROVIDED, That in any area where the ordinary high water mark cannot be found, the ordinary high water mark adjoining salt water shall be the line of mean higher high tide and the ordinary high water mark adjoining fresh water shall be the line of mean high water.*

The OHWM of streams were marked with sequentially numbered white/blue dot flagging. Streams <2' in width (Type 5 streams) were flagged at the centerline.

3.0 OBSERVATIONS

3.1 Existing Site Documentation.

Prior to visiting the site, a review of several natural resource inventory maps was conducted. Resources reviewed included the National Wetland Inventory Map, the Washington State Department of Natural Resources (WADNR) FPARS stream mapping website, the Kittitas County Mapsifter website with Wetland layers, and data on file at the Kittitas County NRCS office in regards to soil data for the site.

3.1.1 Soil Survey

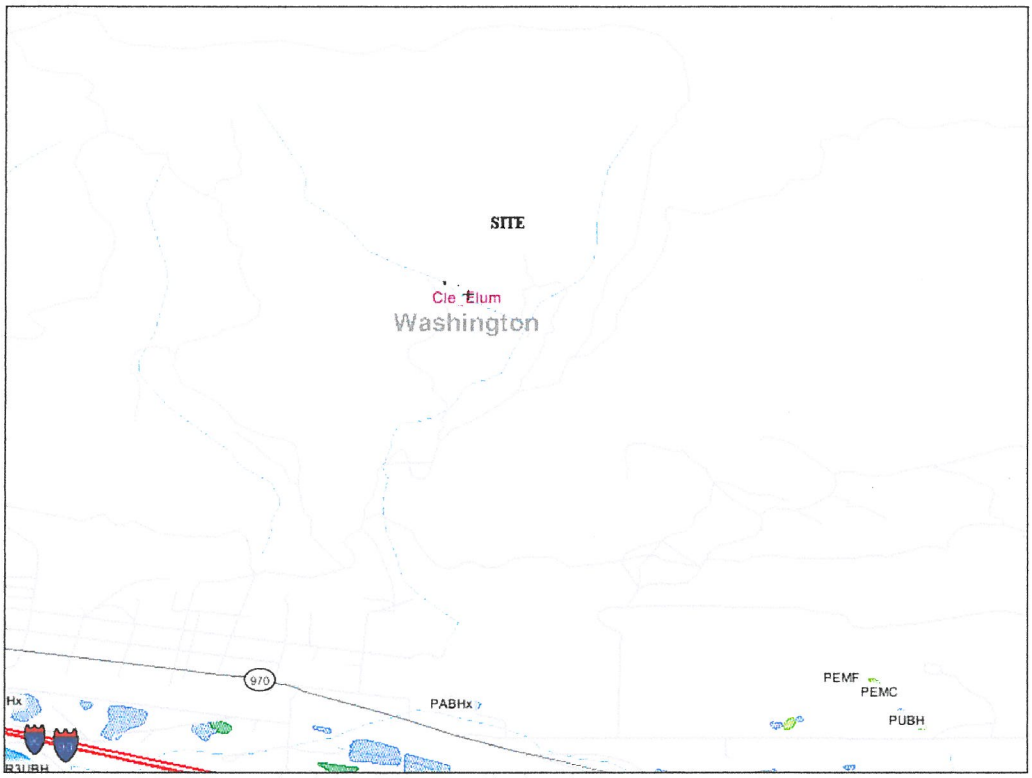
According to data on file with the NRCS Soil Mapper website, the site is mapped as 100% Teanaway loam, 10%-25%% slopes (map unit #1441). Teanaway soils are moderately well drained soils formed in loess over glacial till or outwash with some volcanic ash in surface horizons. Teanaway soils are not considered a hydric or wetland soil. A detailed soil report specific to the Forest Ridge site printed from the NRCS website is included as an attachment to this report.



Above: NRCS Soil Mapper website image of site. #1441 indicates Teanaway soils.

3.1.2 National Wetlands Inventory (NWI)

According to the NWI map for the site, there are no wetlands on or near the site. Two streams are depicted crossing the site.



Above: National Wetlands Inventory Map of the site.



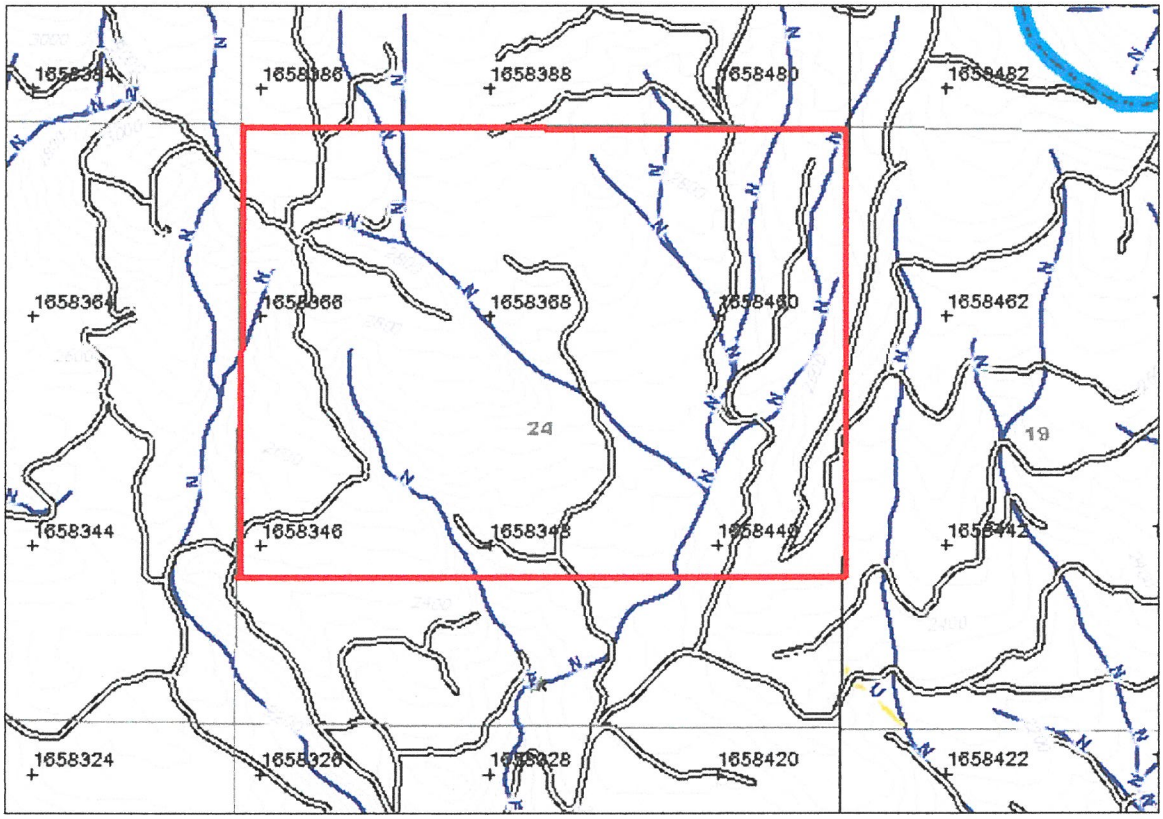
Above: Kittitas County Mapsifter webpage depicting the site (12-7-09).

3.1.3 Kittitas County Mapsifter – Wetland Layer

The Kittitas County Mapsifter website depicts no wetlands or streams on or near the site.

3.1.4 WADNR FPARS website

According to the WADNR FPARS website with stream types layers activated, there are five (5) forks of a single common stream on the site. All of these streams are depicted as Type N waters, which equates to both Type 4 and 5 waters under the Kittitas County stream typing system. Based upon this map, there is no fish use of these channels, and fish use within the common receiving stream stops approximately 800'-900' south of the site.



Above: WADNR FPARS website depicting several forks of a common stream passing through the site.

3.2 Field observations

3.2.1 Uplands

The site consists of a sloping forested hillside with numerous well defined ridges and ravines draining to the south. One of the drainages within the center of the site is commonly referred to as "Steiners Canyon" on various maps of the site. The high point on the site is at elevation approximately 2,950' near the northwest side of the site, and a low of 2,300' near the center of the south property line.

Numerous logging roads cross the site and there is evidence of significant landscape disturbance as a result of past logging work, and possibly mining (prospect holes, wildcat mines) on the property. This is evidenced by several of the streams which have been channelized in places into ditches paralleling natural channels, berms across the land, old excavations and landing areas, large slash piles, altered grades, and logged areas that do not appear to have been replanted. Several of these excavations and soil surface disturbances appear to have greatly influenced how water flows across the site. For example, at least one stream (*Stream B, upper portion of what is known and commonly mapped as Steiners Canyon*) was found to have no surface connection to streams downslope, and appears to infiltrate into soils. This may be natural or may be a result of landscape level soil disturbance in the past.

The majority of the site is dominated by a thinned overstory of ponderosa pine (*Pinus ponderosa*) and scattered Douglas fir (*Psuedotsuga menziesii*). Trees range from 6 to 40 inches diameter at breast height (dbh) with the majority in the 12 to 24-inch size range. Canopy coverage in this area ranges from 35% to 80%. Additionally, scattered large cottonwoods (*Populus balsamifera*)are found on the site within some of the drainages as well as a few small clusters of quacking aspen (*Populus tremuloides*).

The understory within the forested area is variable as a result of past logging, ranging from areas with scattered shrubs with a pine needle litter-covered forest floor understory to the more open areas with a dense cover of shrubs, grasses and forbs. Species found in the shrub strata of this area include serviceberry (*Amalanchier alnifolia*), snowberry (*Symphocarpos albus),* oceanspray (*Holodiscus discolor*), rose (*Rosa* spp.), snowbush (*Ceanothus velutinous*), kinnikinnik (*Arctostaphylos patula*) Oregon grape (*Berberis nervosa*), bulbous bluegrass (*Poa bulbosa*), quackgrass (*Agropyron* spp.), serviceberry, knapweed (*Centaurea* spp.), balsamroot, oceanspray, California hellbore (*Veratrum californicum*), lupine (*Lupinus laxiflorus*), peavine (*Lathyrus* spp.), bracken fern (*Pteridium aquilinum*), blue elderberry (*Sambucus cerrulea*), chokecherry (*Prunus virginiana*), hazelnut (*Corylus cornuta*), balsamroot (*Balsamorhiza sagittata*), and some scattered antelope bitterbrush (*Purshia tridentata*).

Soil pits excavated within the upland areas of the site generally revealed a gravelly clay loam, or a clay loam with a color of 10YR 4/3-4/6 with no hydric characteristics. Soils within upland areas were dry during all site visits.

3.2.2 Wetlands & Streams

The site contains a total of ten wetlands and five streams. All of the streams except Stream B (aka Steiners Canyon) are branches of the same stream located off-site to the south. Stream B/Steiners Canyon is a non-connected drainage that has no surface connection to any other waterbodies. Below is a description of the wetland and stream features on-site;

WETLANDS

Wetland A (located off-site to the south of the southwest corner approximately 30')

Wetland A consists of a small (2,343sf) isolated, forested and emergent wetland located in a well defined depression just south of the southeast corner of the site. It was originally delineated as the boundary was not well defined. The wetland appears to have been used as a slash dump from logging operations in the emergent portion, property. This was flagged with flags A1-A5.

The emergent portion is vegetated with a sedge (*Carex* spp.), and the forested portion on the west is a grove of older willows (*Salix* spp.) with hardhack (*Spirea douglasii*) and rose (*Rosa* spp.) in the understory.

Soil pits excavated within the wetland revealed a black (10YR 2/1) clay loam with few, fine, faint redoximorphic concentrations. Soils were moist during our late dry season site visit to this wetland.

Using the US Fish and Wildlife Wetland Classification Method (Cowardin et al. 1979), Wetland A would be classified as PFO1C (palustrine, forested, broad leaved deciduous, seasonally flooded).

Kittitas County also utilizes the old Washington Department of Ecology Wetland Ratings System from 1991. Using this system, Wetland A meets the criteria of Category 2 wetland due to a total score of 22 points. A score of 22 points or more indicates a Category 2 wetland. According to Kittitas County Code 17A.04.020, Category 2 wetlands >2,000sf in size have a minimum buffer of 25'. This buffer would not encroach onto the site.

Wetland B

Wetland B is an isolated (1,672sf) emergent wetland that appears to have formed in an old rectangular excavation. The wetland was flagged with flags B1-B4 and is vegetated with scattered willow and rose along its perimeter and is bare mud substrate with some sedge in the center. Water appears to pond in this up to several feet deep based upon water marks on the willows along the edge.

Soil pits excavated within the wetland revealed a black (10YR 2/1) clay loam with few, fine, faint redoximorphic concentrations. Soils were moist during our late dry season site visit to this wetland.

Using the US Fish and Wildlife Wetland Classification Method (Cowardin et al. 1979), Wetland B would be classified as PEM1C (palustrine, emergent, persistent, seasonally flooded).

Kittitas County also utilizes the old Washington Department of Ecology Wetland Ratings System from 1991. Using this system, Wetland B meets the criteria of Category 3 wetland due to a total score of 11 points. A score of less than 22 points indicates a Category 3 wetland. According to Kittitas County Code 17A.04.020, Category 3 wetlands >10,000sf in size have a minimum buffer of 20'. This wetland is <10,000sf and therefore, would not be regulated by the County.

Wetland C

Wetland C consists of a small (3,112sf) isolated, scrub-shrub wetland located in a well defined depression near the northeast corner of the site. The wetland appears to have been used as a slash dump from logging operations. This was flagged with flags C1-C5.

This wetland vegetated with a mix of sedge, willow and hardhack.

Soil pits excavated within the wetland revealed a clay loam with a color of 10YR 2/2 to a depth of 6", below this, a clay loam with a matrix color of 10YR 3/2 with common, medium, distinct redoximorphic concentrations was observed to a depth of 16". Soils were saturated to the surface during our site visit.

Using the US Fish and Wildlife Wetland Classification Method (Cowardin et al. 1979), Wetland C would be classified as PSS1C (palustrine, scrub-shrub, broad leaved deciduous, seasonally flooded).

Kittitas County also utilizes the old Washington Department of Ecology Wetland Ratings System from 1991. Using this system, Wetland C meets the criteria of Category 3 wetland due to a total score of 13 points. A score of less than 22 points indicates a

Category 3 wetland. According to Kittitas County Code 17A.04.020, Category 3 wetlands >10,000sf in size have a minimum buffer of 20'. This wetland is <10,000sf and therefore, would not be regulated by the County.

Wetland D

Wetland D is a 1.98 acre forested and scrub-shrub slope wetland that is located near the south property line. This wetland was flagged with flags D1-D44.

Wetland D is a slope type wetland which appears to have its hydrology provided by surficial groundwater discharge as well as the input of stream water from the north from Stream G.

This wetland vegetated with a mix of cottonwood, willow, dogwood, rose, woolgrass and sedge.

Soil pits excavated within the wetland revealed a clay loam with colors ranging from 10YR 2/1 to 10YR 2/2 with common, medium, distinct redoximorphic concentrations was observed to a depth of 16". Soils were saturated to the surface during our site visit.

Using the US Fish and Wildlife Wetland Classification Method (Cowardin et al. 1979), Wetland D contains areas that would be classified as PSS1C (palustrine, scrub-shrub, broad leaved deciduous, seasonally flooded) and PFO1C (palustrine, forested, broad leaved deciduous, seasonally flooded).

Kittitas County also utilizes the old Washington Department of Ecology Wetland Ratings System from 1991. Using this system, Wetland D meets the criteria of Category 2 wetland due to a total score of 30 points. A score of 22 points or more indicates a Category 2 wetland. According to Kittitas County Code 17A.04.020, Category 2 wetlands >2,000sf in size have a minimum buffer of 25'.

Wetland E

Wetland E consists of a 3,998sf forested wetland located within the Stream E corridor. Stream E enters and leaves this wetland. The wetland is primarily forested with a small scrub-shrub component on the south in an area of apparent logging disturbance. This wetland was flagged with flags E1-E7.

This wetland vegetated with an overstory of black cottonwood with vine maple and red-osier dogwood in the understory.

Soil pits excavated within the wetland revealed a clay loam with a color of 10YR 2/1 to a depth of 16". Soils were moist in the northern end and saturated in the southern depression during our site visit.

Using the US Fish and Wildlife Wetland Classification Method (Cowardin et al. 1979), Wetland E would be classified as PFO1C (palustrine, forested, broad leaved deciduous, seasonally flooded).

Kittitas County also utilizes the old Washington Department of Ecology Wetland Ratings System from 1991. Using this system, Wetland E meets the criteria of Category 2 wetland due to a total score of 23 points. A score of 22 points or more indicates a Category 2 wetland. According to Kittitas County Code 17A.04.020, Category 2 wetlands have a minimum buffer of 25'.

Wetland F

Wetland F consists of a 5,701sf scrub-shrub wetland located in the Stream E drainage in a fairly well defined depression with the stream passing through the east side of the wetland. This was flagged with flags F1-F9. Wetland F appears to receive its hydrology from stream flow in, direct precipitation and possibly some groundwater discharge.

This wetland vegetated with a mix of willow, hardhack, red-osier dogwood, vine maple, quackgrass (*Agropyron* spp.) and bentgrass (*Agrostis* spp.).

Soil pits excavated within the wetland revealed a clay loam with a color of 10YR 3/2 with common, coarse, distinct redoximorphic concentrations. Soils were saturated at a depth of -12" during our site visit.

Using the US Fish and Wildlife Wetland Classification Method (Cowardin et al. 1979), Wetland F would be classified as PSS1C (palustrine, scrub-shrub, broad leaved deciduous, seasonally flooded).

Kittitas County also utilizes the old Washington Department of Ecology Wetland Ratings System from 1991. Using this system, Wetlands F meets the criteria of Category 3 wetland due to a total score of 20 points. A score of less than 22 points indicates a Category 3 wetland. According to Kittitas County Code 17A.04.020, Category 3 wetlands >10,000sf in size have a minimum buffer of 20'. This wetland is <10,000sf and therefore, would not be regulated by the County.

Wetland G

Wetland G consists of a 1,469sf forested wetland located within the Stream F corridor. Stream F enters and leaves this wetland. This was flagged with flags G1-G7. Wetland G appears to have stream flow in and direct precipitation as hydrologic inputs. Stream F exits the wetland. A small excavation, possibly an old prospect hole, is located along its southeast corner. Water appears to drain into this feature and infiltrate into the ground.

This wetland vegetated with an overstory of black cottonwood with vine maple, willow and red-osier dogwood in the understory. Manna grass (*Glyceria* spp.), woolgrass (*Scirpus cyperinus*) and sedge are found in the herbaceous strata.

Soil pits excavated within the wetland revealed a clay loam with a color of 10YR 2/2 to a depth of 6", below this, a clay loam with a matrix color of 10YR 3/2 with common, medium, distinct redoximorphic concentrations was observed to a depth of 16". Soils were saturated to the surface during our site visit.

Using the US Fish and Wildlife Wetland Classification Method (Cowardin et al. 1979), Wetland G would be classified as PFO1C (palustrine, forested, broad leaved deciduous, seasonally flooded).

Kittitas County also utilizes the old Washington Department of Ecology Wetland Ratings System from 1991. Using this system, Wetlands G meets the criteria of Category 2 wetland due to a total score of 24 points. A score of 22 points or more indicates a Category 2 wetland. According to Kittitas County Code 17A.04.020, Category 2 wetlands have a minimum buffer of 25'.

Wetland H

Wetland H consists of a 7,833sf scrub-shrub wetland located in the Stream F drainage near the northeast corner of the site. This was flagged with flags H1-H9. Stream F enters this wetland in a braided channel disturbed by logging operations. This stream also leaves in a discontinuous braded area through areas of disturbed soil and slash piles. This wetland appears to receive its hydrology from stream flow in, direct precipitation and groundwater discharge.

This wetland vegetated with a mix of willow, hardhack, red-osier dogwood, woolgrass, sedge and cattail (*Typha latifolia*).

Soil pits excavated within the wetland revealed a saturated muck in the upper portion of the wetland, and a clay loam with a color of 10YR 3/2 with common, coarse, distinct redoximorphic concentrations in the lower part. Soils were saturated at the surface near the north end and at a depth of-12" at the south end during our site visit.

Using the US Fish and Wildlife Wetland Classification Method (Cowardin et al. 1979), Wetland H would be classified as PSS1C (palustrine, scrub-shrub, broad leaved deciduous, seasonally flooded).

Kittitas County also utilizes the old Washington Department of Ecology Wetland Ratings System from 1991. Using this system, Wetlands H meets the criteria of Category 3

wetland due to a total score of 21 points. A score of less than 22 points indicates a Category 3 wetland. According to Kittitas County Code 17A.04.020, Category 3 wetlands >10,000sf in size have a minimum buffer of 20'. This wetland is <10,000sf and therefore, would not be regulated by the County.

Wetland I

Wetland I consists of a 1.329sf, scrub-shrub wetland located along the north side of in the Stream F. This was flagged with flags I1-I4. Wetland I appears to receive its hydrology from stream flow in, direct precipitation and possibly some groundwater discharge.

This wetland vegetated with a mix of willow, red-osier dogwood, rose, cattail and Baltic rush.

Soil pits excavated within the wetland revealed a clay loam with a color of 10YR 3/2 with common, coarse, distinct redoximorphic concentrations. Soils were saturated at a depth of -12" during our site visit.

Using the US Fish and Wildlife Wetland Classification Method (Cowardin et al. 1979), Wetland I would be classified as PSS1C (palustrine, scrub-shrub, broad leaved deciduous, seasonally flooded).

Kittitas County also utilizes the old Washington Department of Ecology Wetland Ratings System from 1991. Using this system, Wetland I meets the criteria of Category 3 wetland due to a total score of 19 points. A score of less than 22 points indicates a Category 3 wetland. According to Kittitas County Code 17A.04.020, Category 3 wetlands >10,000sf in size have a minimum buffer of 20'. This wetland is <10,000sf and therefore, would not be regulated by the County.

Wetlands J & K

Wetlands J and K are two wetlands located very close to each other at the headwaters of Stream G. Both appear to be groundwater discharge points and are located within shallow depressions. Wetland J was flagged with flags J1-J6 and Wetland K, K1-K5, and are 2,008sf and 525sf in size, respectively.

Wetland J has a small forested component of cottonwoods, with willow, reed canary grass (*Phalaris arundinacea*), and cattail in depressions holding water. Wetland K contains both scrub shrub and unconsolidated bottom type wetland classes. The scrub-shrub consists of red-osier dogwood, reed canary grass and manna grass surrounding a small area of mud bottomed standing water approximately 6" deep. This water appears to have a spring type water source.

Soil pits excavated within these wetlands revealed a black sapric much with a soil color of 10YR 2/1. Soils were saturated to the surface and in areas, had standing water up to 6" deep.

Using the US Fish and Wildlife Wetland Classification Method (Cowardin et al. 1979), Wetland J would be classified as PFO1C (palustrine, forested, broad leaved deciduous, seasonally flooded). Wetland K would be classified as PSS1C palustrine, scrub-shrub, broad leaved deciduous, seasonally flooded) and PUBh (palustrine, unconsolidated bottom, peremently flooded).

Kittitas County also utilizes the old Washington Department of Ecology Wetland Ratings System from 1991. Using this system, both Wetlands J and K meets the criteria of Category 2 wetlands due to a total score of >22 points (27 points Wetland J and 24 points Wetland K). A score of 22 points or more indicates a Category 2 wetland. According to Kittitas County Code 17A.04.020, Category 2 wetlands have a minimum buffer of 25'.

STREAMS

The site contains 5 streams. All the streams but Stream B are forks of a common creek that flows southerly off-site. Stream B is a discontinuous channel which infiltrates into the soil on-site before connecting with any other channels.

All of these streams are small, intermittent streams with the exception being the southern end of Stream D/G south of Wetland D which appears to be perennial. None of these streams are observed to contain fish habitat, and all appear to be ephemeral channels carrying snow melt flows in the springtime. All of the streams on the site contained average stream channels widths <2', and as such, classify as Type 5 waters. All of the channels have been mapped by WADNR as Type N streams which equates to Type 4 and 5 waters under the older system utilized by Kittitas County. *Note: due to a field labeling sequence error, there is no Stream C or D on the site.*

Below is a general description of these channels;

Stream A

Stream A is the westernmost stream on the site and is a narrow channel approximately 12" in width that was dry during our site visit. This narrow channel follows a well defined ravine to the south before entering a more ditch-like configuration off-site to the south. The centerline of this channel was flagged with CL flags ACL1-ACL33. This channel has several steep drops of 8'-10' over slabs of sandstone, and near the southern edge of the site, runs along the base of a sandstone outcrop.

Do to this streams narrow channel, intermittent flow and lack of fish use, this stream best meets the criteria of a Type 5 water. Under Kittitas County Code Type 5 waters typically have a 15' building setback measured from the channel.

Stream B (Steiners Canyon)

Stream B is located within what is referred to on various maps as "Steiners Canyon". This narrow channel (1'-2'), intermittent stream appears to flow only during snow melt in the spring. No water was noted within the channel during our site visit. The stream has been greatly modified throughout its length, particularly at its southern end where past logging disturbance appears to have terminated any connection the channel has to areas downslope of the last flag. A berm is founding this location and no defined channel is found south of this area. It is possible that some of the water may flow in a nearby logging road rut but that could not be confirmed and it appears most likely the water just infiltrates into the ground. The previous mappings of this stream connecting to streams to the east (Stream G) are not correct and even before logging were probably not correct as a ridge is located within this area which would have restricted flow in that direction.

Based upon this streams narrow channel, intermittent flow and lack of fish use, this stream best meets the criteria of a Type 5 water. Under Kittitas County Code Type 5 waters typically have a 15' building setback measured from the channel.

Stream E

Stream E is a narrow (1'-2') wide, intermittent stream with the centerline flagged with flags ECL1-ECL57. This channel was entirely dry during our site visit. This channel has been greatly modified with portions now appearing to flow in ditches paralleling the natural channel in portions, and in ditched, channels sections particularly near the south boundary. This stream passes through both Wetlands E and F.

Due to this streams narrow channel, intermittent flow and lack of fish use, this stream best meets the criteria of a Type 5 water. Under Kittitas County Code Type 5 waters typically have a 15' building setback measured from the channel.

Stream F

Stream F is also a narrow (1'-2') wide intermittent channel that was dry during our site visit. This stream was flagged with centerline flags FCL1-FCL54. This stream passes through Wetlands H, G and I. The upper portions of this channel north of the existing road crossing, have several poorly defined sections, particularly in the vicinity of Wetland H. In this area past logging disturbance seems to have split drain flows into ruts, depressions and other low areas breaking up the obvious flow channel. This stream flows

through a small culvert dropping 5'-6' and continuing on to the south, passing through Wetland G and I and then connecting with Stream E.

Due to this streams narrow channel, intermittent flow and lack of fish use, this stream best meets the criteria of a Type 5 water. Under Kittitas County Code Type 5 waters typically have a 15' building setback measured from the channel.

Stream G

Stream G consists of the channel between Wetlands J and D, flagged GCL1-GCL13. This well defined channel in a narrow ravine is approximately 2' wide with a bouder/cobble bottom located within a heavily vegetated ravine. No flow was noted in the channel. Stream G spreads out into Wetland D and eventually re-forms a channel south of the southern property line at Wetland D's south end.

Due to this streams narrow channel, intermittent flow and lack of fish use, this stream best meets the criteria of a Type 5 water. Under Kittitas County Code Type 5 waters typically have a 15' building setback measured from the channel.

4.0 REGULATIONS

In addition to the wetland regulations previously described for wetlands, certain activities (filling and dredging) within "waters of the United States" may fall under the jurisdiction of the U.S. Army Corps of Engineers (USACOE). The USACOE regulates all discharges into "waters of the United States" (wetlands) under Section 404(b) of the Clean Water Act. Wetlands that are hydrologically isolated are not regulated by the USACOE, per the SWANCC and as interpreted by the Corps and EPA in their Regulatory Guidance Letter.

Discharges (fills) into any wetlands that are not considered "isolated" are regulated by the Corps. However, only the Corps can make that determination.

The Washington Department of Fish and Wildlife (WDFW) regulates all work within waters of the state (streams) under the Hydraulic Project Approval process. All work proposed within the streams on site would require obtaining approval under this process from WDFW.

If you have any questions in regards to this report or need additional information, please feel free to contact me at (253) 859-0515 or at esewall@sewallwc.com .

Sincerely,
Sewall Wetland Consulting, Inc.

Ed Sewall
Senior Wetlands Ecologist PWS #212



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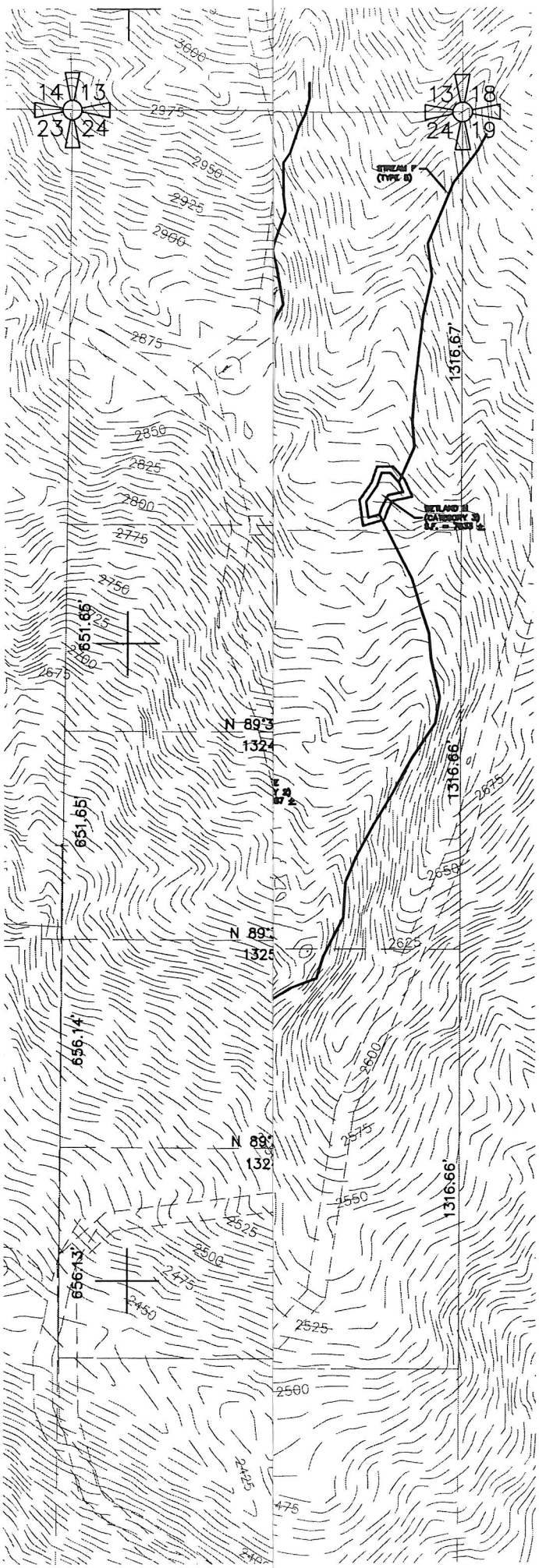
14 13
23 24
13 18
24 19
STREAM F
(TYPE 5)
WETLAND H
(CATEGORY 3)
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651.65'
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656.14'
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Map Unit Legend

Kittitas County Area, Washington (WA637)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
1441	Teanaway loam, 10 to 25 percent slopes	478.4	100.0%
Totals for Area of Interest		**478.4**	**100.0%**

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Forest Ridge City/County: Kittitas Sampling Date: 11-4-09

Applicant/Owner: State: WA Sampling Point: Wet B

Investigator(s): Ed Sewell Section, Township, Range: 24-20-15

Landform (hillslope, terrace, etc.): Local relief (concave, convex, none): Slope (%):

Subregion (LRR): Lat: Long: Datum:

Soil Map Unit Name: Tenaway NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓ No ____	**Is the Sampled Area within a Wetland?** Yes ✓ No ____
Hydric Soil Present?	Yes ✓ No ____	
Wetland Hydrology Present?	Yes ✓ No ____	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1. Rosa spp	60		FAC
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: ____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks:

SOIL

Sampling Point: WL B

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
14	10YR 2/1						clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR C)**
- ___ 1 cm Muck (A9) **(LRR D)**
- ___ Depleted Below Dark Surface (A11)
- ✓ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR C)**
- ___ 2 cm Muck (A10) **(LRR B)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ✓ Water Marks (B1) **(Nonriverine)**
- ✓ Sediment Deposits (B2) **(Nonriverine)**
- ✓ Drift Deposits (B3) **(Nonriverine)**
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) **(Riverine)**
- ___ Sediment Deposits (B2) **(Riverine)**
- ___ Drift Deposits (B3) **(Riverine)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): _____

Water Table Present? Yes ___ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): _____

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Forest Ridge City/County: Kittitas Sampling Date: 11-12-09

Applicant/Owner: State: WA Sampling Point: Wet C

Investigator(s): Ed Sewell Section, Township, Range: 24-20-15

Landform (hillslope, terrace, etc.): Local relief (concave, convex, none): Slope (%):

Subregion (LRR): Lat: Long: Datum:

Soil Map Unit Name: Tenaway NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No	**Is the Sampled Area within a Wetland?** Yes ✓ No
Hydric Soil Present?	Yes ✓	No	
Wetland Hydrology Present?	Yes ✓	No	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1. Spirea douglasii	40	✓	FACW
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size:)			
1. Carex spp	50		FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: ____ (A)

Total Number of Dominant Species Across All Strata: ____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals: (A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No

Remarks:

SOIL

Sampling Point: Wet C

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
6	10YR 2/2							
16	10YR 3/2		common med distinct				clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR C)**
- ___ 1 cm Muck (A9) **(LRR D)**
- ___ Depleted Below Dark Surface (A11)
- ✓ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ✓ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR C)**
- ___ 2 cm Muck (A10) **(LRR B)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1) **(Nonriverine)**
- ___ Sediment Deposits (B2) **(Nonriverine)**
- ✓ Drift Deposits (B3) **(Nonriverine)**
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) **(Riverine)**
- ___ Sediment Deposits (B2) **(Riverine)**
- ___ Drift Deposits (B3) **(Riverine)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): _____

Water Table Present? Yes ___ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): surface

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Forest Ridge City/County: Kittitas Sampling Date: 11-12-09

Applicant/Owner: State: WA Sampling Point: Wet E

Investigator(s): Ed Sewell Section, Township, Range: 24-20-15

Landform (hillslope, terrace, etc.): Local relief (concave, convex, none): Slope (%):

Subregion (LRR): Lat: Long: Datum:

Soil Map Unit Name: Tenaway NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No	**Is the Sampled Area within a Wetland?** Yes ____ No ____
Hydric Soil Present?	Yes ✓	No	
Wetland Hydrology Present?	Yes ✓	No	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1. Populus balsamifera	75		FAC
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1. Acer circinatum	40		FAC
2. Cornus stolonifera	40		FACW
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: ____ (A)

Total Number of Dominant Species Across All Strata: ____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks:

SOIL

Sampling Point: wet E

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
16	10YR 2/1						clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR C)**
- ___ 1 cm Muck (A9) **(LRR D)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR C)**
- ___ 2 cm Muck (A10) **(LRR B)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No _____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ✓ Water Marks (B1) **(Nonriverine)**
- ___ Sediment Deposits (B2) **(Nonriverine)**
- ___ Drift Deposits (B3) **(Nonriverine)**
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) **(Riverine)**
- ___ Sediment Deposits (B2) **(Riverine)**
- ___ Drift Deposits (B3) **(Riverine)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ✓ No _____ Depth (inches): _____

Wetland Hydrology Present? Yes ✓ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Forest Ridge City/County: Kittitas Sampling Date: 11-12-09

Applicant/Owner: State: WA Sampling Point: WetF

Investigator(s): Ed Sewell Section, Township, Range: 24-20-15

Landform (hillslope, terrace, etc.): Local relief (concave, convex, none): Slope (%):

Subregion (LRR): Lat: Long: Datum:

Soil Map Unit Name: Tenaway NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____ No ____	**Is the Sampled Area within a Wetland?** Yes ✓ No ____
Hydric Soil Present?	Yes ____ No ____	
Wetland Hydrology Present?	Yes ____ No ____	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1. Cornus stolonifera	60		FACW
2. Salix spp	20		FACW
3. Acer circinatum	20		FAC
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: ____)			
1. Agropyron spp	50		FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: ____ (A)

Total Number of Dominant Species Across All Strata: ____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals: (A)		(B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks:

SOIL

Sampling Point: Wet F

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
16	10YR 3/2		common coarse distinct				clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR C)**
- ___ 1 cm Muck (A9) **(LRR D)**
- ___ Depleted Below Dark Surface (A11)
- ✓ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ✓ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR C)**
- ___ 2 cm Muck (A10) **(LRR B)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ✓ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) **(Nonriverine)**
- ___ Sediment Deposits (B2) **(Nonriverine)**
- ___ Drift Deposits (B3) **(Nonriverine)**
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) **(Riverine)**
- ___ Sediment Deposits (B2) **(Riverine)**
- ___ Drift Deposits (B3) **(Riverine)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): _____

Water Table Present? Yes ___ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): -12"

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Forest Ridge City/County: Kittitas Sampling Date: 11-12-09

Applicant/Owner: State: WA Sampling Point: Wet G

Investigator(s): Ed Sewell Section, Township, Range: 24-20-15

Landform (hillslope, terrace, etc.): Local relief (concave, convex, none): Slope (%):

Subregion (LRR): Lat: Long: Datum:

Soil Map Unit Name: Tenaway NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No (If no, explain in Remarks.)

Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No

Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓ No	**Is the Sampled Area within a Wetland?** Yes ✓ No
Hydric Soil Present?	Yes ✓ No	
Wetland Hydrology Present?	Yes ✓ No	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1. Populus balsamifera			FAC
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1. Cornus stolonifera			FACW
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size:)			
1. Carex spp			FAC
2. Scirpus cyperinus			FACW
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum % Cover of Biotic Crust

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: (A)

Total Number of Dominant Species Across All Strata: (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals: (A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- Dominance Test is >50%
- Prevalence Index is ≤3.0[1]
- Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No

Remarks:

SOIL

Sampling Point: wet G

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
4	10YR 2/2							
16	10YR 3/2		Common med. distinct				Clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR C)**
- ___ 1 cm Muck (A9) **(LRR D)**
- ✓ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR C)**
- ___ 2 cm Muck (A10) **(LRR B)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1) **(Nonriverine)**
- ___ Sediment Deposits (B2) **(Nonriverine)**
- ___ Drift Deposits (B3) **(Nonriverine)**
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) **(Riverine)**
- ___ Sediment Deposits (B2) **(Riverine)**
- ___ Drift Deposits (B3) **(Riverine)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___

Water Table Present? Yes ___ No ✓ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 0

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Forest Ridge City/County: Kittitas Sampling Date: 11-13-09

Applicant/Owner: State: WA Sampling Point: Wet H

Investigator(s): Ed Sewell Section, Township, Range: 24-20-15

Landform (hillslope, terrace, etc.): Local relief (concave, convex, none): Slope (%):

Subregion (LRR): Lat: Long: Datum:

Soil Map Unit Name: Tanaway NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓ No	**Is the Sampled Area within a Wetland?** Yes ✓ No
Hydric Soil Present?	Yes ✓ No	
Wetland Hydrology Present?	Yes ✓ No	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1. Cornus stolonifera	50		FACW
2. Salix spp	50		FACW
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size:)			
1. Carex spp	30		FAC
2. Typha latifolia	40		OBL
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: ____ (A)

Total Number of Dominant Species Across All Strata: ____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals: (A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No

Remarks:

SOIL

Sampling Point: wet H

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
16	10YR 2/1						Sapric	muck

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ✓ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR C)**
- ___ 1 cm Muck (A9) **(LRR D)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ✓ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR C)**
- ___ 2 cm Muck (A10) **(LRR B)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) **(Nonriverine)**
- ___ Sediment Deposits (B2) **(Nonriverine)**
- ___ Drift Deposits (B3) **(Nonriverine)**
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) **(Riverine)**
- ___ Sediment Deposits (B2) **(Riverine)**
- ___ Drift Deposits (B3) **(Riverine)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___

Water Table Present? Yes ___ No ✓ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 0"

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Forest Ridge City/County: Kittitas Sampling Date: 11-24-09

Applicant/Owner: State: WA Sampling Point: Wet I

Investigator(s): Ed Sewell Section, Township, Range: 24-20-15

Landform (hillslope, terrace, etc.): Local relief (concave, convex, none): Slope (%):

Subregion (LRR): Lat: Long: Datum:

Soil Map Unit Name: Tenaway NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No (If no, explain in Remarks.)

Are Vegetation, Soil, or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No

Are Vegetation, Soil, or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓ No	**Is the Sampled Area within a Wetland?** Yes ✓ No
Hydric Soil Present?	Yes ✓ No	
Wetland Hydrology Present?	Yes ✓ No	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1. Cornus stolonifera			FACW
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size:)			
1. Juncus balticus			FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum % Cover of Biotic Crust

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: (A)

Total Number of Dominant Species Across All Strata: (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 1 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals: (A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No

Remarks:

SOIL

Sampling Point: West I

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
14	10YR 3/2		Com. med. dist.				clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR C)**
- ___ 1 cm Muck (A9) **(LRR D)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR C)**
- ___ 2 cm Muck (A10) **(LRR B)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1) **(Nonriverine)**
- ___ Sediment Deposits (B2) **(Nonriverine)**
- ___ Drift Deposits (B3) **(Nonriverine)**
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) **(Riverine)**
- ___ Sediment Deposits (B2) **(Riverine)**
- ___ Drift Deposits (B3) **(Riverine)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___

Water Table Present? Yes ___ No ✓ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 0"

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Forest Ridge City/County: Kittitas Sampling Date: 11-24-09

Applicant/Owner: State: WA Sampling Point: Wet J

Investigator(s): Ed Sewell Section, Township, Range: 24-20-15

Landform (hillslope, terrace, etc.): Local relief (concave, convex, none): Slope (%):

Subregion (LRR): Lat: Long: Datum:

Soil Map Unit Name: Tenaway NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓ No	**Is the Sampled Area within a Wetland?** Yes ✓ No
Hydric Soil Present?	Yes ✓ No	
Wetland Hydrology Present?	Yes ✓ No	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1. Populus balsamifera			FAC
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size:)			
1. Phalaris arundinacea			FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: ____ (A)

Total Number of Dominant Species Across All Strata: ____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals: (A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No

Remarks:

SOIL

Sampling Point: wet J

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
16	10YR 2/1						clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR C)**
- ___ 1 cm Muck (A9) **(LRR D)**
- ___ Depleted Below Dark Surface (A11)
- ✓ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR C)**
- ___ 2 cm Muck (A10) **(LRR B)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ✓ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1) **(Nonriverine)**
- ___ Sediment Deposits (B2) **(Nonriverine)**
- ___ Drift Deposits (B3) **(Nonriverine)**
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) **(Riverine)**
- ___ Sediment Deposits (B2) **(Riverine)**
- ___ Drift Deposits (B3) **(Riverine)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✓ No ___ Depth (inches): +2"

Water Table Present? Yes ___ No ✓ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 0"

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Forest Ridge City/County: Kittitas Sampling Date: 11-24-09

Applicant/Owner: State: WA Sampling Point: wet K

Investigator(s): Ed Sewell Section, Township, Range: 24-20-15

Landform (hillslope, terrace, etc.): Local relief (concave, convex, none): Slope (%):

Subregion (LRR): Lat: Long: Datum:

Soil Map Unit Name: Tenaway NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓ No ____	**Is the Sampled Area within a Wetland?** Yes ✓ No ____
Hydric Soil Present?	Yes ✓ No ____	
Wetland Hydrology Present?	Yes ✓ No ____	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1. Cornus stolonifera			FACW
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: ____)			
1. Glyceria spp			FACW
2. Phalaris spp			FACW
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: ____ (A)

Total Number of Dominant Species Across All Strata: ____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals: (A)		(B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? ✓ Yes ____ No ____

Remarks:

SOIL

Sampling Point: wet K

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
14	10YR 2/1						Sapric muck	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ✓ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR C)**
- ___ 1 cm Muck (A9) **(LRR D)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR C)**
- ___ 2 cm Muck (A10) **(LRR B)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ✓ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1) **(Nonriverine)**
- ___ Sediment Deposits (B2) **(Nonriverine)**
- ___ Drift Deposits (B3) **(Nonriverine)**
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) **(Riverine)**
- ___ Sediment Deposits (B2) **(Riverine)**
- ___ Drift Deposits (B3) **(Riverine)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✓ No ___ Depth (inches): 6"

Water Table Present? Yes ___ No ✓ Depth (inches): 0"

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 0"

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Forest Ridge City/County: Kittitas Sampling Date: 11-12-09

Applicant/Owner: [redacted] State: WA Sampling Point: Wet D

Investigator(s): [redacted] Aaron Will Section, Township, Range: 24-20-15

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____ Slope (%): _____

Subregion (LRR): _____ Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: Tcwaway NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓ No _____	**Is the Sampled Area within a Wetland?** Yes ✓ No _____
Hydric Soil Present?	Yes ✓ No _____	
Wetland Hydrology Present?	Yes ✓ No _____	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1. Cornus stolonifera			FACW
2. Salix spp			FACW
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	_____ = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum _____ % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals: (A)		(B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No _____

Remarks:

SOIL

Sampling Point: _____

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
16	10YR 2/1						Sandy mud	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ✓ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR C)**
- ___ 1 cm Muck (A9) **(LRR D)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR C)**
- ___ 2 cm Muck (A10) **(LRR B)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No _____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1) **(Nonriverine)**
- ___ Sediment Deposits (B2) **(Nonriverine)**
- ___ Drift Deposits (B3) **(Nonriverine)**
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) **(Riverine)**
- ___ Sediment Deposits (B2) **(Riverine)**
- ___ Drift Deposits (B3) **(Riverine)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ✓ No _____ Depth (inches): 0"

Wetland Hydrology Present? Yes ✓ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLANDS RATING FIELD DATA FORM

BACKGROUND INFORMATION:

Name of Rater: Ed Sewall Affiliation: _____ Date: 12/09

Name of wetland (if known): Wetland A - Forest Ridge

Government Jurisdiction of wetland: Kittitas Co

Location: 1/4 S: _____ of 1/4 S: _____ SEC: 24 TWNSHP: 20 RNGE: 15

SOURCES OF INFORMATION: (Check all sources that apply)

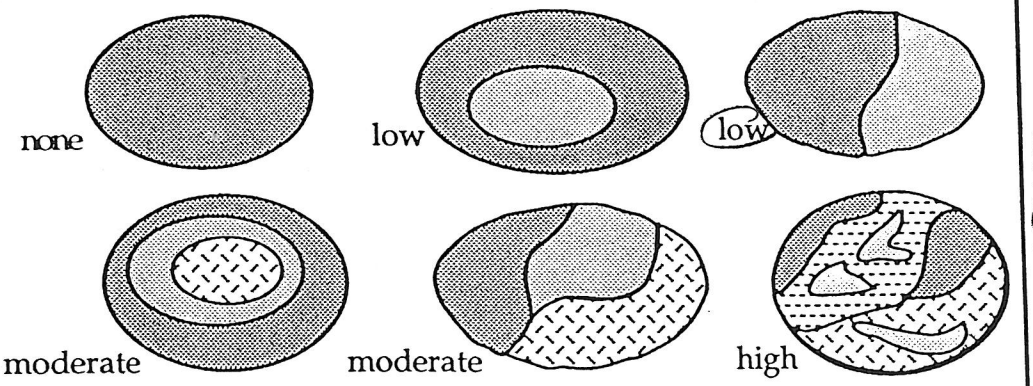
Site visit: ✓ USGS Topo Map: ✓ NWI map: ✓ Aerial Photo: ✓ Soils survey: ✓

Other: ___ Describe: _____

WHEN THE FIELD DATA FORM IS COMPLETE ENTER CATEGORY HERE:	2
Q.1. <u>High Quality Natural Heritage Wetland.</u> Answer this question if you have adequate information or experience to do so. If not find someone with the expertise to answer the questions. Then, if the answer to questions 1a, 1b and 1c are all NO, contact the Natural Heritage program of DNR.	Circle answers:
1a. Is there significant evidence of human-caused changes to topography or hydrology of the wetland? Significant changes <u>could</u> include clearing, grading, filling, logging of the wetland or its immediate buffer, or culverts, ditches, dredging, diking or drainage of the wetland. Briefly describe the changes and your information source/s: Disturbed from logging Slash in wetland	(Yes: go to Q.3.) No: go to 1b.
1b. Are there populations of non-native plants which are currently present and appear to be invading native populations? Briefly describe any non-native plant populations and information source(s): _____	Yes: go to Q.3. No: go to 1c.
1c. Is there significant evidence of human-caused disturbance of the water quality of the system? Degradation of water quality could be evidenced by culverts entering the system, direct road/parking lot runoff, evidence of historic dumping of wastes, oily sheens, extreme eutrophic conditions, livestock use or dead fish etc. Briefly describe: _____	Yes: go to Q.3. No: <u>Possible Category I</u>

Q.2. Regionally Rare Native Wetland Communities The Department of Ecology is developing a methodology for regionally rare native wetland communities. It is not yet available for use.	
Q.3. Irreplaceable Ecological Functions: Does the wetland: - have at a least 1/2 acre of contiguous peat wetland; . . . . . . - or, have a forested class greater than 1 acre ;	No to both: go to Q.4. Yes: go to 3a. Yes: go to 3b.
Q.3a. Peat Wetlands. 3a1. Does at least 1/2 acre of the contiguous peat wetland have < 25% areal cover of any combination of species from the list of invasive/exotic species on p.19, and have < 80% areal cover of *Spirea douglasii*?	Yes: Category I No: go to Q.4.
Q.3b. Mature forested wetland. 3b1. Is the average age of dominant trees in the forested wetland > 80 years?	Yes: Category I No: go to 3b2.
3b2. Is the average age of dominant trees in the forested wetland 50-80 years, and is the structural diversity high as characterized by a multi-layer community of trees > 50' tall and trees 20'-49' tall and shrubs and herbaceous groundcover? . .	Yes: go to 3b3. No: go to Q.5.
3b3. Is > 50% (areal cover) of the dominant plants in one or more layers (canopy, young trees, shrubs, herbs) invasive/exotic plant species from the p.19 list? . .	Yes: go to Q.5. No: Category I
Q.4. Category IV wetlands 4.1. Is the wetland: less than 1 acre and, hydrologically isolated and, comprised of one vegetated class that is dominated (> 80% areal cover) by one species from the list in guidance p.18.	Yes: Category IV No: go to 4.2.
4.2. Is the wetland: less than two acres and, hydrologically isolated, with one vegetated class, and > 90% of areal cover is any combination of species from the list in guidance p.19.	Yes: Category IV No: go to Q.5.

Q.5. Significant habitat value. Answer all questions and enter data requested.		Circle scores that qualify
5a. Total wetland area Estimate area, select from choices in the near-right column, and score in the far column: Enter acreage of wetland here:_____acres, and source:_____	acres > 20.00 10 - 19.99 5 - 9.99 1 - 4.99 0.1 - 0.99 <0.1	 Yes=6 Yes=5 Yes=4 Yes=3 (Yes=2) Yes=1 2
5b. Wetland classes: Circle the wetland classes below that qualify: Open Water: if the area of open water is > 1/2 acre or > 10% of the total wetland area. Source: _____ Aquatic Beds: if the area of aquatic beds > 10% of the open water area or > 1/2 acre. (Emergent): if the area of emergent class is > 1/2 acre or > 10% of the total wetland area. Scrub-Shrub: if the area of scrub-shrub class is > 1/2 acre or > 10% of the total wetland area. (Forested): if area of forested class is > 1/2 acre or > 10% of the total wetland area.		
Add the number of wetland classes, above, that qualify, and then score according to the columns at right. e.g. If there are 4 classes (aquatic beds, open water, emergent & scrub-shrub), you would circle 8 points in the far right column.	# of classes 1 . . . . . . 2 . . . . . . 3 . . . . . . 4 . . . . . . 5	 Yes =1 (Yes =3) Yes =5 Yes =8 Yes =11 3
5c. Plant species diversity. For all wetland classes (at right) that qualify in 5b. above, count the number of different plant species you can find. You do not have to name them. Score in column at far right: e.g. If a wetland has an aquatic bed class with 3 species, an emergent class with 4 species and a scrub-shrub class with 2 species you would circle 2, 2, and 1 in the far column.	Class — # of species Aquatic Bed 1-2... " " 3.... " " > 3... Emergent 1-2... " 3-4... " > 4... Scrub-Shrub 1-2... " 3-4... " > 4... Forested 1... " 2... " > 2...	 Yes=1 Yes=2 Yes=3 Yes=1 Yes=2 (Yes=3) Yes=1 Yes=2 Yes=3 Yes=1 Yes=2 (Yes=3) 6

5d. Structural diversity. If the wetland has a forested class, add 1 point for each of the following: -trees > 50' tall -trees 20'- 49' tall -shrubs -herbaceous ground cover	 Yes=1 Yes=1 Yes=1 Yes=1 2
5e. Decide from the diagrams below whether interspersion between wetland classes is high, moderate, low or none?  	High=3 Moderate=2 Low=1 None=0 1
5f. Habitat features. Answer questions below, circle features that apply, and score to right: Is there evidence of current use by beavers ? No Is a heron rookery located within 300'? No Are raptor nest/s located within 300'? No Are there at least 3 standing dead trees (snags) per acre? No Are any of these standing dead trees (snags) > 10" in diameter? Are there any other perches (wires, poles or posts)? Are there at least 3 downed logs per acre? Yes	 Yes=3 Yes=2 Yes=1 Yes=1 Yes=1 Yes=1 Yes=1 1
5g. Connection to streams. (Score one answer only.) Is the wetland connected at any time of the year via surface water: to a perennial stream or a seasonal stream with fish; or, to a seasonal stream without fish; or, is not connected to any stream?	 Yes=6 Yes=4 Yes=0 0

15

5h. Buffers.

STEP 1 Estimate (to the nearest 5%) the % of each buffer or land-use type (below) that adjoins the wetland boundary. Then multiply the %/s by the factor(s) below and enter result in column to right:	STEP 2 Multiply result(s) of step 1: by 1, if buffer width is 25-50'; by 2, if buffer width is 50-100'; by 3, if buffer width is >100'. Enter results below and add subscore:
roads, buildings or parking lots: %___ x 0 =	0
lawn, grazed pasture, vineyards or annual crops: %___ x 1 =	____ x __ = ___
ungrazed grassland or orchards: %___ x 2 =	____ x __ = ___
open water or native grasslands: %___ x 3 =	____ x __ = ___
forest or shrub: %100 x 4 =	400 x3 = 1200
Add Buffer total = 1200	

STEP 3. Score points according to table at right :

Buffer total	
900-1200...	Yes=4
600-899....	Yes=3
300-599....	Yes=2
100-299....	Yes=1

4

5i. Connection to other habitat areas:

- Is there a riparian corridor to other wetlands within 0.25 of a mile, or a corridor > 100' wide with good forest or shrub cover to any other habitat area?..... No ..... Yes =6

- Is there a narrow corridor < 100' wide with good cover or a wide corridor > 100' wide with low cover to any other habitat area?..... Yes=4

- Is there a narrow corridor < 100' wide with low cover or a significant habitat area within 0.25 mile but no corridor?..... Yes=1

- Is the wetland and buffer completely isolated by development and or cultivated agricultural land?..... Yes=0

4

NOW: Add the scores circled (for Q.5a - Q.5i above) to get a Total..... Total = 23

Is the Total greater than or equal to 22 points..... Yes: Category II / No: Category III

WETLANDS RATING FIELD DATA FORM

BACKGROUND INFORMATION:

Name of Rater: Ed Sewell Affiliation: _____ Date: 12/09

Name of wetland (if known): Wetland B - Forest Ridge

Government Jurisdiction of wetland: King Co

Location: 1/4 S: _____ of 1/4 S: _____ SEC: 24 TWNSHP: 20N RNGE: 15E

SOURCES OF INFORMATION: (Check all sources that apply)

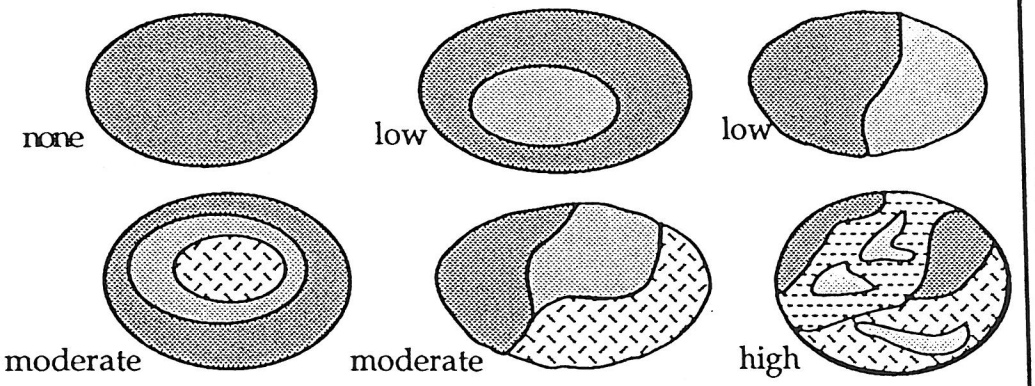
Site visit: ✓ USGS Topo Map: ✓ NWI map: ✓ Aerial Photo: ✓ Soils survey: ___

Other: ___ Describe: _____

WHEN THE FIELD DATA FORM IS COMPLETE ENTER CATEGORY HERE:	3
Q.1. High Quality Natural Heritage Wetland. Answer this question if you have adequate information or experience to do so. If not find someone with the expertise to answer the questions. Then, if the answer to questions 1a, 1b and 1c are all NO, contact the Natural Heritage program of DNR.	Circle answers:
1a. Is there significant evidence of human-caused changes to topography or hydrology of the wetland? Significant changes could include clearing, grading, filling, logging of the wetland or its immediate buffer, or culverts, ditches, dredging, diking or drainage of the wetland. Briefly describe the changes and your information source/s: may be old excavation	Yes: go to Q.3. No: go to 1b.
1b. Are there populations of non-native plants which are currently present and appear to be invading native populations? Briefly describe any non-native plant populations and information source(s): _____	Yes: go to Q.3. No: go to 1c.
1c. Is there significant evidence of human-caused disturbance of the water quality of the system? Degradation of water quality could be evidenced by culverts entering the system, direct road/parking lot runoff, evidence of historic dumping of wastes, oily sheens, extreme eutrophic conditions, livestock use or dead fish etc. Briefly describe: _____	Yes: go to Q.3. No: Possible Category I

Q.2. Regionally Rare Native Wetland Communities The Department of Ecology is developing a methodology for regionally rare native wetland communities. It is not yet available for use.	
Q.3. Irreplaceable Ecological Functions: Does the wetland:	No to both: go to Q4.
- have at a least 1/2 acre of contiguous peat wetland;	Yes: go to 3a.
- or, have a forested class greater than 1 acre ;	Yes: go to 3b.
Q.3a. Peat Wetlands. 3a1. Does at least 1/2 acre of the contiguous peat wetland have < 25% areal cover of any combination of species from the list of invasive/exotic species on p.19, and have < 80% areal cover of *Spirea douglasii*?.	Yes: Category I No: go to Q.4.
Q.3b. Mature forested wetland. 3b1. Is the average age of dominant trees in the forested wetland > 80 years?	Yes: Category I No: go to 3b2.
3b2. Is the average age of dominant trees in the forested wetland 50-80 years, and is the structural diversity high as characterized by a multi-layer community of trees > 50' tall and trees 20'-49' tall and shrubs and herbaceous groundcover? . .	Yes: go to 3b3. No: go to Q.5.
3b3. Is > 50% (areal cover) of the dominant plants in one or more layers (canopy, young trees, shrubs, herbs) invasive/exotic plant species from the p.19 list?. .	Yes: go to Q.5. No: Category I
Q.4. Category IV wetlands 4.1. Is the wetland: less than 1 acre and, hydrologically isolated and, comprised of one vegetated class that is dominated (> 80% areal cover) by one species from the list in guidance p.18.	Yes: Category IV No: go to 4.2.
4.2. Is the wetland: less than two acres and, hydrologically isolated, with one vegetated class, and > 90% of areal cover is any combination of species from the list in guidance p.19.	Yes: Category IV No: go to Q.5.

Q.5. Significant habitat value. Answer all questions and enter data requested.		Circle scores that qualify
5a. Total wetland area Estimate area, select from choices in the near-right column, and score in the far column: Enter acreage of wetland here:_____acres, and source:_____	acres > 20.00 10 - 19.99 5 - 9.99 1 - 4.99 0.1 - 0.99 <0.1	 Yes=6 Yes=5 Yes=4 Yes=3 Yes=2 Yes=1
5b. Wetland classes: Circle the wetland classes below that qualify: Open Water: if the area of open water is > 1/2 acre or > 10% of the total wetland area. Source: _____ Aquatic Beds: if the area of aquatic beds > 10% of the open water area or > 1/2 acre. Emergent: if the area of emergent class is > 1/2 acre or > 10% of the total wetland area. Scrub-Shrub: if the area of scrub-shrub class is > 1/2 acre or > 10% of the total wetland area. Forested: if area of forested class is > 1/2 acre or > 10% of the total wetland area. Add the number of wetland classes, above, that qualify, and then score according to the columns at right. e.g. If there are 4 classes (aquatic beds, open water, emergent & scrub-shrub), you would circle 8 points in the far right column.	# of classes 1 . . . . . . 2 . . . . . . 3 . . . . . . 4 . . . . . . 5	 Yes =1 Yes =3 Yes =5 Yes =8 Yes =11
5c. Plant species diversity. For all wetland classes (at right) that qualify in 5b. above, count the number of different plant species you can find. You do not have to name them. Score in column at far right: e.g. If a wetland has an aquatic bed class with 3 species, an emergent class with 4 species and a scrub-shrub class with 2 species you would circle 2, 2, and 1 in the far column.	Class — # of species Aquatic Bed 1-2... " " 3... " " > 3... Emergent 1-2... " 3-4... " > 4... Scrub-Shrub 1-2... " 3-4... " > 4... Forested 1... " 2... " > 2...	 Yes=1 Yes=2 Yes=3 Yes=1 Yes=2 Yes=3 Yes=1 Yes=2 Yes=3 Yes=1 Yes=2 Yes=3

5d. Structural diversity. If the wetland has a forested class, add 1 point for each of the following: -trees > 50' tall ..... -trees 20'- 49' tall ..... -shrubs..... -herbaceous ground cover.....	 Yes=1 Yes=1 Yes=1 Yes=1 NA
5e. Decide from the diagrams below whether interspersion between wetland classes is high, moderate, low or none?  	High=3 Moderate=2 Low=1 None=0 0
5f. Habitat features. Answer questions below, circle features that apply, and score to right: Is there evidence of current use by beavers ? ..... Is a heron rookery located within 300'? ..... Are raptor nest/s located within 300'? ..... Are there at least 3 standing dead trees (snags) per acre?..... Are any of these standing dead trees (snags) > 10" in diameter?..... Are there any other perches (wires, poles or posts)? ..... Are there at least 3 downed logs per acre?.....	 Yes=3 Yes=2 Yes=1 Yes=1 Yes=1 Yes=1 Yes=1 0
5g. Connection to streams. (Score one answer only.) Is the wetland connected at any time of the year via surface water: to a perennial stream or a seasonal stream with fish; ..... or, to a seasonal stream without fish; ..... or, is not connected to any stream?.....	 Yes=6 Yes=4 Yes=0 0

3

5h. Buffers.

STEP 1 Estimate (to the nearest 5%) the % of each buffer or land-use type (below) that adjoins the wetland boundary. Then multiply the %/s by the factor(s) below and enter result in column to right:	STEP 2 Multiply result(s) of step 1: by 1, if buffer width is 25-50'; by 2, if buffer width is 50-100'; by 3, if buffer width is >100'. Enter results below and add subscore:
roads, buildings or parking lots: %___ x 0 =	0
lawn, grazed pasture, vineyards or annual crops: % ___ x 1 =	____ x __ = ___
ungrazed grassland or orchards: %___ x 2 =	____ x __ = ___
open water or native grasslands: %___ x 3 =	____ x __ = ___
forest or shrub: %100 x 4 =	400 x 3 = 1200
	Add Buffer total = 1200

STEP 3. Score points according to table at right :

Buffer total	
900-1200...	Yes=4
600-899....	Yes=3
300-599....	Yes=2
100-299....	Yes=1

4

5i. Connection to other habitat areas:

- Is there a riparian corridor to other wetlands within 0.25 of a mile, or a corridor > 100' wide with good forest or shrub cover to any other habitat area?.....	Yes =6
- Is there a narrow corridor < 100' wide with good cover or a wide corridor > 100' wide with low cover to any other habitat area?.....	Yes=4
- Is there a narrow corridor < 100' wide with low cover or a significant habitat area within 0.25 mile but no corridor?.....	Yes=1
- Is the wetland and buffer completely isolated by development and or cultivated agricultural land?.....	Yes=0

4

NOW: Add the scores circled (for Q.5a - Q.5i above) to get a Total.....	Total = 11
Is the Total greater than or equal to 22 points.....	Yes: Category II No: Category III

WETLANDS RATING FIELD DATA FORM

BACKGROUND INFORMATION:

Name of Rater: Ed Sewall Affiliation: _____ Date: 12/07

Name of wetland (if known): Wetland C - Forest Ridge

Government Jurisdiction of wetland: _____

Location: 1/4 S: _____ of 1/4 S: _____ SEC: 24 TWNSHP: 20N RNGE: 15E

SOURCES OF INFORMATION: (Check all sources that apply)

Site visit: ✓ USGS Topo Map: ✓ NWI map: ✓ Aerial Photo: ✓ Soils survey: ___

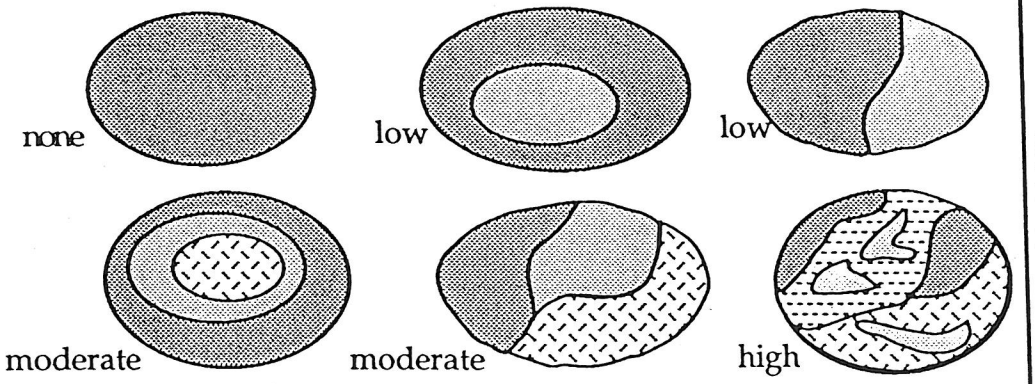
Other: ___ Describe: _____

WHEN THE FIELD DATA FORM IS COMPLETE ENTER CATEGORY HERE:	3
Q.1. <u>High Quality Natural Heritage Wetland.</u> Answer this question if you have adequate information or experience to do so. If not find someone with the expertise to answer the questions. Then, if the answer to questions 1a, 1b and 1c are all NO, contact the Natural Heritage program of DNR.	Circle answers:
1a. Is there significant evidence of human-caused changes to topography or hydrology of the wetland? Significant changes <u>could</u> include clearing, grading, filling, logging of the wetland or its immediate buffer, or culverts, ditches, dredging, diking or drainage of the wetland. Briefly describe the changes and your information source/s: logging disturbance	Yes: go to Q.3. No: go to 1b.
1b. Are there populations of non-native plants which are currently present and appear to be invading native populations? Briefly describe any non-native plant populations and information source(s): _____	Yes: go to Q.3. No: go to 1c.
1c. Is there significant evidence of human-caused disturbance of the water quality of the system? Degradation of water quality could be evidenced by culverts entering the system, direct road/parking lot runoff, evidence of historic dumping of wastes, oily sheens, extreme eutrophic conditions, livestock use or dead fish etc. Briefly describe: _____	Yes: go to Q.3. No: <u>Possible Category I</u>

Q.2. Regionally Rare Native Wetland Communities The Department of Ecology is developing a methodology for regionally rare native wetland communities. It is not yet available for use.	
Q.3. Irreplaceable Ecological Functions: Does the wetland: - have at a least 1/2 acre of contiguous peat wetland; . . . . . . - or, have a forested class greater than 1 acre ;	~~No to both~~: go to Q.4. Yes: go to 3a. Yes: go to 3b.
Q.3a. Peat Wetlands. 3a1. Does at least 1/2 acre of the contiguous peat wetland have < 25% areal cover of any combination of species from the list of invasive/exotic species on p.19, and have < 80% areal cover of *Spirea douglasii*?.	Yes: Category I No: go to Q.4.
Q.3b. Mature forested wetland. 3b1. Is the average age of dominant trees in the forested wetland > 80 years?	Yes: Category I No: go to 3b2.
3b2. Is the average age of dominant trees in the forested wetland 50-80 years, and is the structural diversity high as characterized by a multi-layer community of trees > 50' tall and trees 20'-49' tall and shrubs and herbaceous groundcover? . .	Yes: go to 3b3. No: go to Q.5.
3b3. Is > 50% (areal cover) of the dominant plants in one or more layers (canopy, young trees, shrubs, herbs) invasive/exotic plant species from the p.19 list?. .	Yes: go to Q.5. No: Category I
Q.4. Category IV wetlands 4.1. Is the wetland: less than 1 acre and, hydrologically isolated and, comprised of one vegetated class that is dominated (> 80% areal cover) by one species from the list in guidance p.18.	Yes: Category IV No: go to 4.2.
4.2. Is the wetland: less than two acres and, hydrologically isolated, with one vegetated class, and > 90% of areal cover is any combination of species from the list in guidance p.19.	Yes: Category IV No: go to Q.5.

Q.5. Significant habitat value. Answer all questions and enter data requested.		Circle scores that qualify
5a. Total wetland area Estimate area, select from choices in the near-right column, and score in the far column: Enter acreage of wetland here:_____acres, and source:_____	acres > 20.00 10 - 19.99 5 - 9.99 1 - 4.99 0.1 - 0.99 <0.1	 Yes=6 Yes=5 Yes=4 Yes=3 Yes=2 Yes=1
5b. Wetland classes: Circle the wetland classes below that qualify: Open Water: if the area of open water is > 1/2 acre or > 10% of the total wetland area. Source: _____ Aquatic Beds: if the area of aquatic beds > 10% of the open water area or > 1/2 acre. Emergent: if the area of emergent class is > 1/2 acre or > 10% of the total wetland area. Scrub-Shrub: if the area of scrub-shrub class is > 1/2 acre or > 10% of the total wetland area. Forested: if area of forested class is > 1/2 acre or > 10% of the total wetland area. Add the number of wetland classes, above, that qualify, and then score according to the columns at right. e.g. If there are 4 classes (aquatic beds, open water, emergent & scrub-shrub), you would circle 8 points in the far right column.	# of classes 1 . . . . . . 2 . . . . . . 3 . . . . . . 4 . . . . . . 5	 Yes =1 Yes =3 Yes =5 Yes =8 Yes =11
5c. Plant species diversity. For all wetland classes (at right) that qualify in 5b. above, count the number of different plant species you can find. You do not have to name them. Score in column at far right: e.g. If a wetland has an aquatic bed class with 3 species, an emergent class with 4 species and a scrub-shrub class with 2 species you would circle 2, 2, and 1 in the far column.	Class — # of species Aquatic Bed 1-2... " " 3... " " > 3... Emergent 1-2... " 3-4... " > 4... Scrub-Shrub 1-2... " 3-4... " > 4... Forested 1... " 2... " > 2...	 Yes=1 Yes=2 Yes=3 Yes=1 Yes=2 Yes=3 Yes=1 Yes=2 Yes=3 Yes=1 Yes=2 Yes=3

5

5d. Structural diversity. If the wetland has a forested class, add 1 point for each of the following: -trees > 50' tall -trees 20'- 49' tall -shrubs -herbaceous ground cover	 Yes=1 Yes=1 Yes=1 Yes=1 NA
5e. Decide from the diagrams below whether interspersion between wetland classes is high, moderate, low or none?  	High=3 Moderate=2 Low=1 None=0 0
5f. Habitat features. Answer questions below, circle features that apply, and score to right: Is there evidence of current use by beavers ? Is a heron rookery located within 300'? Are raptor nest/s located within 300'? Are there at least 3 standing dead trees (snags) per acre? Are any of these standing dead trees (snags) > 10" in diameter? Are there any other perches (wires, poles or posts)? Are there at least 3 downed logs per acre?	 Yes=3 Yes=2 Yes=1 Yes=1 Yes=1 Yes=1 Yes=1 1
5g. Connection to streams. (Score one answer only.) Is the wetland connected at any time of the year via surface water: to a perennial stream or a seasonal stream with fish; or, to a seasonal stream without fish; or, is not connected to any stream?	 Yes=6 Yes=4 Yes=0 0

6

5h. Buffers.

STEP 1 Estimate (to the nearest 5%) the % of each buffer or land-use type (below) that adjoins the wetland boundary. Then multiply the %/s by the factor(s) below and enter result in column to right:	STEP 2 Multiply result(s) of step 1: by 1, if buffer width is 25-50'; by 2, if buffer width is 50-100'; by 3, if buffer width is >100'. Enter results below and add subscore:
roads, buildings or parking lots: %30 x 0 =	0
lawn, grazed pasture, vineyards or annual crops: % ___ x 1 =	____ x __ = ___
ungrazed grassland or orchards: %___ x 2 =	____ x __ = ___
open water or native grasslands: %___ x 3 =	____ x __ = ___
forest or shrub: %70 x 4 =	280 x 3 = 840
	Add Buffer total =___

STEP 3. Score points according to table at right :

Buffer total	
900-1200...	Yes=4
600-899....	Yes=3
300-599....	Yes=2
100-299....	Yes=1

3

5i. Connection to other habitat areas:

- Is there a riparian corridor to other wetlands within 0.25 of a mile, or a corridor > 100' wide with good forest or shrub cover to any other habitat area?..... Yes =6

- Is there a narrow corridor < 100' wide with good cover or a wide corridor > 100' wide with low cover to any other habitat area?..... Yes=4

- Is there a narrow corridor < 100' wide with low cover or a significant habitat area within 0.25 mile but no corridor?..... Yes=1

- Is the wetland and buffer completely isolated by development and or cultivated agricultural land?..... Yes=0

4

NOW: Add the scores circled (for Q.5a - Q.5i above) to get a Total..... Total = 13

Is the Total greater than or equal to 22 points..... Yes: Category II / No: Category III

WETLANDS RATING FIELD DATA FORM

BACKGROUND INFORMATION:

Name of Rater: Ed Sewall Affiliation: _____ Date: 12/09

Name of wetland (if known): Wetland D - Forest Ridge

Government Jurisdiction of wetland: K. Hills Co

Location: 1/4 S: _____ of 1/4 S: _____ SEC: 24 TWNSHP: 20N RNGE: 5E

SOURCES OF INFORMATION: (Check all sources that apply)

Site visit: ✓ USGS Topo Map: ✓ NWI map: ✓ Aerial Photo: ✓ Soils survey: ✓

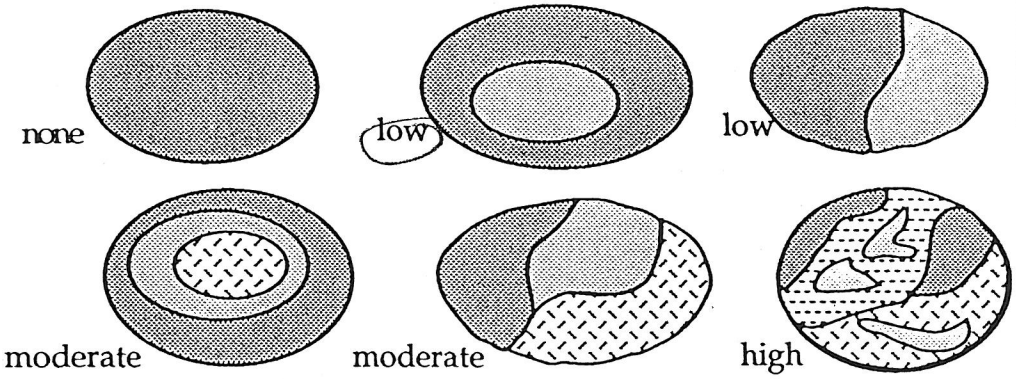
Other: ___ Describe: _____

WHEN THE FIELD DATA FORM IS COMPLETE ENTER CATEGORY HERE:	2

Q.1. High Quality Natural Heritage Wetland.	Circle answers:
Answer this question if you have adequate information or experience to do so. If not find someone with the expertise to answer the questions. Then, if the answer to questions 1a, 1b and 1c are all NO, contact the Natural Heritage program of DNR.	
1a. Is there significant evidence of human-caused changes to topography or hydrology of the wetland? Significant changes could include clearing, grading, filling, logging of the wetland or its immediate buffer, or culverts, ditches, dredging, diking or drainage of the wetland. Briefly describe the changes and your information source/s: clearing ditch	(Yes: go to Q.3.) No: go to 1b.
1b. Are there populations of non-native plants which are currently present and appear to be invading native populations? Briefly describe any non-native plant populations and information source(s): _____	Yes: go to Q.3. No: go to 1c.
1c. Is there significant evidence of human-caused disturbance of the water quality of the system? Degradation of water quality could be evidenced by culverts entering the system, direct road/parking lot runoff, evidence of historic dumping of wastes, oily sheens, extreme eutrophic conditions, livestock use or dead fish etc. Briefly describe: _____	Yes: go to Q.3. No: Possible Category I

Q.2. Regionally Rare Native Wetland Communities The Department of Ecology is developing a methodology for regionally rare native wetland communities. It is not yet available for use.	
Q.3. Irreplaceable Ecological Functions: Does the wetland: - have at a least 1/2 acre of contiguous peat wetland; . . . . . . - or, have a forested class greater than 1 acre ;	No to both: go to Q.4. Yes: go to 3a. Yes: go to 3b.
Q.3a. Peat Wetlands. 3a1. Does at least 1/2 acre of the contiguous peat wetland have < 25% areal cover of any combination of species from the list of invasive/exotic species on p.19, and have < 80% areal cover of *Spirea douglasii*?.	Yes: Category I No: go to Q.4.
Q.3b. Mature forested wetland. 3b1. Is the average age of dominant trees in the forested wetland > 80 years?	Yes: Category I No: go to 3b2.
3b2. Is the average age of dominant trees in the forested wetland 50-80 years, and is the structural diversity high as characterized by a multi-layer community of trees > 50' tall and trees 20'-49' tall and shrubs and herbaceous groundcover? . .	Yes: go to 3b3. No: go to Q.5.
3b3. Is > 50% (areal cover) of the dominant plants in one or more layers (canopy, young trees, shrubs, herbs) invasive/exotic plant species from the p.19 list?. .	Yes: go to Q.5. No: Category I
Q.4. Category IV wetlands 4.1. Is the wetland: less than 1 acre and, hydrologically isolated and, comprised of one vegetated class that is dominated (> 80% areal cover) by one species from the list in guidance p.18.	Yes: Category IV No: go to 4.2.
4.2. Is the wetland: less than two acres and, hydrologically isolated, with one vegetated class, and > 90% of areal cover is any combination of species from the list in guidance p.19.	Yes: Category IV No: go to Q.5.

Q.5. Significant habitat value. Answer all questions and enter data requested.		Circle scores that qualify
5a. Total wetland area Estimate area, select from choices in the near-right column, and score in the far column: Enter acreage of wetland here:_____acres, and source:_____	acres > 20.00 10 - 19.99 5 - 9.99 1 - 4.99 0.1 - 0.99 <0.1	 Yes=6 Yes=5 Yes=4 Yes=3 Yes=2 Yes=1
5b. Wetland classes: Circle the wetland classes below that qualify: Open Water: if the area of open water is > 1/2 acre or > 10% of the total wetland area. Source: _____ Aquatic Beds: if the area of aquatic beds > 10% of the open water area or > 1/2 acre. Emergent: if the area of emergent class is > 1/2 acre or > 10% of the total wetland area. Scrub-Shrub: if the area of scrub-shrub class is > 1/2 acre or > 10% of the total wetland area. Forested: if area of forested class is > 1/2 acre or > 10% of the total wetland area. Add the number of wetland classes, above, that qualify, and then score according to the columns at right. e.g. If there are 4 classes (aquatic beds, open water, emergent & scrub-shrub), you would circle 8 points in the far right column.	# of classes 1 . . . . . . 2 . . . . . . 3 . . . . . . 4 . . . . . . 5	 Yes =1 Yes =3 Yes =5 Yes =8 Yes =11
5c. Plant species diversity. For all wetland classes (at right) that qualify in 5b. above, count the number of different plant species you can find. You do not have to name them. Score in column at far right: e.g. If a wetland has an aquatic bed class with 3 species, an emergent class with 4 species and a scrub-shrub class with 2 species you would circle 2, 2, and 1 in the far column.	Class — # of species Aquatic Bed 1-2... " " 3... " " > 3... Emergent 1-2... " 3-4... " > 4... Scrub-Shrub 1-2... " 3-4... " > 4... Forested 1... " 2... " > 2...	 Yes=1 Yes=2 Yes=3 Yes=1 Yes=2 Yes=3 Yes=1 Yes=2 Yes=3 Yes=1 Yes=2 Yes=3

5d. Structural diversity. If the wetland has a forested class, add 1 point for each of the following: -trees > 50' tall -trees 20'- 49' tall -shrubs -herbaceous ground cover	 Yes=1 Yes=1 Yes=1 Yes=1 3
5e. Decide from the diagrams below whether interspersion between wetland classes is high, moderate, low or none?  	High=3 Moderate=2 Low=1 None=0 1
5f. Habitat features. Answer questions below, circle features that apply, and score to right: Is there evidence of current use by beavers ? No Is a heron rookery located within 300'? No Are raptor nest/s located within 300'? No Are there at least 3 standing dead trees (snags) per acre? No Are any of these standing dead trees (snags) > 10" in diameter? No Are there any other perches (wires, poles or posts)? No Are there at least 3 downed logs per acre?	 Yes=3 Yes=2 Yes=1 Yes=1 Yes=1 Yes=1 Yes=1 1
5g. Connection to streams. (Score one answer only.) Is the wetland connected at any time of the year via surface water: to a perennial stream or a seasonal stream with fish; or, to a seasonal stream without fish; or, is not connected to any stream?	 Yes=6 Yes=4 Yes=0 4

20

5h. Buffers.

STEP 1 Estimate (to the nearest 5%) the % of each buffer or land-use type (below) that adjoins the wetland boundary. Then multiply the %/s by the factor(s) below and enter result in column to right:	STEP 2 Multiply result(s) of step 1: by 1, if buffer width is 25-50'; by 2, if buffer width is 50-100'; by 3, if buffer width is >100'. Enter results below and add subscore:
roads, buildings or parking lots: %___ x 0 =	0
lawn, grazed pasture, vineyards or annual crops: %___ x 1 =	_____ x __ = ___
ungrazed grassland or orchards: %___ x 2 =	_____ x __ = ___
open water or native grasslands: %___ x 3 =	_____ x __ = ___
forest or shrub: %___ x 4 =	400 x 3 = 1200
	Add Buffer total = 1200

STEP 3. Score points according to table at right :

Buffer total	
900-1200...	Yes=4
600-899....	Yes=3
300-599....	Yes=2
100-299....	Yes=1

4

5i. Connection to other habitat areas:

- Is there a riparian corridor to other wetlands within 0.25 of a mile, or a corridor > 100' wide with good forest or shrub cover to any other habitat area?..... Yes =6

- Is there a narrow corridor < 100' wide with good cover or a wide corridor > 100' wide with low cover to any other habitat area?..... Yes=4

- Is there a narrow corridor < 100' wide with low cover or a significant habitat area within 0.25 mile but no corridor?..... Yes=1

- Is the wetland and buffer completely isolated by development and or cultivated agricultural land?..... Yes=0

6

NOW: Add the scores circled (for Q.5a - Q.5i above) to get a Total..... Total = 30

Is the Total greater than or equal to 22 points..... Yes: Category II

No: Category III

WETLANDS RATING FIELD DATA FORM

BACKGROUND INFORMATION:

Name of Rater: Ed Sewall Affiliation: _____ Date: 12/09

Name of wetland (if known): Wetland E - Forest Ridge

Government Jurisdiction of wetland: _____

Location: 1/4 S: _____ of 1/4 S: _____ SEC: 24 TWNSHP: 20N RNGE: 15E

SOURCES OF INFORMATION: (Check all sources that apply)

Site visit: ✓ USGS Topo Map: ✓ NWI map: ✓ Aerial Photo: ✓ Soils survey: ✓

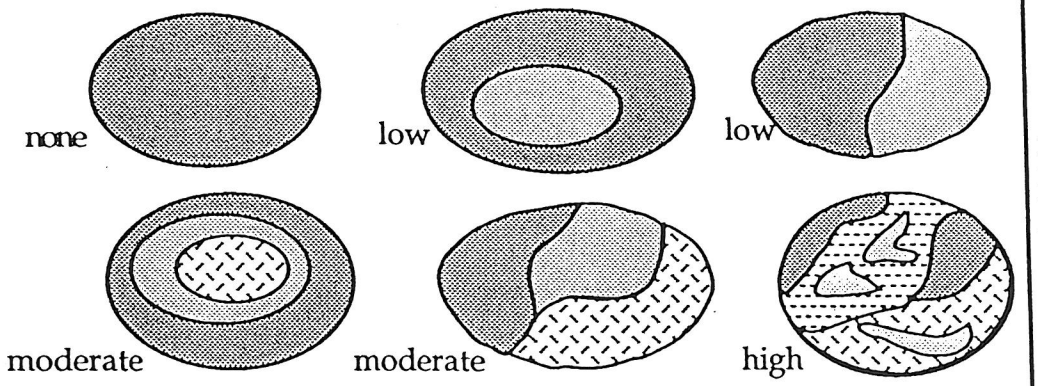
Other: ___ Describe: _____

WHEN THE FIELD DATA FORM IS COMPLETE ENTER CATEGORY HERE:	2
Q.1. High Quality Natural Heritage Wetland.	Circle answers:
Answer this question if you have adequate information or experience to do so. If not find someone with the expertise to answer the questions. Then, if the answer to questions 1a, 1b and 1c are all NO, contact the Natural Heritage program of DNR.	
1a. Is there significant evidence of human-caused changes to topography or hydrology of the wetland? Significant changes could include clearing, grading, filling, logging of the wetland or its immediate buffer, or culverts, ditches, dredging, diking or drainage of the wetland. Briefly describe the changes and your information source/s: logged	Yes: go to Q.3. (circled) No: go to 1b.
1b. Are there populations of non-native plants which are currently present and appear to be invading native populations? Briefly describe any non-native plant populations and information source(s): _____	Yes: go to Q.3. No: go to 1c.
1c. Is there significant evidence of human-caused disturbance of the water quality of the system? Degradation of water quality could be evidenced by culverts entering the system, direct road/parking lot runoff, evidence of historic dumping of wastes, oily sheens, extreme eutrophic conditions, livestock use or dead fish etc. Briefly describe: _____	Yes: go to Q.3. No: Possible Category I

Q.2. Regionally Rare Native Wetland Communities The Department of Ecology is developing a methodology for regionally rare native wetland communities. It is not yet available for use.	
Q.3. Irreplaceable Ecological Functions: Does the wetland: - have at a least 1/2 acre of contiguous peat wetland; . . . . . - or, have a forested class greater than 1 acre ;	No to both: go to Q.4. Yes: go to 3a. Yes: go to 3b.
Q.3a. Peat Wetlands. 3a1. Does at least 1/2 acre of the contiguous peat wetland have < 25% areal cover of any combination of species from the list of invasive/exotic species on p.19, and have < 80% areal cover of *Spirea douglasii*?.	Yes: Category I No: go to Q.4.
Q.3b. Mature forested wetland. 3b1. Is the average age of dominant trees in the forested wetland > 80 years? . . . . . 3b2. Is the average age of dominant trees in the forested wetland 50-80 years, and is the structural diversity high as characterized by a multi-layer community of trees > 50' tall and trees 20'-49' tall and shrubs and herbaceous groundcover? . . 3b3. Is > 50% (areal cover) of the dominant plants in one or more layers (canopy, young trees, shrubs, herbs) invasive/exotic plant species from the p.19 list?. .	Yes: Category I No: go to 3b2. Yes: go to 3b3. No: go to Q.5. Yes: go to Q.5. No: Category I
Q.4. Category IV wetlands 4.1. Is the wetland: less than 1 acre and, hydrologically isolated and, comprised of one vegetated class that is dominated (> 80% areal cover) by one species from the list in guidance p.18. . . . . 4.2. Is the wetland: less than two acres and, hydrologically isolated, with one vegetated class, and > 90% of areal cover is any combination of species from the list in guidance p.19.	Yes: Category IV No: go to 4.2. Yes: Category IV No: go to Q.5.

Q.5. Significant habitat value. Answer all questions and enter data requested.		Circle scores that qualify
5a. Total wetland area Estimate area, select from choices in the near-right column, and score in the far column: Enter acreage of wetland here:_____acres, and source:_____	acres > 20.00 10 - 19.99 5 - 9.99 1 - 4.99 0.1 - 0.99 <0.1	 Yes=6 Yes=5 Yes=4 Yes=3 (Yes=2) Yes=1 2
5b. Wetland classes: Circle the wetland classes below that qualify: Open Water: if the area of open water is > 1/2 acre or > 10% of the total wetland area. Source: _____ Aquatic Beds: if the area of aquatic beds > 10% of the open water area or > 1/2 acre. Emergent: if the area of emergent class is > 1/2 acre or > 10% of the total wetland area. Scrub-Shrub: if the area of scrub-shrub class is > 1/2 acre or > 10% of the total wetland area. Forested: if area of forested class is > 1/2 acre or > 10% of the total wetland area.		
Add the number of wetland classes, above, that qualify, and then score according to the columns at right. e.g. If there are 4 classes (aquatic beds, open water, emergent & scrub-shrub), you would circle 8 points in the far right column.	# of classes 1 . . . . . . 2 . . . . . . 3 . . . . . . 4 . . . . . . 5	 (Yes =1) Yes =3 Yes =5 Yes =8 Yes =11 1
5c. Plant species diversity. For all wetland classes (at right) that qualify in 5b. above, count the number of different plant species you can find. You do not have to name them. Score in column at far right: e.g. If a wetland has an aquatic bed class with 3 species, an emergent class with 4 species and a scrub-shrub class with 2 species you would circle 2, 2, and 1 in the far column.	Class # of species Aquatic Bed 1-2... " " 3... " " > 3... Emergent 1-2... " 3-4... " > 4... Scrub-Shrub 1-2... " 3-4... " > 4... Forested 1... " 2... " > 2...	 Yes=1 Yes=2 Yes=3 Yes=1 Yes=2 Yes=3 Yes=1 Yes=2 Yes=3 Yes=1 Yes=2 (Yes=3) 3

6

5d. Structural diversity. If the wetland has a forested class, add 1 point for each of the following: -trees > 50' tall ..... -trees 20'- 49' tall ..... -shrubs. ..... -herbaceous ground cover.	 Yes=1 Yes=1 Yes=1 Yes=1 3
5e. Decide from the diagrams below whether interspersion between wetland classes is high, moderate, low or none?  	High=3 Moderate=2 Low=1 None=0 6
5f. Habitat features. Answer questions below, circle features that apply, and score to right: Is there evidence of current use by beavers ? ..... Is a heron rookery located within 300'? ..... Are raptor nest/s located within 300'? ..... Are there at least 3 standing dead trees (snags) per acre? ..... Are any of these standing dead trees (snags) > 10" in diameter? ..... Are there any other perches (wires, poles or posts)? ..... Are there at least 3 downed logs per acre?	 Yes=3 Yes=2 Yes=1 Yes=1 Yes=1 Yes=1 Yes=1 2
5g. Connection to streams. (Score one answer only.) Is the wetland connected at any time of the year via surface water: to a perennial stream or a seasonal stream with fish; ..... or, to a seasonal stream without fish; ..... or, is not connected to any stream?	 Yes=6 Yes=4 Yes=0 4

15

5h. Buffers.

STEP 1 Estimate (to the nearest 5%) the % of each buffer or land-use type (below) that adjoins the wetland boundary. Then multiply the %/s by the factor(s) below and enter result in column to right:	STEP 2 Multiply result(s) of step 1: by 1, if buffer width is 25-50'; by 2, if buffer width is 50-100'; by 3, if buffer width is >100'. Enter results below and add subscore:
roads, buildings or parking lots: %___ x 0 =	0
lawn, grazed pasture, vineyards or annual crops: % ___ x 1 =	____ x __ = ___
ungrazed grassland or orchards: %___ x 2 =	____ x __ = ___
open water or native grasslands: %___ x 3 =	____ x __ = ___
forest or shrub: %___ x 4 =	____ x __ = 120
	Add Buffer total =___

STEP 3. Score points according to table at right :

Buffer total	
900-1200...	(Yes=4)
600-899....	Yes=3
300-599....	Yes=2
100-299....	Yes=1

4

5i. Connection to other habitat areas:

- Is there a riparian corridor to other wetlands within 0.25 of a mile, or a corridor > 100' wide with good forest or shrub cover to any other habitat area?.....	Yes =6
- Is there a narrow corridor < 100' wide with good cover or a wide corridor > 100' wide with low cover to any other habitat area?.....	(Yes=4)
- Is there a narrow corridor < 100' wide with low cover or a significant habitat area within 0.25 mile but no corridor?.....	Yes=1
- Is the wetland and buffer completely isolated by development and or cultivated agricultural land?.....	Yes=0

4

NOW: Add the scores circled (for Q.5a - Q.5i above) to get a Total.....	Total = 23
Is the Total greater than or equal to 22 points.....	(Yes: Category II) No: ~~Category III~~

WETLANDS RATING FIELD DATA FORM

BACKGROUND INFORMATION:

Name of Rater: Ed Sarll Affiliation: _____ Date: 12/09

Name of wetland (if known): wetland F - Forest Ridge

Government Jurisdiction of wetland: K, Pitkin Co

Location: 1/4 S: _____ of 1/4 S: _____ SEC: 24 TWNSHP: 20N RNGE: 15E

SOURCES OF INFORMATION: (Check all sources that apply)

Site visit: ___ USGS Topo Map: ✓ NWI map: ___ Aerial Photo: ✓ Soils survey: ✓

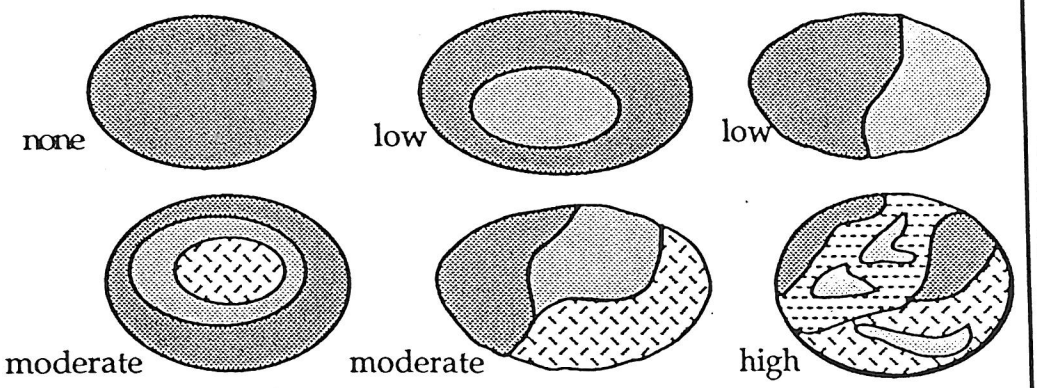
Other: ___ Describe: _____

WHEN THE FIELD DATA FORM IS COMPLETE ENTER CATEGORY HERE:	3
Q.1. High Quality Natural Heritage Wetland.	Circle answers:
Answer this question if you have adequate information or experience to do so. If not find someone with the expertise to answer the questions. Then, if the answer to questions 1a, 1b and 1c are all NO, contact the Natural Heritage program of DNR.	
1a. Is there significant evidence of human-caused changes to topography or hydrology of the wetland? Significant changes could include clearing, grading, filling, logging of the wetland or its immediate buffer, or culverts, ditches, dredging, diking or drainage of the wetland. Briefly describe the changes and your information source/s: logged	Yes: go to Q.3. ~~No: go to 1b.~~
1b. Are there populations of non-native plants which are currently present and appear to be invading native populations? Briefly describe any non-native plant populations and information source(s): _____	Yes: go to Q.3. No: go to 1c.
1c. Is there significant evidence of human-caused disturbance of the water quality of the system? Degradation of water quality could be evidenced by culverts entering the system, direct road/parking lot runoff, evidence of historic dumping of wastes, oily sheens, extreme eutrophic conditions, livestock use or dead fish etc. Briefly describe: _____	Yes: go to Q.3. No: Possible Category I

Q.2. Regionally Rare Native Wetland Communities The Department of Ecology is developing a methodology for regionally rare native wetland communities. It is not yet available for use.	
Q.3. Irreplaceable Ecological Functions: Does the wetland: - have at a least 1/2 acre of contiguous peat wetland; . . . . . . - or, have a forested class greater than 1 acre ;	No to both: go to Q.4. Yes: go to 3a. Yes: go to 3b.
Q.3a. Peat Wetlands. 3a1. Does at least 1/2 acre of the contiguous peat wetland have < 25% areal cover of any combination of species from the list of invasive/exotic species on p.19, and have < 80% areal cover of *Spirea douglasii*?.	Yes: Category I No: go to Q.4.
Q.3b. Mature forested wetland. 3b1. Is the average age of dominant trees in the forested wetland > 80 years?	Yes: Category I No: go to 3b2.
3b2. Is the average age of dominant trees in the forested wetland 50-80 years, and is the structural diversity high as characterized by a multi-layer community of trees > 50' tall and trees 20'-49' tall and shrubs and herbaceous groundcover? . .	Yes: go to 3b3. No: go to Q.5.
3b3. Is > 50% (areal cover) of the dominant plants in one or more layers (canopy, young trees, shrubs, herbs) invasive/exotic plant species from the p.19 list?. .	Yes: go to Q.5. No: Category I
Q.4. Category IV wetlands 4.1. Is the wetland: less than 1 acre and, hydrologically isolated and, comprised of one vegetated class that is dominated (> 80% areal cover) by one species from the list in guidance p.18.	Yes: Category IV No: go to 4.2.
4.2. Is the wetland: less than two acres and, hydrologically isolated, with one vegetated class, and > 90% of areal cover is any combination of species from the list in guidance p.19.	Yes: Category IV No: go to Q.5.

Q.5. Significant habitat value. Answer all questions and enter data requested.		Circle scores that qualify
5a. Total wetland area Estimate area, select from choices in the near-right column, and score in the far column: Enter acreage of wetland here:_____acres, and source:_____	acres > 20.00 10 - 19.99 5 - 9.99 1 - 4.99 0.1 - 0.99 <0.1	 Yes=6 Yes=5 Yes=4 Yes=3 Yes=2 Yes=1 2
5b. Wetland classes: Circle the wetland classes below that qualify: Open Water: if the area of open water is > 1/2 acre or > 10% of the total wetland area. Source: _____ Aquatic Beds: if the area of aquatic beds > 10% of the open water area or > 1/2 acre. Emergent: if the area of emergent class is > 1/2 acre or > 10% of the total wetland area. Scrub-Shrub: if the area of scrub-shrub class is > 1/2 acre or > 10% of the total wetland area. Forested: if area of forested class is > 1/2 acre or > 10% of the total wetland area. Add the number of wetland classes, above, that qualify, and then score according to the columns at right. e.g. If there are 4 classes (aquatic beds, open water, emergent & scrub-shrub), you would circle 8 points in the far right column.	# of classes 1 . . . . . . 2 . . . . . . 3 . . . . . . 4 . . . . . . 5	 Yes =1 Yes =3 Yes =5 Yes =8 Yes =11 1
5c. Plant species diversity. For all wetland classes (at right) that qualify in 5b. above, count the number of different plant species you can find. You do not have to name them. Score in column at far right: e.g. If a wetland has an aquatic bed class with 3 species, an emergent class with 4 species and a scrub-shrub class with 2 species you would circle 2, 2, and 1 in the far column.	Class # of species Aquatic Bed 1-2... " " 3... " " > 3... Emergent 1-2... " 3-4... " > 4... Scrub-Shrub 1-2... " 3-4... " > 4... Forested 1... " 2... " > 2...	 Yes=1 Yes=2 Yes=3 Yes=1 Yes=2 Yes=3 Yes=1 Yes=2 Yes=3 Yes=1 Yes=2 Yes=3 3

6

5d. Structural diversity. If the wetland has a forested class, add 1 point for each of the following: -trees > 50' tall -trees 20'- 49' tall -shrubs -herbaceous ground cover	 Yes=1 Yes=1 Yes=1 Yes=1 NA
5e. Decide from the diagrams below whether interspersion between wetland classes is high, moderate, low or none?  	High=3 Moderate=2 Low=1 None=0 0
5f. Habitat features. Answer questions below, circle features that apply, and score to right: Is there evidence of current use by beavers ? Is a heron rookery located within 300'? Are raptor nest/s located within 300'? Are there at least 3 standing dead trees (snags) per acre? Are any of these standing dead trees (snags) > 10" in diameter? Are there any other perches (wires, poles or posts)? Are there at least 3 downed logs per acre?	 Yes=3 Yes=2 Yes=1 Yes=1 Yes=1 Yes=1 Yes=1 0
5g. Connection to streams. (Score one answer only.) Is the wetland connected at any time of the year via surface water: to a perennial stream or a seasonal stream with fish; or, to a seasonal stream without fish; or, is not connected to any stream?	 Yes=6 ~~Yes=4~~ Yes=0 4

5h. Buffers.

STEP 1 Estimate (to the nearest 5%) the % of each buffer or land-use type (below) that adjoins the wetland boundary. Then multiply the %/s by the factor(s) below and enter result in column to right:	STEP 2 Multiply result(s) of step 1: by 1, if buffer width is 25-50'; by 2, if buffer width is 50-100'; by 3, if buffer width is >100'. Enter results below and add subscore:
roads, buildings or parking lots: %___ x 0 =	0
lawn, grazed pasture, vineyards or annual crops: %___ x 1 =	____ x __ = ___
ungrazed grassland or orchards: %___ x 2 =	____ x __ = ___
open water or native grasslands: %___ x 3 =	____ x __ = ___
forest or shrub: %___ x 4 =	____ x __ = 1200
	Add Buffer total = 1200

STEP 3. Score points according to table at right :

Buffer total	
900-1200...	Yes=4
600-899....	Yes=3
300-599....	Yes=2
100-299....	Yes=1

4

5i. Connection to other habitat areas:

- Is there a riparian corridor to other wetlands within 0.25 of a mile, or a corridor > 100' wide with good forest or shrub cover to any other habitat area?.....	Yes =6
- Is there a narrow corridor < 100' wide with good cover or a wide corridor > 100' wide with low cover to any other habitat area?.....	Yes=4
- Is there a narrow corridor < 100' wide with low cover or a significant habitat area within 0.25 mile but no corridor?.....	Yes=1
- Is the wetland and buffer completely isolated by development and or cultivated agricultural land?.....	Yes=0

NOW: Add the scores circled (for Q.5a - Q.5i above) to get a Total.....	Total = 20
Is the Total greater than or equal to 22 points.....	Yes: Category II No: Category III

WETLANDS RATING FIELD DATA FORM

BACKGROUND INFORMATION:

Name of Rater: Ed Sewall Affiliation: _____ Date: 12/04

Name of wetland (if known): Wetland G - Forest Ridge

Government Jurisdiction of wetland: Kittitas Co

Location: 1/4 S: _____ of 1/4 S: _____ SEC: 24 TWNSHP: 20N RNGE: 15E

SOURCES OF INFORMATION: (Check all sources that apply)

Site visit: ___ USGS Topo Map: ✓ NWI map: ✓ Aerial Photo: ✓ Soils survey: ✓

Other: ___ Describe: _____

WHEN THE FIELD DATA FORM IS COMPLETE ENTER CATEGORY HERE:	2
Q.1. High Quality Natural Heritage Wetland. Answer this question if you have adequate information or experience to do so. If not find someone with the expertise to answer the questions. Then, if the answer to questions 1a, 1b and 1c are all NO, contact the Natural Heritage program of DNR.	Circle answers:
1a. Is there significant evidence of human-caused changes to topography or hydrology of the wetland? Significant changes could include clearing, grading, filling, logging of the wetland or its immediate buffer, or culverts, ditches, dredging, diking or drainage of the wetland. Briefly describe the changes and your information source/s: logged	Yes: go to Q.3. No: go to 1b.
1b. Are there populations of non-native plants which are currently present and appear to be invading native populations? Briefly describe any non-native plant populations and information source(s): _____	Yes: go to Q.3. No: go to 1c.
1c. Is there significant evidence of human-caused disturbance of the water quality of the system? Degradation of water quality could be evidenced by culverts entering the system, direct road/parking lot runoff, evidence of historic dumping of wastes, oily sheens, extreme eutrophic conditions, livestock use or dead fish etc. Briefly describe: _____	Yes: go to Q.3. No: Possible Category I

Q.2. Regionally Rare Native Wetland Communities The Department of Ecology is developing a methodology for regionally rare native wetland communities. It is not yet available for use.	
Q.3. Irreplaceable Ecological Functions: Does the wetland: - have at a least 1/2 acre of contiguous peat wetland; . . . . . . - or, have a forested class greater than 1 acre ;	~~No to both: go to Q.4.~~ Yes: go to 3a. Yes: go to 3b.
Q.3a. Peat Wetlands. 3a1. Does at least 1/2 acre of the contiguous peat wetland have < 25% areal cover of any combination of species from the list of invasive/exotic species on p.19, and have < 80% areal cover of *Spirea douglasii*?.	Yes: Category I No: go to Q.4.
Q.3b. Mature forested wetland. 3b1. Is the average age of dominant trees in the forested wetland > 80 years?	Yes: Category I No: go to 3b2.
3b2. Is the average age of dominant trees in the forested wetland 50-80 years, and is the structural diversity high as characterized by a multi-layer community of trees > 50' tall and trees 20'-49' tall and shrubs and herbaceous groundcover? . .	Yes: go to 3b3. No: go to Q.5.
3b3. Is > 50% (areal cover) of the dominant plants in one or more layers (canopy, young trees, shrubs, herbs) invasive/exotic plant species from the p.19 list?. .	Yes: go to Q.5. No: Category I
Q.4. Category IV wetlands 4.1. Is the wetland: less than 1 acre and, hydrologically isolated and, comprised of one vegetated class that is dominated (> 80% areal cover) by one species from the list in guidance p.18.	Yes: Category IV ~~No: go to 4.2.~~
4.2. Is the wetland: less than two acres and, hydrologically isolated, with one vegetated class, and > 90% of areal cover is any combination of species from the list in guidance p.19.	Yes: Category IV ~~No: go to Q.5.~~

Q.5. Significant habitat value. Answer all questions and enter data requested.		Circle scores that qualify
5a. Total wetland area Estimate area, select from choices in the near-right column, and score in the far column: Enter acreage of wetland here:_____acres, and source:_____	acres > 20.00 10 - 19.99 5 - 9.99 1 - 4.99 0.1 - 0.99 <0.1	 Yes=6 Yes=5 Yes=4 Yes=3 Yes=2 Yes=1 2
5b. Wetland classes: Circle the wetland classes below that qualify: Open Water: if the area of open water is > 1/2 acre or > 10% of the total wetland area. Source: _____ Aquatic Beds: if the area of aquatic beds > 10% of the open water area or > 1/2 acre. Emergent: if the area of emergent class is > 1/2 acre or > 10% of the total wetland area. Scrub-Shrub: if the area of scrub-shrub class is > 1/2 acre or > 10% of the total wetland area. Forested: if area of forested class is > 1/2 acre or > 10% of the total wetland area.		
Add the number of wetland classes, above, that qualify, and then score according to the columns at right. e.g. If there are 4 classes (aquatic beds, open water, emergent & scrub-shrub), you would circle 8 points in the far right column.	# of classes 1 . . . . . . 2 . . . . . . 3 . . . . . . 4 . . . . . . 5	 Yes =1 Yes =3 Yes =5 Yes =8 Yes =11 1
5c. Plant species diversity. For all wetland classes (at right) that qualify in 5b. above, count the number of different plant species you can find. You do not have to name them. Score in column at far right: e.g. If a wetland has an aquatic bed class with 3 species, an emergent class with 4 species and a scrub-shrub class with 2 species you would circle 2, 2, and 1 in the far column.	Class # of species Aquatic Bed 1-2... " " 3... " " > 3... Emergent 1-2... " 3-4... " > 4... Scrub-Shrub 1-2... " 3-4... " > 4... Forested 1... " 2... " > 2...	 Yes=1 Yes=2 Yes=3 Yes=1 Yes=2 Yes=3 Yes=1 Yes=2 Yes=3 Yes=1 Yes=2 Yes=3 3

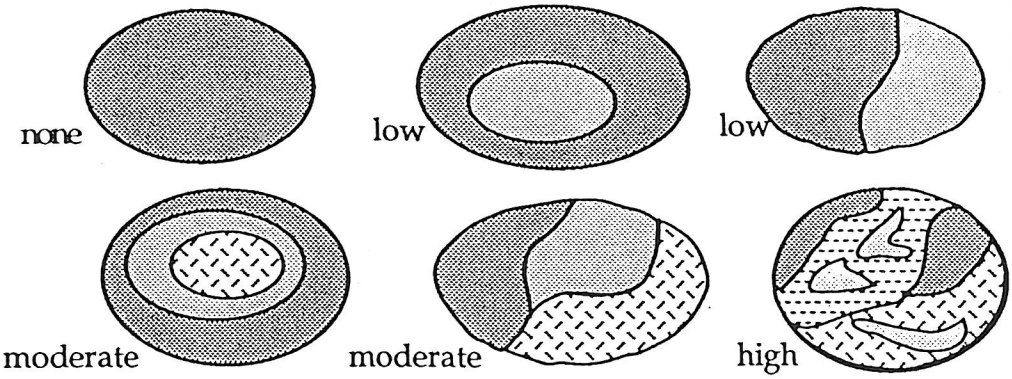
6

5d. Structural diversity.
If the wetland has a forested class, add 1 point for each of the following:

-trees > 50' tall	Yes=1
-trees 20'- 49' tall	Yes=1
-shrubs	Yes=1
-herbaceous ground cover	Yes=1

3

5e. Decide from the diagrams below whether interspersion between wetland classes is high, moderate, low or none?



High=3
Moderate=2
Low=1
None=0

0

5f. Habitat features.

Answer questions below, circle features that apply, and score to right:

Is there evidence of current use by beavers ?	Yes=3
Is a heron rookery located within 300'?	Yes=2
Are raptor nest/s located within 300'?	Yes=1
Are there at least 3 standing dead trees (snags) per acre?	Yes=1
Are any of these standing dead trees (snags) > 10" in diameter?	Yes=1
Are there any other perches (wires, poles or posts)?	Yes=1
Are there at least 3 downed logs per acre?	Yes=1

1

5g. Connection to streams. (Score one answer only.)

Is the wetland connected at any time of the year via surface water:

to a perennial stream or a seasonal stream with fish;	Yes=6
or, to a seasonal stream without fish;	Yes=4
or, is not connected to any stream?	Yes=0

4

14

5h. Buffers.

STEP 1 Estimate (to the nearest 5%) the % of each buffer or land-use type (below) that adjoins the wetland boundary. Then multiply the %/s by the factor(s) below and enter result in column to right:	STEP 2 Multiply result(s) of step 1: by 1, if buffer width is 25-50'; by 2, if buffer width is 50-100'; by 3, if buffer width is >100'. Enter results below and add subscore:
roads, buildings or parking lots: %25 x 0 =	0
lawn, grazed pasture, vineyards or annual crops: % ___ x 1 =	____ x __ = ___
ungrazed grassland or orchards: % ___ x 2 =	____ x __ = ___
open water or native grasslands: % ___ x 3 =	____ x __ = ___
forest or shrub: %75 x 4 =	300 x 3 = 900
	Add Buffer total = ___

STEP 3. Score points according to table at right :

Buffer total	
900-1200...	~~Yes=4~~
600-899....	Yes=3
300-599....	Yes=2
100-299....	Yes=1

4

5i. Connection to other habitat areas:

- Is there a riparian corridor to other wetlands within 0.25 of a mile, or a corridor > 100' wide with good forest or shrub cover to any other habitat area?..... Yes =6

- Is there a narrow corridor < 100' wide with good cover or a wide corridor > 100' wide with low cover to any other habitat area?..... Yes=4

- Is there a narrow corridor < 100' wide with low cover or a significant habitat area within 0.25 mile but no corridor?..... Yes=1

- Is the wetland and buffer completely isolated by development and or cultivated agricultural land?..... Yes=0

NOW: Add the scores circled (for Q.5a - Q.5i above) to get a Total..... ...
Is the Total greater than or equal to 22 points.....

Total = 24
Yes: Category II
No: Category III

WETLANDS RATING FIELD DATA FORM

BACKGROUND INFORMATION:

Name of Rater: El Sundl Affiliation: _____ Date: 12/09

Name of wetland (if known): Wetland H - Forest Ridge

Government Jurisdiction of wetland: Kittitas Co

Location: 1/4 S: _____ of 1/4 S: _____ SEC: 24 TWNSHP: 20N RNGE: 15E

SOURCES OF INFORMATION: (Check all sources that apply)

Site visit: ✓ USGS Topo Map: ✓ NWI map: ✓ Aerial Photo: ✓ Soils survey: ✓

Other: ___ Describe: _____

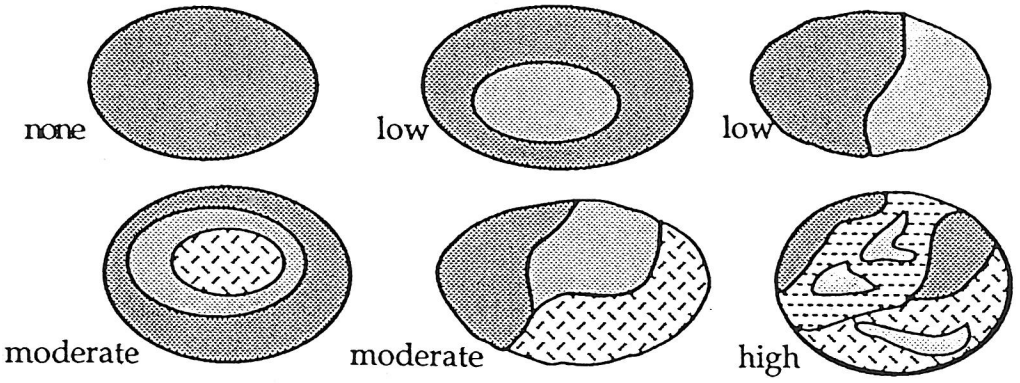
WHEN THE FIELD DATA FORM IS COMPLETE ENTER CATEGORY HERE:	3

Q.1. High Quality Natural Heritage Wetland.	Circle answers:
Answer this question if you have adequate information or experience to do so. If not find someone with the expertise to answer the questions. Then, if the answer to questions 1a, 1b and 1c are all NO, contact the Natural Heritage program of DNR.	
1a. Is there significant evidence of human-caused changes to topography or hydrology of the wetland? Significant changes could include clearing, grading, filling, logging of the wetland or its immediate buffer, or culverts, ditches, dredging, diking or drainage of the wetland. Briefly describe the changes and your information source/s: logged	(Yes: go to Q.3.) No: go to 1b.
1b. Are there populations of non-native plants which are currently present and appear to be invading native populations? Briefly describe any non-native plant populations and information source(s):	Yes: go to Q.3. No: go to 1c.
1c. Is there significant evidence of human-caused disturbance of the water quality of the system? Degradation of water quality could be evidenced by culverts entering the system, direct road/parking lot runoff, evidence of historic dumping of wastes, oily sheens, extreme eutrophic conditions, livestock use or dead fish etc. Briefly describe:	Yes: go to Q.3. No: Possible Category I

Q.2. Regionally Rare Native Wetland Communities The Department of Ecology is developing a methodology for regionally rare native wetland communities. It is not yet available for use.	
Q.3. Irreplaceable Ecological Functions: Does the wetland: - have at a least 1/2 acre of contiguous peat wetland; . . . . . . - or, have a forested class greater than 1 acre ;	No to both: go to Q.4. Yes: go to 3a. Yes: go to 3b.
Q.3a. Peat Wetlands. 3a1. Does at least 1/2 acre of the contiguous peat wetland have < 25% areal cover of any combination of species from the list of invasive/exotic species on p.19, and have < 80% areal cover of *Spirea douglasii*?	Yes: Category I No: go to Q.4.
Q.3b. Mature forested wetland. 3b1. Is the average age of dominant trees in the forested wetland > 80 years?	Yes: Category I No: go to 3b2.
3b2. Is the average age of dominant trees in the forested wetland 50-80 years, and is the structural diversity high as characterized by a multi-layer community of trees > 50' tall and trees 20'-49' tall and shrubs and herbaceous groundcover? . .	Yes: go to 3b3. No: go to Q.5.
3b3. Is > 50% (areal cover) of the dominant plants in one or more layers (canopy, young trees, shrubs, herbs) invasive/exotic plant species from the p.19 list?. .	Yes: go to Q.5. No: Category I
Q.4. Category IV wetlands 4.1. Is the wetland: less than 1 acre and, hydrologically isolated and, comprised of one vegetated class that is dominated (> 80% areal cover) by one species from the list in guidance p.18.	Yes: Category IV No: go to 4.2.
4.2. Is the wetland: less than two acres and, hydrologically isolated, with one vegetated class, and > 90% of areal cover is any combination of species from the list in guidance p.19.	Yes: Category IV No: go to Q.5.

Q.5. Significant habitat value. Answer all questions and enter data requested.		Circle scores that qualify
5a. Total wetland area Estimate area, select from choices in the near-right column, and score in the far column: Enter acreage of wetland here:_____acres, and source:_____	acres > 20.00 10 - 19.99 5 - 9.99 1 - 4.99 0.1 - 0.99 <0.1	 Yes=6 Yes=5 Yes=4 Yes=3 Yes=2 Yes=1 2
5b. Wetland classes: Circle the wetland classes below that qualify: Open Water: if the area of open water is > 1/2 acre or > 10% of the total wetland area. Source: _____ Aquatic Beds: if the area of aquatic beds > 10% of the open water area or > 1/2 acre. Emergent: if the area of emergent class is > 1/2 acre or > 10% of the total wetland area. Scrub-Shrub: if the area of scrub-shrub class is > 1/2 acre or > 10% of the total wetland area. Forested: if area of forested class is > 1/2 acre or > 10% of the total wetland area. Add the number of wetland classes, above, that qualify, and then score according to the columns at right. e.g. If there are 4 classes (aquatic beds, open water, emergent & scrub-shrub), you would circle 8 points in the far right column.	# of classes 1 . . . . . . 2 . . . . . . 3 . . . . . . 4 . . . . . . 5	 Yes=1 Yes =3 Yes =5 Yes =8 Yes =11 1
5c. Plant species diversity. For all wetland classes (at right) that qualify in 5b. above, count the number of different plant species you can find. You do not have to name them. Score in column at far right: e.g. If a wetland has an aquatic bed class with 3 species, an emergent class with 4 species and a scrub-shrub class with 2 species you would circle 2, 2, and 1 in the far column.	Class — # of species Aquatic Bed 1-2... " " 3... " " > 3... Emergent 1-2... " 3-4... " > 4... Scrub-Shrub 1-2... " 3-4... " > 4... Forested 1... " 2... " > 2...	 Yes=1 Yes=2 Yes=3 Yes=1 Yes=2 Yes=3 Yes=1 Yes=2 Yes=3 Yes=1 Yes=2 Yes=3 3

6

5d. Structural diversity. If the wetland has a forested class, add 1 point for each of the following: -trees > 50' tall -trees 20'- 49' tall -shrubs -herbaceous ground cover	 Yes=1 Yes=1 Yes=1 Yes=1 NA
5e. Decide from the diagrams below whether interspersion between wetland classes is high, moderate, low or none?  	High=3 Moderate=2 Low=1 None=0 0
5f. Habitat features. Answer questions below, circle features that apply, and score to right: Is there evidence of current use by beavers ? Is a heron rookery located within 300'? Are raptor nest/s located within 300'? Are there at least 3 standing dead trees (snags) per acre? Are any of these standing dead trees (snags) > 10" in diameter? Are there any other perches (wires, poles or posts)? Are there at least 3 downed logs per acre?	 Yes=3 Yes=2 Yes=1 Yes=1 Yes=1 Yes=1 Yes=1 1
5g. Connection to streams. (Score one answer only.) Is the wetland connected at any time of the year via surface water: to a perennial stream or a seasonal stream with fish; or, to a seasonal stream without fish; or, is not connected to any stream?	 Yes=6 Yes=4 Yes=0 4

11

5h. Buffers.

STEP 1 Estimate (to the nearest 5%) the % of each buffer or land-use type (below) that adjoins the wetland boundary. Then multiply the %/s by the factor(s) below and enter result in column to right:	STEP 2 Multiply result(s) of step 1: by 1, if buffer width is 25-50'; by 2, if buffer width is 50-100'; by 3, if buffer width is >100'. Enter results below and add subscore:
roads, buildings or parking lots: %___ x 0 =	0
lawn, grazed pasture, vineyards or annual crops: %___ x 1 =	_____ x __ = ___
ungrazed grassland or orchards: %___ x 2 =	_____ x __ = ___
open water or native grasslands: %___ x 3 =	_____ x __ = ___
forest or shrub: %___ x 4 =	_____ x __ = 120
	Add Buffer total =___

STEP 3. Score points according to table at right :

Buffer total	
900-1200...	Yes=4
600-899....	Yes=3
300-599....	Yes=2
100-299....	Yes=1

4

5i. Connection to other habitat areas:

- Is there a riparian corridor to other wetlands within 0.25 of a mile, or a corridor > 100' wide with good forest or shrub cover to any other habitat area?..... Yes =6

- Is there a narrow corridor < 100' wide with good cover or a wide corridor > 100' wide with low cover to any other habitat area?..... Yes=4

- Is there a narrow corridor < 100' wide with low cover or a significant habitat area within 0.25 mile but no corridor?..... Yes=1

- Is the wetland and buffer completely isolated by development and or cultivated agricultural land?..... Yes=0

NOW: Add the scores circled (for Q.5a - Q.5i above) to get a Total..... Total = 21

Is the Total greater than or equal to 22 points..... Yes: Category II / No: Category III

WETLANDS RATING FIELD DATA FORM

BACKGROUND INFORMATION:

Name of Rater: Ed Sewell Affiliation: _____ Date: 12/04

Name of wetland (if known): Wetland I - Forest Ridge

Government Jurisdiction of wetland: Kittitas Co

Location: 1/4 S: _____ of 1/4 S: _____ SEC: 24 TWNSHP: 20N RNGE: 15E

SOURCES OF INFORMATION: (Check all sources that apply)

Site visit: ✓ USGS Topo Map: ✓ NWI map: ✓ Aerial Photo: ✓ Soils survey: ✓

Other: ___ Describe: _____

WHEN THE FIELD DATA FORM IS COMPLETE ENTER CATEGORY HERE:	3
Q.1. High Quality Natural Heritage Wetland. Answer this question if you have adequate information or experience to do so. If not find someone with the expertise to answer the questions. Then, if the answer to questions 1a, 1b and 1c are all NO, contact the Natural Heritage program of DNR.	Circle answers:
1a. Is there significant evidence of human-caused changes to topography or hydrology of the wetland? Significant changes could include clearing, grading, filling, logging of the wetland or its immediate buffer, or culverts, ditches, dredging, diking or drainage of the wetland. Briefly describe the changes and your information source/s: logged + dug out	Yes: go to Q.3. No: go to 1b.
1b. Are there populations of non-native plants which are currently present and appear to be invading native populations? Briefly describe any non-native plant populations and information source(s): _____	Yes: go to Q.3. No: go to 1c.
1c. Is there significant evidence of human-caused disturbance of the water quality of the system? Degradation of water quality could be evidenced by culverts entering the system, direct road/parking lot runoff, evidence of historic dumping of wastes, oily sheens, extreme eutrophic conditions, livestock use or dead fish etc. Briefly describe: _____	Yes: go to Q.3. No: Possible Category I

Q.2. Regionally Rare Native Wetland Communities The Department of Ecology is developing a methodology for regionally rare native wetland communities. It is not yet available for use.	
Q.3. Irreplaceable Ecological Functions: Does the wetland: - have at a least 1/2 acre of contiguous peat wetland; . . . . . . - or, have a forested class greater than 1 acre ;	~~No to both~~: ~~go to Q.4~~. Yes: go to 3a. Yes: go to 3b.
Q.3a. Peat Wetlands. 3a1. Does at least 1/2 acre of the contiguous peat wetland have < 25% areal cover of any combination of species from the list of invasive/exotic species on p.19, and have < 80% areal cover of *Spirea douglasii*?	Yes: Category I No: go to Q.4.
Q.3b. Mature forested wetland. 3b1. Is the average age of dominant trees in the forested wetland > 80 years?	Yes: Category I No: go to 3b2.
3b2. Is the average age of dominant trees in the forested wetland 50-80 years, and is the structural diversity high as characterized by a multi-layer community of trees > 50' tall and trees 20'-49' tall and shrubs and herbaceous groundcover? . .	Yes: go to 3b3. No: go to Q.5.
3b3. Is > 50% (areal cover) of the dominant plants in one or more layers (canopy, young trees, shrubs, herbs) invasive/exotic plant species from the p.19 list? . .	Yes: go to Q.5. No: Category I
Q.4. Category IV wetlands 4.1. Is the wetland: less than 1 acre and, hydrologically isolated and, comprised of one vegetated class that is dominated (> 80% areal cover) by one species from the list in guidance p.18.	Yes: Category IV ~~No: go to 4.2~~.
4.2. Is the wetland: less than two acres and, hydrologically isolated, with one vegetated class, and > 90% of areal cover is any combination of species from the list in guidance p.19.	Yes: Category IV ~~No: go to Q.5~~.

Q.5. Significant habitat value. Answer all questions and enter data requested.		Circle scores that qualify
5a. Total wetland area Estimate area, select from choices in the near-right column, and score in the far column: Enter acreage of wetland here:_____acres, and source:_____	acres > 20.00 10 - 19.99 5 - 9.99 1 - 4.99 0.1 - 0.99 <0.1	 Yes=6 Yes=5 Yes=4 Yes=3 Yes=2 Yes=1 1
5b. Wetland classes: Circle the wetland classes below that qualify: Open Water: if the area of open water is > 1/2 acre or > 10% of the total wetland area. Source: _____ Aquatic Beds: if the area of aquatic beds > 10% of the open water area or > 1/2 acre. Emergent: if the area of emergent class is > 1/2 acre or > 10% of the total wetland area. Scrub-Shrub: if the area of scrub-shrub class is > 1/2 acre or > 10% of the total wetland area. Forested: if area of forested class is > 1/2 acre or > 10% of the total wetland area.		
Add the number of wetland classes, above, that qualify, and then score according to the columns at right. e.g. If there are 4 classes (aquatic beds, open water, emergent & scrub-shrub), you would circle 8 points in the far right column.	# of classes 1 ..... 2 ..... 3 ..... 4 ..... 5	 Yes =1 Yes =3 Yes =5 Yes =8 Yes =11 1
5c. Plant species diversity. For all wetland classes (at right) that qualify in 5b. above, count the number of different plant species you can find. You do not have to name them. Score in column at far right: e.g. If a wetland has an aquatic bed class with 3 species, an emergent class with 4 species and a scrub-shrub class with 2 species you would circle 2, 2, and 1 in the far column.	Class # of species Aquatic Bed 1-2... " " 3... " " > 3... Emergent 1-2... " 3-4... " > 4... Scrub-Shrub 1-2... " 3-4... " > 4... Forested 1... " 2... " > 2...	 Yes=1 Yes=2 Yes=3 Yes=1 Yes=2 Yes=3 Yes=1 Yes=2 Yes=3 Yes=1 Yes=2 Yes=3 3

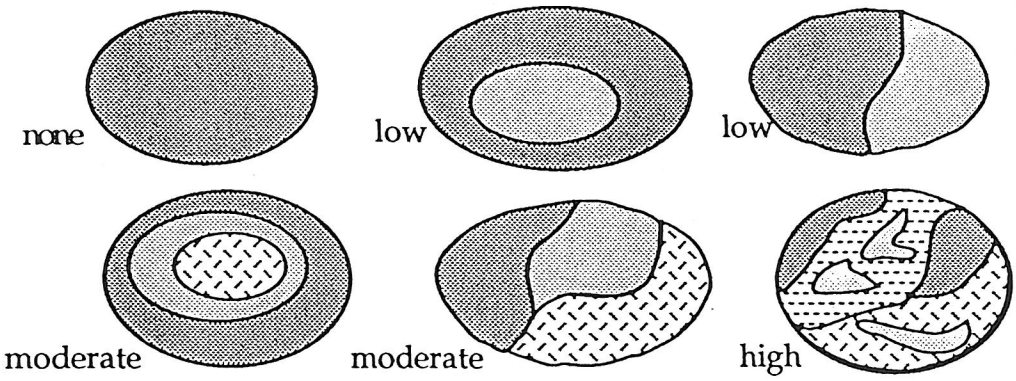
5

5d. Structural diversity.
If the wetland has a forested class, add 1 point for each of the following:

-trees > 50' tall	Yes=1
-trees 20'- 49' tall	Yes=1
-shrubs	Yes=1
-herbaceous ground cover	Yes=1

NA

5e. Decide from the diagrams below whether interspersion between wetland classes is high, moderate, low or none?



High=3
Moderate=2
Low=1
None=0

0

5f. Habitat features.

Answer questions below, circle features that apply, and score to right:

Is there evidence of current use by beavers ?	Yes=3
Is a heron rookery located within 300'?	Yes=2
Are raptor nest/s located within 300'?	Yes=1
Are there at least 3 standing dead trees (snags) per acre?	Yes=1
Are any of these standing dead trees (snags) > 10" in diameter?	Yes=1
Are there any other perches (wires, poles or posts)?	Yes=1
Are there at least 3 downed logs per acre?	Yes=1

0

5g. Connection to streams. (Score one answer only.)

Is the wetland connected at any time of the year via surface water:

to a perennial stream or a seasonal stream with fish;	Yes=6
or, to a seasonal stream without fish;	Yes=4
or, is not connected to any stream?	Yes=0

4

9

5h. Buffers.

STEP 1 Estimate (to the nearest 5%) the % of each buffer or land-use type (below) that adjoins the wetland boundary. Then multiply the %/s by the factor(s) below and enter result in column to right:	STEP 2 Multiply result(s) of step 1: by 1, if buffer width is 25-50'; by 2, if buffer width is 50-100'; by 3, if buffer width is >100'. Enter results below and add subscore:
roads, buildings or parking lots: %___ x 0 =	0
lawn, grazed pasture, vineyards or annual crops: %___ x 1 =	____ x __ = ___
ungrazed grassland or orchards: %___ x 2 =	____ x __ = ___
open water or native grasslands: %___ x 3 =	____ x __ = ___
forest or shrub: %___ x 4 =	____ x __ = 1200
Add Buffer total =___	

STEP 3. Score points according to table at right :

Buffer total	
900-1200...	Yes=4
600-899....	Yes=3
300-599....	Yes=2
100-299....	Yes=1

4

5i. Connection to other habitat areas:

- Is there a riparian corridor to other wetlands within 0.25 of a mile, or a corridor > 100' wide with good forest or shrub cover to any other habitat area?..... Yes =6

- Is there a narrow corridor < 100' wide with good cover or a wide corridor > 100' wide with low cover to any other habitat area?..... Yes=4

- Is there a narrow corridor < 100' wide with low cover or a significant habitat area within 0.25 mile but no corridor?..... Yes=1

- Is the wetland and buffer completely isolated by development and or cultivated agricultural land?..... Yes=0

NOW: Add the scores circled (for Q.5a - Q.5i above) to get a Total..... Total = 19

Is the Total greater than or equal to 22 points..... Yes: Category II
No: Category III

WETLANDS RATING FIELD DATA FORM

BACKGROUND INFORMATION:

Name of Rater: Ed Sewall Affiliation: _____ Date: 12/09

Name of wetland (if known): Wetland J - Forest Ridge

Government Jurisdiction of wetland: Kittitas Co

Location: 1/4 S: _____ of 1/4 S: _____ SEC: 24 TWNSHP: 20N RNGE: 15E

SOURCES OF INFORMATION: (Check all sources that apply)

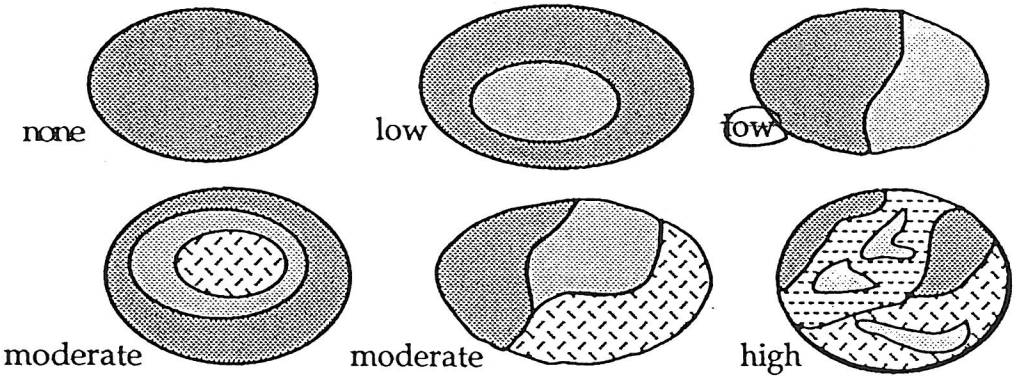
Site visit: ✓ USGS Topo Map: ✓ NWI map: ✓ Aerial Photo: ✓ Soils survey: ✓

Other: ___ Describe: _____

WHEN THE FIELD DATA FORM IS COMPLETE ENTER CATEGORY HERE:	2
Q.1. <u>High Quality Natural Heritage Wetland.</u> Answer this question if you have adequate information or experience to do so. If not find someone with the expertise to answer the questions. Then, if the answer to questions 1a, 1b and 1c are all NO, contact the Natural Heritage program of DNR.	Circle answers:
1a. Is there significant evidence of human-caused changes to topography or hydrology of the wetland? Significant changes <u>could</u> include clearing, grading, filling, logging of the wetland or its immediate buffer, or culverts, ditches, dredging, diking or drainage of the wetland. Briefly describe the changes and your information source/s: logged, slash pile within	Yes: go to Q3. No: go to 1b.
1b. Are there populations of non-native plants which are currently present and appear to be invading native populations? Briefly describe any non-native plant populations and information source(s): _____	Yes: go to Q.3. No: go to 1c.
1c. Is there significant evidence of human-caused disturbance of the water quality of the system? Degradation of water quality could be evidenced by culverts entering the system, direct road/parking lot runoff, evidence of historic dumping of wastes, oily sheens, extreme eutrophic conditions, livestock use or dead fish etc. Briefly describe: _____	Yes: go to Q.3. No: <u>Possible Category I</u>

Q.2. Regionally Rare Native Wetland Communities The Department of Ecology is developing a methodology for regionally rare native wetland communities. It is not yet available for use.	
Q.3. Irreplaceable Ecological Functions: Does the wetland: - have at a least 1/2 acre of contiguous peat wetland; . . . . . . - or, have a forested class greater than 1 acre ;	No to both; go to Q.4. Yes: go to 3a. Yes: go to 3b.
Q.3a. Peat Wetlands. 3a1. Does at least 1/2 acre of the contiguous peat wetland have < 25% areal cover of any combination of species from the list of invasive/exotic species on p.19, and have < 80% areal cover of *Spirea douglasii*?.	Yes: Category I No: go to Q.4.
Q.3b. Mature forested wetland. 3b1. Is the average age of dominant trees in the forested wetland > 80 years?	Yes: Category I No: go to 3b2.
3b2. Is the average age of dominant trees in the forested wetland 50-80 years, and is the structural diversity high as characterized by a multi-layer community of trees > 50' tall and trees 20'-49' tall and shrubs and herbaceous groundcover? . .	Yes: go to 3b3. No: go to Q.5.
3b3. Is > 50% (areal cover) of the dominant plants in one or more layers (canopy, young trees, shrubs, herbs) invasive/exotic plant species from the p.19 list?. .	Yes: go to Q.5. No: Category I
Q.4. Category IV wetlands 4.1. Is the wetland: less than 1 acre and, hydrologically isolated and, comprised of one vegetated class that is dominated (> 80% areal cover) by one species from the list in guidance p.18.	Yes: Category IV No: go to 4.2.
4.2. Is the wetland: less than two acres and, hydrologically isolated, with one vegetated class, and > 90% of areal cover is any combination of species from the list in guidance p.19.	Yes: Category IV No: go to Q.5.

Q.5. Significant habitat value. Answer all questions and enter data requested.		Circle scores that qualify
5a. Total wetland area Estimate area, select from choices in the near-right column, and score in the far column: Enter acreage of wetland here:_____acres, and source:_____	acres > 20.00 10 - 19.99 5 - 9.99 1 - 4.99 0.1 - 0.99 <0.1	 Yes=6 Yes=5 Yes=4 Yes=3 Yes=2 Yes=1 2
5b. Wetland classes: Circle the wetland classes below that qualify: Open Water: if the area of open water is > 1/2 acre or > 10% of the total wetland area. Source: _____ Aquatic Beds: if the area of aquatic beds > 10% of the open water area or > 1/2 acre. Emergent: if the area of emergent class is > 1/2 acre or > 10% of the total wetland area. Scrub-Shrub: if the area of scrub-shrub class is > 1/2 acre or > 10% of the total wetland area. Forested: if area of forested class is > 1/2 acre or > 10% of the total wetland area. Add the number of wetland classes, above, that qualify, and then score according to the columns at right. e.g. If there are 4 classes (aquatic beds, open water, emergent & scrub-shrub), you would circle 8 points in the far right column.	# of classes 1 . . . . . . 2 . . . . . . 3 . . . . . . 4 . . . . . . 5	

5d. Structural diversity. If the wetland has a forested class, add 1 point for each of the following: -trees > 50' tall -trees 20'- 49' tall -shrubs -herbaceous ground cover	 Yes=1 Yes=1 Yes=1 Yes=1
5e. Decide from the diagrams below whether interspersion between wetland classes is high, moderate, low or none?  	High=3 Moderate=2 Low=1 None=0
5f. Habitat features. Answer questions below, circle features that apply, and score to right: Is there evidence of current use by beavers ? Is a heron rookery located within 300'? Are raptor nest/s located within 300'? Are there at least 3 standing dead trees (snags) per acre? Are any of these standing dead trees (snags) > 10" in diameter? Are there any other perches (wires, poles or posts)? Are there at least 3 downed logs per acre?	 Yes=3 Yes=2 Yes=1 Yes=1 Yes=1 Yes=1 Yes=1
5g. Connection to streams. (Score one answer only.) Is the wetland connected at any time of the year via surface water: to a perennial stream or a seasonal stream with fish; or, to a seasonal stream without fish; or, is not connected to any stream?	 Yes=6 Yes=4 Yes=0

17

5h. Buffers.

STEP 1 Estimate (to the nearest 5%) the % of each buffer or land-use type (below) that adjoins the wetland boundary. Then multiply the %/s by the factor(s) below and enter result in column to right:	STEP 2 Multiply result(s) of step 1: by 1, if buffer width is 25-50'; by 2, if buffer width is 50-100'; by 3, if buffer width is >100'. Enter results below and add subscore:
roads, buildings or parking lots: %___ x 0 =	0
lawn, grazed pasture, vineyards or annual crops: %___ x 1 =	____ x __ = ___
ungrazed grassland or orchards: %___ x 2 =	____ x __ = ___
open water or native grasslands: %___ x 3 =	____ x __ = ___
forest or shrub: %___ x 4 =	____ x __ = 120
	Add Buffer total =___

STEP 3. Score points according to table at right :

Buffer total	
900-1200...	Yes=4
600-899....	Yes=3
300-599....	Yes=2
100-299....	Yes=1

4

5i. Connection to other habitat areas:

- Is there a riparian corridor to other wetlands within 0.25 of a mile, or a corridor > 100' wide with good forest or shrub cover to any other habitat area?..... Yes =6

- Is there a narrow corridor < 100' wide with good cover or a wide corridor > 100' wide with low cover to any other habitat area?..... Yes=4

- Is there a narrow corridor < 100' wide with low cover or a significant habitat area within 0.25 mile but no corridor?..... Yes=1

- Is the wetland and buffer completely isolated by development and or cultivated agricultural land?..... Yes=0

6

NOW: Add the scores circled (for Q.5a - Q.5i above) to get a Total..... Total = 27

Is the Total greater than or equal to 22 points..... Yes Category II

No: Category III

WETLANDS RATING FIELD DATA FORM

BACKGROUND INFORMATION:

Name of Rater: Ed Sewall Affiliation: _____ Date: 12/04

Name of wetland (if known): Wetland K - Forest Ridge

Government Jurisdiction of wetland: Kittitas Co

Location: 1/4 S: _____ of 1/4 S: _____ SEC: 24 TWNSHP: 20 N RNGE: 15E

SOURCES OF INFORMATION: (Check all sources that apply)

Site visit: ✓ USGS Topo Map: ✓ NWI map: ✓ Aerial Photo: ✓ Soils survey: ✓

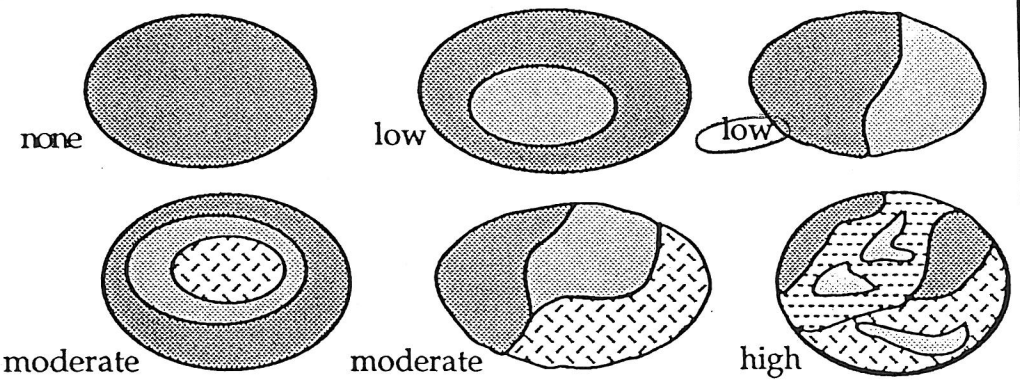
Other: ___ Describe: _____

WHEN THE FIELD DATA FORM IS COMPLETE ENTER CATEGORY HERE:	2
Q.1. <u>High Quality Natural Heritage Wetland.</u> Answer this question if you have adequate information or experience to do so. If not find someone with the expertise to answer the questions. Then, if the answer to questions 1a, 1b and 1c are all NO, contact the Natural Heritage program of DNR.	Circle answers:
1a. Is there significant evidence of human-caused changes to topography or hydrology of the wetland? Significant changes <u>could</u> include clearing, grading, filling, logging of the wetland or its immediate buffer, or culverts, ditches, dredging, diking or drainage of the wetland. Briefly describe the changes and your information source/s: logged	Yes: go to Q.3 No: go to 1b.
1b. Are there populations of non-native plants which are currently present and appear to be invading native populations? Briefly describe any non-native plant populations and information source(s): _____	Yes: go to Q.3. No: go to 1c.
1c. Is there significant evidence of human-caused disturbance of the water quality of the system? Degradation of water quality could be evidenced by culverts entering the system, direct road/parking lot runoff, evidence of historic dumping of wastes, oily sheens, extreme eutrophic conditions, livestock use or dead fish etc. Briefly describe: _____	Yes: go to Q.3. No: <u>Possible Category I</u>

Q.2. Regionally Rare Native Wetland Communities The Department of Ecology is developing a methodology for regionally rare native wetland communities. It is not yet available for use.	
Q.3. Irreplaceable Ecological Functions: Does the wetland: - have at a least 1/2 acre of contiguous peat wetland; . . . . . . - or, have a forested class greater than 1 acre ;	No to both: go to Q.4. Yes: go to 3a. Yes: go to 3b.
Q.3a. Peat Wetlands. 3a1. Does at least 1/2 acre of the contiguous peat wetland have < 25% areal cover of any combination of species from the list of invasive/exotic species on p.19, and have < 80% areal cover of *Spirea douglasii*?.	Yes: Category I No: go to Q.4.
Q.3b. Mature forested wetland. 3b1. Is the average age of dominant trees in the forested wetland > 80 years?	Yes: Category I No: go to 3b2.
3b2. Is the average age of dominant trees in the forested wetland 50-80 years, and is the structural diversity high as characterized by a multi-layer community of trees > 50' tall and trees 20'-49' tall and shrubs and herbaceous groundcover? . .	Yes: go to 3b3. No: go to Q.5.
3b3. Is > 50% (areal cover) of the dominant plants in one or more layers (canopy, young trees, shrubs, herbs) invasive/exotic plant species from the p.19 list?. .	Yes: go to Q.5. No: Category I
Q.4. Category IV wetlands 4.1. Is the wetland: less than 1 acre and, hydrologically isolated and, comprised of one vegetated class that is dominated (> 80% areal cover) by one species from the list in guidance p.18.	Yes: Category IV No: go to 4.2.
4.2. Is the wetland: less than two acres and, hydrologically isolated, with one vegetated class, and > 90% of areal cover is any combination of species from the list in guidance p.19.	Yes: Category IV No: go to Q.5.

Q.5. Significant habitat value. Answer all questions and enter data requested.		Circle scores that qualify
5a. Total wetland area Estimate area, select from choices in the near-right column, and score in the far column: Enter acreage of wetland here:____acres, and source:_____	acres > 20.00 10 - 19.99 5 - 9.99 1 - 4.99 0.1 - 0.99 <0.1	 Yes=6 Yes=5 Yes=4 Yes=3 Yes=2 Yes=1
5b. Wetland classes: Circle the wetland classes below that qualify: Open Water: if the area of open water is > 1/2 acre or > 10% of the total wetland area. Source: _____ Aquatic Beds: if the area of aquatic beds > 10% of the open water area or > 1/2 acre. Emergent: if the area of emergent class is > 1/2 acre or > 10% of the total wetland area. Scrub-Shrub: if the area of scrub-shrub class is > 1/2 acre or > 10% of the total wetland area. Forested: if area of forested class is > 1/2 acre or > 10% of the total wetland area. Add the number of wetland classes, above, that qualify, and then score according to the columns at right. e.g. If there are 4 classes (aquatic beds, open water, emergent & scrub-shrub), you would circle 8 points in the far right column.	# of classes 1 . . . . . . 2 . . . . . . 3 . . . . . . 4 . . . . . . 5	 Yes =1 Yes =3 Yes =5 Yes =8 Yes =11 3
5c. Plant species diversity. For all wetland classes (at right) that qualify in 5b. above, count the number of different plant species you can find. You do not have to name them. Score in column at far right: e.g. If a wetland has an aquatic bed class with 3 species, an emergent class with 4 species and a scrub-shrub class with 2 species you would circle 2, 2, and 1 in the far column.	Class — # of species Aquatic Bed 1-2... " " 3... " " > 3... Emergent 1-2... " 3-4... " > 4... Scrub-Shrub 1-2... " 3-4... " > 4... Forested 1... " 2... " > 2...	 Yes=1 Yes=2 Yes=3 Yes=1 Yes=2 Yes=3 Yes=1 Yes=2 Yes=3 Yes=1 Yes=2 Yes=3 5

9

5d. Structural diversity. If the wetland has a forested class, add 1 point for each of the following: -trees > 50' tall -trees 20'- 49' tall -shrubs -herbaceous ground cover	 Yes=1 Yes=1 Yes=1 Yes=1 NA
5e. Decide from the diagrams below whether interspersion between wetland classes is high, moderate, low or none?  	High=3 Moderate=2 ~~Low=1~~ None=0 1
5f. Habitat features. Answer questions below, circle features that apply, and score to right: Is there evidence of current use by beavers ? Is a heron rookery located within 300'? Are raptor nest/s located within 300'? Are there at least 3 standing dead trees (snags) per acre? Are any of these standing dead trees (snags) > 10" in diameter? Are there any other perches (wires, poles or posts)? Are there at least 3 downed logs per acre?	 Yes=3 Yes=2 Yes=1 Yes=1 Yes=1 Yes=1 Yes=1 0
5g. Connection to streams. (Score one answer only.) Is the wetland connected at any time of the year via surface water: to a perennial stream or a seasonal stream with fish; or, to a seasonal stream without fish; or, is not connected to any stream?	 Yes=6 ~~Yes=4~~ Yes=0 4

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5h. Buffers.

STEP 1 Estimate (to the nearest 5%) the % of each buffer or land-use type (below) that adjoins the wetland boundary. Then multiply the %/s by the factor(s) below and enter result in column to right:	STEP 2 Multiply result(s) of step 1: by 1, if buffer width is 25-50'; by 2, if buffer width is 50-100'; by 3, if buffer width is >100'. Enter results below and add subscore:
roads, buildings or parking lots: %___ x 0 =	0
lawn, grazed pasture, vineyards or annual crops: %___ x 1 =	_____ x __ = ___
ungrazed grassland or orchards: %___ x 2 =	_____ x __ = ___
open water or native grasslands: %___ x 3 =	_____ x __ = ___
forest or shrub: %___ x 4 =	_____ x __ = ___
	Add Buffer total =___

STEP 3. Score points according to table at right :

Buffer total	
900-1200...	Yes=4
600-899....	Yes=3
300-599....	Yes=2
100-299....	Yes=1

4

5i. Connection to other habitat areas:

- Is there a riparian corridor to other wetlands within 0.25 of a mile, or a corridor > 100' wide with good forest or shrub cover to any other habitat area?..... Yes =6

- Is there a narrow corridor < 100' wide with good cover or a wide corridor > 100' wide with low cover to any other habitat area?..... Yes=4

- Is there a narrow corridor < 100' wide with low cover or a significant habitat area within 0.25 mile but no corridor?..... Yes=1

- Is the wetland and buffer completely isolated by development and or cultivated agricultural land?..... Yes=0

6

NOW: Add the scores circled (for Q.5a - Q.5i above) to get a Total..... 24

Is the Total greater than or equal to 22 points..... Yes: Category II / No: Category III

FOREST RIDGE

Streams and Wildlife Habitat Study

RECEIVED
DEC 2 9 2009
KITTITAS COUNTY
CDS

Prepared for:

Sapphire Skies
206 West First Street
Cle Elum, WA 98922

December 2009



ESA Adolfson

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1.0 INTRODUCTION

At the request of Sapphire Skies, ESA Adolfson (ESA) conducted a wildlife habitat study for the Forest Ridge residential developments and prepared this technical report to support overall site evaluation and Kittitas County permitting. The study area for this project is approximately 483 acres located north of Columbia Avenue on the South Cle Elum ridge, and includes portions of Steiner's Canyon (Township 20 North, Range 15 East, Sections 23 and 24). The proposed development is a 171-lot subdivision north of the City of Cle Elum (Figure 1) (Forest Ridge Performance Based Cluster Plat August 2009). This report has been written to address habitats for the property as defined by the Kittitas County Code (KCC) Chapter 17A Critical Areas.

2.0 METHODS

2.1 Scope of Work

ESA conducted surveys for streams and terrestrial wildlife, with emphasis on avian species and large mammals. Wildlife habitat is defined in KCC Chapter 17A Critical Areas (17A.02.090; 17A.02.230; 17A.02.250). Wetland delineations were performed by Brookside Consulting and Sewall Wetland Consulting, Inc. and were not included in ESA's scope of work. Wetlands and streams were surveyed by Encompass Engineering & Surveying with Baima & Holmberg. Information on wetlands and streams was provided by others.

2.2 Review of Agency Databases and Existing Information

State and federal agency databases were searched to determine if any listed or priority species occur in the vicinity of the study area. A search of the Washington Department of Fish and Wildlife (WDFW) Priority Habitats and Species (PHS) database was conducted on October 16, 2009 for the vicinity of Township 20 North, Range 15 East, Sections 23 and 24. The National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS) list of federally threatened, endangered, proposed, candidate species of concern and critical habitat for Kittitas County, and the Washington State Department of Natural Resources (DNR) Natural Heritage Program database were reviewed (October 2009). The species lists are included as Appendix A.

ESA biologists reviewed existing literature, maps, and other materials to identify vegetation types and wildlife habitats in the study area and surrounding vicinity. Wildlife habitat was preliminarily evaluated and mapped through the interpretation of aerial photographs (October 22, 2009). Several documents were reviewed:

- Kittitas County Mapsifter, accessed at http://www.co.kittitas.wa.us/cds/default.asp ;
- National Wetland Inventory (NWI) Online Mapping Tool (2009);
- NRCS Web Soil Survey (USDA, 2009);

- Aerial orthophotographs (USDA, National Agriculture Imagery Program, 2007);
- U.S. Geological Survey 1:24,000 Topographic Map, Cle Elum quadrangle (1973);
- WDFW Priority Habitats and Species (PHS) mapping (2009);
- WDFW SalmonScape mapping (2009);
- WA Natural Heritage Program Species List for Kittitas County, dated July 2009;
- US Fish and Wildlife Service (USFWS) list of Endangered, Threatened, Proposed and Candidate Species in Kittitas County, dated July 24, 2008 (accessed October 22, 2009); and
- National Marine Fisheries Service (NMFS) Endangered Species Act Status of West Coast Salmon & Steelhead, dated July 1, 2009 (accessed October 22, 2009).

2.3 Wildlife Habitat Assessment and Survey

Wildlife habitat in the study area was evaluated in the field during two days of reconnaissance-level investigation in October 2009. Adolfson biologists applied the assessment methods described in *Wildlife–Habitat Relationships in Oregon and Washington* (Johnson and O'Neil, 2001) to describe and evaluate common habitat types in the study area. Biologists from the Washington Department of Fish and Wildlife (WDFW) developed these methods with input from a panel of regional wildlife experts and information collected from more than 12,000 pertinent publications.

Habitats preliminarily mapped using aerial photographs were ground-truthed and assessed at three levels of detail for presence of: wildlife habitat types, structural conditions, and habitat elements. Field investigations also included observations of current threats to habitat and opportunities for improving habitat.

Wildlife observations, both visual and auditory, were recorded while walking through different habitat types and vegetation communities that exist in the study area. Animal tracks and sign, such as scat, pellets, or excavations were also recorded.

3.0 KITTITAS COUNTY REGULATIONS

The Growth Management Act (GMA) requires Kittitas and other counties and cities in Washington to designate and protect critical areas including wildlife habitat. The Kittitas County Critical Areas Ordinance (CAO) addresses this requirement through policies that require the County to protect "Habitat," as defined in KCC 17A.07. Certain species are also protected through the establishment of fish and wildlife habitat conservation areas (KCC 17A.02).

As defined in KCC 17A.07, habitats identified as critical areas fall within five separate designations, as described in the following sections.

3.1 Riparian habitat

Riparian habitat critical areas include stream corridors that are Type 1, 2 and 3 waters (as defined in KCC 17A.02) and portions of Type 4 and 5 waters where they intersect with Type 1, 2 or 3 waters. Riparian habitats have performance standard buffers as follows:

- Type 1 waters: 40-200 feet from OHWM
- Type 2 waters: 40-100 feet from OHWM
- Type 3 waters: 20-50 feet from OHWM
- Type 4 waters: 10- 20 feet from the intersection with a Type 1, 2 or 3 water for a distance of 40 to 500 feet. From the point at which the buffer ends (40 - 500 feet upstream from the confluence), there shall be a 15-foot structural setback from the ordinary high water mark.
- Type 5 waters: None required (buffering will be provided by the Type 1, 2 or 3 waters' buffers). Note: Building setbacks from a Type 5 water will be 15 feet, unless a buffer greater than or equal to the 15-foot setback is in place.

Buffer ranges are based on the impact of certain intense land uses on riparian habitat functions and values. The director shall base a buffer size on multiple factors, such as overall intensity of proposed land use, the presence of listed species, and the inclusion of a buffer enhancement plan (KCC 17A.07.010 (3)).

The director may also average buffers widths on riparian habitat buffers where the applicant demonstrates:

a) That averaging is necessary to avoid an extraordinary hardship to the applicant caused by circumstances peculiar to the property;

b) That the riparian habitat contains variations in sensitivity due to existing physical characteristics;

c) That the proposed use would be located adjacent to areas where buffer width is reduced, and that such land uses will not have a significant adverse impact to the habitat and its buffer;

d) That buffer width averaging will not adversely impact riparian habitat functions and values.

KCC 17A.07.010 (6) states several allowed uses within riparian habitat buffers. Allowed uses are exempt activities or activities deemed by the administrator to be consistent with the purpose and function of the habitat buffer and which do not cause a significant adverse impact to the habitat and its buffer based on sensitivity of the habitat, including but not limited to: stock watering, utilization of water rights, trails, recreational uses, hunting, and fishing.

3.2 Designation of Big Game Winter Range

According to the KCC, big game winter range constitutes all federal land and all land owned or leased by WDFW. The existing range conservation and management program of WDFW is long established and relies upon voluntary agreements with landowners together with state purchase of appropriate lands.

3.3 Priority Species Habitat

The designation of priority species habitat is used when threatened, endangered, or sensitive priority species known to occur on a site not located in a riparian habitat, floodplain, or wetland (which are protected under other parts of KCC Chapter 17A). If priority species are determined to be within a project area in Kittitas County, then protective measures for the designated area shall be determined by reference to applicable state and federal law for the protection of threatened, endangered, or sensitive priority species.

3.4 Habitats for Species of Local Importance

Habitats for species of local importance are designated through nomination and subsequent consideration by the Kittitas planning commission, which then make a recommendation to the Kittitas County board of commissioners. The nomination and decision must consider: a) a seasonal range or habitat element which if altered may reduce the likelihood that the species will maintain or reproduce over the long term; b) areas of high relative density or species richness, breeding habitat, winter range, and movement corridors; c) habitat with limited availability or high vulnerability to alteration; d) whether these habitats are already identified and protected under the provisions of this or other county ordinances or state or federal law.

Adoption of a habitat of local importance will result in an amendment to KCC Chapter 17A. At the time of amendment adoption, designating habitat for species of local importance, the County shall also adopt performance standards based upon recommendations from County residents and appropriate government agencies.

As of the writing of this report, no habitats for species of local importance have been adopted for Kittitas County.

3.5 Species of Local Importance

Species of local importance are designated through the same process as described previously for habitats of local importance. The nomination and decision must consider a) concern due to population status; or b) sensitivity to habitat manipulation.

As of the writing of this report, no species of local importance have been adopted for Kittitas County.

4.0 FINDINGS

The following sections describe the results of the review of existing information and field investigation. ESA biologists Steve Krueger, Adam Merrill and Rosemary Baker conducted the field investigation on October 26 and 27, 2009.

4.1 Watershed Setting

The study area is located in the Upper Yakima watershed in Water Resource Inventory Area 39 (WRIA 39). Several small, unnamed headwater tributaries drain South Cle Elum Ridge within the study area. The unnamed tributaries flow to south to their confluence with the Yakima River, located south and approximately 1.3 miles outside the study area. Land use within the watershed vicinity is comprised of urban and rural residential, public forest land, private timberland, and mixed agricultural use.

4.2 Existing Information

The NWI online mapping tool does not identify wetlands in the study area but does indicate several streams flowing north to south located throughout the study area (Figure 2). USGS topographic mapping indicates the presence of Steiner's Canyon within the southwest portion of the study area and web soil survey mapping indicates that the study area is comprised entirely of well-drained Teanaway loam with 10 to 25 percent slopes.

Approximately 0.1 acres of the northeast tip of the study area overlaps with mapped historic spotted owl range (WDFW, 2009). Pileated woodpecker and northern goshawk occurrences are mapped throughout the north Cle Elum ridge vicinity with the closest occurrences located approximately one mile north and north east of the study area.

4.2.1 Wetlands and streams

Eleven wetlands were delineated within the study area (Figure 2). Wetlands are referred to as Wetlands A through K. Eight of these are associated with the headwaters of on-site streams. Five total drainage features and streams were surveyed within the study area; these are referred to as Streams A, B, E, F and G. For complete wetland characterizations refer to the *Forest Ridge – Existing Conditions Kitittas County Critical Areas Report* (Brookside Consulting and Sewall Wetland Consulting, Inc.; Encompass Engineering & Surveying with Baima & Holmberg 2009).

4.2.2 Off-site wetlands and streams

The closest NWI mapped wetland in the vicinity of the study area is a permanently ponded and excavated palustrine aquatic bed wetland located approximately 1.2 miles to the south located within the city of Cle Elum. Other mapped wetlands in the vicinity are approximately 1.5 to 2 miles to the south located along I-90, are excavated and permanently ponded stormwater systems or riverine and palustrine forested and shrub-scrub wetlands associated with the Yakima River.

4.3 Wildlife Habitat Types

According to the wildlife habitat classification system organized by Johnson and O'Neil (2001), the Forest Ridge property contains two habitat types:

- Eastside (Interior) Mixed Conifer Forest
  - Shrub-sapling conifer forest
- Eastside (Interior) Riparian - Wetlands
  - Eastside Midmontane Riparian shrublands

Figure 3 shows the extent of these habitat types within the study area. Each of these habitat types is discussed in detail below. Wildlife species that are associated with the various habitat types are listed in Appendix B. The species listed in Appendix B are those that could be present in the study area based on the habitat types present. Species actually observed in the study area during field studies for this project are listed in Table 1. Vegetation observed in the study area are listed in Appendix C.

4.3.1 Eastside (Interior) Mixed Conifer Forest

Eastside mixed conifer forest is the most common habitat type observed and occurs over 442 acres of the study area (Figure 3). Within this habitat type, one distinct vegetative community was identified during the field investigation: shrub/sapling (regenerating) conifer forest, which has been harvested in the last 20-30 years (Photos 1 and 2). Forest structural elements defined by Johnson and O'Neil (2001) include tree size, number of canopy layers, and canopy closure. No mature mixed conifer forest is present in the study area.

Shrub/sapling conifer forest in the study area is comprised of Grand fir, Douglas fir, and ponderosa pine. Most trees within this habitat type are only 10-20 feet tall and less then 12-inches diameter at breast height (dbh). The shrub community consists of large (<10 feet tall) serviceberry, Mackenzie willow, and oceanspray with a sub-shrub layer dominated by snowberry, roses, birch-leaved spiraea, pinemat manzanita, and kinnickinnik. Grasses, lupine, wild strawberry, arrow-leaf balsamroot, and yarrow are dominant in the herbaceous layer. Stumps, downed decaying logs, and porous soils are common throughout this habitat type providing nest sites, perches, burrowing habitat, and food sources for wildlife.

The majority of the Forest Ridge plats, approximately 285 acres of the study area, consist of shrub/sapling conifer forest. Photos 1 and 2 show areas that are representative of this habitat type.

In general, eastside shrub/sapling conifer forest habitat in the study area provides wildlife habitat. Within the study area, existing dirt roads interrupt connectivity in some areas, but the roads are narrow with some overreaching tree canopies. The area has good interspersion of habitats containing shrub thickets intermixed with conifer islands, riparian drainages, and meadow. In the project vicinity, eastside conifer forest occurs in patches disrupted by residential development, roads, and utilities. Habitat connectivity exists between the study area habitat and areas of intact forest to the west, north, and east of study area boundaries. The site contains relatively few invasive non-native plants. When present, invasives have limited distribution,

mainly along roads or other disturbed areas. Invasive species include knapweed, Canada thistle, and cheat grass.

According to Johnson and O'Neil (2001), wildlife species associated with and present in the eastside conifer forest habitat type include 116 birds, 81 mammals, 12 amphibians and 11 reptiles. Appendix B contains a complete list of these potential species and the definitions of association.

4.3.2 Eastside (Interior) Riparian

Eastside Riparian and more specifically **eastside midmontane riparian shrublands** in the study area are generally associated with the seasonal spring-melt headwater drainages and streams oriented from north to south throughout the study area. These riparian habitats cover approximately 40.5 acres of the study area. According to Johnson and O'Neil (2001) riparian habitats and in particular riparian forest and shrublands appear on sites subject to temporary flooding during spring runoff. Eastside riparian habitats occur along streams, seeps, and lakes within the Eastside Mixed Conifer Forest with often nearly completely closed thickets. The dominant plant species observed in this habitat type were vine maple, serviceberry, Mackenzie willow, Scouler's willow, beaked hazelnut, oceanspray, sapling Douglas fir, grand fir, and ponderosa pine, roses, snowberry, bitter cherry, thimbleberry, black-capped raspberry, and trailing blackberry (Photo 4, 6, and 7). The dominant herbaceous species found within this wetland complex are wood's strawberry, bracken fern, penstemon, monkeyflower, and various sedges and grasses.

Several of the riparian headwater drainages contained no discernable channel and were entirely and thickly vegetated with shrubs, herbs, and grasses and some interspersion of small to large trees. Riparian streams in the study area contained two to four feet wide and one to four feet deep channels with evidence of scour from spring melt and an absence of herbaceous vegetation (Photo 5). Substrate within the stream channels consisted primarily of fines, sand, occasional patches of small gravel and some areas of bedrock.

Eastside riparian provide valuable habitat for many wildlife species that reside in or migrate through the area. Studies show that wildlife species abundance and diversity are higher in riparian-wetland areas than in other habitat types because these areas generally provide:

- Greater structural and plant diversity;
- Edge habitat (where two or more habitat types adjoin);
- Varied forage; and
- A predictable water source (Kauffman, et al., 2001 *in* Johnson and O'Neil, 2001; O'Connell et al., 2000).

According to Johnson and O'Neil (2001), eastside riparian-wetlands have the greatest bird species richness (155 species). The structurally diverse deciduous habitats dominated by cottonwoods, alder, willows, and maples are heavily used by birds, particularly for breeding. Elk and deer also use riparian areas as important forage areas as well as shelter. A complete list of these potential species is provided in Appendix B.

4.4 Wildlife Observations

General observations of wildlife use on the site were recorded during the October 2009 visit. Weather conditions during the first day of the study were rainy and overcast with light overnight snow. Temperatures were in the 30s and 40s. The second day remained overcast with sunbreaks and temperatures in the 40s. Table 1 is a list of wildlife species observed, and is grouped into the habitat types previously described.

Table 1: Wildlife Observations by Habitat Types

	Eastside Mixed Conifer Forrest	Eastside Riparian Wetlands
Birds		
American robin	X	
Black-capped chickadee	X	X
Dark-eyed junco	X	
Northern flicker	X	X
Red-breasted nuthatch	X	X
Steller's jay	X	X
Varied thrush	X	
Mammals		
Mule deer (scat, tracks)	X	X
Douglas squirrel	X	X
Least chipmunk	X	
Elk (scat, tracks)	X	X
Mountain beaver (tunnels)	X	X
Coyote (scat)	X	X

4.4.1 Birds

The shrub/sapling conifer forest, support a diverse community of trees and shrubs that provide food and shelter for songbirds, raptors and woodpeckers. Common bird species observed in the conifer forest habitat within the study area include Steller's jay, northern flicker, red-breasted nuthatch, and dark-eyed junco.

Bird species closely associated with the sapling and shrub component of the conifer forest include Steller's jay, white-crowned sparrow, rufous hummingbird, brown-headed cowbird, dark-eyed junco and spotted towhee.

4.4.2 Mammals

Mammals observed during the field investigation included Douglas squirrel and least chipmunk. Local residents have routinely observed Rocky Mountain elk within the study area and ESA

biologists found both tracks and scat of Rocky Mountain elk, and mule deer throughout the study area during the field investigation. Coyote scat was observed along the road. Northern pocket gopher excavations were also observed at the tops of ridges in areas dominated by herbs and grasses with little underbrush. It is likely that other mammal species including opossum, weasel, bat species, mountain beaver, cougar, and black bear also use habitats within the study area (see Appendix B).

4.4.3 Amphibians and Reptiles

ESA biologists did not encounter any reptiles or amphibians during the October 2009 field investigation. Due to the scarcity, isolation, and seasonality of wet habitats it is unlikely but possible that Pacific chorus frog, Western toad, spotted frog, and long-toed salamander use habitats in the study area. Reptile species such as alligator lizard, rubber boa, racer, garter snake and western fence lizard are expected to inhabit upland areas (see Appendix B).

4.4.4 Fish

No fish were observed in the study area. The streams observed on the property are seasonal with intermittent flow and do not provide fish habitat.

5.0 REGULATORY IMPLICATIONS

5.1 Listed and Priority Species

Listed species include those species designated by federal or state government agencies (USFWS, National Marine Fisheries Service (NMFS), and WDFW) as endangered and threatened. Priority species include listed species as well as proposed, candidate, sensitive, and monitor species. Several game species are considered priority species as well as vulnerable aggregations of species or groups of animals susceptible to significant population declines (e.g. heron rookeries, fish spawning areas). In addition, native and non-native fish and wildlife species of recreational or commercial importance, and recognized species used for tribal ceremonial and subsistence purpose that are vulnerable to habitat loss or degradation are considered priority species by WDFW.

The USFWS and NMFS were consulted for listed species that may potentially occur in the vicinity of the study area. Appendix A contains the federal species lists. The WDFW PHS and SalmonScape databases were consulted for known occurrences of listed species in the study area (WDFW, 2009; WDFW, 2009).

No state or federally listed species were observed during the field investigation however the very northeast corner (0.1 acres) of the study area falls within range of the historic northern spotted owl (WDFW, 2009) (Figure 3). The Fisher, a federal species of concern, is likely to use habitat within the study area, however, none were observed during this study. The study area does not contain habitat for federally listed or candidate species in Kittitas County, including: gray wolf, bull trout, grizzly bear, Canada lynx, marbled murrelet, greater sage-grouse or yellow-billed

cuckoo. These species either have a distribution range that occurs outside of the study area or they require a specific habitat type that is not present within the study area. Priority wildlife species, as designated by WDFW, were observed in the study area included: black-tailed deer and Rocky Mountain elk.

No state or federally-listed fish species are known to occur in the study area and none were observed during field investigations (WDFW, 2009; WDFW, 2009).

5.2 Kittitas County Designated Habitats

Of the five designated habitats described in KCC 17A.07, none occur within the study area. The unnamed tributaries are classified as Type 4 and Type 5 waterways because of their seasonal and intermittent nature with a channel width of two feet or less between the OHWM. These waterways do not intersect with Type 1, 2, or 3 waters and therefore do not meet the code definition of riparian habitat [17A.07.010(1)]. According to KCC 17A.07.010 (2), Type 5 waters do not have a standard buffer, but building setbacks from a Type 5 water will be 15 feet.

Neither big game winter range, habitat for species of local importance, nor species of local importance occur in the study area. The closest area of big game winter range occurs southeast of the study area in the LT Murray Wildlife Area. The LT Murray State Wildlife Recreation Area is managed by WDFW and supports a large herd of Rocky Mountain elk.

As stated in KCC 17A.07.020, the designation of priority species habitat will only occur if the threatened, endangered, or sensitive priority species is located in a riparian habitat, floodplain or wetland. No threatened, endangered, or sensitive species were observed during the field survey and PHS data did not indicate their presence on site. Lastly, at the time of this report, Kittitas County has not designated any habitats or species of local importance in the study area or its vicinity.

6.0 SUMMARY AND CONCLUSIONS

Based on our review of available information, agency databases, and the findings of the field investigation, the study area supports diverse wildlife habitats. However, no federal or state listed species are known to occur on the site and none were observed during field investigations.

The Forest Ridge plat developments have been designed to avoid and minimize impacts to existing waterways and wildlife habitat in the study area. The current design and layout of the proposed developments meet the intent and requirements of the Kittitas County Code, including the provisions for protecting waterways and riparian habitat areas. Under the August 2009 site plan contiguous patches of native forest habitat would be preserved as open space in accordance with Kittitas County requirements. The developments would not disturb the unnamed drainages. In addition, the developments have been designed to avoid all impacts to regulated wetlands and result minimal impacts to wetland buffers. The limited wetland buffer impact would be mitigated through wetland buffer averaging as allowed by KCC 17A.04.050.

The project would result in the loss of general upland forest habitat throughout the study area. In addition, some wildlife would likely be impacted by the introduction of human presence in previously undeveloped areas. Species such as cougar, black bear, and northern goshawk may avoid the area after development. Although the project area would support fewer individuals of some species after development, no species is likely to be excluded from the site. The unnamed headwater tributaries and existing wetlands would be preserved, and thus no impacts to fish are anticipated.

7.0 LIMITATIONS

Within the limitations of schedule, budget, and scope-of-work, we warrant that this study was conducted in accordance with generally accepted environmental science practices, including the technical guidelines and criteria in effect at the time this study was performed, as outlined in the Methods section. We have relied upon the BCE map of wetlands and streams as part of our assessment of wildlife habitat issues related to this project. The results and conclusions of this report represent the authors' best professional judgment, based upon information provided by the project proponent in addition to that obtained during the course of this study. No other warranty, expressed or implied, is made.

The information provided in this report is not a comprehensive inventory of all wildlife within the Sapphire Skies Forest Ridge property. Wildlife surveys were conducted in October 2009 during wet winter conditions. Some species that typically use the area for breeding, wintering, or during migration, may not have been present during the field studies.

8.0 REFERENCES

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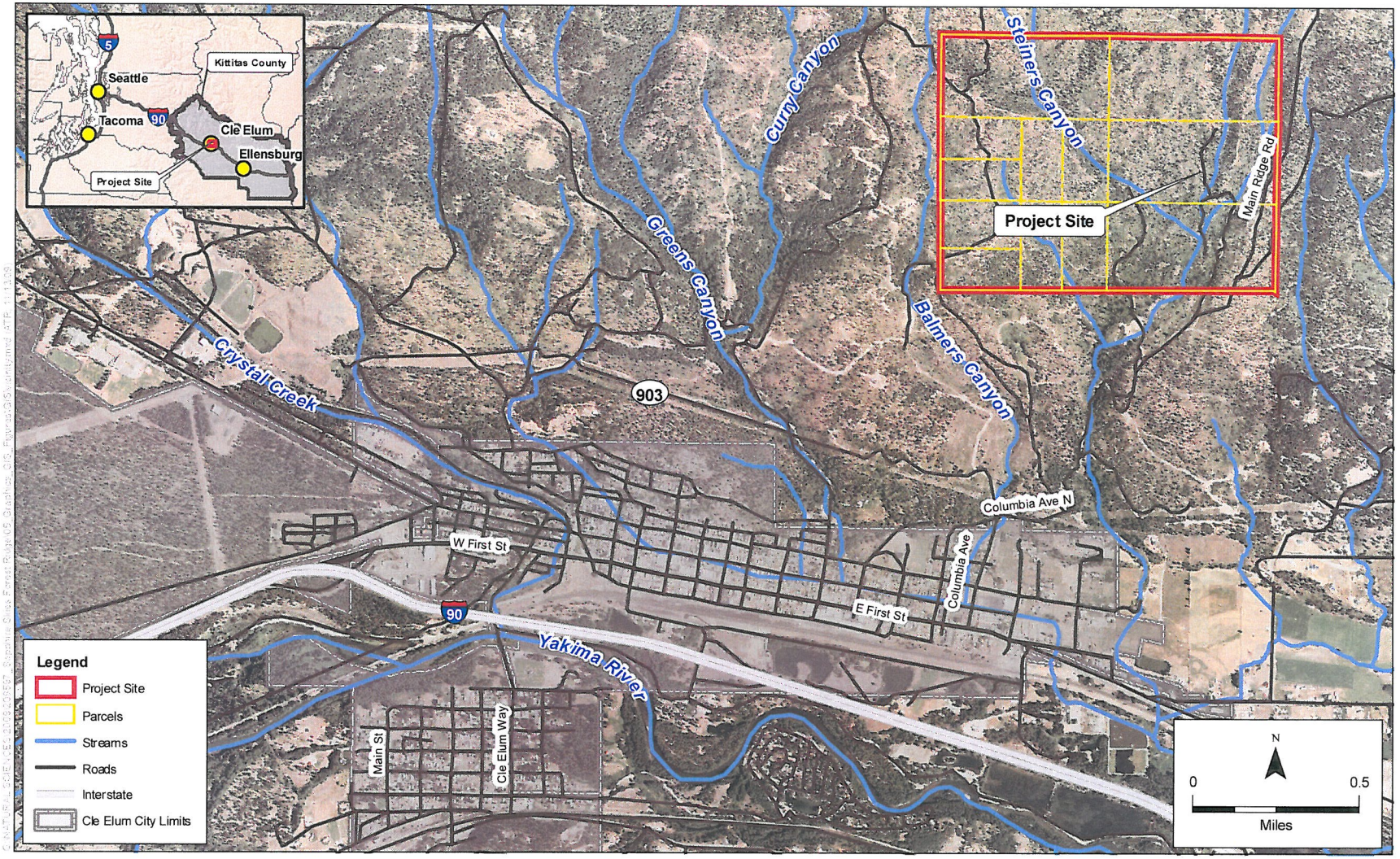
FIGURES AND PHOTOGRAPHS



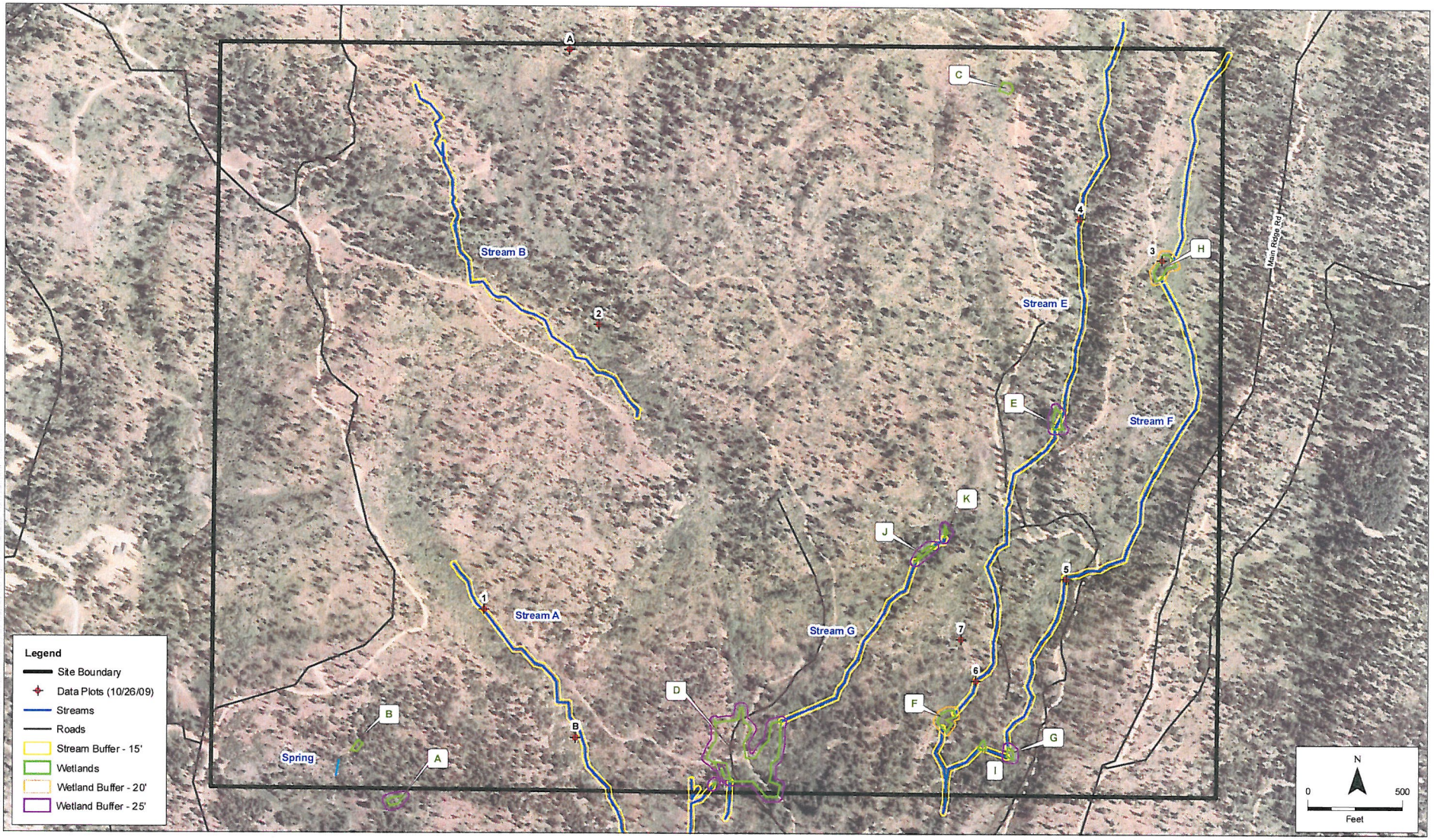
SOURCE: ESA Adolfson, 2009; ESRI, 2000; Kittitas County, 2009; NAIP (USDA), 2006 (Aerial)

Sapphire Skies Forest Ridge . 209597

Figure 1

Vicinity Map

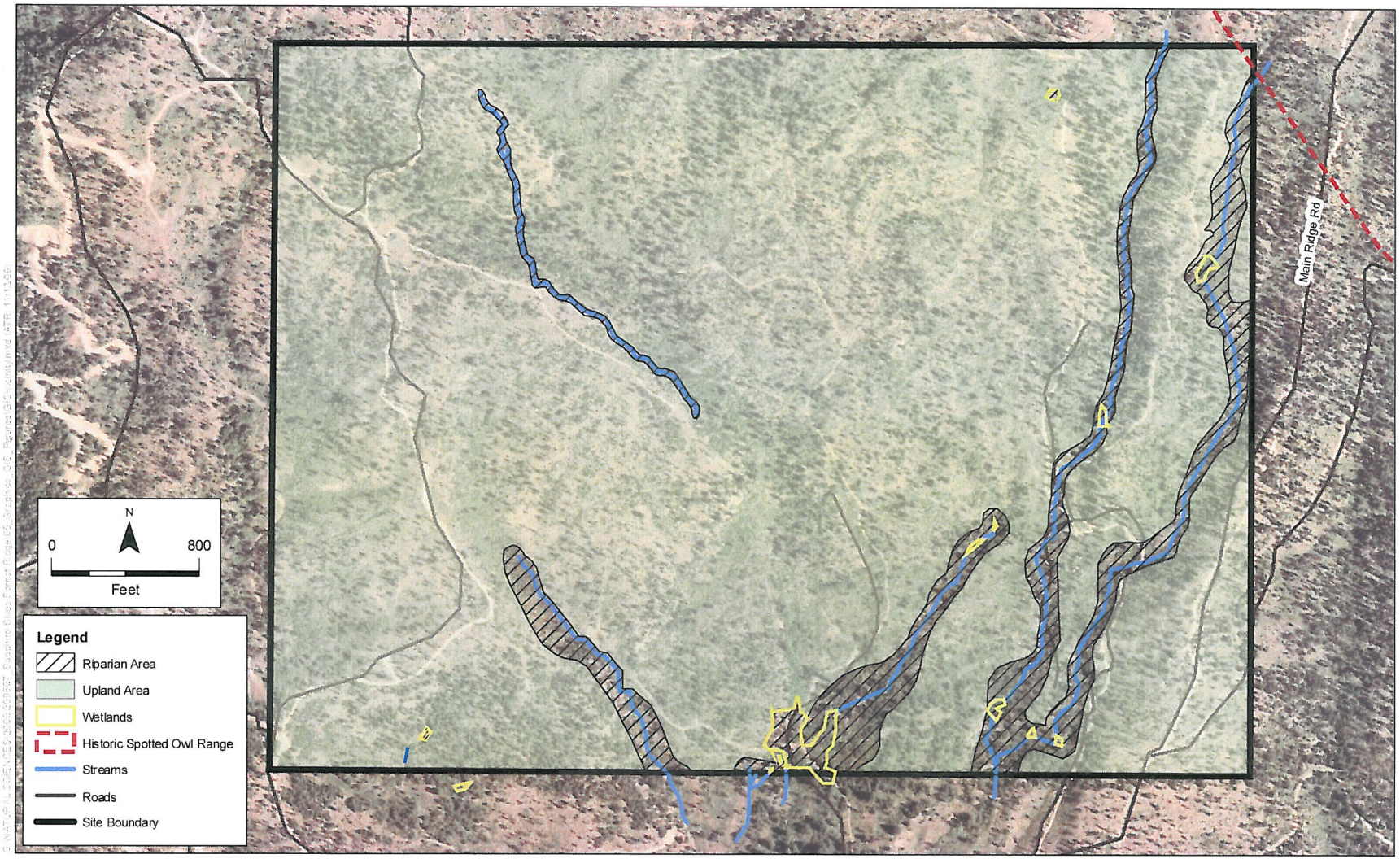
Kittitas County, Washington



SOURCE: ESA Adolfson, 2009; Brookside Consulting and Sewall Wetland Consulting, Inc, 2009; ESRI, 2000; Kittitas County, 2009; NAIP (USDA), 2006 (Aerial)

Sapphire Skies Forest Ridge . 209597

Figure 2
Streams and Wetlands
Kittitas County, Washington



SOURCE: Brookside Consulting and Sewall Wetland Consulting, Inc, 2009; ESRI, 2000; Kittitas County, 2009; NAIP (USDA), 2006

Sapphire Skies Forest Ridge . 209597

Figure 3

Habitat Types

Kittitas County, Washington



Photo 1: View of typical stand of Eastside open conifer forest within the project area looking south. (October 26, 2009).



Photo 2: View of typical Eastside conifer forest in the shrub/sapling (regenerating) stage (October 26, 2009).



Photo 3: View of herbaceous sloped wetland habitat located adjacent to the below seasonal headwater stream on the west side of the project area looking west (October 26, 2009).



Photo 4: View of seasonal headwater stream on west side of project area looking north (October 26, 2009).



Photo 5: Shrub-scrub wetland habitat present in the northeast region of the project area and associated with a riparian headwater stream (October 27, 2009).

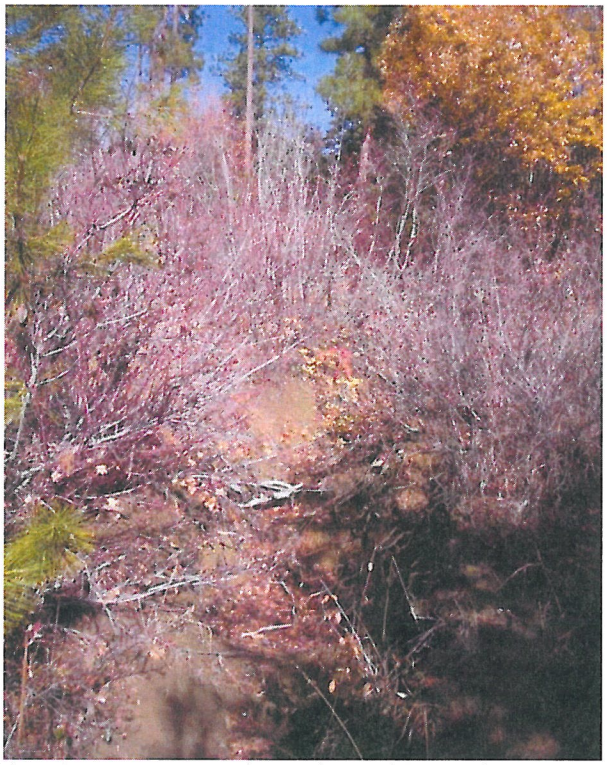


Photo 6: Seasonal headwater stream channel running north to south on the east side of the project area (October 27, 2009).



Photo 7: Typical riparian vegetation associated with unnamed drainage features in the study area (October 27, 2009).

APPENDIX A:
USFWS, NMFS, AND WA DNR SPECIES LISTS

NOAA/NMFS Endangered Species Act Status of West Coast Salmon and Steelhead List

Endangered Species Act Status of West Coast Salmon & Steelhead

(Updated July 1, 2009)

Species[1]			Current Endangered Species Act Listing Status[2]	ESA Listing Actions Under Review
Sockeye Salmon (*Oncorhynchus nerka*)	1	Snake River	Endangered	
	2	Ozette Lake	Threatened	
	3	Baker River	Not Warranted	
	4	Okanogan River	Not Warranted	
	5	Lake Wenatchee	Not Warranted	
	6	Quinalt Lake	Not Warranted	
	7	Lake Pleasant	Not Warranted	
Chinook Salmon (*O. tshawytscha*)	8	Sacramento River Winter-run	Endangered	
	9	Upper Columbia River Spring-run	Endangered	
	10	Snake River Spring/Summer-run	Threatened	
	11	Snake River Fall-run	Threatened	
	12	Puget Sound	Threatened	
	13	Lower Columbia River	Threatened	
	14	Upper Willamette River	Threatened	
	15	Central Valley Spring-run	Threatened	
	16	California Coastal	Threatened	
	17	Central Valley Fall and Late Fall-run	Species of Concern	
	18	Upper Klamath-Trinity Rivers	Not Warranted	
	19	Oregon Coast	Not Warranted	
	20	Washington Coast	Not Warranted	
	21	Middle Columbia River spring-run	Not Warranted	
	22	Upper Columbia River summer/fall-run	Not Warranted	
	23	Southern Oregon and Northern California Coast	Not Warranted	
	24	Deschutes River summer/fall-run	Not Warranted	
Coho Salmon (*O. kisutch*)	25	Central California Coast	Endangered	
	26	Southern Oregon/Northern California	Threatened	
	27	Lower Columbia River	Threatened	• Critical habitat
	28	Oregon Coast	Threatened	
	29	Southwest Washington	Undetermined	
	30	Puget Sound/Strait of Georgia	Species of Concern	
	31	Olympic Peninsula	Not Warranted	
Chum Salmon (*O. keta*)	32	Hood Canal Summer-run	Threatened	
	33	Columbia River	Threatened	
	34	Puget Sound/Strait of Georgia	Not Warranted	
	35	Pacific Coast	Not Warranted	
Steelhead (*O. mykiss*)	36	Southern California	Endangered	
	37	Upper Columbia River	Threatened	
	38	Central California Coast	Threatened	
	39	South Central California Coast	Threatened	
	40	Snake River Basin	Threatened	
	41	Lower Columbia River	Threatened	
	42	California Central Valley	Threatened	
	43	Upper Willamette River	Threatened	
	44	Middle Columbia River	Threatened	
	45	Northern California	Threatened	
	46	Oregon Coast	Species of Concern	
	47	Southwest Washington	Not Warranted	
	48	Olympic Peninsula	Not Warranted	
	49	Puget Sound	Threatened	• Critical habitat
	50	Klamath Mountains Province	Not Warranted	
Pink Salmon (*O. gorbuscha*)	51	Even-year	Not Warranted	
	52	Odd-year	Not Warranted	

1 The ESA defines a "species" to include any distinct population segment of any species of vertebrate fish or wildlife. For Pacific salmon, NOAA Fisheries Service considers an evolutionarily significant unit, or "ESU," a "species" under the ESA. For Pacific steelhead, NOAA Fisheries Service has delineated distinct population segments (DPSs) for consideration as "species" under the ESA.

USFWS
Northern Idaho and Eastern WA Endangered, Threatened, Proposed, and Candidate Species
KITTITAS COUNTY
Last Updated 7/24/2008 (accessed October 22, 2009)

LISTED

Endangered

Gray wolf *(Canis lupus)*

Threatened

Bull trout *(Salvelinus confluentus)* – Columbia River distinct population segment
Grizzly bear *(Ursus arctos horribilis)*
Canada lynx *(Lynx canadensis)*
Marbled murrelet *(Brachyramphus marmoratus)*
Northern spotted owl *(Strix occidentalis caurina)*
Spiranthes diluvialis (Ute ladies'-tresses), plant

Designated

Critical habitat for the northern spotted owl
Critical habitat for the Columbia River distinct population segment of the bull trout

CANDIDATE

Fisher *(Martes pennanti)* - West Coast distinct population segment
Greater sage grouse *(Centrocercus urophasianus)* – Columbia Basin distinct population segment
Yellow-billed cuckoo (*Coccyzus americanus*)

SPECIES OF CONCERN

Animals

Bald eagle *(Haliaeetus leucocephalus)* (delisted, monitor status)
Black swift (*Cypseloides niger*)
Burrowing owl *(Athene cunicularia)*
Ferruginous hawk *(Buteo regalis)*
Larch Mountain salamander *(Plethodon larselli)*
Loggerhead shrike *(Lanius ludovicianus)*
Long-eared myotis (*Myotis evotis*)
Northern goshawk *(Accipiter gentilis)*
Olive-sided flycatcher *(Contopus cooperi)*
Pacific lamprey *(Lampetra tridentata)*

Pallid Townsend's big-eared bat *(Corynorhinus townsendii pallescens)*
Peregrine falcon (*Falco peregrinus*) (Delisted, monitor status)
Pygmy whitefish (*Prosopium coulteri*)
Redband trout (*Oncorhynchus mykiss*)
River lamprey (*Lampetra ayresi*)
Sagebrush lizard (*Sceloporus graciosus*)
Sharptail snake (*Contia tenius*)
Townsend's ground squirrel (*Spermophilus townsendii*)
Western brook lamprey (*Lampetra richardsoni*)
Western gray squirrel *(Sciurus griseus griseus)*
Westslope cutthroat trout *(Oncorhynchus clarki lewisi)*
Wolverine *(Gulo gulo)*

Vascular Plants

Astragalus columbianus (Columbia milk-vetch)
Cypripedium fasciculatum (Clustered lady's-slipper)
Delphinium viridescens (Wenatchee larkspur)
Lomatium tuberosum (Hoover's desert-parsley)
Phacelia minutissima (Least phacelia)
Pinus albicaulis (Whitebark pine)
Silene seelyi (Seely's silene)
Tauschia hooveri (Hoover's tauschia)

Mosses

Orthotrichum praemorsum

Washington Natural Heritage Information System
List of Known Occurrences of Rare Plants in Washington
February 2009
Kittitas County

A key to status fields appears below. If a scientific name is underlined you may click on it to go to a field guide page (pdf format, average size 300 kb) for that taxon.

Scientific Name	Common Name	State Status	Federal Status	Historic Record
Agoseris elata	tall agoseris	S		
Anemone patens var. multifida	pasqueflower	T		
Anthoxanthum hirtum	common northern sweet grass	R1		H
Astragalus arrectus	Palouse milk-vetch	T		H
Astragalus columbianus	Columbia milk-vetch	S	SC	
Astragalus misellus var. pauper	Pauper milk-vetch	S		
Camissonia pygmaea	dwarf evening-primrose	S		
Camissonia scapoidea ssp. scapoidea	naked-stemmed evening-primrose	S		
Carex comosa	bristly sedge	S		H
Carex macrochaeta	large-awn sedge	T		H
Carex pauciflora	few-flowered sedge	S		
Carex scirpoidea ssp. scirpoidea	Canadian single-spike sedge	S		
Chaenactis thompsonii	Thompson's chaenactis	S		
Collomia macrocalyx	bristle-flowered collomia	S		
Cryptantha gracilis	narrow-stem cryptantha	S		
Cryptantha leucophaea	gray cryptantha	S	SC	
Cryptantha rostellata	beaked cryptantha	T		
Cryptantha scoparia	miner's candle	S		
Cypripedium fasciculatum	clustered lady's-slipper	S	SC	
Delphinium viridescens	Wenatchee larkspur	T	SC	
Eatonella nivea	white eatonella	T		
Erigeron basalticus	basalt daisy	T	SC	
Erigeron piperianus	Piper's daisy	S		H
Erigeron salishii	Salish fleabane	S		H
Gentiana douglasiana	swamp gentian	S		
Hackelia hispida var. disjuncta	sagebrush stickseed	S		H
Iliamna longisepala	longsepal globemallow	S		
Juncus howellii	Howell's rush	T		
Lomatium tuberosum	Hoover's desert-parsley	S	SC	

Mimulus suksdorfii	Suksdorf's monkey-flower	S		
Minuartia nuttallii ssp. fragilis	Nuttall's sandwort	T		
Montia diffusa	branching montia	S		H
Nicotiana attenuata	coyote tobacco	S		
Oenothera caespitosa ssp. caespitosa	cespitose evening-primrose	S		
Ophioglossum pusillum	Adder's-tongue	T		H
Oxytropis campestris var. gracilis	slender crazyweed	S		H
Pediocactus nigrispinus	snowball cactus	R1		
Pellaea breweri	Brewer's cliff-brake	S		
Penstemon eriantherus var. whitedii	fuzzytongue penstemon	S		
Phacelia minutissima	least phacelia	E	SC	
Pyrrocoma hirta var. sonchifolia	sticky goldenweed	S		
Sidalcea oregana var. calva	Wenatchee Mountain checker-mallow	E	LE	
Silene seelyi	Seely's silene	S	SC	
Spiranthes porrifolia	western ladies-tresses	S		
Subularia aquatica var. americana	water awlwort	R1		
Tauschia hooveri	Hoover's tauschia	T	SC	

Description of Codes

Historic Record:

H indicates most recent sighting in the county is before 1977.

State Status

State Status of plant species is determined by the Washington Natural Heritage Program. Factors considered include abundance, occurrence patterns, vulnerability, threats, existing protection, and taxonomic distinctness.
Values include:
E = Endangered. In danger of becoming extinct or extirpated from Washington.
T = Threatened. Likely to become Endangered in Washington.
S = Sensitive. Vulnerable or declining and could become Endangered or Threatened in the state.
X = Possibly extinct or Extirpated from Washington.
R1 = Review group 1. Of potential concern but needs more field work to assign another rank.
R2 = Review group 2. Of potential concern but with unresolved taxonomic questions.

Federal Status

Federal Status under the U.S. Endangered Species Act(USESA) as published in the Federal Register:
LE = Listed Endangered. In danger of extinction.
LT = Listed Threatened. Likely to become endangered.
PE = Proposed Endangered.
PT = Proposed Threatened.
C = Candidate species. Sufficient information exists to support listing as Endangered or Threatened.
SC = Species of Concern. An unofficial status, the species appears to be in jeopardy, but insufficient information to support listing.

APPENDIX B:
WILDLIFE HABITAT ASSOCIATION TABLE (Based upon: Johnson and O'Neill 2001)

Table B-1. Wildlife Species and Habitat Associations for the Habitat Types Present in the Study Area

VERTEBRATE SPECIES		Eastside (Interior) Mixed Conifer Forest	Eastside (Interior) Riparian-Wetlands
MAMMALS *			
Allen's chipmunk	*Eutamias senex*	CA/B	
American badger	*Taxidea taxus*	GA/B	P/F
American beaver	*Castor canadensis*	GA/F	CA/B
American marten	*Martes americana*	CA/B	P/B
American pika	*Ochotona princeps*	GA/B	
Belding's ground squirrel	*Spermophilus beldingi*		
Big brown bat	*Eptesicus fuscus*	CA/B	CA/B
Black bear	*Ursus americanus*	GA/B	GA/B
Black rat	*Rattus rattus*		
Black-tailed deer	*Odocoileus hemionus col.*	GA/B	GA/B
Black-tailed jackrabbit	*Lepus californicus*		
Bobcat	*Lynx rufus*	GA/B	GA/B
Brazilian free-tailed bat	*Tadarida brasiliensis*		
Broad-footed mole	*Scapanus latimanus*	GA/B	GA/B
Brush rabbit	*Sylvilagus bachmani*		GA/B
Bushy-tailed woodrat	*Neotoma cinerea*	CA/B	CA/B
California bighorn sheep	*Ovis canadensis californiana*		
California ground squirrel	*Spermophilus beecheyi*	GA/B	
California myotis	*Myotis californicus*	CA/B	GA/B
California vole	*Microtus californicus*		
Camas pocket gopher	*Thomomys bottae*		
Cascade golden-mantled ground squirrel	*Spermophilus saturatus*	CA/B	
Coast mole	*Scapanus orarius*	CA/B	P/B
Columbia white-tailed deer	*Odocoileus virginianus*		
Columbian ground squirrel	*Spermophilus columbianus*	CA/B	GA/B
Columbian mouse	*Peromyscus oreas*	GA/B	GA/B
Common porcupine	*Erethizon dorsatum*	CA/B	GA/B

VERTEBRATE SPECIES		Eastside (Interior) Mixed Conifer Forest	Eastside (Interior) Riparian-Wetlands
Coyote	*Canis latrans*	GA/B	GA/B
Creeping vole	*Microtus oregoni*	GA/B	GA/B
Deer mouse	*Peromyscus maniculatus*	CA/B	CA/B
Douglas squirrel	*Tamiasciurus douglasi*	GA/B	
Dusky-footed woodrat	*Neotoma fuscipes*		
Eastern cottontail	*Sylvilagus floridanus*	GA/B	
Eastern fox squirrel	*Sciurus niger*		GA/B
Eastern gray squirrel	*Sciurus carolinensis*		
Ermine	*Mustela erminea*	GA/B	GA/B
European rabbit	*Oryctolagus cuniculus*		
Feral horse	*Equus caballus*	GA/B	GA/F
Feral pig	*Sus scrofa*		GA/B
Fisher	*Martes pennanti*	CA/B	GA/B
Fringed myotis	*Myotis thysanodes*	GA/B	GA/B
Golden-mantled ground squirrel	*Spermophilus lateralis*	CA/B	P/B
Gray fox	*Urocyon cinereoargenteus*	P/B	
Gray wolf	*Canis lupus*	GA/B	
Gray-tailed vole	*Microtus canicaudus*		
Great basin pocket mouse	*Perognathus parvus*		
Grizzly bear	*Ursus arctos horribilis*	GA/B	P/F
Heather vole	*Phenacomys intermedius*	CA/B	P/B
Hoary bat	*Lasiurus cinereus*	GA/F	GA/F
House mouse	*Mus musculus*		
Least chipmunk	*Tamias minimus*		P/B
Little brown myotis	*Myotis lucifugus*	GA/B	GA/B
Long-eared myotis	*Myotis evotis*	GA/B	GA/B
Long-legged myotis	*Myotis volans*	CA/B	CA/B
Long-tailed vole	*Microtus longicaudus*	GA/B	CA/B
Long-tailed weasel	*Mustela frenata*	GA/B	GA/B
Lynx	*Lynx canadensis*	CA/B	

VERTEBRATE SPECIES		Eastside (Interior) Mixed Conifer Forest	Eastside (Interior) Riparian-Wetlands
Masked shrew	*Sorex cinereus*	CA/B	GA/B
Meadow vole	*Microtus pennsylvanicus*	P/B	CA/B
Merriam's ground squirrel	*Spermophilus canus*		
Mink	*Mustela vison*	P/F	CA/B
Montane shrew	*Sorex monticolus*	GA/B	P/B
Montane vole	*Microtus montanus*	GA/B	GA/B
Mountain caribou	*Rangifer tarandus caribou*	GA/B	GA/B
Mountain lion	*Felis concolor*	GA/B	A/B
Moose	*Alces alces*	GA/B	GA/B
Mule deer	*Odocoileus hemionus*	GA/B	GA/B
Muskrat	*Ondatra zibethica*		CA/B
Northern bog lemming	*Synaptomys borealis*	GA/B	
Northern flying squirrel	*Glaucomys sabrinus*	CA/B	GA/B
Northern grasshopper mouse	*Onychomys leucogaster*		
Northern pocket gopher	*Thomomys talpoides*	CA/B	GA/B
Northern river otter	*Lontra canadensis*		CA/B
Norway rat	*Rattus norvegicus*		
Nutria	*Myocaster coypus*		
Nuttall's cottontail	*Sylvilagus nuttallii*		
Pacific jumping mouse	*Zapus trinotatus*	GA/B	CA/B
Pacific water shrew	*Sorex bendirii*	GA/B	GA/B
Pallid bat	*Antrozous palidus*		CA/B
Pistol river (botta's) pocket gopher	*Thomomys bottae detumidus*		
Piute ground squirrel	*Spermophilus mollis*		
Preble's shrew	*Sorex preblei*	P/B	P/B
Pronghorn antelope	*Antilocarpa americana*	P/B	P/F
Pygmy shrew	*Sorex minutus*	CA/B	
Raccoon	*Procyon lotor*	GA/B	CA/B
Red fox	*Vulpes vulpes*	P/B	GA/B

VERTEBRATE SPECIES		Eastside (Interior) Mixed Conifer Forest	Eastside (Interior) Riparian-Wetlands
Red squirrel	*Sciurus vulgaris*	CA/B	
Red-tailed chipmunk	*Tamias ruficaudus*	CA/B	
Ringtail	*Bassariscus astutus*	GA/B	
Rocky mountain bighorn sheep	*Ovis canadensis*	P/F	
Rocky mountain elk	*Cervus elaphus nelsoni*	GA/B	GA/B
Roosevelt elk	*Cervus canadensis*		
Shrew mole	*Neurotrichus gibbsii*	GA/B	GA/B
Silver-haired bat	*Lasionycteris noctivagans*	CA/B	GA/B
Snowshoe hare	*Lepus americanus*	CA/B	CA/B
Southern red-backed vole	*Clethrionomys gapperi*	CA/B	CA/B
Spotted bat	*Euderma maculatum*		GA/B
Striped skunk	*Mephitis mephitis*	P/B	GA/B
Townsend's mole	*Scaparus townsendii*		
Townsend's big-eared bat	*Plecotis townsendii*	GA/B	GA/F
Townsend's chipmunk	*Eutamias townsendii*	CA/B	
Townsend's ground squirrel	*Spermophilus townsendii*		
Townsend's pocket gopher	*Thomomys townsendii*		
Townsend's vole	*Microtus townsedii*		
Trowbridge's shrew	*Sorex trowbridgei*	GA/B	GA/B
Vagrant shrew	*Sorex vagrans*	GA/B	P/B
Virginia opossum	*Dedelphis virginiana*	GA/B	GA/B
Water shrew	*Sorex palustris*	GA/B	CA/B
Water vole	*Microtus richarsoni*	P/B	CA/B
Washington ground squirrel	*Spermophilus washingtoni*		
Western gray squirrel	*Thomomys mazama*		
Western jumping mouse	*Zapus princeps*	GA/B	CA/B
Western harvest mouse	*Reithrodontomys megalotis*		CA/B
Western pipistrelle	*Pipistrellus hesperus*	P/F	CA/B

VERTEBRATE SPECIES		Eastside (Interior) Mixed Conifer Forest	Eastside (Interior) Riparian-Wetlands
Western pocket gopher			
Western red-backed vole	*Clethrionomys occidentalis*	P/B	
Western small-footed myotis	*Myotis ciliolabrum*		CA/B
Western spotted skunk	*Spilogale putorius*	GA/B	GA/B
White-tailed deer	*Odocoileus virginianus*	GA/B	CA/B
White-tailed jackrabbit	*Lepus townsendii*		P/B
Wild burro	*Equus asinus*		GA/F
Yellow-bellied marmot	*Marmota flaviventris*	P/B	GA/B
Yellow-pine chipmunk	*Tamias amoenus*	GA/B	GA/B
Yuma myotis	*Myotis yumanensis*	GA/B	CA/B
Birds			
American avocet	*Recurvirostra americana*		
American black duck	*Anas rubripes*		CA/B
American bittern	*Botaurus lentiginosus*		
American coot	*Fulica americana*		
American crow	*Corvus brachyrhynchos*	GA/B	GA/B
American dipper	*Cinclus mexicanus*		CA/B
American goldfinch	*Carduelis tristis*	GA/B	GA/B
American kestrel	*Falco sparverius*	GA/B	GA/B
American pipit	*Anthus rubescens*		
American redstart	*Setophaga ruticilla*		CA/B
American robin	*Turdus migratorius*	GA/B	GA/B
American tree sparrow	*Spizella aborea*		GA/B
American wigeon	*Anas americana*		P/F
American golden-plover	*Pluvialis dominica*		
Ash-throated flycatcher	*Myiarchus cinerascens*		P/B
Baird's sandpiper	*Calidris bairdii*		
Bald eagle	*Haliaeetus leucocephalus*	GA/R	GA/B
Band-tailed pigeon	*Columba fasicata*	P/F	P/F
Bank swallow	*Riparia riparia*	GA/F	CA/B

VERTEBRATE SPECIES		Eastside (Interior) Mixed Conifer Forest	Eastside (Interior) Riparian-Wetlands
Barn owl	*Tyto alba*		GA/B
Barn swallow	*Hirundo rustica*	P/B	CA/B
Band-tailed pigeon	*Patagioenas fasciata*		
Barred owl	*Strix varia*	CA/B	P/B
Belted kingfisher	*Ceryle alcyon*		CA/B
Bewick's wren	*Thryomanes bewickii*		
Black phoebe	*Sayornis nigricans*		
Black swift	*Cypseloides niger*	GA/F	GA/B
Black tern	*Chlidonias niger*		
Black-backed woodpecker	*Picoides arcticus*	GA/B	P/B
Black-bellied plover	*Pluvialis squatarola*		
Black-billed magpie	*Pica hudsonia*		CA/B
Black-capped chickadee	*Parus atricapilus*	P/B	GA/B
Black-chinned hummingbird	*Archilochus alexandri*	P/B	GA/B
Black-crowned night-heron	*Nycticorax nycticorax*		CA/B
Black-headed grosbeak	*Pheucticus melanocephalus*	P/B	GA/B
Black-necked stilt	*Himantopus mexicanus*		
Black-throated gray warbler	*Dendroica nigrescens*	GA/B	CA/B
Blue grouse	*Dendragapus obscurus*	CA/B	CA/B
Blue-winged teal	*Anas discors*		
Bobolink	*Dolichonyx oryzivorus*		GA/B
Bohemian waxwing	*Bombycilla garrulus*	GA/F	GA/F
Bonaparte's gull	*Larus philadelphia*		
Boreal owl	*Aegolius funereus*	GA/B	
Brewer's blackbird	*Euphagus cyanocephalus*		GA/B
Brewer's sparrow	*Spizella breweri*		
Broad-tailed hummingbird	*Selasphorus platycercus*		GA/B
Brown creeper	*Certhia americana*	GA/B	GA/B
Brown-headed cowbird	*Molothrus ater*	GA/R	GA/B

VERTEBRATE SPECIES		Eastside (Interior) Mixed Conifer Forest	Eastside (Interior) Riparian-Wetlands
Bufflehead	*Bucephala albeola*		GA/B
Buff-breasted sandpiper	*Tryngites subruficollis*		
Bullock's oriole	*Icterus bullockii*		CA/B
Burrowing owl	*Athene cunicularia*		
Bushtit	*Psaltriparus minimus*	GA/B	GA/B
California gull	*Larus californicus*		
California quail	*Callipepla californica*	GA/B	GA/B
California towhee	*Pipilo crissalis*		
Calliope hummingbird	*Stellula calliope*	P/B	GA/B
Canada goose	*Branta canadensis*		P/B
Canvasback	*Aythya valisineria*		
Canyon wren	*Catherpes mexicanus*	GA/B	GA/B
Cassin's finch	*Carpodacus cassinii*	GA/B	GA/B
Cassin's vireo (solitary vireo)	*Vireo cassinii (vireo solitarius)*	GA/B	
Cattle egret	*Bubulcus ibis*		GA/B
Cedar waxwing	*Bombycilla cedrorum*	P/F	GA/B
Chestnut-backed chickadee	*Parus rufescens*	GA/B	
Chipping sparrow	*Spizella passerina*	GA/B	GA/B
Chukar	*Alectoris chukar*		P/F
Cinnamon teal	*Anas cyanoptera*		
Clark's nutcracker	*Nucifraga columbiana*	GA/B	
Clay-colored sparrow	*Spizella pallida*		
Cliff swallow	*Petrochelidon pyrrhonota*	GA/B	CA/B
Common goldeneye	*Bucephala clangula*	GA/R	
Common merganser	*Mergus merganser*	CA/R	CA/B
Common nighthawk	*Chordeiles minor*	GA/B	GA/F
Common poorwill	*Phalaenoptilus nuttallii*	GA/B	
Common raven	*Corvus corax*	GA/B	GA/B
Common redpoll	*Carduelis flammea*	GA/F	GA/F
Common snipe	*Gallinago gallinago*		

VERTEBRATE SPECIES		Eastside (Interior) Mixed Conifer Forest	Eastside (Interior) Riparian-Wetlands
Common yellowthroat	*Geothlypis trichas*	GA/B	CA/B
Cooper's hawk	*Accipiter cooperii*	GA/B	GA/B
Cordilleran flycatcher	*Empidonax occidentalis*	GA/B	CA/B
Dark-eyed junco	*Junco hyemalis*	GA/B	GA/B
Double-crested cormorant	*Phalacrocorax auritus*		CA/B
Downy woodpecker	*Picoides pubescens*	GA/B	GA/B
Dunlin	*Calidris alpina*		
Dusky flycatcher	*Empidonax oberholseri*	GA/B	GA/B
Eastern kingbird	*Tyrannus tyrannus*		GA/B
Eurasian wigeon	*Anas penelope*		
European starling	*Sturmus vulgaris*	P/B	CA/B
Evening grosbeak	*Coccothraustes vespertinus*	GA/B	GA/B
Ferruginous hawk	*Buteo regalis*		
Flammulated owl	*Otus flammeolus*	CA/B	GA/B
Fox sparrow	*Passerella iliaca*	GA/F	CA/F
Franklin's gull	*Larus pipixcan*		
Gadwall	*Anas strepera*		
Grasshopper sparrow	*Ammodramus savannarum*		
Gray catbird	*Dumetella carolinensis*	P/B	CA/B
Gray jay	*Perisoreus canadensis*	GA/B	GA/B
Gray partridge	*Perdix perdix*		
Great blue heron	*Ardea herodias*	GA/R	CA/B
Great egret	*Ardea alba*		CA/B
Great gray owl	*Strix nebulosa*	GA/B	
Great horned owl	*Bubo virginianus*	GA/B	GA/B
Great white-fronted goose	*Anser albifrons*		
Greater yellowlegs	*Tringa melanoleuca*		GA/F
Green-tailed towhee	*Pipilo chlorurus*	CA/B	P/B
Green-winged teal	*Anas crecca*		GA/F
Golden-crowned kinglet	*Regulus satrapa*	CA/B	GA/B
Golden-crowned sparrow	*Zonotrichia atricapilla*	GA/F	GA/F

VERTEBRATE SPECIES		Eastside (Interior) Mixed Conifer Forest	Eastside (Interior) Riparian-Wetlands
Golden eagle	*Aquila chrysaetos*	P/B	GA/B
Gyrfalcon	*Falco rusticolus*		
Hairy woodpecker	*Picoides villosus*	GA/B	GA/B
Hammond's flycatcher	*Empidonax hammondii*	GA/B	
Harlequin duck	*Histrionicus histrionicus*		CA/B
Harris's sparrow	*Zonotrichia querula*		
Hermit thrush	*Catharus guttatus*	GA/B	GA/B
Hermit warbler	*Dendroica occidentalis*	P/B	
Herring gull	*Larus argentatus*		
Hooded merganser	*Lophodytes cucullatus*	CA/R	CA/B
Horned lark	*Eremophila alpestris*		
House finch	*Carpodacus mexicanus*	P/B	P/B
House sparrow	*Passer domesticus*		
House wren	*Troglodytes aedon*	GA/B	GA/B
Hutton's vireo	*Vireo huttoni*		
Killdeer	*Charadrius vociferous*	P/B	GA/B
Lapland longspur	*Calcarius lapponicus*		
Lazuli bunting	*Passerina amoena*		CA/B
Least flycatcher	*Empidonax minimus*		GA/B
Least sandpiper	*Calidris minutilla*		
Lesser goldfinch	*Carduelis psaltria*		P/B
Lesser yellowlegs	*Tringa flavipes*		GA/F
Lewis's woodpecker	*Melanerpes lewis*	GA/B	GA/B
Lincoln's sparrow	*Melospiza lincolnii*		A/B
Loggerhead shrike	*Lanius ludovicianus*		
Long-billed curlew	*Numenius americanus*		
Long-billed dowitcher	*Limnodromus scolopaceus*		
Long-eared owl	*Asio otus*	GA/B	CA/B
Macgillivray's warbler	*Oporornis tolmiei*	GA/B	GA/B
Mallard	*Anas platyrhynchos*		CA/B
Merlin	*Falco columbarius*	P/B	P/F

VERTEBRATE SPECIES		Eastside (Interior) Mixed Conifer Forest	Eastside (Interior) Riparian-Wetlands
Golden eagle	*Aquila chrysaetos*	P/B	GA/B
Gyrfalcon	*Falco rusticolus*		
Hairy woodpecker	*Picoides villosus*	GA/B	GA/B
Hammond's flycatcher	*Empidonax hammondii*	GA/B	
Harlequin duck	*Histrionicus histrionicus*		CA/B
Harris's sparrow	*Zonotrichia querula*		
Hermit thrush	*Catharus guttatus*	GA/B	GA/B
Hermit warbler	*Dendroica occidentalis*	P/B	
Herring gull	*Larus argentatus*		
Hooded merganser	*Lophodytes cucullatus*	CA/R	CA/B
Horned lark	*Eremophila alpestris*		
House finch	*Carpodacus mexicanus*	P/B	P/B
House sparrow	*Passer domesticus*		
House wren	*Troglodytes aedon*	GA/B	GA/B
Hutton's vireo	*Vireo huttoni*		
Killdeer	*Charadrius vociferous*	P/B	GA/B
Lapland longspur	*Calcarius lapponicus*		
Lazuli bunting	*Passerina amoena*		CA/B
Least flycatcher	*Empidonax minimus*		GA/B
Least sandpiper	*Calidris minutilla*		
Lesser goldfinch	*Carduelis psaltria*		P/B
Lesser yellowlegs	*Tringa flavipes*		GA/F
Lewis's woodpecker	*Melanerpes lewis*	GA/B	GA/B
Lincoln's sparrow	*Melospiza lincolnii*		A/B
Loggerhead shrike	*Lanius ludovicianus*		
Long-billed curlew	*Numenius americanus*		
Long-billed dowitcher	*Limnodromus scolopaceus*		
Long-eared owl	*Asio otus*	GA/B	CA/B
Macgillivray's warbler	*Oporornis tolmiei*	GA/B	GA/B
Mallard	*Anas platyrhynchos*		CA/B
Merlin	*Falco columbarius*	P/B	P/F

VERTEBRATE SPECIES		Eastside (Interior) Mixed Conifer Forest	Eastside (Interior) Riparian-Wetlands
Mew gull	*Larus canus*		
Mountain bluebird	*Sialia currucoides*	GA/B	GA/B
Mountain chickadee	*Poecile gambeli*	GA/B	GA/B
Mountain quail	*Oreortyx pictus*	GA/B	GA/B
Mourning dove	*Zenaida macroura*	GA/B	CA/B
Mute swan	*Cygnus olor*		
Nashville warbler	*Vermivora ruficapilla*	GA/B	GA/B
Northern bobwhite	*Colinus virginianus*		
Northern flicker	*Colaptes cafer*	GA/B	GA/B
Northern goshawk	*Accipiter gentilis*	CA/B	GA/B
Northern harrier	*Circus cyaneus*		P/B
Northern mockingbird	*Mimus polyglottos*		
Northern pintail	*Anas acuta*		
Northern pygmy owl	*Glaucidium gnoma*	CA/B	GA/B
Northern rough-winged swallow	*Stelgidopteryx serripennis*	GA/F	CA/B
Northern saw-whet owl	*Aegolius acadicus*	CA/B	P/B
Northern shoveler	*Anas elypeata*		
Northern shrike	*Lanius excubitor*		
Northern waterthrush	*Seiurus noveboracensis*		CA/B
Northwestern crow	*Corvus caurinus*		
Oak titmouse	*Baelophus inornatus*		
Olive-sided flycatcher	*Contopus borealis*	CA/B	GA/B
Orange-crowned warbler	*Vermivora celata*	GA/B	GA/B
Osprey	*Pandion haliaetus*	GA/R	GA/B
Pacific golden-plover	*Pluvialis fulva*		
Palm warbler	*Dendroica palmarum*		
Pectoral sandpiper	*Calidris melanotos*		
Peregrine falcon	*Falco peregrinus*	GA/B	GA/F
Pied-billed grebe	*Podilymbus podiceps*		GA/B
Pileated woodpecker	*Dryocopus pileatus*	GA/B	GA/B

VERTEBRATE SPECIES		Eastside (Interior) Mixed Conifer Forest	Eastside (Interior) Riparian-Wetlands
Pine grosbeak	*Pinicola enucleator*	P/B	
Pine siskin	*Carduelis pinus*	GA/B	GA/B
Prairie falcon	*Falco mexicanus*	P/B	P/B
Purple finch	*Carpodacus purpureus*	GA/B	
Purple martin	*Progne subis*		
Pygmy nuthatch	*Sitta pygmaea*		CA/B
Red crossbill	*Loxia curvirostra*	GA/B	P/F
Red knot	*Calidris canutus*		
Red-breasted nuthatch	*Sitta canadensis*	GA/B	GA/B
Red-breasted sapsucker	*Sphyrapicus ruber*	P/B	GA/B
Red-eyed vireo	*Vireo olivaceus*	P/B	CA/B
Red-naped sapsucker	*Sphyrapicus nuchalis*	GA/B	CA/B
Red-shouldered hawk	*Buteo lineatus*		
Red-tailed hawk	*Buteo jamaicensis*	GA/B	GA/B
Red-winged blackbird	*Agelaius phoenicens*		GA/B
Ring-billed gull	*Larus delawarensis*		
Ring-necked dove	*Phasianus colchicus*		
Ring-necked duck	*Aythya collaris*		GA/B
Ring-necked pheasant	*Phasianus colchicus*	GA/F	CA/B
Rock dove	*Columba livia*		
Rock wren	*Salpinctes obsoletus*	GA/B	
Ross's goose	*Chen rossii*		
Rough-legged hawk	*Buteo lagopus*	P/F	P/F
Ruby-crowned kinglet	*Regulus calendula*	GA/B	GA/F
Ruffed grouse	*Bonasa umbellus*	GA/F	CA/B
Rufous hummingbird	*Selasphorus rufus*	GA/B	GA/B
Sage grouse	*Centrocercus urophasianus*		
Sandhill crane	*Grus canadensis*		GA/B
Say's phoebe	*Sayornis saya*		GA/B
Savannah sparrow	*Passercullus sanwichensis*		GA/B
Semipalmated plover	*Calidris pusilla*		

VERTEBRATE SPECIES		Eastside (Interior) Mixed Conifer Forest	Eastside (Interior) Riparian-Wetlands
Sharp-shinned hawk	*Accipeter striatus*	GA/B	
Sharp-tailed grouse	*Tympanuchus phasianellus*		CA/F
Short-billed dowitcher	*Limnodromus griseus*		
Short-eared owl	*Asio flammeus*		
Sky lark	*Alauda arvensis*		
Snow bunting	*Plectrophenas nivalis*		
Snow goose	*Chen caerulescens*		
Snowy egret	*Egretta thula*		CA/B
Snowy owl	*Bubo scandiacus*		
Solitary sandpiper	*Tringa solitaria*		CA/F
Song sparrow	*Melospiza melodia*	GA/B	GA/B
Sora	*Porzana carolina*		
Spotted owl	*Strix occidentalis*	CA/B	
Spotted sandpiper	*Actitis macularia*		CA/B
Spotted towhee	*Pipilo erythrophthalmus*	GA/B	GA/B
Spruce grouse	*Falcipennis canadensis*	GA/B	
Steller's jay	*Cyanocitta stelleri*	GA/B	GA/B
Swainson's hawk	*Buteo swainsoni*		GA/B
Swainson's thrush	*Catharus ustulatus*	GA/B	GA/B
Swamp sparrow	*Melospiza georgiana*		
Thayer's gull	*Larus thayeri*		
Three-toed woodpecker	*Picoides dorsalis*	GA/B	P/B
Townsend's solitaire	*Myadestes townsendi*	GA/B	GA/F
Townsend's warbler	*Dendroica townsendii*	GA/B	P/B
Tree swallow	*Tachycineta bicolor*	P/B	CA/B
Tricolored blackbird			
Trumpeter swan	*Cygnus buccinator*		
Tundra swan	*Cygnus columbianus*		
Turkey vulture	*Cathartes aura*	GA/B	GA/B
Upland sandpiper	*Bartramia longicauda*		
Varied thrush	*Ixoreus naevius*	CA/B	

VERTEBRATE SPECIES		Eastside (Interior) Mixed Conifer Forest	Eastside (Interior) Riparian-Wetlands
Vaux's swift	*Chaetura vauxi*	GA/B	P/B
Veery	*Catharus fuscescens*		CA/B
Vesper sparrow	*Pooecetes gramineus*		
Violet-green swallow	*Tachycineta thalassina*	GA/B	GA/B
Virginia rail	*Rallus limicola*		
Warbling vireo	*Vireo gilvus*	GA/B	CA/B
Western bluebird	*Sialia mexicana*	GA/B	
Western kingbird	*Tyrannus verticalis*		
Western meadowlark	*Sturnella neglecta*		
Western sandpiper	*Calidris mauri*		
Western screech-owl	*Otus kennicotti*	GA/B	CA/B
Western scrub-jay	*Aphelocoma californica*		
Western tanager	*Piranga ludoviciana*	CA/B	GA/B
Western wood pewee	*Contopus sordidulus*	GA/B	GA/B
Whimbrel	*Numenius phaeopus*		
White-breasted nuthatch	*Sitta carolinensis*		GA/B
White-crowned sparrow	*Zonotrichia leucophrys*	GA/B	GA/B
White-faced ibis	*Plegadis chihi*		
White-headed woodpecker	*Picoides albolarvatus*	GA/B	GA/B
White-tailed kite	*Elanus leucurus*		
White-throated sparrow	*Zonotrichia albicollis*		
White-throated swift	*Aeronautes saxatalis*	GA/B	GA/F
White-winged crossbill	*Loxia leucoptera*	GA/B	
Wild turkey	*Meleagris gallopavo*	GA/B	GA/B
Willet	*Catoptrophorus semipalmatus*		
Williamson's sapsucker	*Sphyrapicus thyroideus*	GA/B	GA/B
Willow flycatcher	*Empidonax trailli*	P/B	CA/B
Wilson's warbler	*Wilsonia pusilla*	GA/B	GA/B
Winter wren	*Troglodytes troglodytes*	GA/B	GA/B
Wood duck	*Aix sponsa*	GA/R	CA/B
Yellow-billed cuckoo	*Coccyzus americanus*	CA/B	

VERTEBRATE SPECIES		Eastside (Interior) Mixed Conifer Forest	Eastside (Interior) Riparian-Wetlands
Yellow-breasted chat	*Icteria virens*		CA/B
Yellow-headed blackbird			
Yellow-rumped warbler	*Dendroica coronata*	GA/B	GA/B
Yellow rail	*Coturnicops noveboracensis*		
Yellow warbler	*Dendroica petechia*		CA/B
Reptiles and amphibians			
Bull frog	*Rana catesbeiana*	GA/F	CA/B
California mountain kingsnake	*Lampropeltis zonata*		
California slender salamander	*Batrachoseps*		
Cascades frog	*Rana cascadae*	P/F	GA/B
Clouded salamander	*Aneides ferreus*		
Columbia spotted frog	*Rana Luteiventris*	GA/F	CA/B
Common garter snake	*Thamnophis sirtalis*	GA/B	CA/B
Common kingsnake	*Lampropeltis getulus*		
Ensatina	*Ensatina eschscholtzii*		
Foothill yellow-legged frog	*Rana boylii*		
Gopher snake	*Pituophis melanoleucus*	GA/B	GA/B
Great basin spadefoot	*Spea intermontana*	GA/B	CA/B
Long-toed salamander	*A. macrodactylum*	GA/B	CA/B
Night snake	*Hypsiglena torquata*	GA/B	
Northern alligator lizard	*Gerrhontus coeruleus*	GA/B	GA/B
Northern leopard frog	*Rana pipiens*		CA/B
Northwestern garter snake	*T. ordinoides*		
Northwestern salamander	*Ambystoma gracile*	P/F	P/B
Oregon spotted frog	*Rana pretiosa*	GA/F	
Pacific chorus frog	*Hyla regilla*	GA/B	CA/B
Pacific coast aquatic garter snake	*Thamnophis stratus*		
Pacific giant salamander	*Dicamptodon tenebrosus*	GA/F	
Painted turtle	*Chrysemys picta*		GA/B
Racer	*Coluber constrictor*	GA/B	GA/B
Red-eared slider turtle	*Trachemys scripta*		

VERTEBRATE SPECIES		Eastside (Interior) Mixed Conifer Forest	Eastside (Interior) Riparian-Wetlands
Red-legged frog	*Rana aurora*	P/F	P/B
Ringneck snake	*Diadophis punctatus*		
Rough-skinned newt	*Taricha granulosa*	P/F	P/B
Rubber boa	*Charina bottae*	GA/B	GA/B
Sharptail snake	*Myrichthys breviceps*		GA/B
Snapping turtle	*Chelydra serpentina*		
Southern alligator lizard	*Elgaria multicarinata webbi*	P/B	P/B
Tailed frog	*Ascaphus montanus*	GA/F	CA/B
Tiger salamander	*Ambystoma tigrinum*		CA/B
Western fence lizard	*Sceloporus occidentalis*	GA/B	
Western pond turtle	*Clemys marmorata*		
Western rattlesnake	*Crotalus biridis helleri*	GA/B	GA/B
Western skink	*Eumeces skiltonianus*	G/A	
Western terrestrial garter snake	*T. elegans*	GA/B	GA/B
Western toad	*Bufo boreas*	GA/F	CA/B
Woodhouse's toad	*Bufo woodhousii*		CA/B

Adapted from the CD Matrix provided in: Johnson, D.H. and T.A. O'Neil. 2001. *Wildlife-Habitat Relationships in Oregon and Washington*. Oregon State University Press. Corvallis, Oregon.

Definitions:

CA: *Closely Associated – A species is widely known to depend on a habitat for part of all of its life history requirements.*
GA: *Generally Associated – A species exhibits a high degree of adaptability and may be supported by a number of habitats.*
P: *Present – A species demonstrates occasional use of a habitat.*
B: *Breeds and feeds*
F: *Feeds only*
R: *Reproduces only*
O: *Other, such as roosting, resting, hibernacula, or cover.*

APPENDIX C:
OBSERVED PLANT LIST

Common Name	Scientific Name
Trees	
Grand fir	*Abies grandis*
Douglas fir	*Pseudotsuga menziesii*
Big-leaf maple	*Acer macrophyllum*
Black cottonwood	*Populus balsamifera*
Ponderosa pine	*Pinus ponderosa*
Shrubs	
Vine maple	*Acer circinatum*
Serviceberry	*Amelanchier alnifolia*
Kinnikinnik	*Arctostaphylos uva-ursi*
Pine mat Manzanita	*Arctostaphylos nevadensis*
Cascade Oregongrape	*Berberis nervosa*
Creeping Oregongrape	*Berberis repens*
Red-stem ceanothus	*Ceanothus sanguineus*
Red-osier dogwood	*Cornus sericea*
Beaked hazelnut	*Corylus cornuta*
Douglas hawthorne	*Crataegus douglasii*
Ocean spray	*Holodiscus discolor*
Mountain box	*Pachistima myrsinites*
Bitter cherry	*Prunus emarginata*
Red-flowered currant	*Ribes sanguineum*
Baldhip rose	*Rosa gymnocarpa*
Nootka rose	*Rosa nootkana*
Prairie Rose	*Rosa woodsii*
Blackcap	*Rubus leucodermis*
Trailing blackberry	*Rubus ursinus*
Thimbleberry	*Rubus parviflorus*
Mackenzie willow	*Salix rigida*
Scouler willow	*Salix scouleriana*
Black elderberry	*Sambucus cerulea*
Birch-leafed spirea	*Spiraea betulifolia*
Common snowberry	*Symphoricarpos albus*
Trailing snowberry	*Symphoricarpos mollis*
Herbs and Grasses	
Yarrow	*Achillea millefolium*
Pearly everlasting	*Anaphalis margaritacea*

Rosy pussy-toes	*Antennaria microphylla*
Arrow-leaved balsamroot	*Balsamhoriza sagitata*
California brome	*Bromus carinatus*
Smooth brome	*Bromus inermis*
Cheat grass	*Bromus tectorum*
Liddon's sedge	*Carex petasata*
Chicory	*Cichorium intybus*
Canada thistle	*Cirsium arvense*
Large-flowered collomia	*Collomia grandiflora*
Spotted coral-root	*Corallorhiza maculata*
Upland larkspur	*Delphinium nuttallianum*
Fireweed	*Epilobium angustifolium*
Common horsetail	*Equisetum arvense*
Wild strawberry	*Fragaria vesca*
Woods strawberry	*Fragaria virginiana*
Cleavers	*Galium aparine*
Hawkweed	*Hieracium sp.*
Unknown rush	*Juncus sp.*
Peavine	*Lathyrus sp.*
Pestle parsnip	*Lomatium nudicaule*
Nine-leaf lomatium	*Lomatium triternatum*
Spurred lupine	*Lupinus laxiflorus*
Short-flowered monkey-flower	*Mimulus breviflorus*
Small-flowered penstemon	*Penstemon procerus*
English plantain	*Plantago lanceolata**
Bulbous bluegrass	*Poa bulbosa**
Sticky cinquefoil	*Potentilla glandulosa*
Graceful cinquefoil	*Potentilla gracilis*
Bracken	*Pteridium aquilinum*
Worm-leaf stonecrop	*Sedum stenopetalum*
Broadleaved starflower	*Trientalis latifolia*
Indian hellebore	*Veratrum viride*

APPENDIX D:
DATASHEETS

Wildlife Habitat Assessment Form

(Habitat types described in Johnson and O'Neil, 2001)

Project: Sapphire Skies, Forest Ridge **Dates:** Octobes 26+27, 2009

Assessment Form # 2 **Field Investigator:** SK, AM, ~~RB~~

Habitat Area Size: _____ **Photo #'s:** 8-15, 22-23, 26-28

Location: South Cle Elum Ridge

Habitat Dominant Plants: Vine maple, serviceberry, Oceanspray, Rose, snowberry, bitter cherry, Thimbleberry, black-capped raspberry, wood strawberry, unk. penstemon, trailing blackberry, young Ponderosa pine + Douglas fir.

Structural Conditions (% tree/shrub canopy; canopy layers, tree size, land cover conditions, etc.):

2-5% tree canopy cover + 60-80% shrub cover. Majority of conifers are sapling size (<5ft). Headwater drainages are densely vegetated by shrubs, have evidence of a scoured channel ≥2ft wide that is sparsely or entirely unvegetated by herbs.

Habitat Elements (snags, perches, downed logs, constructed features):

steep slopes, thick overhanging vegetation, dead branches and leaf litter, bare ground

Invasive Plants:

Canada thistle

Wildlife Observations: No water, no fish use, dark-eyed junco, Stellar's Jay, elk and black-tailed deer scat and browse

Priority Species Presence and Habitat Use:

elk and black-tailed deer
- scat
- browse
- corridor use

Habitat Continuity/Use as a Corridor:

Riparian drainages continue throughout the hillside to the base of slope at bottom of hill. May serve as a corridor for small rodents, birds, etc.

Adjacent Land Uses and Conditions:

Areas currently contains some road crossings and culverts. Headwater streams shows signs of erosion and increased flows, conveying increased sediments down stream.

Threats to Habitat Integrity:

Increased flows and erosion from vegetation clearing, roads, and permanent structures

Opportunities:

Wildlife Habitat Assessment Form

(Habitat types described in Johnson and O'Neil, 2001)

Project: Sapphire Skies, Forest Ridge **Dates:** Oct. 26 & 27, 2009

Assessment Form # 3 **Field Investigator:** AM, ~~RB~~

Habitat Area Size: _____ **Photo #'s:** 19-21

Location: South Cle Elum Ridge

Habitat Dominant Plants: Scouler's willow, Doulas spiraea, beaked hazelnut, Oceanspray, Nootka rose, cattail, small-fruited bulrush, common horsetail, fireweed, black cottonwood, vine maple

Structural Conditions (% tree/shrub canopy; canopy layers, tree size, land cover conditions, etc.):

Thickly vegetated-dominated by shrubs, willow & spiraea thickets w/ 100 % aereal cover & areas dominated by WL herbs

small areas of ponded water

Habitat Elements (snags, perches, downed logs, constructed features):

Thickets
ponded still water
multiple vegetative layers

Invasive Plants:

none observed

Wildlife Observations:

none observed

Priority Species Presence and Habitat Use:

none observed - but likely used by small rodents, elk, deer, cougar, bear, birds

Habitat Continuity/Use as a Corridor:

Isolated from other similar wetlands but connected to headwaters of Type 4 stream

Adjacent Land Uses and Conditions:

Adjacent uplands contain roads and a few residential development. Primarily undeveloped

Threats to Habitat Integrity:

Increased development & potential buffer impacts.

Opportunities:

Increased flows from removal of upland vegetation and additional roads/development could increase H_2O to this wetland perhaps changing function and ~~vegetative structure~~ and diversity.

Wildlife Habitat Assessment Form

(Habitat types described in Johnson and O'Neil, 2001)

Project: Sapphire Skies, Forest Ridge **Dates:** October 26 & 27, 2009

Assessment Form # 1 **Field Investigator:** SK, AM, ~~RB~~

Habitat Area Size: _____ **Photo #'s:** 1-7, 24-25, P1, P2, P2(2)

Location: South Cle Elum Ridge

Habitat Dominant Plants:

Douglas fir, Grand fir, Ponderosa pine, beaked hazelnut, oceanspray, serviceberry, trailing snowberry, prairie rose, creeping Oregon grape, pine-mat manzanita, unknown sedge, red flowering currant, birch-leaved spiraea, Yarrow, wild strawberry, arrowleaf balsamroot, kinnickinnik, Indian hellebore

Structural Conditions (% tree/shrub canopy; canopy layers, tree size, land cover conditions, etc.):

10-7% tree canopy + 30-40% shrub cover. Forest thinning has occurred in recent past and majority of conifers are seedlings to between 20-25 years old. Fairly open, regenerating coniferous forested slopes. Areas of hillocky/hummocky topography with various seasonal drainages.

Habitat Elements (snags, perches, downed logs, constructed features):

Snags, down/decaying logs and stumps, porous soils, steep slopes

Invasive Plants:

Canada thistle, Bulbous bluegrass, knapweed along roads, cheat grass

Wildlife Observations: Townsend's solitaire, Stellar's Jay, Douglas squirrel, dark-eyed junko, red-breasted nuthatch, Northern pocket gopher mounds, coyote, elk and black-tailed deer scat

Priority Species Presence and Habitat Use:

elk and black-tailed deer,
- scat
- well worn game trails
- browse damage on shrubs + trees

Habitat Continuity/Use as a Corridor:

South Cle Elum ridge is a corridor for elk and deer as well as Cougar and black bear. It is currently continuous and mostly undeveloped with surrounding ridges and hilltops

Adjacent Land Uses and Conditions:

- Rural residential development in surrounding areas
- City limits at base of hill

Threats to Habitat Integrity:

Roads, erosion, clearing + development

Opportunities:

Encompass
ENGINEERING & SURVEYING

DOWNSTREAM ANALYSIS

FOREST RIDGE
PERFORMANCE BASED CLUSTER PLAT

File No. LP-08-



108 East Second St., Cle Elum, WA 98922 Phone: (509) 674-7433 Fax: (509) 674-7419
WWW.ENCOMPASSES.NET

FOREST RIDGE – PERFORMANCE BASED CLUSTER PLAT
LEVEL 1 DOWNSTREAM ANALYSIS

SITE OVERVIEW

This site consists of 478.45 acres located in Section 24, Township 20 North, Range 15 East, W.M., Kittitas County, WA and lying north of City of Cle Elum and off of the extension of Columbia Street onto a County private road system(Creekside Road). The site is vegetated with evergreen and deciduous trees with underbrush. Site has experienced selective logging within the past 20-years. There are no structures on-site. The western ¼ of the property slopes southwest into Balmer's Canyon and remainder property slopes south and inward into Steiner's Canyon.

On-site slopes vary from 2.0% to +35%. A review of the Department of Natural Resources maps showed several non-classified streams on-site. However, these streams were classified downstream by a wildlife biologist of Sewall Wetland Consulting, Inc. in June and July of 2009(please see attached aerial map). None of the site is within a 100 Year Flood Plain according to the latest F.E.M.A. maps. This project is within the Upper Kittitas County Sub-Basin of the Yakima River Basin.

A preliminary drainage investigation with the City of Cle Elum was conducted in May of 2009 to gather written complaints and history of drainage patterns downstream. No written comments have been recorded, however verbal discussions with City and County officials indicate that yearly flooding occurs downstream of the property along the Balmer's & Steiner's Canyon.

FOREST RIDGE – PERFORMANCE BASED CLUSTER PLAT
LEVEL 1 DOWNSTREAM ANALYSIS

UPSTREAM BASIN

The upstream basin contributing to this site consists of approximately 300 acres of similar land characteristics immediately north of the property. 50% of this upstream contributory sheet flows onto the property with the other 50% entering defined stream channels.

DOWNSTREAM BASIN

Storm runnoff on the site splits into two sub-basins, Balmer's Canyon and Steiner's Canyon. Balmer's Canyon drains south and eventually crosses under Columbia St./Creekside Road and enters the City of Cle Elum limits and private property. It then combines with Steiner's Canyon runoff north of 3rd St. just outside of the City limits and east of Cottage Avenue. Steiner's Canyon drains south and crosses Creekside Road before heading south east toward the Yakima River. See the Off-Site Analysis Drainage System Table.

CONCLUSION

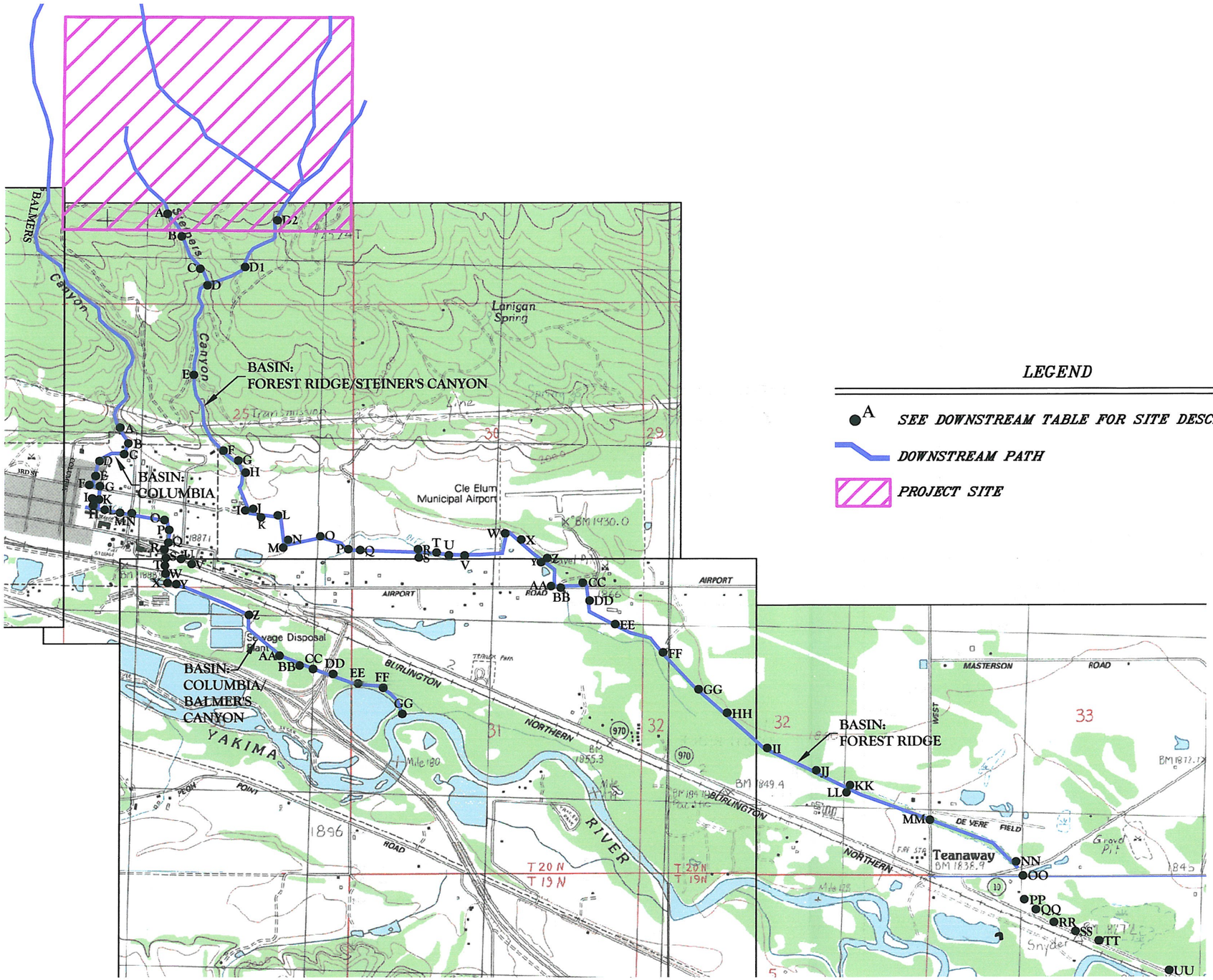
Although there is no written history of drainage complaints within the City of Cle Elum or Kittitas County Public Works records, it is local knowledge that downstream flooding exists during spring runoff and large storm events. This report provides a good summary of the drainage system that exists today and will assist all future developments in designing methods to improve the system in the future. It should be made clear that the project site is located ¾ of a mile north of the City limits of Cle Elum. Responsibility of drainage improvements beyond ¼ of a mile are not typically done, but may be necessary to address annual problems for this area. Below are suggestions:

- City of Cle Elum & Kittitas County need to create a process to collect written documentation of drainage complaints.
- Forest Ridge PBCP should be proactive in establishing a maintenance strategy of streams, culverts & catch basins that convey stormwater on-site. City of Cle Elum, County and downstream neighbors should do the same for the off-site.
- Forest Ridge PBCP should establish a snow removal strategy of private streets that allow the majority of the stormwater systems to still convey stormwater. City and County should do the same for the off-site.
- Forest Ridge PBCP, at time of civil design, should perform a backwater analysis on portions of the downstream path to determine ditch & pipe velocities and capacities for the 100-yr. storm event. This analysis will determine if upgrades to the existing downstream system are necessary by either City, County or applicant.

FOREST RIDGE – PERFORMANCE BASED CLUSTER PLAT
LEVEL 1 DOWNSTREAM ANALYSIS

- Forest Ridge PBCP, City, County and downstream neighbors need to stabilize channels, outlets and protect drain inlets
- Forest Ridge PBCP shall control on-site flow rates and pollutants per DOE's Stormwater Management Manual for Eastern Washington.
- Forest Ridge PBCP shall maintain BMPs

FIGURE C._____



LEGEND

A *SEE DOWNSTREAM TABLE FOR SITE DESCRIPTION*

DOWNSTREAM PATH

PROJECT SITE

N

GRAPHIC SCALE

2000' 0 1000' 2000'

(IN FEET)
1 inch = 2000 ft.

Encompass
ENGINEERING & SURVEYING
108 EAST 2ND ST.
CLE ELUM, WA 98922
PHONE: (509) 674-7433
FAX: (509) 674-7419

DOWNSTREAM DRAINAGE SYSTEM
FOREST RIDGE
PERFORMANCE BASED CLUSTER PLAT

J:\08\08008\SURVEY\DWG\08008-DOWNSTREAM BASIN.DWG

OFF-SITE ANALYSIS DRAINAGE

SYSTEM TABLE

STEINER'S CANYON

SYSTEM TABLE

OFF-SITE ANALYSIS DRAINAGE SYSTEM TABLE SURFACE WATER DESIGN MANUAL, CORE REQUIREMENT #2

Basin:Forest Ridge			Sub.Steiner's Canyon		Sub. Number:	
Symbol	**Drainage, Component Type, Name and Size**	**Drainage Component Description**	**Slope**	**Distance from site discharge**	**Existing Problems/Potential Problems**	**Oberservations of field inspector, resource reviewer, or resident**
see map	Type: Sheet flow, swale, stream, channel, pipe, pond: Size: diameter, surface area	Dranage basin, vegetation, cover, depth, type of sensitive area, volume	%	1/4 mi = 1,320 ft.	Constrictions, under capacity, ponding, overtopping, flooding, habitat or organism destruction, scouring, bank sloughing, sedimentation, incision, other erosion	Tributary area, likelihood of problem overflow pathways, potential impacts
A	Dischard site	Creek	~8%	0		Ravine very choked w/brush+wood + debris
B	Waterfall/grade break		~100%	A-B=~800'		Elevation drops
						~20% inc. ~20% horizontal
C	Tributary inflows from NE		2%	B-C=~400'		3' wide creek w/3'-4' high vertical banks
D	Culvert Crossing	30" cmp~40' long	2%	C-D=~150'		
		Under gravel road				
E	Culvert crossing	36" cmp~15' long under dirt rd.	2%	D-E=~800'		
F	Culvert crossing	36"cmp~12' long under dirt rd.	2%	E-F=~1000'		
G	3 culverts laid side by side	(2) 24" black corrugated plastic	2%	F-G=~150'		Creek widens to ~ 25' diameter pool
		(1) 18" cmp				Pool drains through 3 culverts
H	Culvert & crossing	36" cmp	2%	G-H=~200'		
I	(2) culverts laid side by side	(2) 24" cmp~20' long	1%	H-I=~900'		
		Under paved DW				
J	Stream enters culvert	36" cmp heading E.	1%	I-J=~250'		

OFF-SITE ANALYSIS DRAINAGE SYSTEM TABLE SURFACE WATER DESIGN MANUAL, CORE REQUIREMENT #2

Basin:Forest Ridge			Sub.Steiner's Canyon		Sub. Number:	
Symbol	**Drainage, Component Type, Name and Size**	**Drainage Component Description**	**Slope**	**Distance from site discharge**	**Existing Problems/Potential Problems**	**Oberservations of field inspector, resource reviewer, or resident**
see map	Type: Sheet flow, swale, stream, channel, pipe, pond: Size: diameter, surface area	Dranage basin, vegetation, cover, depth, type of sensitive area, volume	%	1/4 ml = 1,320 ft.	Constrictions, under capacity, ponding, overtopping, flooding, habitat or organism destruction, scouring, bank sloughing, sedimentation, incision, other erosion	Tributary area, likelihood of problem overflow pathways, potential impacts
K	Manhole	36" cmp inflow from w.				
		36" Black corrugated				
		Plastic outflow E.				
D1	Culvert crossing					
D2	Discharge point					
L	Manhole	36" Black corrugated plastic inflow from W.	2%	K-L=~400'		
		36" Black corruagted plastic outflow to S.		L-M~=300'		
M	90% Elbow	Inflow from N.		L-M~=300'		Did not see. Buried
		Outflow to E.				Based on information from neighbor
N	End berm	Beam @ S. Bank ends	1%	V-W~=200'		Creek flows into wooded area
	End liner	Liner ends				

OFF-SITE ANALYSIS DRAINAGE SYSTEM TABLE SURFACE WATER DESIGN MANUAL, CORE REQUIREMENT #2

Basin:Forest Ridge			Sub.Steiner's Canyon		Sub. Number:	
Symbol	**Drainage, Component Type, Name and Size**	**Drainage Component Description**	**Slope**	**Distance from site discharge**	**Existing Problems/Potential Problems**	**Oberservations of field inspector, resource reviewer, or resident**
see map	Type: Sheet flow, swale, stream, channel, pipe, pond: Size: diameter, surface area	Dranage basin, vegetation, cover, depth, type of sensitive area, volume	%	1/4 ml = 1,320 ft.	Constrictions, under capacity, ponding, overtopping, flooding, habitat or organism destruction, scouring, bank sloughing, sedimentation, incision, other erosion	Tributary area, likelihood of problem overflow pathways, potential impacts
O	2 culverts laid side by side ~15' long	(1) 18" cmp	2%	N-O=~600'		
	Under field crossing	(1) 18" concrete				
P	Curlvert crossing	36" cmp under paved rd.	1%	O-P=~400'		
		~65' long				
Q	Tributary from SW	36" cmp under paved rd.	1%	P-Q=~65'		
R	Irrigation takeoff	Gate valve feeding 18" cmp feeding ditch flowing SE	1%-2%	Q-R=~1200'		
S	Culvert Crossing	24" cmp ~20' long under farm crossing	1%	R-S=~50'		
T	Culvert Crossing	36"cmp ~50' long under paved rd.	1%	S-T=~300'		
U	Irrigation take off	Gate valve feeding small ditch to S.	1%	T-U=~100'		
V	Begin O ditch liner	Rubber liner in ditch	1%-2%	U-V=~200'		
W	End Berm	Berm @ S. Bank Ends	1%	R-W=~200'		Creek flows into wooded area
	End liner	Liner ends				

OFF-SITE ANALYSIS DRAINAGE SYSTEM TABLE SURFACE WATER DESIGN MANUAL, CORE REQUIREMENT #2

Basin:Forest Ridge			Sub.Steiner's Canyon		Sub. Number:	
Symbol	**Drainage, Component Type, Name and Size**	**Drainage Component Description**	**Slope**	**Distance from site discharge**	**Existing Problems/Potential Problems**	**Oberservations of field inspector, resource reviewer, or resident**
see map	Type: Sheet flow, swale, stream, channel, pipe, pond: Size: diameter, surface area	Dranage basin, vegetation, cover, depth, type of sensitive area, volume	%	1/4 ml = 1,320 ft.	Constrictions, under capacity, ponding, overtopping, flooding, habitat or organism destruction, scouring, bank sloughing, sedimentation, incision, other erosion	Tributary area, likelihood of problem overflow pathways, potential impacts
X	Irrigation take off	Notched log set in creek bank to regulate flow to ditch running N.	1%	W-X=~50'		
Y	Stream enters wetland/swamp	Multiple channels + pools no main channel	<1%	X-Y=~100'		
Z	(3) culverts laid side by side under gravel DW	(2) 24' corrugated black plastic	<1%	Y-Z=~250'		
		(1) 18" corrugated black plastic				
AA	Irrigation takeoff	Gate valve feeding 18" cmp heading S. under paved rd.	3%	Z-AA=~1000'		
BB	Culvert crossing	30" cmp~30' long under gravel rd	2%	AA-BB=~20'		
CC	Culvert crossing	30" concrete ~ 40' long under paved rd.	2%	BB-CC=~175'		Crossing under Airport Rd.
DD	Tributary joins	Outflow of pond to W. flows into creek	1%	CC-DD=~400"		
EE	Culvert Crossing under gravel rd.	(2) 30" cmp culverts laid side by side ! 15' long	<1%	DD-EE=~1000'		
FF	Stream enters swamp	No discernable channel	1%	EE-FF=~400'		
		Sheet flow through lots of skunk cabbage				

OFF-SITE ANALYSIS DRAINAGE SYSTEM TABLE SURFACE WATER DESIGN MANUAL, CORE REQUIREMENT #2

Basin:Forest Ridge			Sub.#1		Sub. Number:	
Symbol	**Drainage, Component Type, Name and Size**	**Drainage Component Description**	**Slope**	**Distance from site discharge**	**Existing Problems/Potential Problems**	**Oberservations of field inspector, resource reviewer, or resident**
see map	Type: Sheet flow, swale, stream, channel, pipe, pond: Size: diameter, surface area	Dranage basin, vegetation, cover, depth, type of sensitive area, volume	%	1/4 ml = 1,320 ft.	Constrictions, under capacity, ponding, overtopping, flooding, habitat or organism destruction, scouring, bank sloughing, sedimentation, incision, other erosion	Tributary area, likelihood of problem overflow pathways, potential impacts
GG	Stream leaves swamp		1%	FF-GG ~800'		Ground around stream still swampy, but channel is discernable
HH	Stream enters swamp		<1%	GG-HH=~500'		Channel becomes indiscernable
II	Stream leaves swamp		<1%	HH-II=~1100'		Swamp narrows into 20'-30' wide slow flowing wetland/channel
JJ	Culvert Crossing	72" cmp culvert ~ 45' long under gravel rd.	<1%	II-JJ=~800'		
KK	Stream enters swamp/beaver pond			JJ-KK=~600'		Large areas of open water observed beaver in pond
LL	Beaver Dam stream enters swamp		1%	KK-LL=~150'		~1.5 acre Beaver pond/swamp
MM	Culvert crossing	(2) 60" cmp culverts ~45' long under paved rd.	1%	LL-MM=~1200'		

OFF-SITE ANALYSIS DRAINAGE SYSTEM TABLE SURFACE WATER DESIGN MANUAL, CORE REQUIREMENT #2						
Basin:Forest Ridge			**Sub.Steiner's Canyon**		**Sub. Number:**	
Symbol	**Drainage, Component Type, Name and Size**	**Drainage Component Description**	**Slope**	**Distance from site discharge**	**Existing Problems/Potential Problems**	**Oberservations of field inspector, resource reviewer, or resident**
see map	Type: Sheet flow, swale, stream, channel, pipe, pond: Size: diameter, surface area	Dranage basin, vegetation, cover, depth, type of sensitive area, volume	%	1/4 ml = 1,320 ft.	Constrictions, under capacity, ponding, overtopping, flooding, habitat or organism destruction, scouring, bank sloughing, sedimentation, incision, other erosion	Tributary area, likelihood of problem overflow pathways, potential impacts
NN	Conc. Box culvert	4'x4' crossing SR 970	1%	0'-100'	No obstructions	
OO		Corr. Metal pipe cul. X-ing Driveway			No obstructions	
PP		Natural Veg. Cat-Tails/reeds	2%	125'-225'	Naturally flowing no obstructions	
QQ	Pond 75' long X 30' wide	Cat-tails/reeds 1'-1.5' deep	0%-1%	225'-300'		
RR	30" metal culvert x-ing driveway		1%	300'-325'	No obstructions	
SS	Stream 2:1	Natural Veg.	1%-2%	325'-500'	Some debris in crk. No restrictions of flow	
TT	Channel 20'-30' wide	Heavily veg., shrubs, reeds, cat tails	1%	500'-1200'	Ponding/swampy outside of channel large wetland	
UU	Swamp 100'-400' wide	Trees, reeds & cat tails	0%-1%	1200'-3800'	Large swamp w/no obvious channel or flow	
		3800 Teanaway River				

BALMER'S CANYON

SYSTEM TABLE

OFF-SITE ANALYSIS DRAINAGE SYSTEM TABLE SURFACE WATER DESIGN MANUAL, CORE REQUIREMENT #2

Basin:Columbia			Sub. Balmer's Canyon		Sub. Number:	
Symbol	**Drainage, Component Type, Name and Size**	**Drainage Component Description**	**Slope**	**Distance from site discharge**	**Existing Problems/Potential Problems**	**Oberservations of field inspector, resource reviewer, or resident**
see map	Type: Sheet flow, swale, stream, channel, pipe, pond: Size: diameter, surface area	Dranage basin, vegetation, cover, depth, type of sensitive area, volume	%	1/4 ml = 1,320 ft.	Constrictions, under capacity, ponding, overtopping, flooding, habitat or organism destruction, scouring, bank sloughing, sedimentation, incision, other erosion	Tributary area, likelihood of problem overflow pathways, potential impacts
A	24" Black Plastic Corrugated Pipe	~ 40' long under gravel rd.	1%	A-B= ~ 140'		Channel splits for ~ 120'
B	18" cmp culvert under gravel DW		4%	B-C=~100'		Channel re-joins
C	30" cmp culvert	Under gravel rd.	3%	C-D ~250'		
D	24" cmp culvert	Under paved st.	3%-4%	D-E ~ 150'		
E	24" Black corrugated plastic pipe	~ 20' long buried in rip-rap & dirt	3%-4%	E-F ~ 125'		Pipe laid to protect SSMH @ W. Edge ditch from washout
F	Bend in channel 18" cone culvert	90° turn to E.	1%-2%	F-G ` 125'		Channel B joined by small ditch from W.
G	18" cone culvert	~ 55'	1%-2%	G-H ~ 225'		S. ~ 10' of culvert is 24" cmp sleeved over concrete
H	Homemade ~36" culvert under concrete SW	~ 10' long made of old fuel tank w/ends cut out	2%-3%	H-I ~15'		
I	Drains into 6' diameter cmp under paved st.		2%-3%			

OFF-SITE ANALYSIS DRAINAGE SYSTEM TABLE SURFACE WATER DESIGN MANUAL, CORE REQUIREMENT #2

Basin:Columbia			Sub. Balmer's Canyon		Sub. Number:	
Symbol	**Drainage, Component Type, Name and Size**	**Drainage Component Description**	**Slope**	**Distance from site discharge**	**Existing Problems/Potential Problems**	**Oberservations of field inspector, resource reviewer, or resident**
see map	Type: Sheet flow, swale, stream, channel, pipe, pond: Size: diameter, surface area	Dranage basin, vegetation, cover, depth, type of sensitive area, volume	%	1/4 ml = 1,320 ft.	Constrictions, under capacity, ponding, overtopping, flooding, habitat or organism destruction, scouring, bank sloughing, sedimentation, incision, other erosion	Tributary area, likelihood of problem overflow pathways, potential impacts
K	6' diameter cmp under paved st.	~ 60' long	1%	K-L ~ 100'		Ditch w/~36" homemade metal culvert enters swale @ W. end 6' culvert
N	6' wide X 4' tall cmp squash pipe	~ 50' long running under paved st.	<1%	N-O ~ 400'		Partially silted @ E. end
O	Wire fence stretched across channel		<1%	O-P~ 75'	Possible flow restriction	
P	3' tall X 4' wide cmp squash pipe under farm crossing		<1%	P-Q ~ 125'		Pipe beat up & misshapen
Q	Fence stretched across channel		<1%	Q-R ~ 25'		Suspended above H20 no flow restriction
S	6' wide X 4' deep concrete box culvert	~ 55' long under SR970		S-T ~ 70'		
T	7' wide x 4' high concrete box culvert	~25' long	1%	T-U ~ 50'		Bottom partially silted

OFF-SITE ANALYSIS DRAINAGE SYSTEM TABLE SURFACE WATER DESIGN MANUAL, CORE REQUIREMENT #2

Basin:Columbia			Sub. Balmer's Canyon		Sub. Number:	
Symbol	**Drainage, Component Type, Name and Size**	**Drainage Component Description**	**Slope**	**Distance from site discharge**	**Existing Problems/Potential Problems**	**Oberservations of field inspector, resource reviewer, or resident**
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U	36"cmp culvert	~ 30' long under dirt rd.	1%	U-V ~ 70'		
V	36' cmp culvert	~20' long	1%	V-W ` 70'		
W	(2) 48' concrete culverts (side by side)	~40' running under RR tracks	2%	W-X ~ 50'		
X	48" cmp culvert	~20' long running under gravel rd.	1%	X-Y ~ 250'		
Y	36" diameter DIP suspended over H20		1%-2%	Y-Z ~1300'		Connects flowing ditch south to north. No flow restriction
Z	Wire fence suspended over channel		1%	Z-AA ~600'		No flow restrictions
AA	Bend in Stream		1%-2%			
BB	Creek feeds swamp	Swamp filled w/cat tails to N. of bend in stream	<1%	BB-CC ~1200'		Definite H20 detention area
CC	Bend in creek		1%	CC-DD ~ 550'		
DD	6' diameter concrete culvert	Flowing under overpass for freeway on ramp ~150' long culvert	2%	DD-EE ~ 1300'		

OFF-SITE ANALYSIS DRAINAGE SYSTEM TABLE SURFACE WATER DESIGN MANUAL, CORE REQUIREMENT #2

Basin:Columbia			Sub. Balmer's Canyon		Sub. Number:	
Symbol	**Drainage, Component Type, Name and Size**	**Drainage Component Description**	**Slope**	**Distance from site discharge**	**Existing Problems/Potential Problems**	**Oberservations of field inspector, resource reviewer, or resident**
see map	Type: Sheet flow, swale, stream, channel, pipe, pond: Size: diameter, surface area	Dranage basin, vegetation, cover, depth, type of sensitive area, volume	%	1/4 ml = 1,320 ft.	Constrictions, under capacity, ponding, overtopping, flooding, habitat or organism destruction, scouring, bank sloughing, sedimentation, incision, other erosion	Tributary area, likelihood of problem overflow pathways, potential impacts
EE	Change in channel/vegetation	Banks become more defined/channel becomes less defined	<1%	EE-FF ~ 600'		
FF	Pond inlet to stream	Swampy area connecting pond to stream definite flow from pond to stream	1%	FF-GG ~200'	Beaver dam + lodge @ Pond edge/Partial Dam in stream restricting flow	
GG	Stream meets Yakima River	Discernable channel downstream from "FF"	<1%			Beaver swamp lots of standing water & downed trees

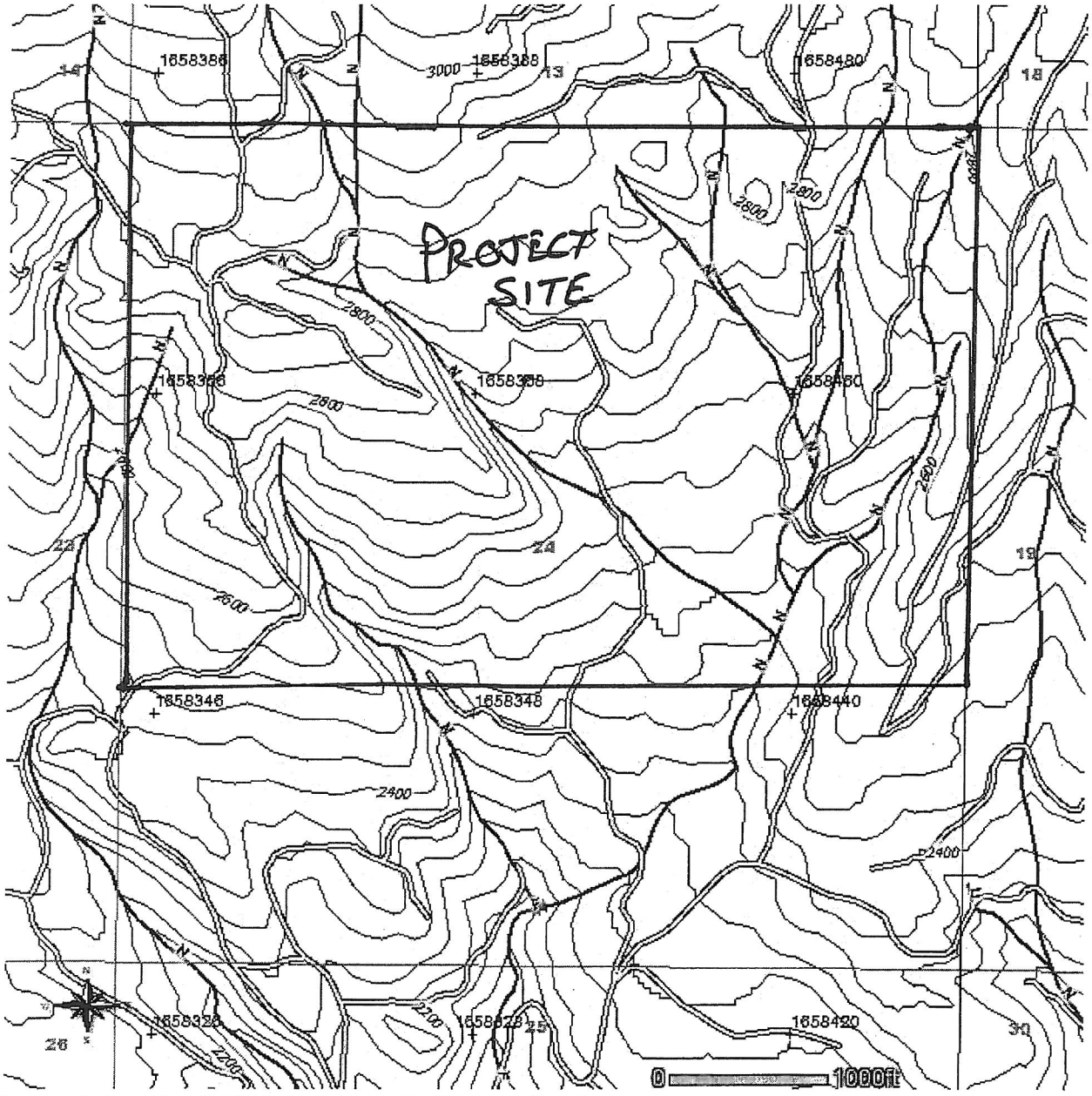
DRAINAGE BASINS, SUBBASINS

AND SITE CHARACTERISTCS

FOREST PRACTICE ACTIVITY MAP

TOWNSHIP 20 NORTH HALF 0, RANGE 15 EAST (W.M.) HALF 0, SECTION 24

Application #:_____

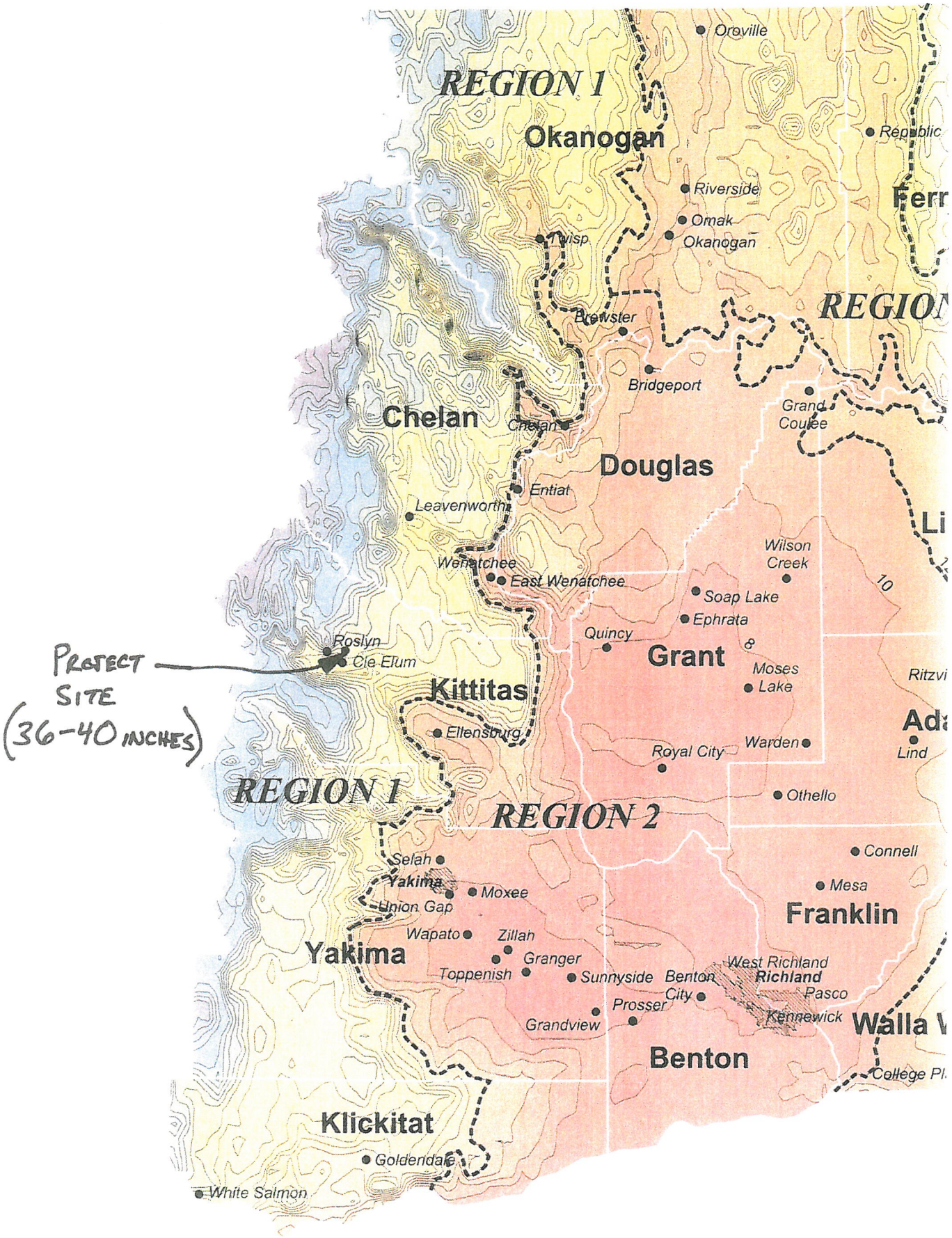


Please use the legend from the FPA Instruction or provide a list of symbols used.

Monday, July 27, 2009 11:21:06 AM
NAD 83
Contour Interval: 40 Feet

DNR Map

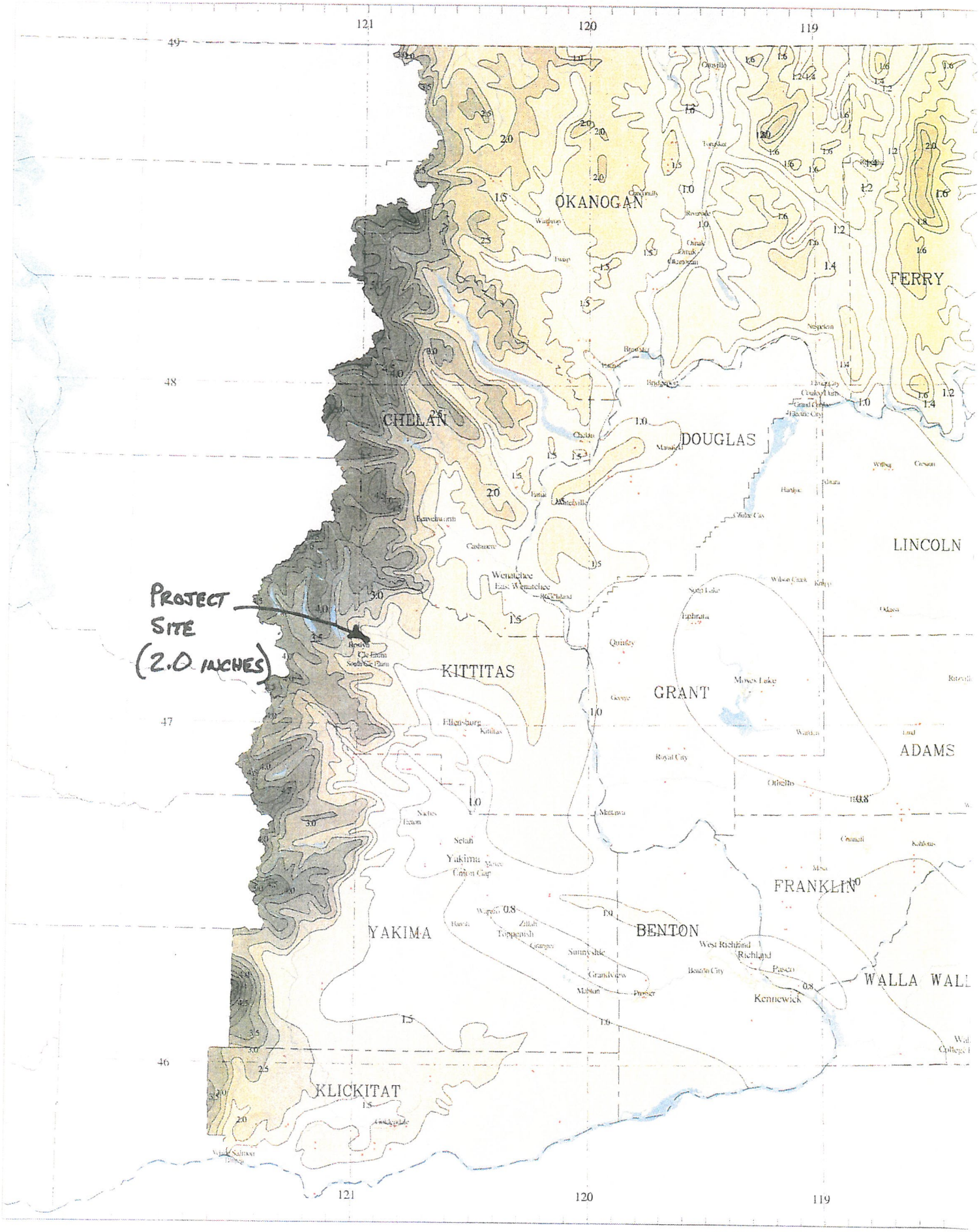
AVG. ANNUAL PRECIP. 1961-1990



PROJECT SITE (36-40 INCHES)

GCH
Mar. 2008
Slope Analysis
Forest Ridge Community
1 Acre
10 Acre
N
Legend
Property Line
0-8% Slopes
8-15% Slopes
15-25% Slopes
25-35% Slopes
35% + Slopes

2-YEAR 24-HR ISOPLUVIAL


121
120
119
49
48
47
46
OKANOGAN
FERRY
CHELAN
DOUGLAS
LINCOLN
KITTITAS
GRANT
ADAMS
YAKIMA
BENTON
FRANKLIN
KLICKITAT
PROJECT SITE (2.0 INCHES)
Wenatchee
East Wenatchee
Ellensburg
Yakima
Union Gap
Moses Lake
Quincy
Ephrata
Royal City
Othello
Sunnyside
Grandview
Prosser
Kennewick
Richland
West Richland
Pasco
Connell
Mattawa
Toppenish
Zillah
Wapato
Selah
Naches
Cle Elum
Roslyn
South Cle Elum
Soap Lake
Odessa
Coulee City
Grand Coulee
Chelan
Manson
Entiat
Waterville
Orondo
Brewster
Bridgeport
Omak
Okanogan
Oroville
Tonasket
Riverside
Winthrop
Twisp
Carlton
Methow
Pateros
Brewster
Nespelem
Coulee Dam
Electric City
Ephrata
Hartline
Wilson Creek
Creston
Wilbur
Harrington
Cashmere
Leavenworth
Peshastin
Dryden
Monitor
Cashmere
Goldendale
Bickleton
Satus Pass
Toppenish
Wapato
Harrah
Granger
Outlook
Grandview
Mabton
Prosser
Benton City
Kennewick
Finley
Burbank
Pasco
Connell
Othello
Warden
Moses Lake
Wilson Creek
Soap Lake
Ephrata
Quincy
Mattawa
Royal City
Ritzville
Odessa
Creston
Wilbur
Harrington
Davenport
Coulee City
Grand Coulee
Electric City
Bridgeport
Brewster
Pateros
Methow
Twisp
Winthrop
Carlton
Omak
Okanogan
Oroville
Tonasket
Riverside
Nespelem
Coulee Dam
Electric City
Ephrata
Hartline
Wilson Creek
Creston
Wilbur
Harrington
Davenport
Cashmere
Leavenworth
Peshastin
Dryden
Monitor

PRELIMINARY STORM DRAINAGE REPORT

for

FOREST RIDGE PERFORMANCE BASED CLUSTER PLAT

December 14, 2009

Encompass Engineering & Surveying, Job No. 08008

RECEIVED
DEC 2 9 2009
KITTITAS COUNTY
CDS

Prepared by:

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(17)

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Soil Map and Soil Map Information	Appendix 'B'
Upstream and Downstream Analysis	Appendix 'C'
Basin Maps and Basin Breakdown Information	Appendix 'D'
Storm Drainage Run-Off Calculations	Appendix 'E'
Storm Drainage Water Quantity Calculations	Appendix 'F'
Storm Drainage Water Quality Calculations	Appendix 'G'

I. OVERVIEW

Forest Ridge Performance Based Cluster Plat (PBCP) is located approximately 1.25 miles north of Cle Elum, within Section 24, Township 20 North, Range 15 East, Willamette Meridian, Kittitas County, State of Washington. The project site takes up the entire north ¾ of Section 24 and it is located off of the extension of Columbia Street onto a County private road system within an upland region above the Yakima River valley, on the south face of Cle Elum Ridge. It is bounded by Creekside Road on the south, Balmer's Canyon on the west, and Main Ridge Road on the east.

The existing parcel is approximately 478.45 acres in size. The proposed performance based cluster plat will create 170 single-family residential lots, a community area, private access roads, and associated utilities. The project will also create Open Space Tracts for the portions of the project site located within the steep slopes, wetland, and stream buffer areas. Multiple storage and treatment facilities are proposed throughout the site, which will provide the required storage to meet the water quality treatment and flow control standards as specified in Title 12 of Kittitas County Code and the 2004 Washington State Department of Ecology Stormwater Management Manual for Eastern Washington (*SWMMEW*).

II. PRE-DEVELOPMENT CONDITIONS

The project site is considered to be undeveloped open range land that is characterized as a mix of thinned forest area (mix of evergreen and deciduous trees), brush and grassland. The topography of the site is rolling in nature with steep slopes varying between 2 percent and 35 percent. The western ¼ of the property slopes southwest into Balmer's Canyon and remainder property slopes south and inward into Steiner's Canyon. There are no existing structures on-site. Based on a review of the Department of Natural Resources maps, there are two main streams (Balmer's Canyon and Steiner's Canyon) and several drainage courses located on-site that collect the existing on-site drainage. The project site has experienced selective logging within the past 20-years.

The Forest Ridge PBCP site is located in the northwest quadrant of the Upper Yakima River Watershed. The Upper Yakima River watershed, which is a part of the greater Yakima River watershed, drains an area 2,139 square miles in size. This watershed contains some of the most intensively irrigated lands in the United States. Below the outlet of the Lake Keechelus dam, the main tributaries to the Upper Yakima River are the Kachess River, Cle Elum River, and Teanaway River. There are many other smaller tributaries to the upper Yakima River. The drainage from the Forest Ridge PBCP project site flows to the south, southwest, and southeast into Balmer's Canyon and Steiner's Canyon. Balmer's Canyon enters City of Cle Elum Storm Drainage system and flows towards Yakima River. Steiner's Canyon enters Kittitas County ditching system and flows towards Teanaway River.

There have been flooding issues downstream of the project site in the past, especially the most recent floods in January of 2009, but the project site has not experienced any flooding. A preliminary drainage investigation with the City of Cle Elum was conducted in May of 2009 to gather written complaints and history of drainage patterns downstream. No written comments have been recorded, however verbal discussions with City and County officials indicate that yearly flooding occurs downstream of the property along the Balmer's Canyon and Steiner's Canyon. None of the project site is located within a 100 Year Flood Plain according to the latest F.E.M.A. maps.

The project site is located in Region 1 – East Slopes of the Cascade Mountains, according to the 2004 *SMMMEW*. The average annual precipitation is approximately 36 inches.

III. SOIL ANALYSIS, STREAMS AND WETLANDS

Based on the USDA Natural Resource Conservation Service National Cooperative Soil Survey, the on-site soils are mapped as Teanaway Loam complex (10 to 25 percent slopes) throughout the project site. For Soil Map and Soil Information refer to Appendix B. Based on the knowledge of the local soils and soils percolation information provided by the Kittitas County Public Health Department, it is a conservative assumption that for the purposes of runoff calculations the Hydrologic Soil Group is "C".

There are two main streams and numerous drainage routes on the project site identified in the Department of Natural Resources Forest Practices Application Review System (DNR FPARS). All streams are identified as Type N (equates to Type 4-5) streams. A portion of Steiner's Canyon, located directly south of the Forest Ridge PBCP project site, is identified as Type F (equates to Type 3) stream. The Type F stream classification is described by DNR as streams and water bodies that are known to be used by fish; the Type N stream classification is described by DNR as streams that have flow year around or streams that do not have surface flow during at least some portion of the year, and do not meet the physical criteria to be used by fish.

The National Wetland Inventory (NWI) and Kittitas County Mapsifter maps for the project site show no wetlands on or near the project site. However, a site-specific investigation has been conducted by Sewell Wetland Consulting, Inc., but at the time of the writing of this report, the wetland and stream report has not been completed.

IV. SITE SPECIFIC DRAINAGE BASIN

There are no known basin studies produced for the watershed that includes the Forest Ridge project site. For the purpose of this report, the sub-basin for the proposed Forest Ridge Performance Based Cluster Plat has been delineated based on USGS maps and other available information. The project site is within the sub-basin located on the north side of the City of Cle Elum, encompassing an area from the Town of Roslyn on the west, Cottage Avenue in the City of Cle Elum on the east, the top of Cle Elum Ridge on the north, 3rd Street and SR-903 within the City of Cle Elum on the south. This sub-basin is approximately 470 acres in size.

Based on preliminary findings, the majority of the Forest Ridge PCBP property hydrology is split between two significant drainage basins, Columbia Basin and Forest Ridge Basin. Columbia Basin collects the drainage from Balmer's Canyon, while Forest Ridge Basin collects the drainage from Steiner's Canyon. These basins are strongly influenced by snow melt and recharge over the upland areas, including on the Forest Ridge PCBP property. Large portions of these two drainage basins are located upstream of the proposed Forest Ridge PCBP project site. These upstream basins are not considered in the hydrologic analysis, and they will be by-passed via existing streams and drainage routes that dissect the project site. On the overall scale, the upstream basins discharge directly to these existing drainage routes. Only small portions of the upstream basins, located along the northern property line, may sheet flow onto the project site. These amounts would not adversely affect the intent of this analysis and could be either included in the final storm drainage calculations/analysis or by-passed via proposed rock-lined swales along the northern property line.

Encompass Engineering & Surveying analyzed the aerial topographic map prepared by Degross Aerial Mapping, Inc. (2009), and delineated six separate site-specific drainage basins. The site specific drainage basin and the project sub-basin area maps are shown in Appendix D. The level of detail utilized for the delineation of the site-specific basins is appropriate for the preliminary storm drainage calculation and analysis for the entire project site. A more detailed analysis of the drainage basins is recommended for the construction design. The site-specific drainage basin descriptions are as follows:

Basin A:
Basin A is located in the western-most area of the project site, and it is 55.18 acres in size. Run-off from this basin contributes to the headwaters of Balmer's Canyon to the west and southwest.

Basin B:
Basin B is located south of Basin A, and it is 23.67 acres in size. Run-off from this basin contributes to the headwaters of Steiner's Canyon to the southeast.

Basin C:
Basin C is located east of Basins A and B, and it is 77.04 acres in size. Run-off from this basin contributes to the headwaters of Steiner's Canyon to the south.

Basin D:
Basin D is located east and north of Basin C, and it is 169.54 acres in size. Run-off from this basin contributes to the headwaters of Steiner's Canyon to the south and southwest.

Basin E:
Basin E is located east of Basin D, and is 138.66 acres in size. Run-off from this basin contributes to the headwaters of Steiner's Canyon to the south.

Basin F:
Basin F is located in the southeast corner of the property and southeast of Basin D, and it is 14.36 acres in size. Run-off from this basin contributes to the headwaters of Steiner's Canyon to the southeast.

V. UPSTREAM AND DOWNSTEAM ANALYSIS

Level 1 downstream analysis was performed by Encompass Engineering & Surveying in July 2009. The following is the summary of the analysis.

Upstream Basin Analysis:

The upstream basin contributing to this site consists of approximately 300 acres of similar land characteristics immediately north of the property. 50% of the upstream basin sheet flows onto the property with the other 50% entering defined stream channels.

Downstream Basin Analysis:

Storm runnoff on the site splits into two drainage basins, Columbia Basin and Forest Ridge Basin. Columbia Basin consists of Balmer's Canyon, which drains south, eventually crosses under Columbia Street / Creekside Road and enters Town Ditch just north of 2nd Street. From here, it heads south through the City of Cle Elum Storm Drainage system toward Yakima River. Forest

Ridge Basin consists of Steiner's Canyon, which drains south, crosses Creekside Road and heads southeast, enters Younger Ditch at White Road culvert crossing, and heads east toward Teanaway River. See the Off-Site Analysis Drainage System Table in Appendix C.

Conclusion:

Although there is no written history of drainage complaints within the City of Cle Elum or Kittitas County Public Works records, it is local knowledge that downstream flooding exists during spring runoff and large storm events. This report provides a good summary of the drainage system that exists today and will assist all future developments in designing methods to improve the system in the future. It should be made clear that the project site is located ¾ of a mile north of the City limits of Cle Elum. Responsibility of drainage improvements beyond ¼ of a mile are not typically done, but may be necessary to address annual problems for this area. Below are suggestions:

- City of Cle Elum & Kittitas County need to create a process to collect written documentation of drainage complaints.
- Forest Ridge PBCP should be proactive in establishing a maintenance strategy of streams, culverts & catch basins that convey stormwater on-site. City of Cle Elum, County and downstream neighbors should do the same for the off-site.
- Forest Ridge PBCP should establish a snow removal strategy of private streets that allow the majority of the stormwater systems to still convey stormwater. City and County should do the same for the off-site.
- Forest Ridge PBCP, at time of civil design, should perform a backwater analysis on portions of the downstream path to determine ditch & pipe velocities and capacities for the 100-yr. storm event. This analysis will determine if upgrades to the existing downstream system are necessary by either City, County or applicant.
- Forest Ridge PBCP, City, County and downstream neighbors need to stabilize channels, outlets and protect drain inlets
- Forest Ridge PBCP shall control on-site flow rates and pollutants per DOE's Stormwater Management Manual for Eastern Washington.
- Forest Ridge PBCP shall maintain BMPs

VI. POST-DEVELOPMENT CONDITIONS

The owner proposes to develop a performance-based cluster plat that will subdivide the project site into 170 single-family residential lots, 1 community area lot, private paved access roads, and associated utilities. The project will also create Open Space Tracts for the portions of the project site located within the steep slopes, wetland, and stream buffer areas.

Density calculations for analyzing the percentage impervious areas are performed for each basin. On the average, it is assumed that 478.45 acres will be subdivided into 170 parcels. This yields a very low average number of 0.36 dwelling units per gross acre (du/ac). Based on 2009 King County Surface Water Design Manual, 15 percent impervious area is proposed for 1.0 dwelling units per gross acre land use approach. It is assumed that the percent impervious for 0.36 du/ac density would approximately be 10% on average for this project. The percent impervious for the community area lot is assumed to be 80%. For more information on post-development basin breakdown refer to Appendix D.

Drainage from the proposed development will be conveyed via roadside ditches to each proposed detention facility. These facilities will be used as on-site detention and treatment facilities sized to provide Basic Water Quality Treatment and Flow Control, based on Title 12 of the Kittitas County Code.

VII. HYDROLOGIC ANALYSIS

Hydrologic analysis for the proposed Forest Ridge PBCP project is consistent with Title 12 of the Kittitas County Code and the 2004 *SMMMEW*. Runoff modeling was done using the Santa Barbara Urban Hydrograph method, SCS Type 1A, 24-hour storm event.

As required by 2004 *SWMMEW* and as defined in Section B.7 of 12.06.080 of the Kittitas County Code, the run-off analysis is performed for the 2-year and 25-year events. Due to existing flooding issues in the vicinity of the project site and considering that the project site is located within the flood plain, the 100-year storm event was also analyzed. The average annual precipitation information used for the pre-development and post-development run-off calculations for the project site is based on the Isopluvial Maps for Eastern Washington provided in the 2004 *SWMMEW*:

P_{2yr} = 2.0"
P_{25yr} = 3.5"
P_{100yr} = 4.75"

In order to account for the rain-on-snow event, a water equivalent value is calculated based on the average daily snow depth for Cle Elum and 20 percent moisture content, which is added to the average annual precipitation for each storm event. The water equivalent was calculated to be 1.34 inches. Thus, the revised average annual precipitation in the site area for the 24-hour duration is (See Appendix D):

P_{2yr} = 3.34"
P_{25yr} = 4.84"
P_{100yr} = 6.09"

Pre-Development Site Conditions:

The pre-development condition of the entire project site is determined to be pervious. It is assumed that most of the pervious area is considered open space and pasture (see Appendix D).

	Basin A	Basin B	Basin C	Basin D	Basin E	Basin F
$A_{pervious}$ (acres)	55.18	23.67	77.04	169.54	138.66	14.36
$CN_{pervious}$	80	80	78	79	75	75
$A_{impervious}$ (acres)	0	0	0	0	0	0
$CN_{pervious}$	98	98	98	98	98	98
Tc (min.)	12.54	5.56	12.89	28.07	22.85	5.00

Utilizing Santa Barbara Urban Hydrograph method, the following run-off quantities are calculated in cubic feet per second (cfs) (See Appendix D):

	Basin A	Basin B	Basin C	Basin D	Basin E	Basin F
$Q_{2\text{-yr}}$	16.76	8.00	20.15	36.85	23.61	3.41
$Q_{25\text{-yr}}$	33.68	15.81	42.66	77.45	55.87	7.66
$Q_{100\text{-yr}}$	48.86	22.82	63.23	114.55	86.34	11.64

Post-Development Site Conditions:

IMPERVIOUS AREA – In addition to the proposed private access roads and approximate proposed surface area of the detention ponds, it is assumed that approximately 10% of each residential lot within the development area is used as impervious. Applying the basic dispersion method to the impervious area, it is assumed that 50% of the area is treated as impervious and 50% as grass. Community area lot is assumed to be 80% impervious.

PERVIOUS AREA – In addition to Open Space Tracts and additional open space to the northwest of the project site, it is assumed that the 90% of residential lot and 20% of the community area lot are used as pervious.

	Basin A	Basin B	Basin C	Basin D	Basin E	Basin F
$A_{pervious}$ (acres)	49.08	20.99	77.55	148.09	131.33	9.97
$CN_{pervious}$	80	80	78	79	75	75
$A_{impervious}$ (acres)	5.73	3.46	6.20	14.04	9.27	2.74
$CN_{pervious}$	98	99	98	98	98	99
Tc (min.)	16.06	8.83	6.06	24.91	13.09	5.29

As it can be seen in the above table (see Appendix D for more details), the total post-development tributary area of each basin is different than the pre-development condition. This is due to the layout of the proposed access roads, roadway ditches and lots compared to the existing streams and other drainage routes. The percent difference is less than 9% for Basin A thru Basin E, and 11.5% for Basin F. In the case of Basin F, the post-development tributary area is smaller than pre-development condition. Observed from the overall perspective, these differences do not create an adverse effect since the total tributary area to each drainage basin, Columbia Basin and Forest Ridge Basin, is the same for the pre-development and the post-development condition. Utilizing

Santa Barbara Urban Hydrograph method, the following run-off quantities are calculated in cubic feet per second (cfs) (see Appendix D):

	Basin A	Basin B	Basin C	Basin D	Basin E	Basin F
$Q_{2\text{-yr}}$	17.80	9.00	26.35	39.85	31.32	4.30
$Q_{25\text{-yr}}$	34.36	17.15	53.29	81.31	70.33	8.51
$Q_{100\text{-yr}}$	49.00	24.32	77.74	118.74	106.68	12.28

Detention / Treatment Facility Sizing:

A detention facility is proposed for each site specific basin. Locations of each detention facility vary from basin to basin. Refer to Figure D.2 in Appendix D for approximate proposed detention facility locations. Each proposed facility is designed to detain the post-development 2-year, 25-year and 100-year storm events. The run-off will be released at 50% of the pre-developed 2-year, pre-developed 25-year and pre-developed 100-year storm events, as required by the Department of Ecology's 2004 *SWMMEW*, into existing streams/drainage routes located adjacent to each basin.

Allowable discharge rates from the proposed detention ponds are based on the *SWMMEW* (see Appendix D):

Post-Development Q_2 = ½ Pre-Development Q_2
Post-Development Q_{25} = Pre-Development Q_{25}
Post-Development Q_{100} = Pre-Development Q_{100}

The following REQUIRED volumes are modeled in cubic feet (see Appendix D):

	Basin A	Basin B	Basin C	Basin D	Basin E	Basin F
$V_{2\text{-yr}}$	54,701	22,551	64,921	150,725	100,889	9,261
$V_{25\text{-yr}}$	73,100	34,465	107,484	211,377	153,203	14,787
$V_{100\text{-yr}}$	82,830	39,757	136,163	238,154	189,848	17,436

The volumes above include the mitigation for the 100-year storm run-off. The criteria for the detention pond calculation and design differ for each basin. See Appendix D for criteria used to model storage volume for each basin.

As required by Ecology's 2004 *SWMMEW*, Core Element #5 – Runoff Treatment is required to reduce pollutant loads and concentrations in stormwater runoff using physical, biological, and chemical removal mechanisms to protect water quality so that beneficial uses of receiving waters are maintained and where applicable, restored (*SWMMEW*, Section 2.2.7). The most effective

basic treatment BMPs remove about 80 percent of total suspended solids contained in the runoff treated, and a much smaller percentage of the dissolved pollutants. It may be necessary to provide additional treatment to remove oil, metals, and/or phosphorus from stormwater runoff.

For the purposes of this preliminary report, treatment facilities were analyzed based on a water quality design volume utilizing Method 1 based on Core Element #5 – Runoff Treatment (*SWMMEW*, Section 2.2.5). This method specifies that the water quality design volume is determined by calculating the volume of runoff for the post-development condition from the regional storm with a 6-month, 24-hour return frequency. However, the actual design of treatment facilities will be based on this or other acceptable methods specified in *SWMMEW*. Pre-treatment facilities may be required, and will be designed based on a water quality design flow rate utilizing the SCS Type IA 24-hour storm with a 25-year return frequency as a conveyance system located "on-line". Following are the estimated required volumes for water quality treatment in cubic feet:

	Basin A	Basin B	Basin C	Basin D	Basin E	Basin F
$V_{quality}$	58,216	25,969	65,003	140,209	76,755	10,992

In some instances, the outflow will start to discharge through the overflow structure at the 25-year and 100-year storm events. The Emergency Overflow was designed such that the proposed detention facility contains the 100-year storm event.

The infiltration of the post-development run-off was not studied during this analysis due to time constraints and the assumption that the infiltration capabilities of the local soils are not suitable. It is recommended that additional soil infiltration and groundwater studies be performed during the final engineering design in order to utilize the infiltration facilities on the project site.

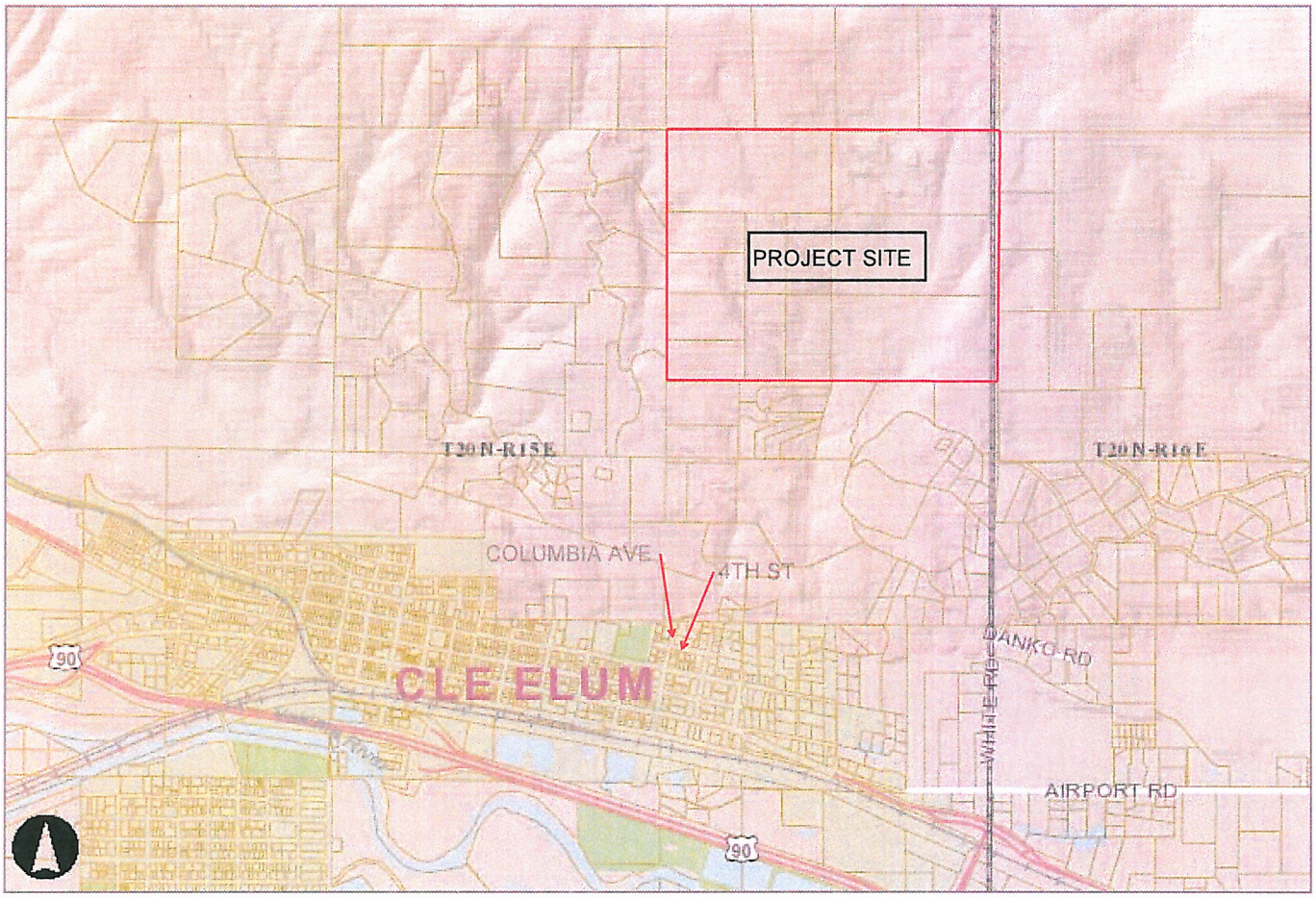
It is proposed that this project be constructed in eight (8) phases. A more detailed storm drainage analysis and design will be performed in the final design phase to more closely match proposed site layouts and proposed construction methods.

VIII. OPERATION AND MAINTENANCE MANUAL

During final engineering design, an Operations and Maintenance Manual will be prepared in accordance with the 2004 *SWMMEW*.

APPENDIX 'A'

Forest Ridge PBCP Vicinity Map



Map Center: Township:20 Range:15 Section:23

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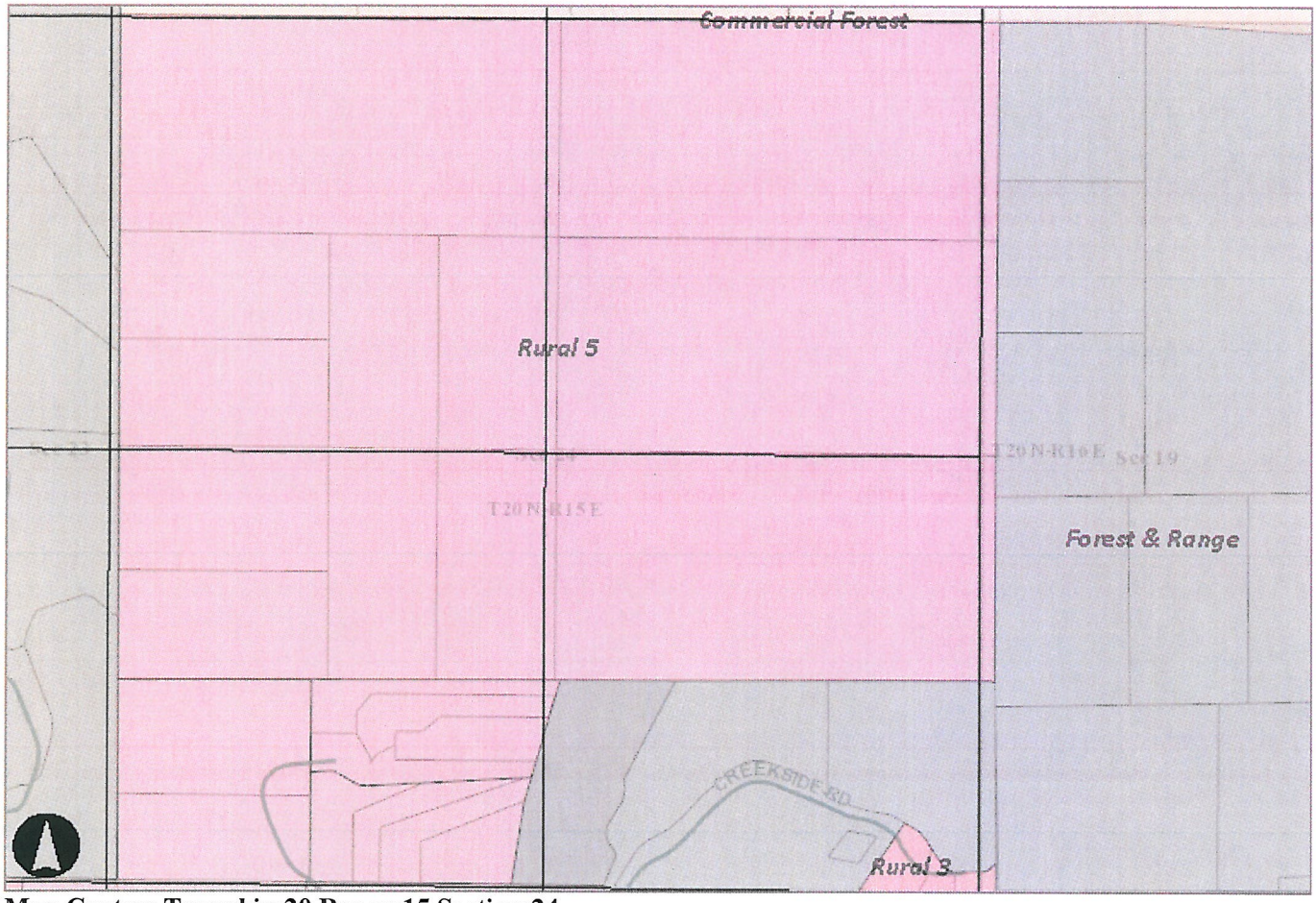
Forest Ridge PBCP Zoning Map



Map Center: Township:20 Range:15 Section:24

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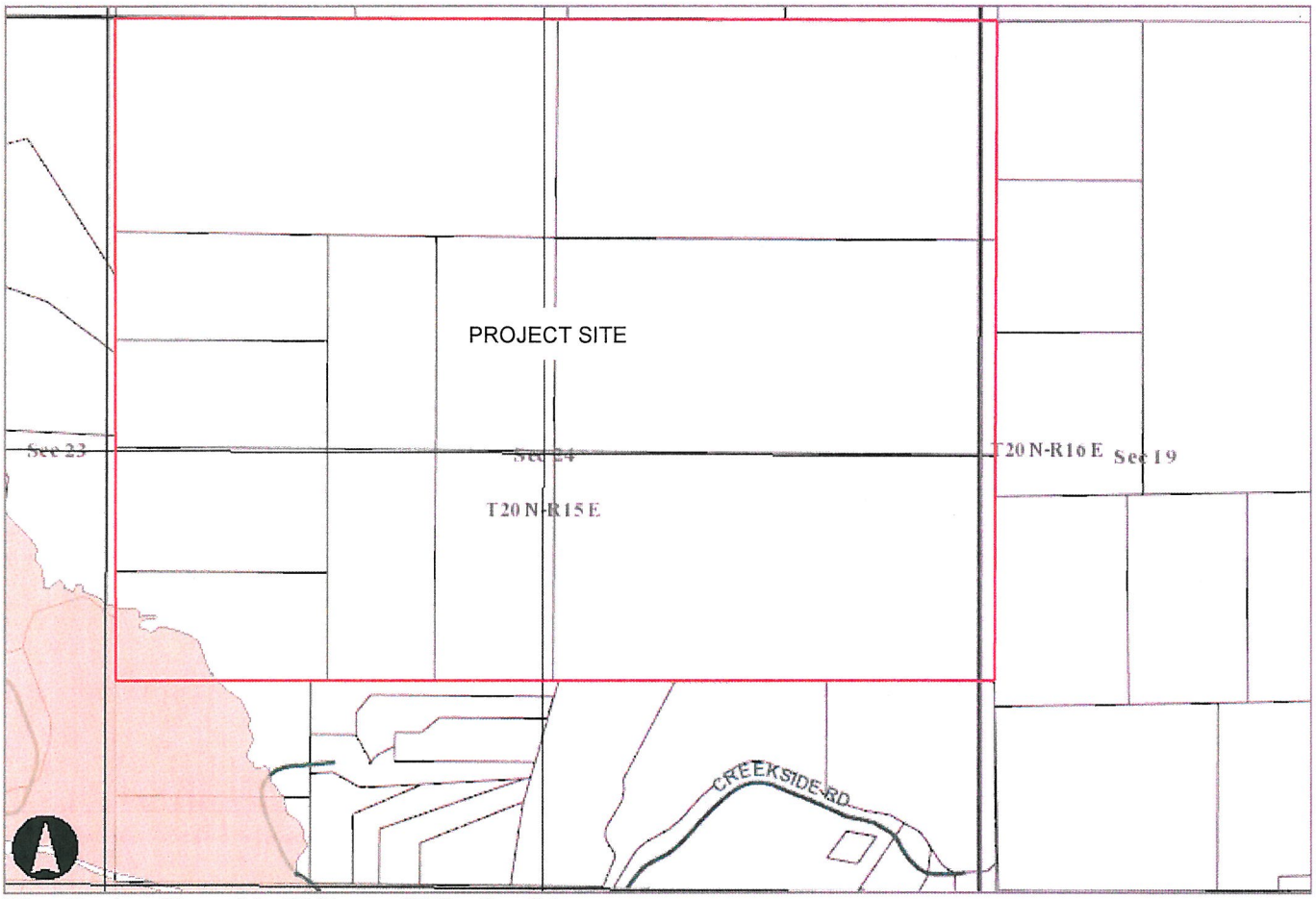
Forest Ridge PBCP Coal Mine Shaft Boundary Map



Map Center: Township:20 Range:15 Section:24

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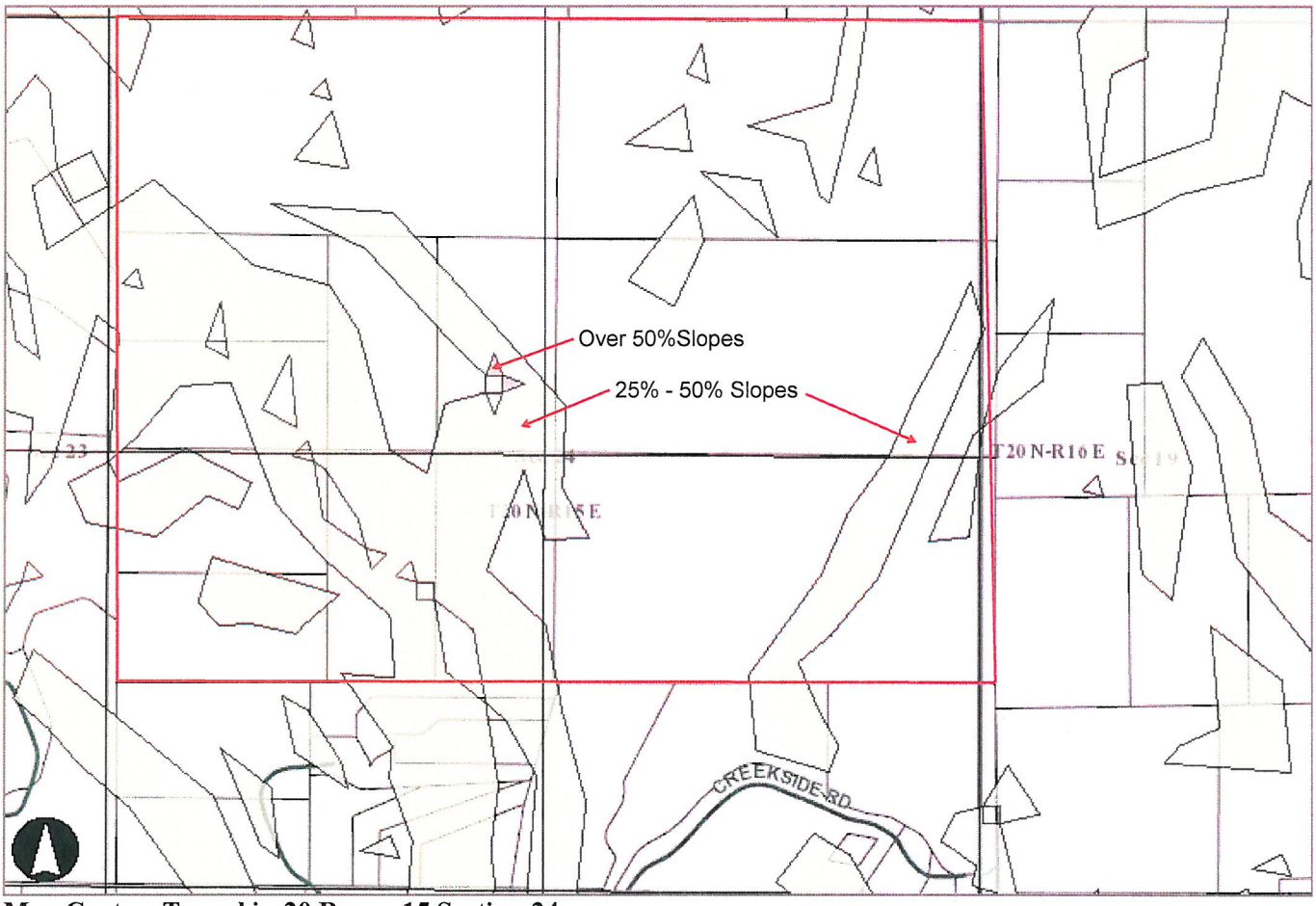
Forest Ridge PBCP Hazardous Slope Map



Map Center: Township:20 Range:15 Section:24

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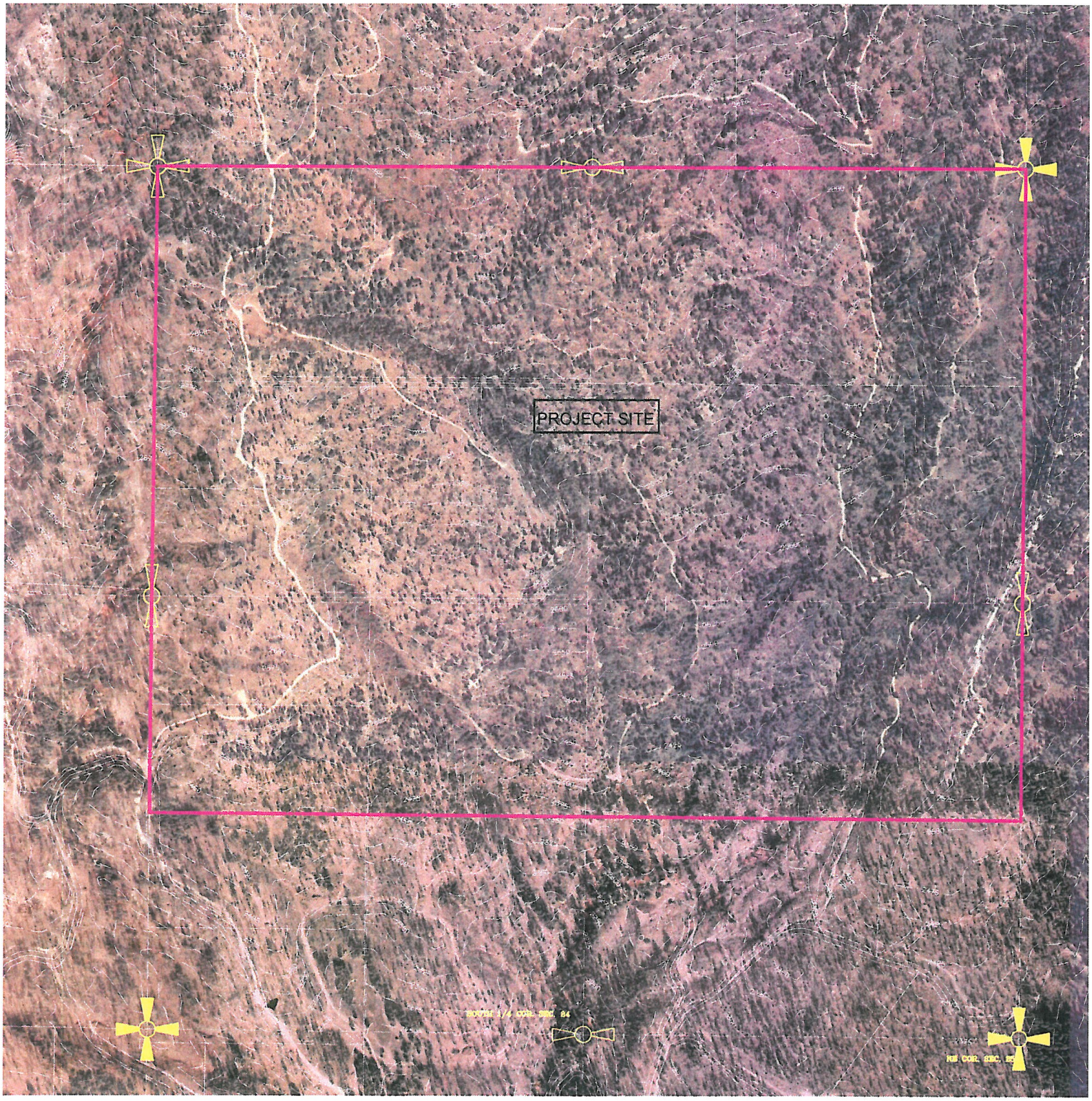
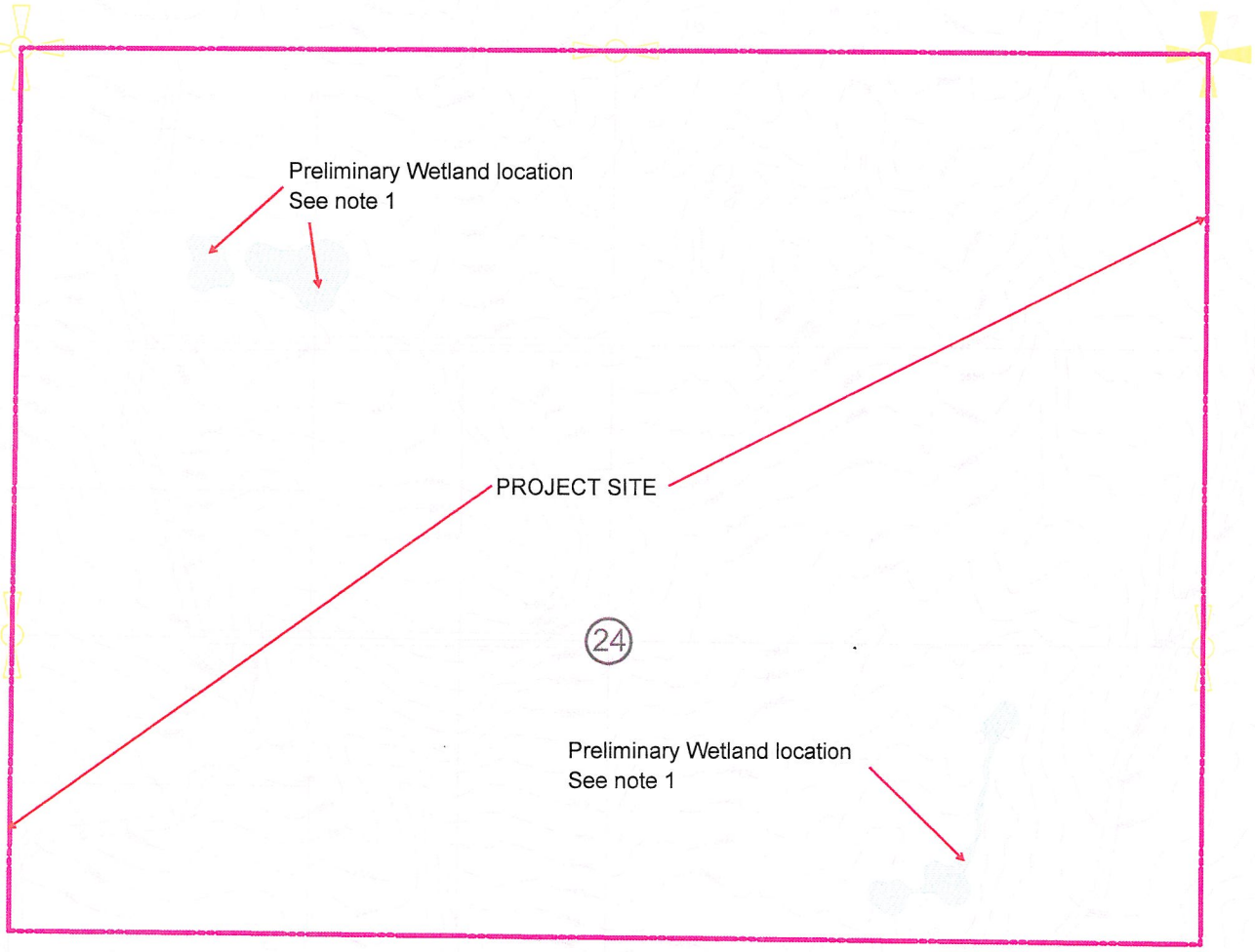
FOREST RIDGE PBCP AERIAL PHOTO MAP



Forrest Ridge PBCP Preliminary Wetland Map

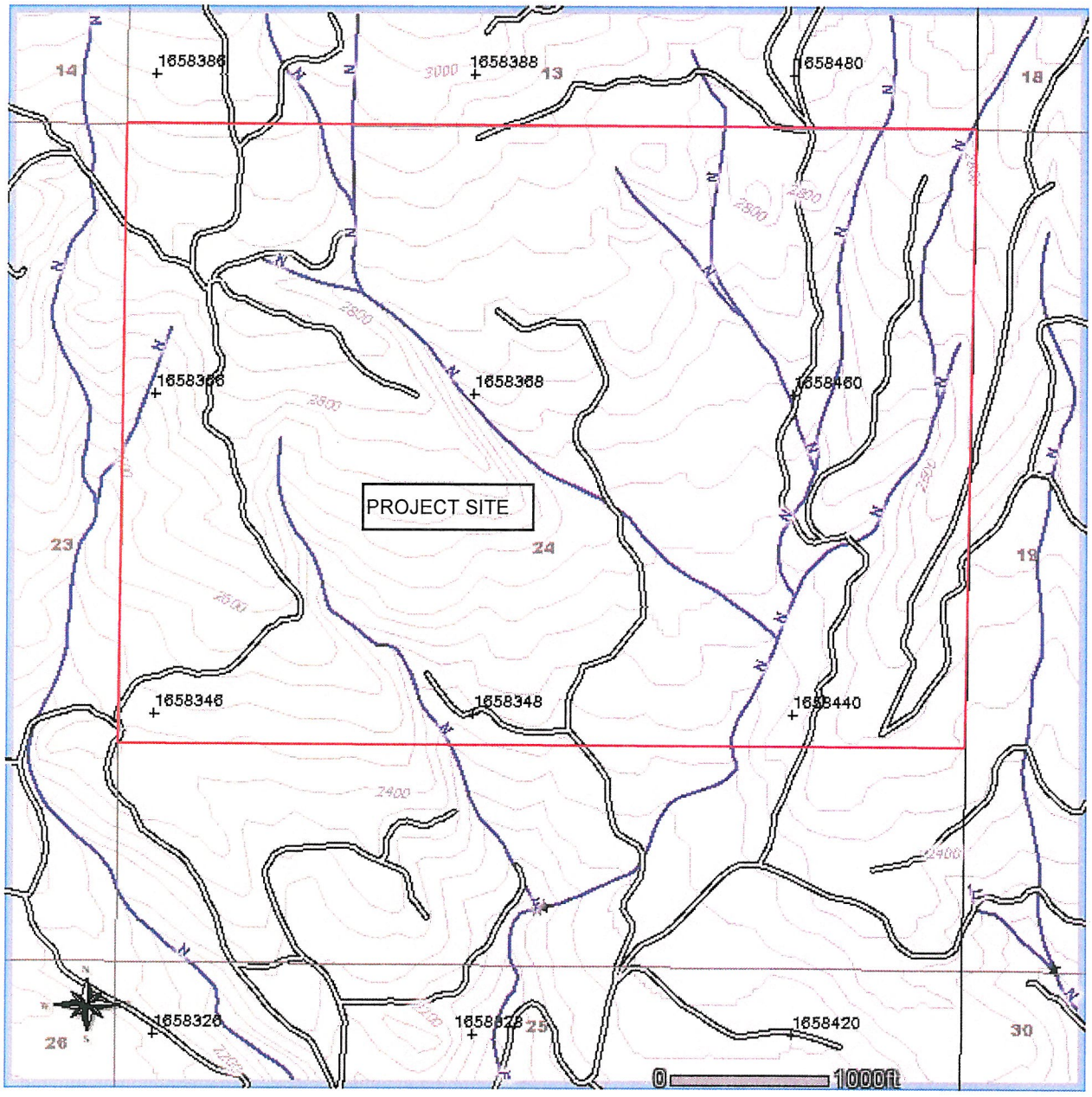


Notes:
1. These wetland locations are preliminary. Wetland delineation and report were not completed at the time of writinig of this report.

FOREST PRACTICE WATER TYPE MAP

TOWNSHIP 20 NORTH HALF 0, RANGE 15 EAST (W.M.) HALF 0, SECTION 24

Application #:_____



Wednesday, December 09, 2009 9:26:05 PM
NAD 83
Contour Interval: 40 Feet

APPENDIX 'B'

United States Department of Agriculture

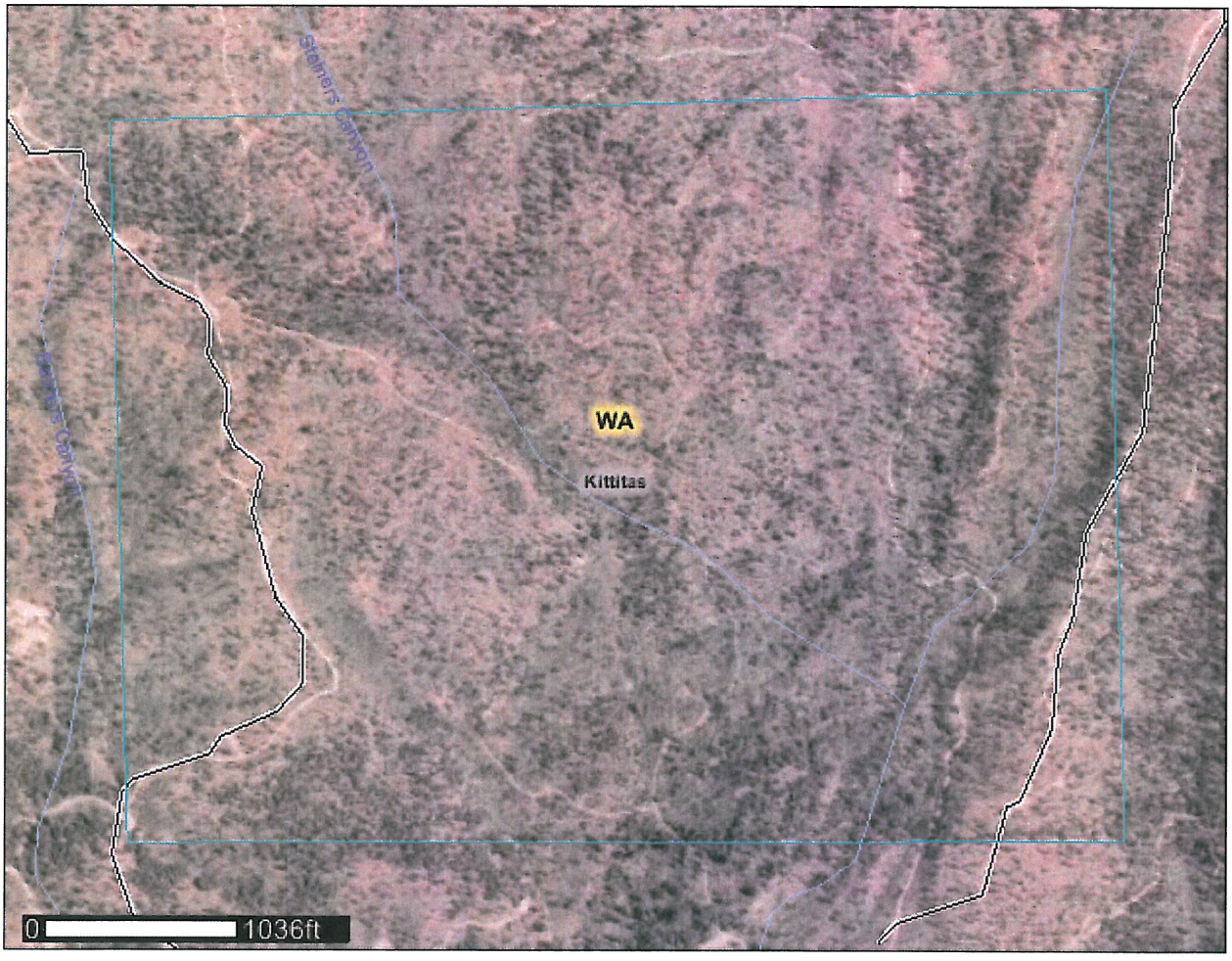
NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Kittitas County Area, Washington

FOREST RIDGE PBCP



December 10, 2009

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://soils.usda.gov/sqi/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (http://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://soils.usda.gov/contact/state_offices/).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Soil Data Mart Web site or the NRCS Web Soil Survey. The Soil Data Mart is the data storage site for the official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means

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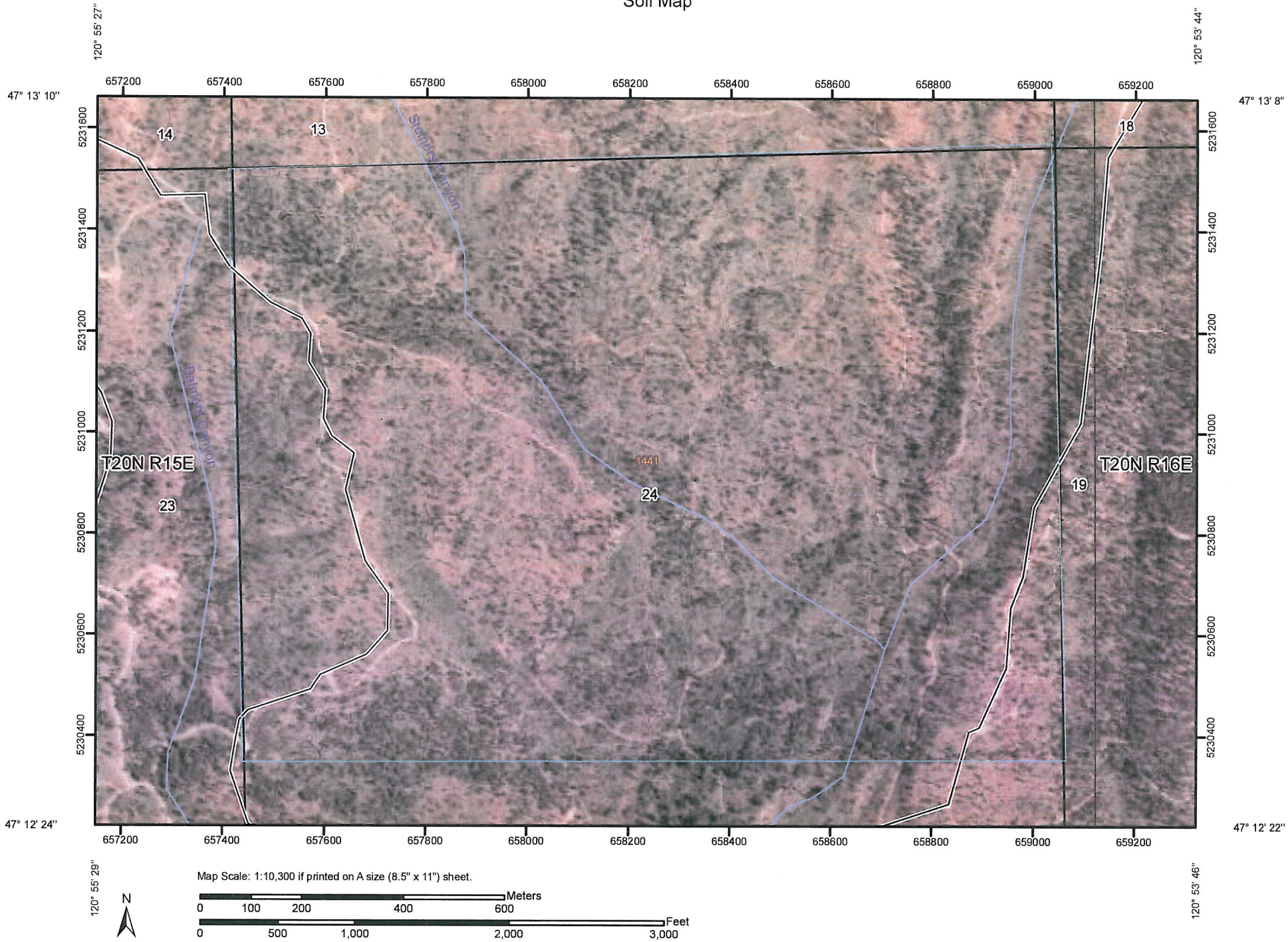
Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.


120° 55' 27"
120° 53' 44"
47° 13' 10"
47° 13' 8"
657200
657400
657600
657800
658000
658200
658400
658600
658800
659000
659200
5231600
5231400
5231200
5231000
5230800
5230600
5230400
14
13
18
Steiners Canyon
Rainier Canyon
T20N R15E
T20N R16E
23
24
19
1441
47° 12' 24"
47° 12' 22"
120° 55' 29"
120° 53' 46"
Map Scale: 1:10,300 if printed on A size (8.5" x 11") sheet.
N
Meters
0
100
200
400
600
Feet
0
500
1,000
2,000
3,000

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Units

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other

Special Line Features
- Gully
- Short Steep Slope
- Other

Political Features
- Cities
- PLSS Township and Range
- PLSS Section

Water Features
- Oceans
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

MAP INFORMATION

Map Scale: 1:10,300 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 10N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Kittitas County Area, Washington
Survey Area Data: Version 3, Jun 15, 2009

Date(s) aerial images were photographed: 7/27/2006

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Kittitas County Area, Washington (WA637)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
1441	Teanaway loam, 10 to 25 percent slopes	481.2	100.0%
Totals for Area of Interest		**481.2**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series.* Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases.* Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas.* Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Kittitas County Area, Washington

1441—Teanaway loam, 10 to 25 percent slopes

Map Unit Setting

Elevation: 1,800 to 3,600 feet
Mean annual precipitation: 25 to 40 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 80 to 120 days

Map Unit Composition

Teanaway and similar soils: 80 percent
Minor components: 20 percent

Description of Teanaway

Setting

Landform: Mountain slopes
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Loess over glacial till or outwash with an influence of volcanic ash in the surface

Properties and qualities

Slope: 10 to 25 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 39 to 51 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: High (about 10.3 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability (nonirrigated): 3e
Other vegetative classification: Douglas-fir/common snowberry/pinegrass (CDS638)

Typical profile

0 to 3 inches: Moderately decomposed plant material
3 to 7 inches: Loam
7 to 22 inches: Loam
22 to 42 inches: Loam
42 to 51 inches: Loam
51 to 60 inches: Gravelly loam

Minor Components

Ampad

Percent of map unit: 10 percent

Swauk

Percent of map unit: 5 percent

Nard

Percent of map unit: 5 percent

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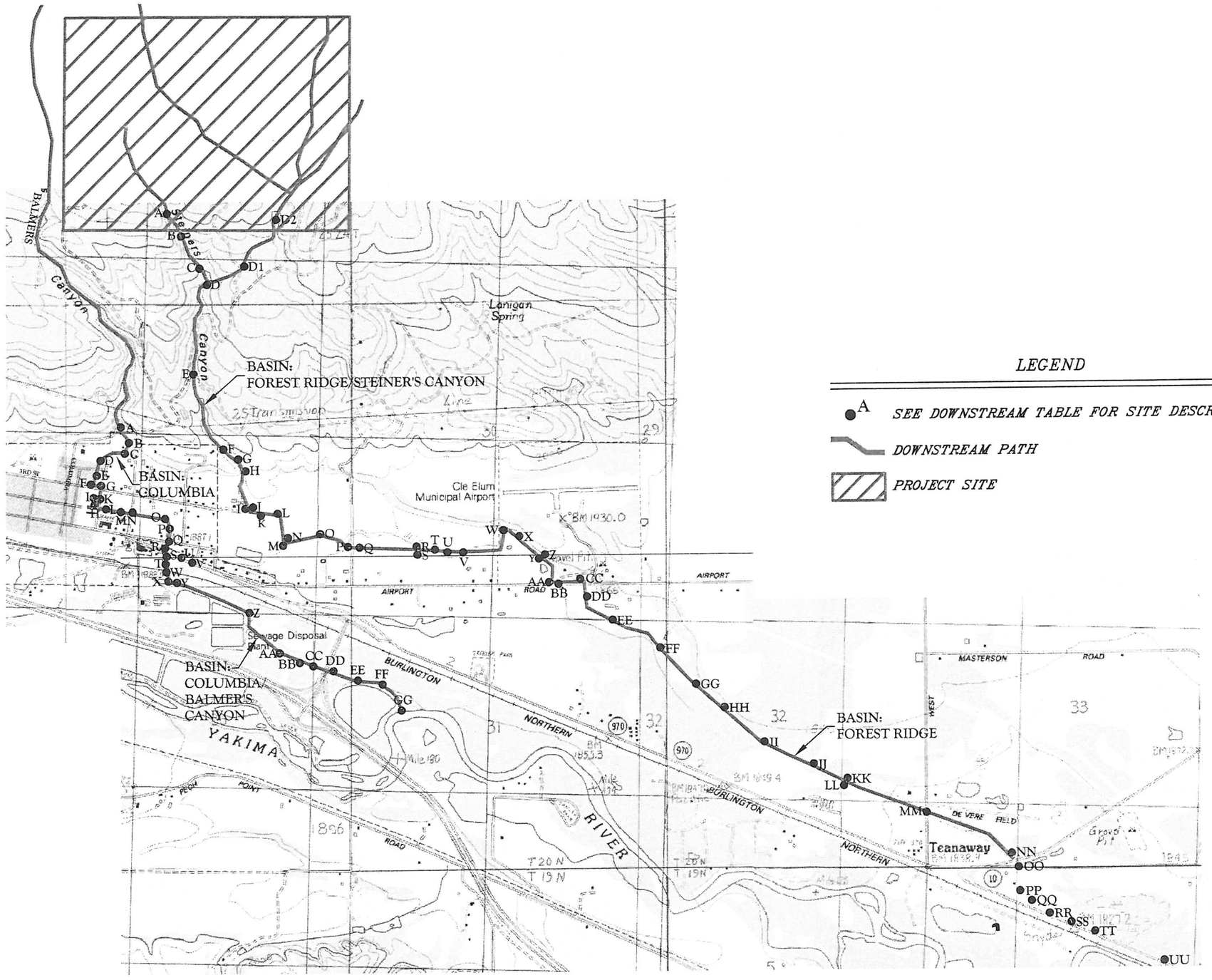
APPENDIX 'C'



LEGEND

- A — *SEE DOWNSTREAM TABLE FOR SITE DESCRIPTION*
- *DOWNSTREAM PATH*
- *PROJECT SITE*

N

GRAPHIC SCALE

2000' 0 1000' 2000'

(IN FEET)
1 inch = 2000 ft.

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CLE ELUM, WA 98922
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DOWNSTREAM DRAINAGE SYSTEM
FOREST RIDGE
PERFORMANCE BASED CLUSTER PLAT

OFF-SITE ANALYSIS DRAINAGE SYSTEM TABLE SURFACE WATER DESIGN MANUAL, CORE REQUIREMENT #2

Basin:Columbia			Sub. Balmer's Canyon		Sub. Number:	
Symbol	Drainage, Component Type, Name and Size	Drainage Component Description	Slope	Distance from site discharge	Existing Problems/Potential Problems	Oberservations of field inspector, resource reviewer, or resident
see map	Type: Sheet flow, swale, stream, channel, pipe, pond: Size: diameter, surface area	Dranage basin, vegetation, cover, depth, type of sensitive area, volume	%	1/4 ml = 1,320 ft.	Constrictions, under capacity, ponding, overtopping, flooding, habitat or organism destruction, scouring, bank sloughing, sedimentation, incision, other erosion	Tributary area, likelihood of problem overflow pathways, potential impacts
K	6' diameter cmp under paved st.	~ 60' long	1%	K-L ~ 100'		Ditch w/~36" homemade metal culvert enters swale @ W. end 6' culvert
N	6' wide X 4' tall cmp squash pipe	~ 50' long running under paved st.	<1%	N-O ~ 400'		Partially silted @ E. end
O	Wire fence stretched across channel		<1%	O-P~ 75'	Possible flow restriction	
P	3' tall X 4' wide cmp squash pipe under farm crossing		<1%	P-Q ~ 125'		Pipe beat up & misshapen
Q	Fence stretched across channel		<1%	Q-R ~ 25'		Suspended above H20 no flow restriction
S	6' wide X 4' deep concrete box culvert	~ 55' long under SR970		S-T ~ 70'		
T	7' wide x 4' high concrete box culvert	~25' long	1%	T-U ~ 50'		Bottom partially silted

OFF-SITE ANALYSIS DRAINAGE SYSTEM TABLE SURFACE WATER DESIGN MANUAL, CORE REQUIREMENT #2

Basin:Columbia			Sub. Balmer's Canyon		Sub. Number:	
Symbol	Drainage, Component Type, Name and Size	Drainage Component Description	Slope	Distance from site discharge	Existing Problems/Potential Problems	Oberservations of field inspector, resource reviewer, or resident
see map	Type: Sheet flow, swale, stream, channel, pipe, pond: Size: diameter, surface area	Dranage basin, vegetation, cover, depth, type of sensitive area, volume	%	1/4 ml = 1,320 ft.	Constrictions, under capacity, ponding, overtopping, flooding, habitat or organism destruction, scouring, bank sloughing, sedimentation, incision, other erosion	Tributary area, likelihood of problem overflow pathways, potential impacts
U	36"cmp culvert	~ 30' long under dirt rd.	1%	U-V ~ 70'		
V	36' cmp culvert	~20' long	1%	V-W ` 70'		
W	(2) 48' concrete culverts (side by side)	~40' running under RR tracks	2%	W-X ~ 50'		
X	48" cmp culvert	~20' long running under gravel rd.	1%	X-Y ~ 250'		
Y	36" diameter DIP suspended over H20		1%-2%	Y-Z ~1300'		Connects flowing ditch south to north. No flow restriction
Z	Wire fence suspended over channel		1%	Z-AA ~600'		No flow restrictions
AA	Bend in Stream		1%-2%			
BB	Creek feeds swamp	Swamp filled w/cat tails to N. of bend in stream	<1%	BB-CC ~1200'		Definite H20 detention area
CC	Bend in creek		1%	CC-DD ~ 550'		
DD	6' diameter concrete culvert	Flowing under overpass for freeway on ramp ~150' long culvert	2%	DD-EE ~ 1300'		

OFF-SITE ANALYSIS DRAINAGE SYSTEM TABLE SURFACE WATER DESIGN MANUAL, CORE REQUIREMENT #2						
Basin:Columbia			**Sub. Balmer's Canyon**		**Sub. Number:**	
Symbol	**Drainage, Component Type, Name and Size**	**Drainage Component Description**	**Slope**	**Distance from site discharge**	**Existing Problems/Potential Problems**	**Oberservations of field inspector, resource reviewer, or resident**
see map	Type: Sheet flow, swale, stream, channel, pipe, pond: Size: diameter, surface area	Dranage basin, vegetation, cover, depth, type of sensitive area, volume	%	1/4 ml = 1,320 ft.	Constrictions, under capacity, ponding, overtopping, flooding, habitat or organism destruction, scouring, bank sloughing, sedimentation, incision, other erosion	Tributary area, likelihood of problem overflow pathways, potential impacts
EE	Change in channel/vegetation	Banks become more defined/channel becomes less defined	<1%	EE-FF ~ 600'		
FF	Pond inlet to stream	Swampy area connecting pond to stream definite flow from pond to stream	1%	FF-GG ~200'	Beaver dam + lodge @ Pond edge/Partial Dam in stream restricting flow	
GG	Stream meets Yakima River	Discernable channel downstream from "FF"	<1%			Beaver swamp lots of standing water & downed trees

OFF-SITE ANALYSIS DRAINAGE SYSTEM TABLE SURFACE WATER DESIGN MANUAL, CORE REQUIREMENT #2

Basin:Forest Ridge			Sub.Steiner's Canyon		Sub. Number:	
Symbol	**Drainage, Component Type, Name and Size**	**Drainage Component Description**	**Slope**	**Distance from site discharge**	**Existing Problems/Potential Problems**	**Oberservations of field inspector, resource reviewer, or resident**
see map	Type: Sheet flow, swale, stream, channel, pipe, pond: Size: diameter, surface area	Dranage basin, vegetation, cover, depth, type of sensitive area, volume	%	1/4 ml = 1,320 ft.	Constrictions, under capacity, ponding, overtopping, flooding, habitat or organism destruction, scouring, bank sloughing, sedimentation, incision, other erosion	Tributary area, likelihood of problem overflow pathways, potential impacts
A	Dischard site	Creek	~8%	0		Ravine very choked w/brush+wood + debris
B	Waterfall/grade break		~100%	A-B=~800'		Elevation drops
						~20% inc. ~20% horizontal
C	Tributary inflows from NE		2%	B-C=~400'		3' wide creek w/3'-4' high vertical banks
D	Culvert Crossing	30" cmp~40' long	2%	C-D=~150'		
		Under gravel road				
E	Culvert crossing	36" cmp~15' long under dirt rd.	2%	D-E=~800'		
F	Culvert crossing	36"cmp~12' long under dirt rd.	2%	E-F=~1000'		
G	3 culverts laid side by side	(2) 24" black corrugated plastic	2%	F-G=~150'		Creek widens to ~ 25' diameter pool
		(1) 18" cmp				Pool drains through 3 culverts
H	Culvert & crossing	36" cmp	2%	G-H=~200'		
I	(2) culverts laid side by side	(2) 24" cmp~20' long	1%	H-I=~900'		
		Under paved DW				
J	Stream enters culvert	36" cmp heading E.	1%	I-J=~250'		

OFF-SITE ANALYSIS DRAINAGE SYSTEM TABLE SURFACE WATER DESIGN MANUAL, CORE REQUIREMENT #2

Basin:Forest Ridge			Sub.Steiner's Canyon		Sub. Number:	
Symbol	**Drainage, Component Type, Name and Size**	**Drainage Component Description**	**Slope**	**Distance from site discharge**	**Existing Problems/Potential Problems**	**Oberservations of field inspector, resource reviewer, or resident**
see map	Type: Sheet flow, swale, stream, channel, pipe, pond: Size: diameter, surface area	Dranage basin, vegetation, cover, depth, type of sensitive area, volume	%	1/4 ml = 1,320 ft.	Constrictions, under capacity, ponding, overtopping, flooding, habitat or organism destruction, scouring, bank sloughing, sedimentation, incision, other erosion	Tributary area, likelihood of problem overflow pathways, potential impacts
K	Manhole	36" cmp inflow from w.				
		36" Black corrugated				
		Plastic outflow E.				
D1	Culvert crossing					
D2	Discharge point					
L	Manhole	36" Black corrugated plastic inflow from W.	2%	K-L=~400'		
		36" Black corruagted plastic outflow to S.		L-M~=300'		
M	90% Elbow	Inflow from N.		L-M~=300'		Did not see. Buried
		Outflow to E.				Based on information from neighbor
N	End berm	Beam @ S. Bank ends	1%	V-W~=200'		Creek flows into wooded area
	End liner	Liner ends				

OFF-SITE ANALYSIS DRAINAGE SYSTEM TABLE SURFACE WATER DESIGN MANUAL, CORE REQUIREMENT #2						
Basin:Forest Ridge			**Sub.Steiner's Canyon**		**Sub. Number:**	
Symbol	**Drainage, Component Type, Name and Size**	**Drainage Component Description**	**Slope**	**Distance from site discharge**	**Existing Problems/Potential Problems**	**Oberservations of field inspector, resource reviewer, or resident**
see map	Type: Sheet flow, swale, stream, channel, pipe, pond: Size: diameter, surface area	Dranage basin, vegetation, cover, depth, type of sensitive area, volume	%	1/4 ml = 1,320 ft.	Constrictions, under capacity, ponding, overtopping, flooding, habitat or organism destruction, scouring, bank sloughing, sedimentation, incision, other erosion	Tributary area, likelihood of problem overflow pathways, potential impacts
O	2 culverts laid side by side ~15' long	(1) 18" cmp	2%	N-O=~600'		
	Under field crossing	(1) 18" concrete				
P	Curlvert crossing	36" cmp under paved rd.	1%	O-P=~400'		
		~65' long				
Q	Tributary from SW	36" cmp under paved rd.	1%	P-Q=~65'		
R	Irrigation takeoff	Gate valve feeding 18" cmp feeding ditch flowing SE	1%-2%	Q-R=~1200'		
S	Culvert Crossing	24" cmp ~20' long under farm crossing	1%	R-S=~50'		
T	Culvert Crossing	36"cmp ~50' long under paved rd.	1%	S-T=~300'		
U	Irrigation take off	Gate valve feeding small ditch to S.	1%	T-U=~100'		
V	Begin O ditch liner	Rubber liner in ditch	1%-2%	U-V=~200'		
W	End Berm	Berm @ S. Bank Ends	1%	R-W=~200'		Creek flows into wooded area
	End liner	Liner ends				

OFF-SITE ANALYSIS DRAINAGE SYSTEM TABLE SURFACE WATER DESIGN MANUAL, CORE REQUIREMENT #2

Basin:Forest Ridge			Sub.Steiner's Canyon		Sub. Number:	
Symbol	**Drainage, Component Type, Name and Size**	**Drainage Component Description**	**Slope**	**Distance from site discharge**	**Existing Problems/Potential Problems**	**Oberservations of field inspector, resource reviewer, or resident**
see map	Type: Sheet flow, swale, stream, channel, pipe, pond: Size: diameter, surface area	Dranage basin, vegetation, cover, depth, type of sensitive area, volume	%	1/4 ml = 1,320 ft.	Constrictions, under capacity, ponding, overtopping, flooding, habitat or organism destruction, scouring, bank sloughing, sedimentation, incision, other erosion	Tributary area, likelihood of problem overflow pathways, potential impacts
X	Irrigation take off	Notched log set in creek bank to regulate flow to ditch running N.	1%	W-X=~50'		
Y	Stream enters wetland/swamp	Multiple channels + pools no main channel	<1%	X-Y=~100'		
Z	(3) culverts laid side by side under gravel DW	(2) 24' corrugated black plastic	<1%	Y-Z=~250'		
		(1) 18" corrugated black plastic				
AA	Irrigation takeoff	Gate valve feeding 18" cmp heading S. under paved rd.	3%	Z-AA=~1000'		
BB	Culvert crossing	30" cmp~30' long under gravel rd	2%	AA-BB=~20'		
CC	Culvert crossing	30" concrete ~ 40' long under paved rd.	2%	BB-CC=~175'		Crossing under Airport Rd.
DD	Tributary joins	Outflow of pond to W. flows into creek	1%	CC-DD=~400"		
EE	Culvert Crossing under gravel rd.	(2) 30" cmp culverts laid side by side ! 15' long	<1%	DD-EE=~1000'		
FF	Stream enters swamp	No discernable channel	1%	EE-FF=~400'		
		Sheet flow through lots of skunk cabbage				

OFF-SITE ANALYSIS DRAINAGE SYSTEM TABLE SURFACE WATER DESIGN MANUAL, CORE REQUIREMENT #2						
Basin:Forest Ridge			**Sub.Steiner's Canyon**		**Sub. Number:**	
Symbol	**Drainage, Component Type, Name and Size**	**Drainage Component Description**	**Slope**	**Distance from site discharge**	**Existing Problems/Potential Problems**	**Oberservations of field inspector, resource reviewer, or resident**
see map	Type: Sheet flow, swale, stream, channel, pipe, pond: Size: diameter, surface area	Dranage basin, vegetation, cover, depth, type of sensitive area, volume	%	1/4 ml = 1,320 ft.	Constrictions, under capacity, ponding, overtopping, flooding, habitat or organism destruction, scouring, bank sloughing, sedimentation, incision, other erosion	Tributary area, likelihood of problem overflow pathways, potential impacts
GG	Stream Leaves Swamp		1%	FF-GG=+-800'		Ground around stream still swampy, but channel is discernable
HH	Stream Enters Swamp		1%	GG-HH=+-500'		Channel becomes indiscernable
II	Stream Leaves Swamp		1%	HH-II=+-1100'		Swamp Narrows into 20'-30' wide slow flowing wetland/channel
JJ	Culvert Crossing	72" cmp culvert +- 45' long under gravel rd.	1%	II-JJ=+-800'		
KK	Stream enters swamp/beaver pond			JJ-KK=+- 600'		Large areas of open water observed Beaver in pond
LL	Beaver Dam stream enters swamp		1%	KK-LL=+-150'		1 acre +- Beaver Pond/Swamp
MM	Culver Crossing	2 20" cmp culverts +- 45' long under paved rd	1%	LL-MM=+- 1200'		

OFF-SITE ANALYSIS DRAINAGE SYSTEM TABLE SURFACE WATER DESIGN MANUAL, CORE REQUIREMENT #2						
Basin:Forest Ridge			**Sub.Steiner's Canyon**		**Sub. Number:**	
Symbol	**Drainage, Component Type, Name and Size**	**Drainage Component Description**	**Slope**	**Distance from site discharge**	**Existing Problems/Potential Problems**	**Oberservations of field inspector, resource reviewer, or resident**
see map	Type: Sheet flow, swale, stream, channel, pipe, pond: Size: diameter, surface area	Dranage basin, vegetation, cover, depth, type of sensitive area, volume	%	1/4 ml = 1,320 ft.	Constrictions, under capacity, ponding, overtopping, flooding, habitat or organism destruction, scouring, bank sloughing, sedimentation, incision, other erosion	Tributary area, likelihood of problem overflow pathways, potential impacts
NN	Conc. Box culvert	4'x4' crossing SR 970	1%	0'-100'	No obstructions	
OO		Corr. Metal pipe cul. X-ing Driveway			No obstructions	
PP		Natural Veg. Cat-Tails/reeds	2%	125'-225'	Naturally flowing no obstructions	
QQ	Pond 75' long X 30' wide	Cat-tails/reeds 1'-1.5' deep	0%-1%	225'-300'		
RR	30" metal culvert x-ing driveway		1%	300'-325'	No obstructions	
SS	Stream 2:1	Natural Veg.	1%-2%	325'-500'	Some debris in crk. No restrictions of flow	
TT	Channel 20'-30' wide	Heavily veg., shrubs, reeds, cat tails	1%	500'-1200'	Ponding/swampy outside of channel large wetland	
UU	Swamp 100'-400' wide	Trees, reeds & cat tails	0%-1%	1200'-3800'	Large swamp w/no obvious channel or flow	
		3800 Teanaway River				

APPENDIX 'D'

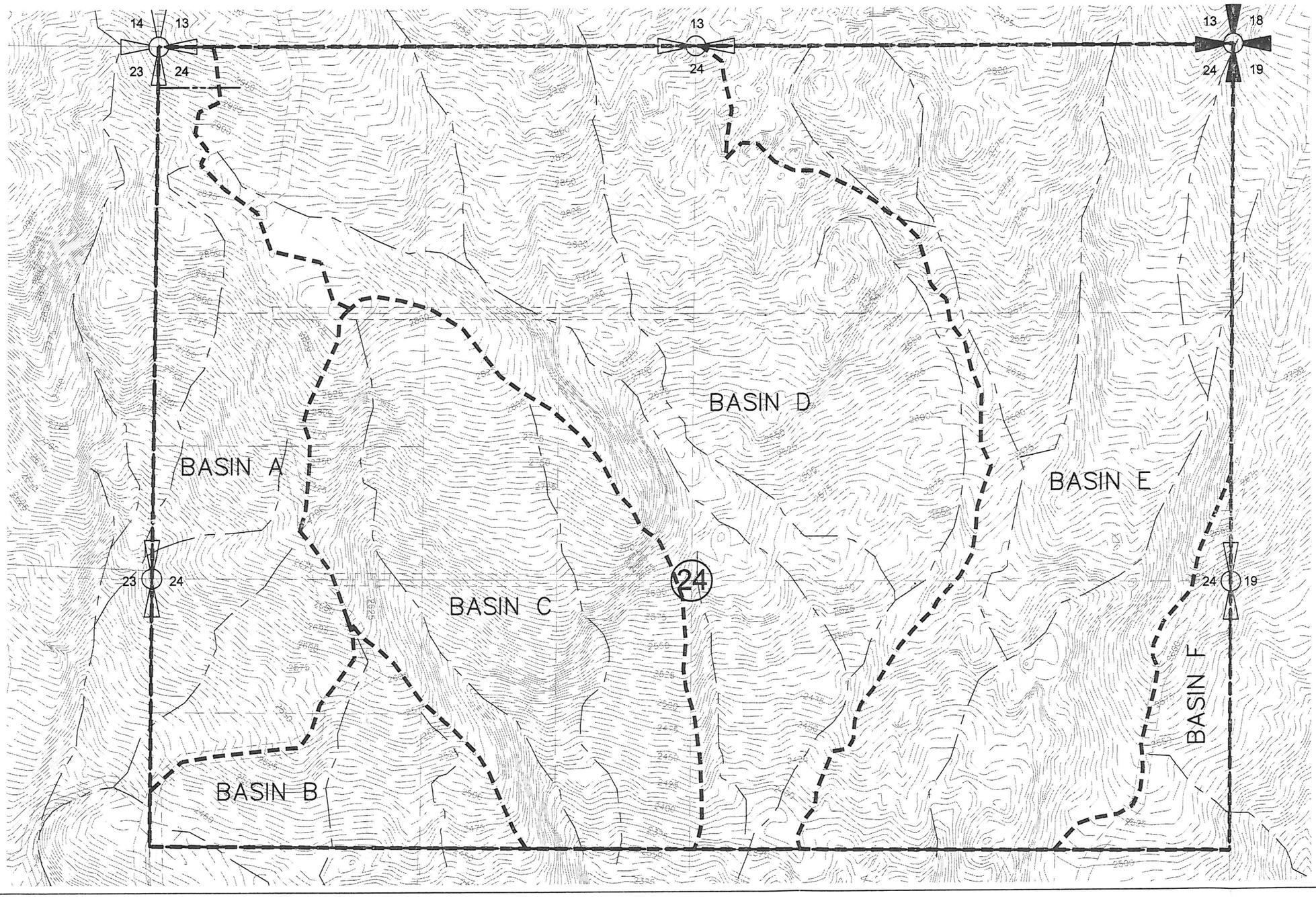

Figure D.1
Pre-Development Condition
Basin Map

December 14, 2009

Scale: 1" = 2000'

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N

BASIN A

BASIN B

BASIN C

BASIN D

BASIN E

BASIN F

OPEN SPACE 193.00 Ac.

OPEN SPACE 193.00 Ac.

OPEN SPACE 193.00 Ac.

OPEN SPACE 193.00 Ac.

COMMUNITY AREA 41 3.43 Ac.

Figure D.2
Post-Development Condition
Basin Map

December 14, 2009

Scale: 1" = 2000'

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FAX: (509) 674-7419

FOREST RIDGE
PERFORMANCE BASED CLUSTER PLAT

BASIN A

AREA	AREA (acres)	HYDROLOGIC SOIL GROUP	DESCRIPTION	CN
OPEN SPACE	55.18	C	Mix of Fair Pasture & Fair Herbaceous Cond.	80

TOTAL AREA CHECK **55.18** **ac.** **$CN_{WEIGHTED}$** **80**

BASIN B

AREA	AREA (acres)	HYDROLOGIC SOIL GROUP	DESCRIPTION	CN
OPEN SPACE (NORTH)	11.84	C	Woods-Grass Combination (Poor Condition)	82
OPEN SPACE (SOUTH)	11.83	C	Brush (Poor Condition)	77

TOTAL AREA CHECK **23.67** **ac.** **$CN_{WEIGHTED}$** **80**

BASIN C

AREA	AREA (acres)	HYDROLOGIC SOIL GROUP	DESCRIPTION	CN
OPEN SPACE (NORTH)	46.22	C	Mix of Fair Pasture & Fair Herbaceous Cond.	80
OPEN SPACE (SOUTH)	30.82	C	Mix of Fair Brush and Poor Woods Cond.	74

TOTAL AREA CHECK **77.04** **ac.** **$CN_{WEIGHTED}$** **78**

BASIN D

AREA	AREA (acres)	HYDROLOGIC SOIL GROUP	DESCRIPTION	CN
OPEN SPACE (CENTRAL)	127.15	C	Herbaceous (Fair Conditions)	81
OPEN SPACE (PERIMETER)	42.39	C	Mix of Fair Brush and Fair Woods Cond.	72

TOTAL AREA CHECK **169.54** **ac.** **$CN_{WEIGHTED}$** **79**

FOREST RIDGE
PERFORMANCE BASED CLUSTER PLAT

BASIN E

AREA	AREA (acres)	HYDROLOGIC SOIL GROUP	DESCRIPTION	CN
OPEN SPACE (NORTH)	46.22	C	Herbaceous (Fair Conditions)	81
OPEN SPACE (SOUTH)	92.44	C	Mix of Fair Brush and Fair Woods Cond.	72

TOTAL AREA CHECK **138.66** **ac.** **$CN_{WEIGHTED}$** **75**

BASIN F

AREA	AREA (acres)	HYDROLOGIC SOIL GROUP	DESCRIPTION	CN
OPEN SPACE (CENTRAL)	4.79	C	Herbaceous (Fair Conditions)	81
OPEN SPACE (EAST)	9.57	C	Mix of Fair Brush and Fair Woods Cond.	72

TOTAL AREA CHECK **14.36** **ac.** **$CN_{WEIGHTED}$** **75**

FOREST RIDGE
PERFORMANCE BASED CLUSTER PLAT

BASIN	# OF LOTS	BASIN AREA (acres)	DENSITY (DU/acre)	ASSUMED % IMPERVIOUS
BASIN A	22	54.81	0.40	10%
BASIN B	9	24.45	0.37	10%
BASIN C	9	83.75	0.11	10%
BASIN D	71	162.13	0.44	10%
BASIN E	53	140.60	0.38	10%
BASIN F	6	12.71	0.47	10%
DEVELOPMENT TOTAL	170	478.45	0.36	10%

FOREST RIDGE
PERFORMANCE BASED CLUSTER PLAT

DEVELOPMENT AREA			BASIN A	BASIN B	BASIN C	BASIN D	BASIN E	BASIN F
OPEN SPACE/BUFFER								
TOTAL AREA =	421.96	Ac.	46.96	20.04	75.34	143.02	127.15	9.45
LANDSCAPE								
TOTAL AREA =	15.05	Ac.	2.12	0.95	2.21	5.07	4.18	0.52
PONDS								
TOTAL AREA =	6.00	Ac.	1.00	1.00	1.00	1.00	1.00	1.00
ROADWAY								
TOTAL AREA =	18.34	Ac.	2.61	1.51	0.94	7.97	4.09	1.22
RESIDENTIAL DENSITY								
TOTAL AREA =	14.36	Ac.	2.12	0.95	1.52	5.07	4.18	0.52
COMMERCIAL								
TOTAL AREA =	2.74	Ac.	0.00	0.00	2.74	0.00	0.00	0.00
TOTAL AREA =	**478.45**	**Ac.**	**54.81**	**24.45**	**83.75**	**162.13**	**140.60**	**12.71**

Total Area Check 478.45 Ac.

FOREST RIDGE
PERFORMANCE BASED CLUSTER PLAT

BASIN A

LOT #	AREA (acres)	% Impervious*	IMPERVIOUS AREA (acres)	BASIC DISPERTION	NEW IMPERVIOUS AREA (acres)	TOTAL LANDSCAPE AREA (acres)
10	3.02	10%	0.30	50%	0.15	0.15
11	2.65	10%	0.27	50%	0.13	0.13
12	2.17	10%	0.22	50%	0.11	0.11
13	1.45	10%	0.15	50%	0.07	0.07
14	1.05	10%	0.11	50%	0.05	0.05
15	1.72	10%	0.17	50%	0.09	0.09
16	1.29	10%	0.13	50%	0.06	0.06
17	0.91	10%	0.09	50%	0.05	0.05
18	1.18	10%	0.12	50%	0.06	0.06
19	1.93	10%	0.19	50%	0.10	0.10
20	2.04	10%	0.20	50%	0.10	0.10
21	2.16	10%	0.22	50%	0.11	0.11
22	2.95	10%	0.30	50%	0.15	0.15
23	2.22	10%	0.22	50%	0.11	0.11
24	2.26	10%	0.23	50%	0.11	0.11
25	1.90	10%	0.19	50%	0.10	0.10
26	2.23	10%	0.22	50%	0.11	0.11
27	2.19	10%	0.22	50%	0.11	0.11
28	2.21	10%	0.22	50%	0.11	0.11
29	1.54	10%	0.15	50%	0.08	0.08
30	1.44	10%	0.14	50%	0.07	0.07
31	1.85	10%	0.19	50%	0.09	0.09
TOTAL	**42.36**	**10%**	**4.24**	**50%**	**2.12**	**2.12**

FOREST RIDGE
PERFORMANCE BASED CLUSTER PLAT

BASIN A

DEVELOPMENT AREA BREAKDOWN	AREA (acres)	% Impervious*	IMPERVIOUS AREA (acres)	TOTAL LANDSCAPE AREA (acres)
RESIDENTIAL DENSITY	54.81	10%	2.12	2.12
COMMERCIAL	0.00	80%	0	0
TOTAL	54.81	N/A	N/A	2.12

From previous table.

IMPERVIOUS AREAS

AREA	AREA (acres)	HYDROLOGIC SOIL GROUP	DESCRIPTION	CN
PONDS	1.00	C	Ponds and watercourses	100
ROADWAY	2.61	C	Paved roads and shoulders	98
RESIDENTIAL	2.12	C	Rooftops, driveways, paths	98
COMMERCIAL	0.00	C	Rooftops, driveways, paths	98
TOTAL IMPERVIOUS	5.73	N/A	N/A	98

PERVIOUS AREAS

AREA	AREA (acres)	HYDROLOGIC SOIL GROUP	DESCRIPTION	CN
OPEN SPACE/BUFFER	46.96	C	See Pre-Development Cond.	80
LANDSCAPE	2.12	C	Lawns (Good Condition)	74
TOTAL PERVIOUS	49.08	N/A	N/A	80

FOREST RIDGE
PERFORMANCE BASED CLUSTER PLAT

BASIN B

LOT #	AREA (acres)	% Impervious*	IMPERVIOUS AREA (acres)	BASIC DISPERTION	NEW IMPERVIOUS AREA (acres)	TOTAL LANDSCAPE AREA (acres)
1	2.27	10%	0.23	50%	0.11	0.11
2	2.33	10%	0.23	50%	0.12	0.12
3	2.42	10%	0.24	50%	0.12	0.12
4	2.09	10%	0.21	50%	0.10	0.10
5	2.10	10%	0.21	50%	0.11	0.11
6	1.58	10%	0.16	50%	0.08	0.08
7	1.68	10%	0.17	50%	0.08	0.08
8	2.25	10%	0.23	50%	0.11	0.11
9	2.37	10%	0.24	50%	0.12	0.12
TOTAL	**19.09**	**10%**	**1.91**	**50%**	**0.95**	**0.95**

FOREST RIDGE
PERFORMANCE BASED CLUSTER PLAT

BASIN B

DEVELOPMENT AREA BREAKDOWN	AREA (acres)	% Impervious*	IMPERVIOUS AREA (acres)	TOTAL LANDSCAPE AREA (acres)
RESIDENTIAL DENSITY	24.45	10%	0.95	0.95
COMMERCIAL	0.00	80%	0	0
TOTAL	24.45	N/A	N/A	0.95

IMPERVIOUS AREAS

AREA	AREA (acres)	HYDROLOGIC SOIL GROUP	DESCRIPTION	CN
PONDS	1.00	C	Ponds and watercourses	100
ROADWAY	1.51	C	Paved roads and shoulders	98
RESIDENTIAL	0.95	C	Rooftops, driveways, paths	98
COMMERCIAL	0.00	C	Rooftops, driveways, paths	98
TOTAL IMPERVIOUS	3.46	N/A	N/A	99

PERVIOUS AREAS

AREA	AREA (acres)	HYDROLOGIC SOIL GROUP	DESCRIPTION	CN
OPEN SPACE/BUFFER	20.04	C	See Pre-Development Cond.	80
LANDSCAPE	0.95	C	Lawns (Good Condition)	74
TOTAL PERVIOUS	20.99	N/A	N/A	80

FOREST RIDGE
PERFORMANCE BASED CLUSTER PLAT

BASIN C

LOT #	AREA (acres)	% Impervious*	IMPERVIOUS AREA (acres)	BASIC DISPERTION	NEW IMPERVIOUS AREA (acres)	TOTAL LANDSCAPE AREA (acres)
42	3.55	10%	0.36	50%	0.18	0.18
43	3.50	10%	0.35	50%	0.18	0.18
44	3.93	10%	0.39	50%	0.20	0.20
45	3.29	10%	0.33	50%	0.16	0.16
46	3.00	10%	0.30	50%	0.15	0.15
47	2.99	10%	0.30	50%	0.15	0.15
48	3.10	10%	0.31	50%	0.16	0.16
49	3.74	10%	0.37	50%	0.19	0.19
50	3.26	10%	0.33	50%	0.16	0.16
TOTAL	**30.36**	**10%**	**3.04**	**50%**	**1.52**	**1.52**

FOREST RIDGE
PERFORMANCE BASED CLUSTER PLAT

BASIN D

LOT #	AREA (acres)	% Impervious*	IMPERVIOUS AREA (acres)	BASIC DISPERTION	NEW IMPERVIOUS AREA (acres)	TOTAL LANDSCAPE AREA (acres)
32	1.95	10%	0.20	50%	0.10	0.10
33	1.11	10%	0.11	50%	0.06	0.06
34	1.08	10%	0.11	50%	0.05	0.05
35	1.42	10%	0.14	50%	0.07	0.07
36	1.49	10%	0.15	50%	0.07	0.07
37	1.56	10%	0.16	50%	0.08	0.08
38	1.88	10%	0.19	50%	0.09	0.09
39	1.47	10%	0.15	50%	0.07	0.07
40	1.42	10%	0.14	50%	0.07	0.07
51	4.93	10%	0.49	50%	0.25	0.25
52	1.27	10%	0.13	50%	0.06	0.06
53	1.13	10%	0.11	50%	0.06	0.06
54	1.36	10%	0.14	50%	0.07	0.07
55	1.30	10%	0.13	50%	0.07	0.07
56	1.23	10%	0.12	50%	0.06	0.06
57	1.22	10%	0.12	50%	0.06	0.06
58	0.98	10%	0.10	50%	0.05	0.05
59	0.95	10%	0.10	50%	0.05	0.05
60	0.71	10%	0.07	50%	0.04	0.04
61	0.83	10%	0.08	50%	0.04	0.04
62	0.93	10%	0.09	50%	0.05	0.05
63	0.91	10%	0.09	50%	0.05	0.05
64	0.98	10%	0.10	50%	0.05	0.05
65	0.99	10%	0.10	50%	0.05	0.05
66	0.99	10%	0.10	50%	0.05	0.05
67	1.37	10%	0.14	50%	0.07	0.07
68	1.80	10%	0.18	50%	0.09	0.09
73	1.67	10%	0.17	50%	0.08	0.08
74	1.53	10%	0.15	50%	0.08	0.08
75	1.51	10%	0.15	50%	0.08	0.08
76	1.61	10%	0.16	50%	0.08	0.08
77	1.60	10%	0.16	50%	0.08	0.08
78	1.16	10%	0.12	50%	0.06	0.06
79	1.24	10%	0.12	50%	0.06	0.06
80	1.29	10%	0.13	50%	0.06	0.06
81	1.50	10%	0.15	50%	0.08	0.08
82	1.42	10%	0.14	50%	0.07	0.07

FOREST RIDGE
PERFORMANCE BASED CLUSTER PLAT

LOT #	AREA (acres)	% Impervious*	IMPERVIOUS AREA (acres)	BASIC DISPERTION	NEW IMPERVIOUS AREA (acres)	TOTAL LANDSCAPE AREA (acres)
83	1.42	10%	0.14	50%	0.07	0.07
84	1.55	10%	0.16	50%	0.08	0.08
85	1.32	10%	0.13	50%	0.07	0.07
86	1.39	10%	0.14	50%	0.07	0.07
87	1.42	10%	0.14	50%	0.07	0.07
88	1.80	10%	0.18	50%	0.09	0.09
89	1.60	10%	0.16	50%	0.08	0.08
90	1.46	10%	0.15	50%	0.07	0.07
91	1.55	10%	0.16	50%	0.08	0.08
92	1.57	10%	0.16	50%	0.08	0.08
93	1.36	10%	0.14	50%	0.07	0.07
94	1.29	10%	0.13	50%	0.06	0.06
95	1.25	10%	0.13	50%	0.06	0.06
96	1.34	10%	0.13	50%	0.07	0.07
97	1.41	10%	0.14	50%	0.07	0.07
98	1.48	10%	0.15	50%	0.07	0.07
99	1.47	10%	0.15	50%	0.07	0.07
100	1.48	10%	0.15	50%	0.07	0.07
101	1.40	10%	0.14	50%	0.07	0.07
104	1.59	10%	0.16	50%	0.08	0.08
105	1.81	10%	0.18	50%	0.09	0.09
150	1.53	10%	0.15	50%	0.08	0.08
151	1.45	10%	0.15	50%	0.07	0.07
157	1.37	10%	0.14	50%	0.07	0.07
158	1.52	10%	0.15	50%	0.08	0.08
159	1.24	10%	0.12	50%	0.06	0.06
160	1.42	10%	0.14	50%	0.07	0.07
161	1.28	10%	0.13	50%	0.06	0.06
162	1.22	10%	0.12	50%	0.06	0.06
163	1.35	10%	0.14	50%	0.07	0.07
164	1.39	10%	0.14	50%	0.07	0.07
165	1.60	10%	0.16	50%	0.08	0.08
170	1.68	10%	0.17	50%	0.08	0.08
171	1.69	10%	0.17	50%	0.08	0.08
TOTAL	**101.49**	**10%**	**10.15**	**50%**	**5.07**	**5.07**

FOREST RIDGE
PERFORMANCE BASED CLUSTER PLAT

BASIN D

DEVELOPMENT AREA BREAKDOWN	AREA (acres)	% Impervious*	IMPERVIOUS AREA (acres)	TOTAL LANDSCAPE AREA (acres)
RESIDENTIAL DENSITY	162.13	10%	5.07	5.07
COMMERCIAL	0.00	80%	0	0
TOTAL	162.13	N/A	N/A	5.07

IMPERVIOUS AREAS

AREA	AREA (acres)	HYDROLOGIC SOIL GROUP	DESCRIPTION	CN
PONDS	1.00	C	Ponds and watercourses	100
ROADWAY	7.97	C	Paved roads and shoulders	98
RESIDENTIAL	5.07	C	Rooftops, driveways, paths	98
COMMERCIAL	0.00	C	Rooftops, driveways, paths	98
TOTAL IMPERVIOUS	14.04	N/A	N/A	98

PERVIOUS AREAS

AREA	AREA (acres)	HYDROLOGIC SOIL GROUP	DESCRIPTION	CN
OPEN SPACE/BUFFER	143.02	C	See Pre-Development Cond.	79
LANDSCAPE	5.07	C	Lawns (Good Condition)	74
TOTAL PERVIOUS	148.09	N/A	N/A	79

FOREST RIDGE
PERFORMANCE BASED CLUSTER PLAT

BASIN E

LOT #	AREA (acres)	% Impervious*	IMPERVIOUS AREA (acres)	BASIC DISPERTION	NEW IMPERVIOUS AREA (acres)	TOTAL LANDSCAPE AREA (acres)
69	1.21	10%	0.12	50%	0.06	0.06
70	1.55	10%	0.16	50%	0.08	0.08
71	1.72	10%	0.17	50%	0.09	0.09
72	1.32	10%	0.13	50%	0.07	0.07
102	1.42	10%	0.14	50%	0.07	0.07
103	1.28	10%	0.13	50%	0.06	0.06
106	1.62	10%	0.16	50%	0.08	0.08
107	1.95	10%	0.20	50%	0.10	0.10
108	1.74	10%	0.17	50%	0.09	0.09
109	1.49	10%	0.15	50%	0.07	0.07
110	1.57	10%	0.16	50%	0.08	0.08
111	1.68	10%	0.17	50%	0.08	0.08
112	1.61	10%	0.16	50%	0.08	0.08
113	1.44	10%	0.14	50%	0.07	0.07
114	1.60	10%	0.16	50%	0.08	0.08
115	1.44	10%	0.14	50%	0.07	0.07
116	1.77	10%	0.18	50%	0.09	0.09
117	1.36	10%	0.14	50%	0.07	0.07
118	1.39	10%	0.14	50%	0.07	0.07
119	1.47	10%	0.15	50%	0.07	0.07
120	1.37	10%	0.14	50%	0.07	0.07
121	1.59	10%	0.16	50%	0.08	0.08
122	1.43	10%	0.14	50%	0.07	0.07
123	1.30	10%	0.13	50%	0.07	0.07
124	1.67	10%	0.17	50%	0.08	0.08
125	1.35	10%	0.14	50%	0.07	0.07
126	1.25	10%	0.13	50%	0.06	0.06
127	1.29	10%	0.13	50%	0.06	0.06
128	1.80	10%	0.18	50%	0.09	0.09
129	1.56	10%	0.16	50%	0.08	0.08
130	1.32	10%	0.13	50%	0.07	0.07
131	1.46	10%	0.15	50%	0.07	0.07
132	1.94	10%	0.19	50%	0.10	0.10
133	1.96	10%	0.20	50%	0.10	0.10
134	1.86	10%	0.19	50%	0.09	0.09
135	1.58	10%	0.16	50%	0.08	0.08
136	1.54	10%	0.15	50%	0.08	0.08

FOREST RIDGE

PERFORMANCE BASED CLUSTER PLAT

LOT #	AREA (acres)	% Impervious*	IMPERVIOUS AREA (acres)	BASIC DISPERTION	NEW IMPERVIOUS AREA (acres)	TOTAL LANDSCAPE AREA (acres)
137	1.47	10%	0.15	50%	0.07	0.07
138	2.74	10%	0.27	50%	0.14	0.14
145	1.64	10%	0.16	50%	0.08	0.08
146	1.65	10%	0.17	50%	0.08	0.08
147	1.56	10%	0.16	50%	0.08	0.08
148	1.77	10%	0.18	50%	0.09	0.09
149	1.57	10%	0.16	50%	0.08	0.08
152	1.73	10%	0.17	50%	0.09	0.09
153	1.39	10%	0.14	50%	0.07	0.07
154	1.41	10%	0.14	50%	0.07	0.07
155	1.39	10%	0.14	50%	0.07	0.07
156	1.81	10%	0.18	50%	0.09	0.09
166	1.56	10%	0.16	50%	0.08	0.08
167	1.68	10%	0.17	50%	0.08	0.08
168	1.66	10%	0.17	50%	0.08	0.08
169	1.76	10%	0.18	50%	0.09	0.09
TOTAL	**83.69**	**10%**	**8.37**	**50%**	**4.18**	**4.18**

FOREST RIDGE
PERFORMANCE BASED CLUSTER PLAT

BASIN E

DEVELOPMENT AREA BREAKDOWN	AREA (acres)	% Impervious*	IMPERVIOUS AREA (acres)	TOTAL LANDSCAPE AREA (acres)
RESIDENTIAL DENSITY	140.60	10%	4.18	4.18
COMMERCIAL	0.00	80%	0	0
TOTAL	140.60	N/A	N/A	4.18

IMPERVIOUS AREAS

AREA	AREA (acres)	HYDROLOGIC SOIL GROUP	DESCRIPTION	CN
PONDS	1.00	C	Ponds and watercourses	100
ROADWAY	4.09	C	Paved roads and shoulders	98
RESIDENTIAL	4.18	C	Rooftops, driveways, paths	98
COMMERCIAL	0.00	C	Rooftops, driveways, paths	98
TOTAL IMPERVIOUS	9.27	N/A	N/A	98

PERVIOUS AREAS

AREA	AREA (acres)	HYDROLOGIC SOIL GROUP	DESCRIPTION	CN
OPEN SPACE/BUFFER	127.15	C	See Pre-Development Cond.	75
LANDSCAPE	4.18	C	Lawns (Good Condition)	74
TOTAL PERVIOUS	131.33	N/A	N/A	75

FOREST RIDGE
PERFORMANCE BASED CLUSTER PLAT

BASIN F

LOT #	AREA (acres)	% Impervious*	IMPERVIOUS AREA (acres)	BASIC DISPERTION	NEW IMPERVIOUS AREA (acres)	TOTAL LANDSCAPE AREA (acres)
139	1.76	10%	0.18	50%	0.09	0.09
140	2.03	10%	0.20	50%	0.10	0.10
141	1.41	10%	0.14	50%	0.07	0.07
142	1.50	10%	0.15	50%	0.08	0.08
143	1.98	10%	0.20	50%	0.10	0.10
144	1.65	10%	0.17	50%	0.08	0.08
TOTAL	**10.33**	**10%**	**1.03**	**50%**	**0.52**	**0.52**

FOREST RIDGE
PERFORMANCE BASED CLUSTER PLAT

BASIN F

DEVELOPMENT AREA BREAKDOWN	AREA (acres)	% Impervious*	IMPERVIOUS AREA (acres)	TOTAL LANDSCAPE AREA (acres)
RESIDENTIAL DENSITY	12.71	10%	0.52	0.52
COMMERCIAL	0.00	80%	0.00	0.00
TOTAL	12.71	N/A	N/A	0.52

IMPERVIOUS AREAS

AREA	AREA (acres)	HYDROLOGIC SOIL GROUP	DESCRIPTION	CN
PONDS	1.00	C	Ponds and watercourses	100
ROADWAY	1.22	C	Paved roads and shoulders	98
RESIDENTIAL	0.52	C	Rooftops, driveways, paths	98
RESIDENTIAL	0.00	C	Rooftops, driveways, paths	98
TOTAL IMPERVIOUS	2.74	N/A	N/A	99

PERVIOUS AREAS

AREA	AREA (acres)	HYDROLOGIC SOIL GROUP	DESCRIPTION	CN
OPEN SPACE/BUFFER	9.45	C	See Pre-Development Cond.	75
LANDSCAPE	0.52	C	Lawns (Good Condition)	74
TOTAL PERVIOUS	9.97	N/A	N/A	75

APPENDIX 'E'

FOREST RIDGE
PERFORMANCE BASED CLUSTER PLAT

BASIN A

PRE-DEVELOPMENT CONDITIONS

The pre-development run-off flow path will begin flowing as Shallow Concentrated Flow from the top of small hill on the north side of the basin. It will flow in the south direction and then turn eastward for the total of 562 feet. The flow will change direction to southwest fo additional 1479 feet before reaching the property line. The entire flow is assumed to be Shallow Concentrated Flow.

The Soil Survey of Kittitas County Area, Washington identifies the soil in this area as a Type "C" soil.

CALCULATE TIME OF CONCENTRATION

Total area =	55.18	acres	
Pervious area (w/o upstream open space) =	55.18	acres	80 CN
Impervious area =	0.00	acres	98 CN

Calculate Time of Concentration assuming Shallow Concentrated Flow approach:

$$V = k\sqrt{S_o} \qquad T_t = \frac{L}{60V}$$

L =	562	ft	L =	1479	ft
S_0 =	0.0489	ft/ft	S_0 =	0.181	ft/ft
k_s =	8		k_s =	8	
V =	1.77	fps	V =	3.40	fps
T_1 =	5.29	min.	T_2 =	7.24	min.

Tc= 12.54 min.

Hydrograph Report

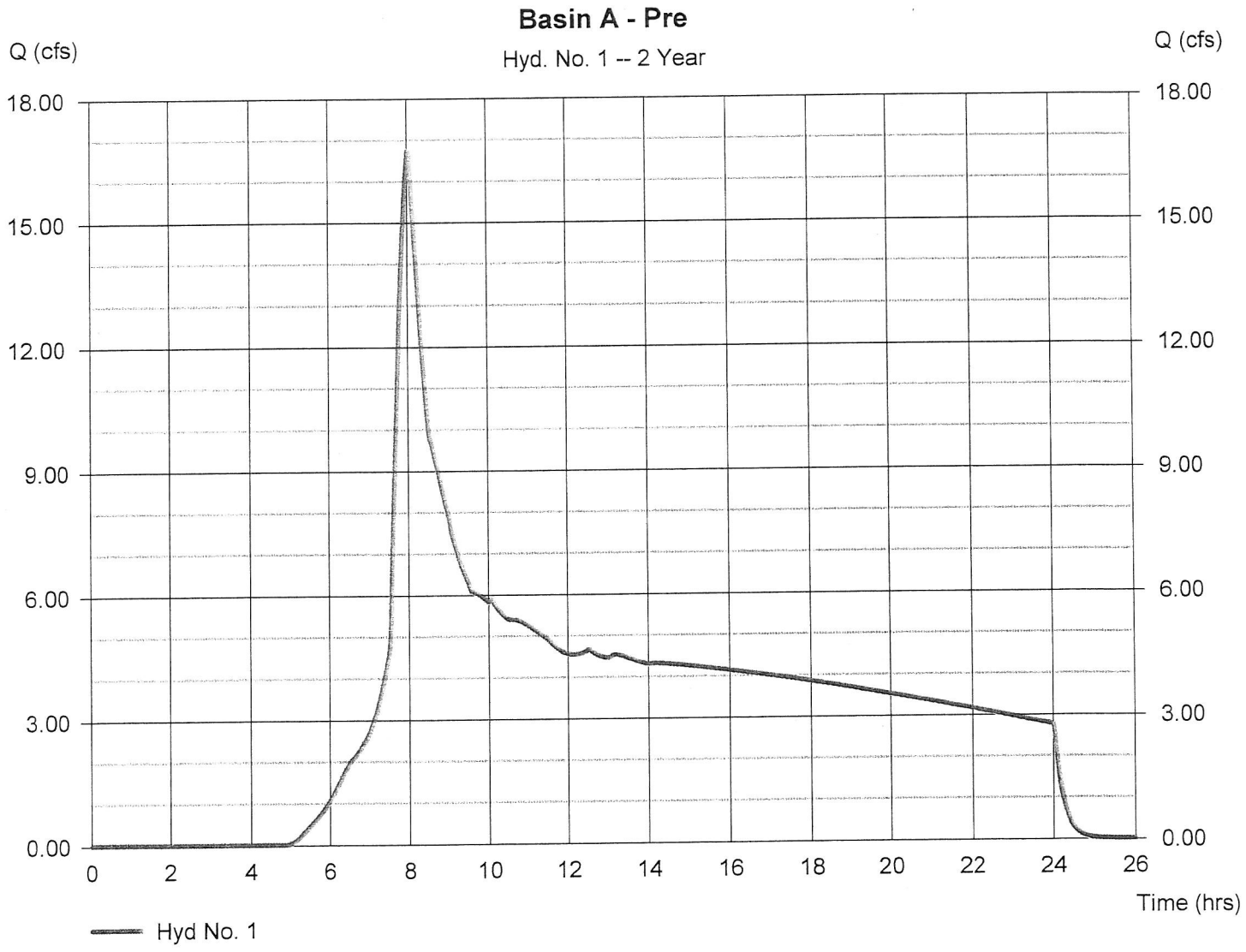
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 — Thursday, Dec 3, 2009

Hyd. No. 1

Basin A - Pre

Hydrograph type	= SBUH Runoff	Peak discharge	= 16.76 cfs
Storm frequency	= 2 yrs	Time to peak	= 8.00 hrs
Time interval	= 2 min	Hyd. volume	= 302,541 cuft
Drainage area	= 55.180 ac	Curve number	= 80*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 12.54 min
Total precip.	= 3.34 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= N/A

* Composite (Area/CN) = [(55.180 x 80)] / 55.180



Hydrograph Report

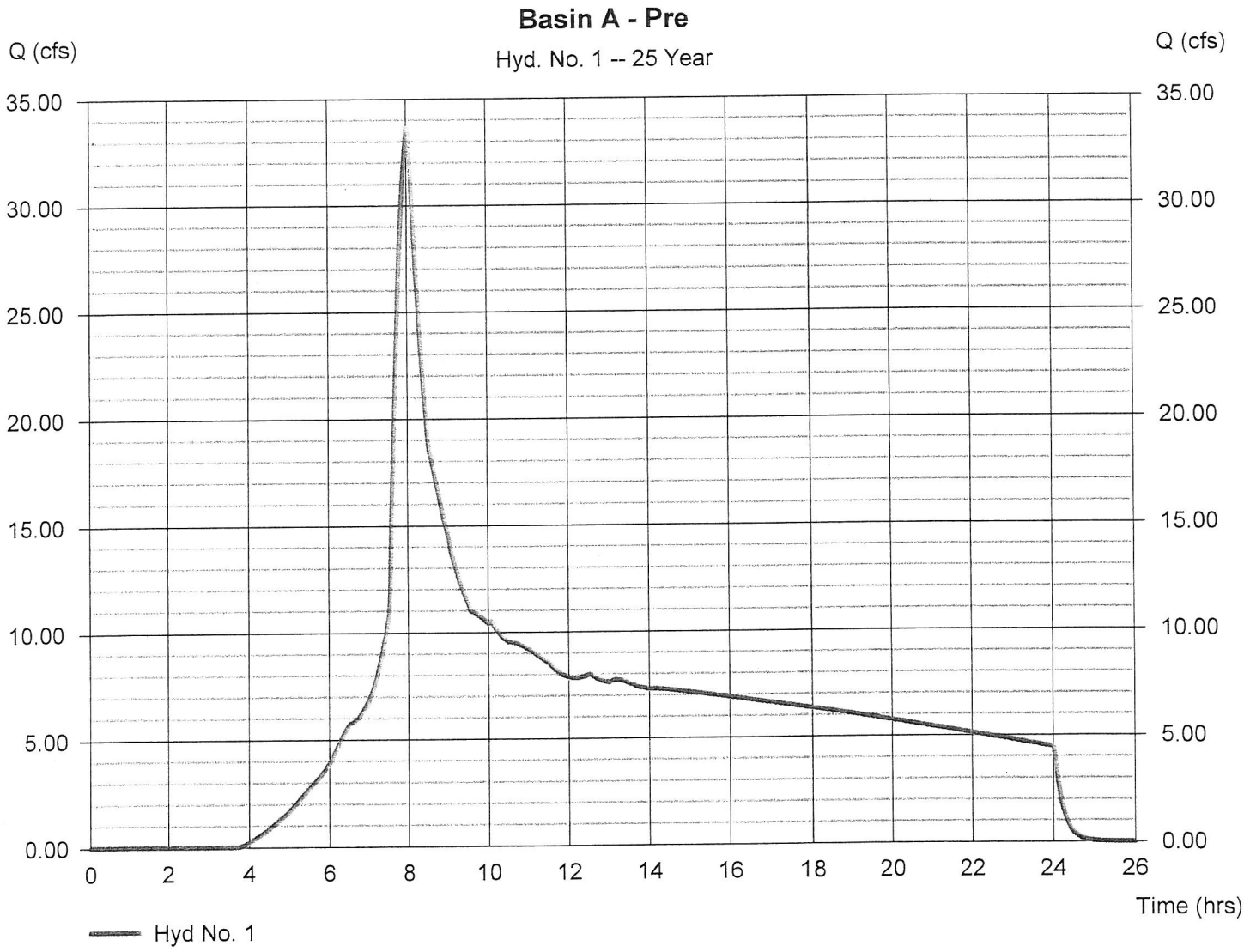
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 — Thursday, Dec 3, 2009

Hyd. No. 1

Basin A - Pre

Hydrograph type	= SBUH Runoff	Peak discharge	= 33.68 cfs
Storm frequency	= 25 yrs	Time to peak	= 8.00 hrs
Time interval	= 2 min	Hyd. volume	= 551,584 cuft
Drainage area	= 55.180 ac	Curve number	= 80*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 12.54 min
Total precip.	= 4.84 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= N/A

* Composite (Area/CN) = [(55.180 x 80)] / 55.180



Hydrograph Report

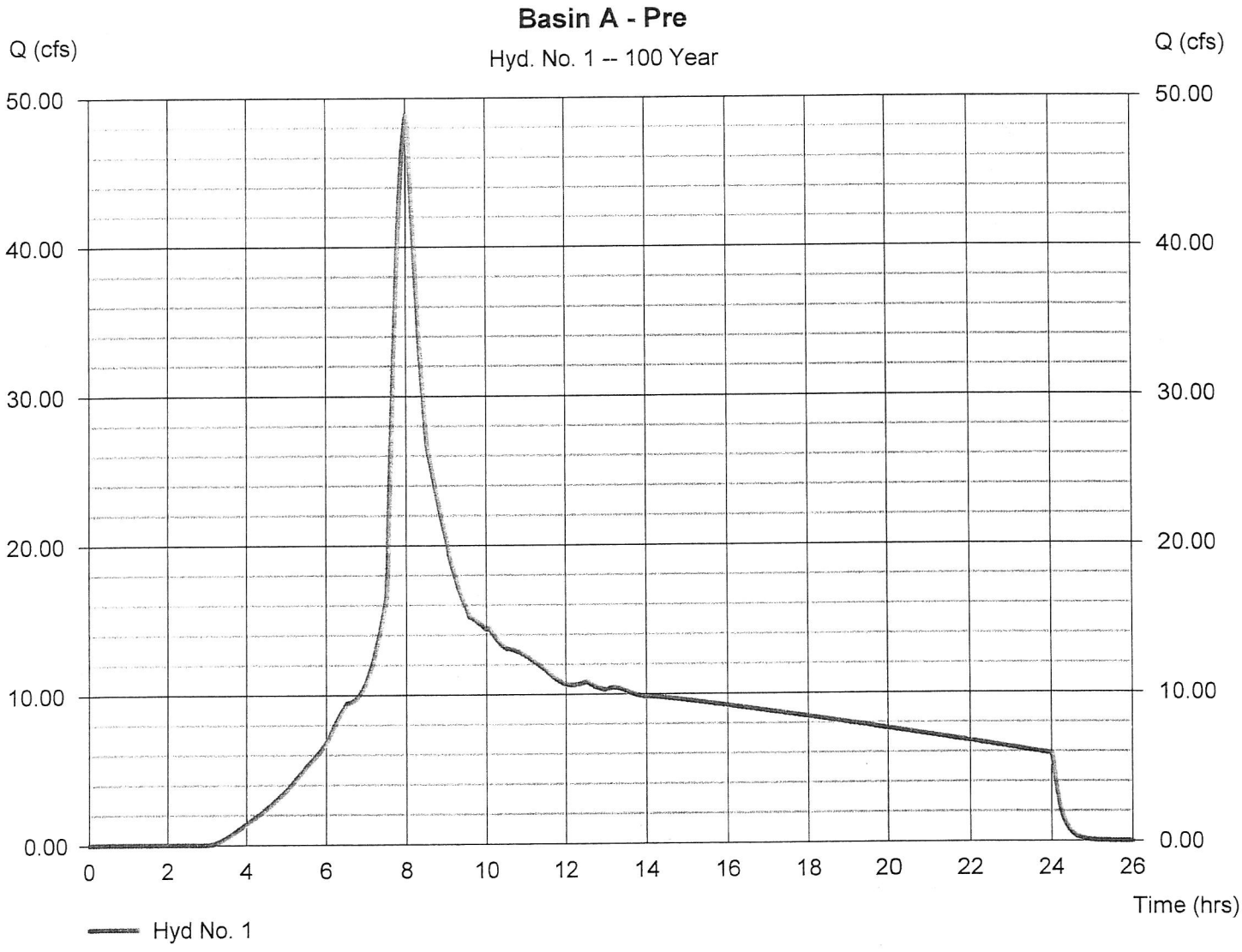
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 — Thursday, Dec 3, 2009

Hyd. No. 1

Basin A - Pre

Hydrograph type	= SBUH Runoff	Peak discharge	= 48.86 cfs
Storm frequency	= 100 yrs	Time to peak	= 8.00 hrs
Time interval	= 2 min	Hyd. volume	= 773,683 cuft
Drainage area	= 55.180 ac	Curve number	= 80*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 12.54 min
Total precip.	= 6.09 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= N/A

* Composite (Area/CN) = [(55.180 x 80)] / 55.180



BASIN A

POST-DEVELOPMENT CONDITIONS

The post-development run-off flow path will begin flowing as Open Channel Flow in the roadside ditch on the northeast side of the proposed basin. It will flow in the roadway ditches and will discharge at the proposed detention facility in the vicinity of Lot #11 in the south portion of the proposed basin.

The Soil Survey of Kittitas County Area, Washington identifies the soil in this area as a Type "C" soil.

CALCULATE TIME OF CONCENTRATION

Total area =	54.81	acres	
Pervious area (w/o upstream open space) =	49.08	acres	79 CN
Impervious area =	5.73	acres	98 CN

Calculate Time of Concentration assuming Open Channel Flow approach:

$$V = k\sqrt{S_o} \qquad T_t = \frac{L}{60V}$$

L =	4782	ft
S_0 =	0.0852	ft/ft
k_s =	17	
V =	4.96	fps
T_1 =	16.06	min.
Tc=	**16.06**	**min.**

Hydrograph Report

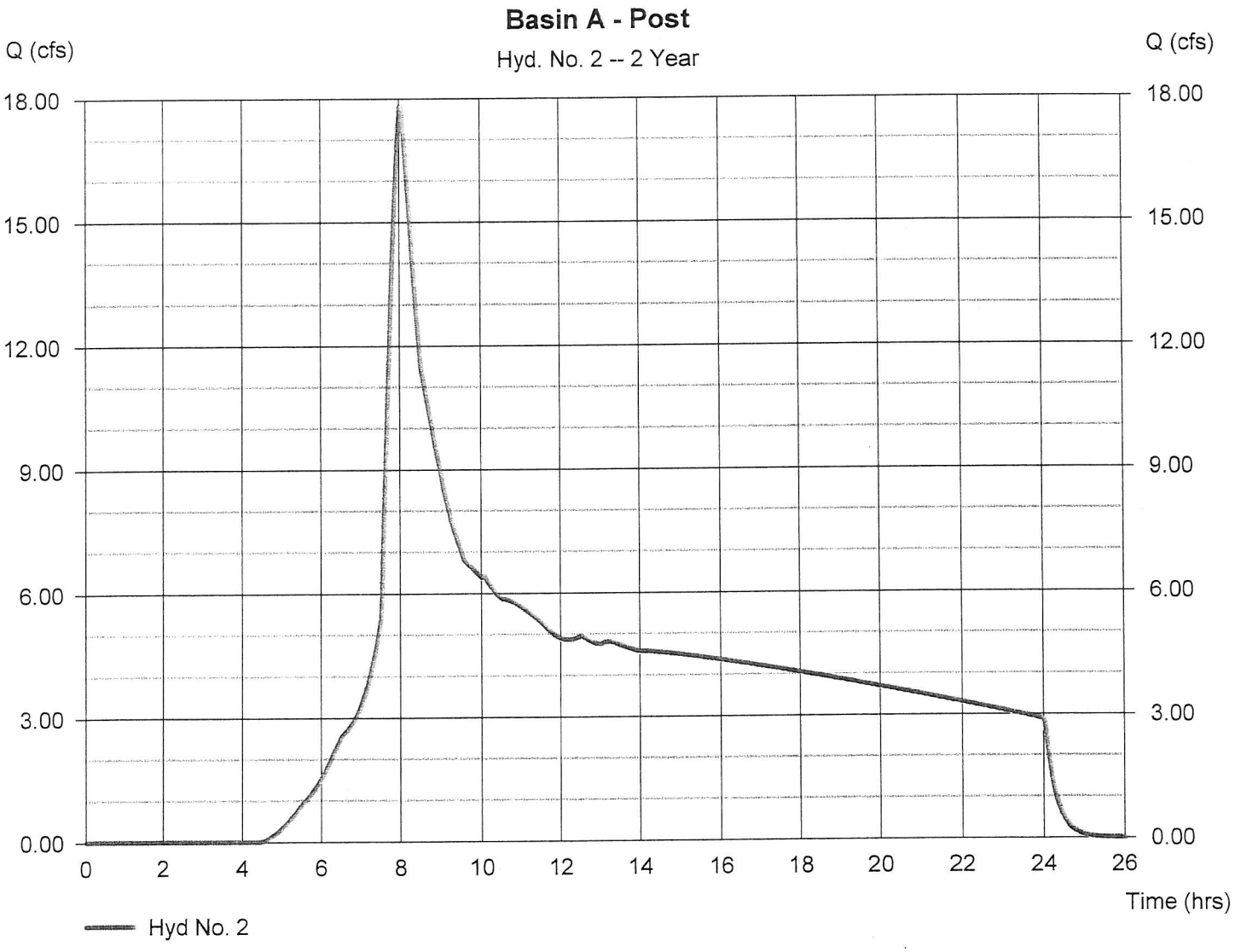
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 — Monday, Dec 7, 2009

Hyd. No. 2

Basin A - Post

Hydrograph type	= SBUH Runoff	Peak discharge	= 17.80 cfs
Storm frequency	= 2 yrs	Time to peak	= 482 min
Time interval	= 2 min	Hyd. volume	= 328,562 cuft
Drainage area	= 54.810 ac	Curve number	= 82*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 16.10 min
Total precip.	= 3.34 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= N/A

* Composite (Area/CN) = [(5.730 x 98) + (46.960 x 80) + (2.120 x 74)] / 54.810



Hydrograph Report

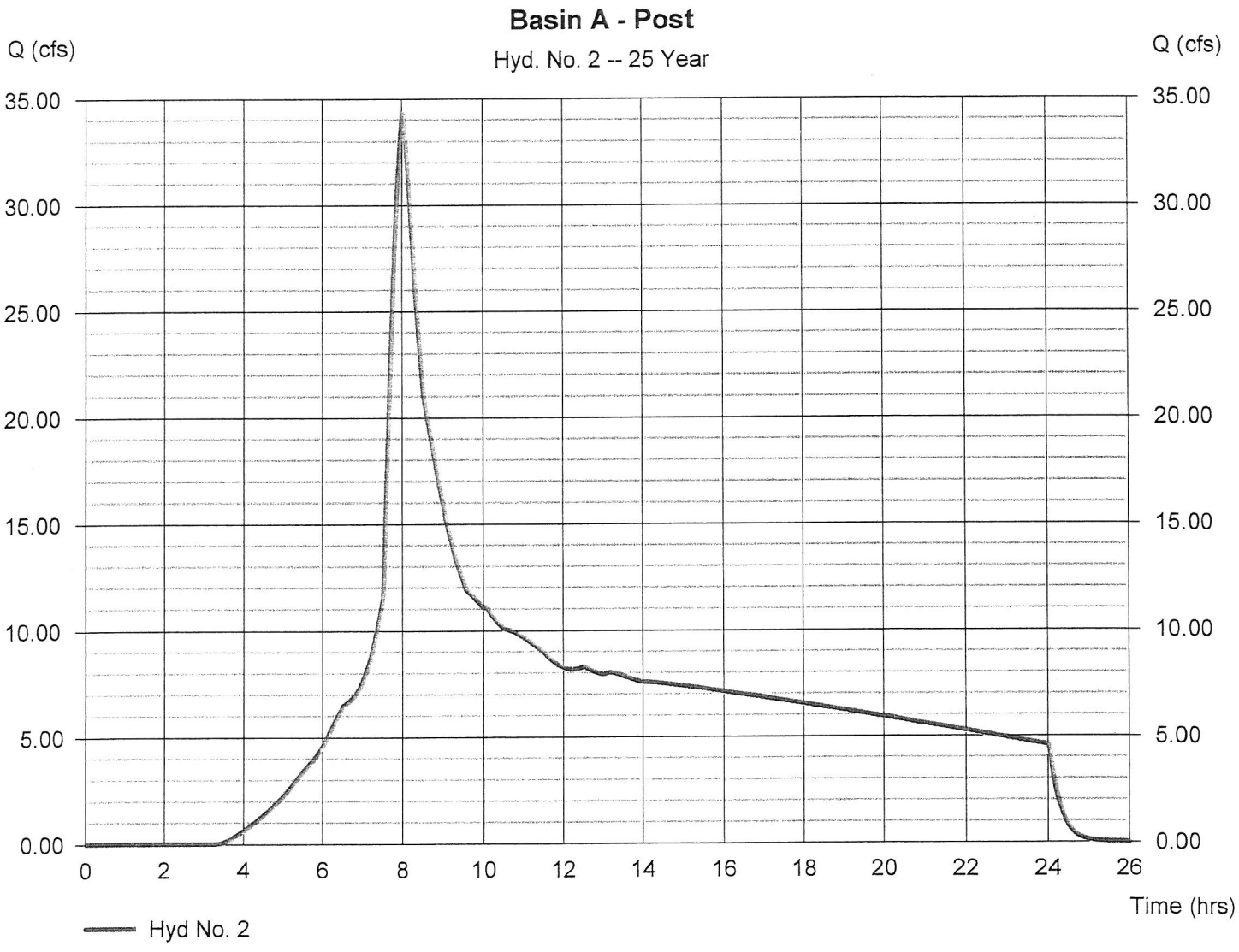
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 — Monday, Dec 7, 2009

Hyd. No. 2

Basin A - Post

Hydrograph type	= SBUH Runoff	Peak discharge	= 34.36 cfs
Storm frequency	= 25 yrs	Time to peak	= 480 min
Time interval	= 2 min	Hyd. volume	= 584,221 cuft
Drainage area	= 54.810 ac	Curve number	= 82*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 16.10 min
Total precip.	= 4.84 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= N/A

* Composite (Area/CN) = [(5.730 x 98) + (46.960 x 80) + (2.120 x 74)] / 54.810



Hydrograph Report

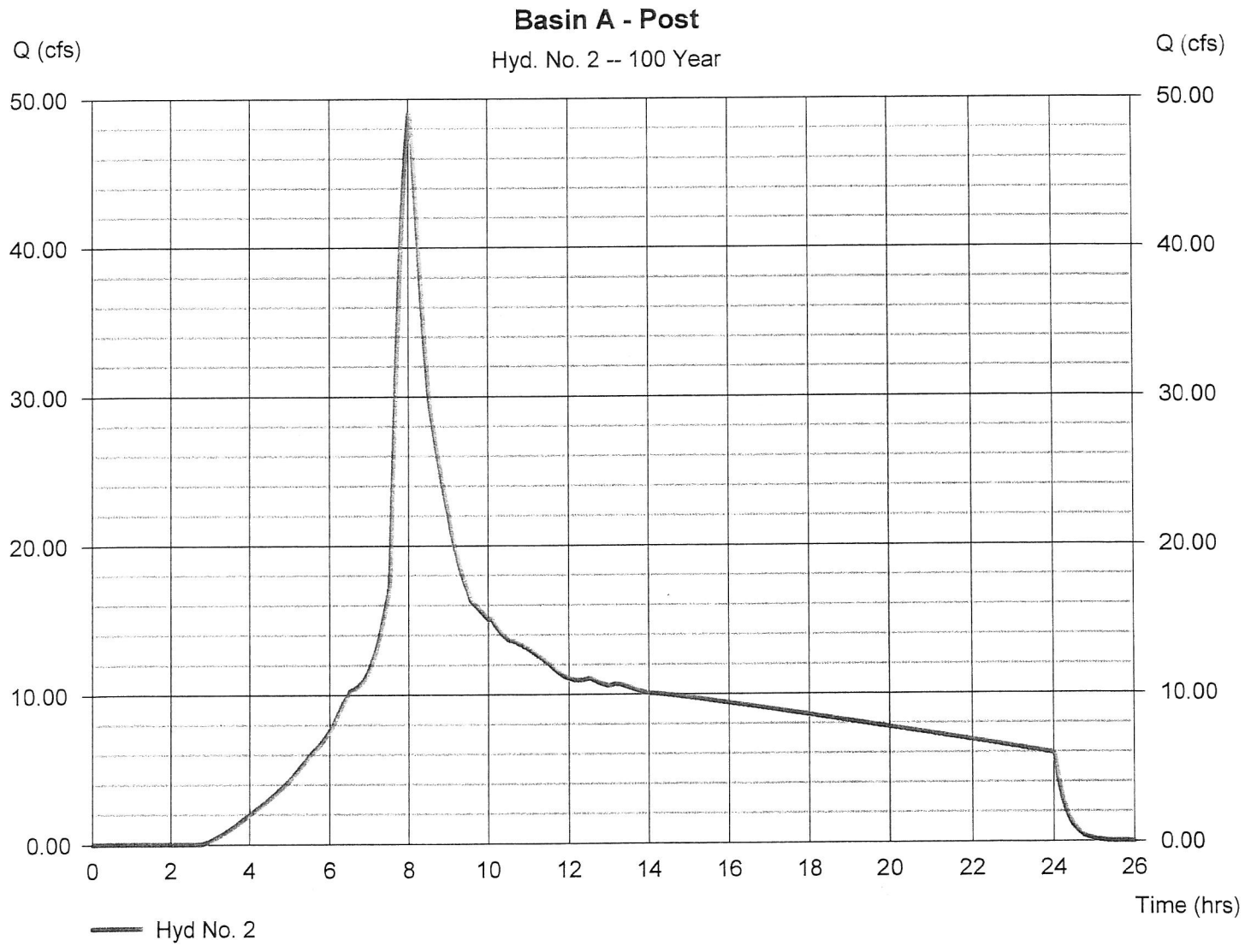
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 — Monday, Dec 7, 2009

Hyd. No. 2

Basin A - Post

Hydrograph type	= SBUH Runoff	Peak discharge	= 49.00 cfs
Storm frequency	= 100 yrs	Time to peak	= 480 min
Time interval	= 2 min	Hyd. volume	= 809,766 cuft
Drainage area	= 54.810 ac	Curve number	= 82*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 16.10 min
Total precip.	= 6.09 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= N/A

* Composite (Area/CN) = [(5.730 x 98) + (46.960 x 80) + (2.120 x 74)] / 54.810



BASIN B

PRE-DEVELOPMENT CONDITIONS

The pre-development run-off flow path will begin flowing as Shallow Concentrated Flow on the north side of the existing basin. It will flow in the southern direction for the total of 1082 feet before reaching the property line. The entire flow is assumed to be Shallow Concentrated Flow.

The Soil Survey of Kittitas County Area, Washington identifies the soil in this area as a Type "C" soil.

CALCULATE TIME OF CONCENTRATION

Total area =	23.67	acres	
Pervious area (w/o upstream open space) =	23.67	acres	80 CN
Impervious area =	0.00	acres	98 CN

Calculate Time of Concentration assuming Shallow Concentrated Flow approach:

$$V = k\sqrt{S_o} \qquad T_t = \frac{L}{60V}$$

L =	1082	ft	L =	0	ft
S_0 =	0.1645	ft/ft	S_0 =	0.181	ft/ft
k_s =	8		k_s =	8	
V =	3.24	fps	V =	3.40	fps
T_1 =	5.56	min.	T_2 =	0.00	min.

Tc= 5.56 min.

Hydrograph Report

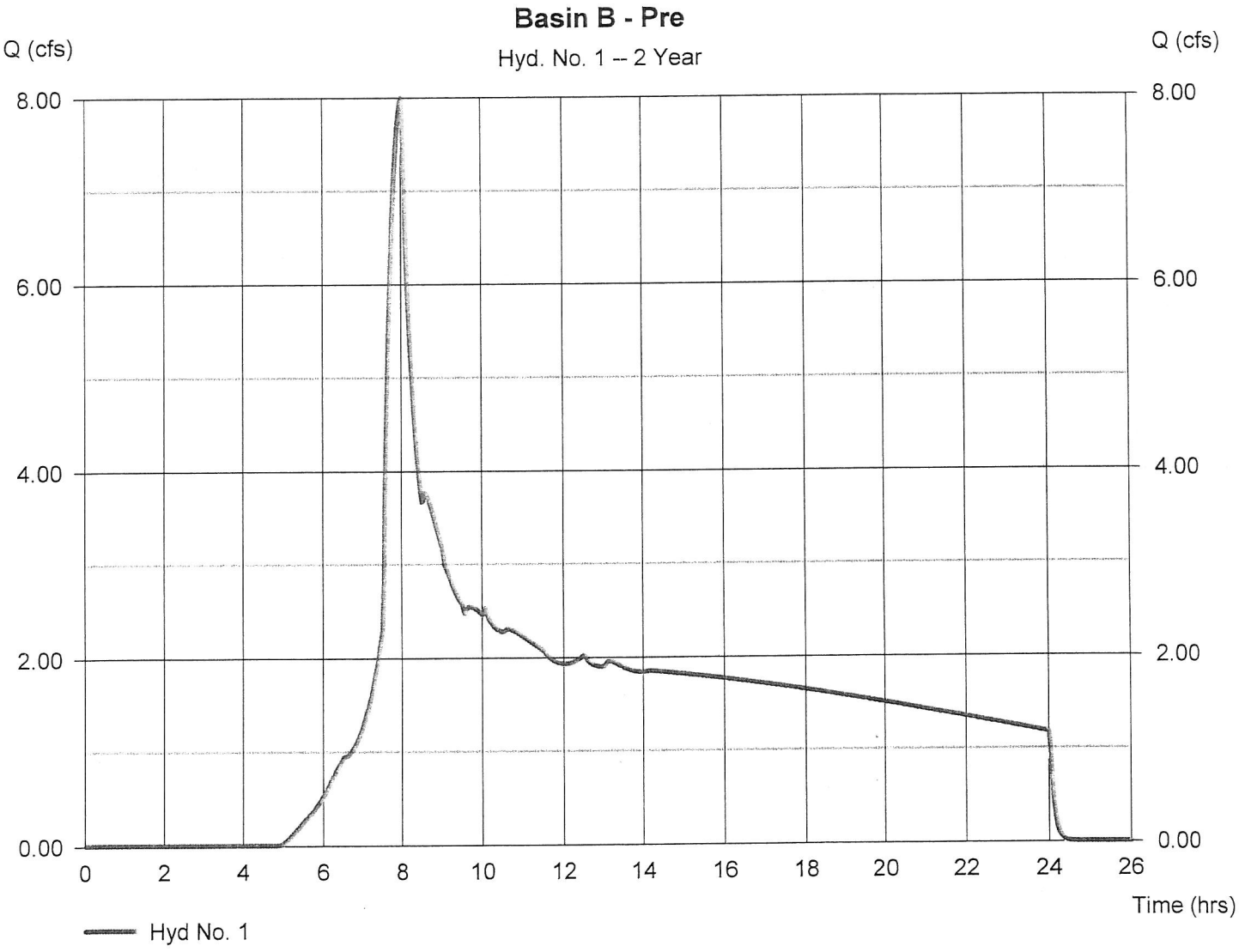
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 — Monday, Dec 7, 2009

Hyd. No. 1

Basin B - Pre

Hydrograph type	= SBUH Runoff	Peak discharge	= 7.996 cfs
Storm frequency	= 2 yrs	Time to peak	= 8.00 hrs
Time interval	= 2 min	Hyd. volume	= 129,778 cuft
Drainage area	= 23.670 ac	Curve number	= 80*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.56 min
Total precip.	= 3.34 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= N/A

* Composite (Area/CN) = [(11.840 x 82) + (11.830 x 77)] / 23.670



Hydrograph Report

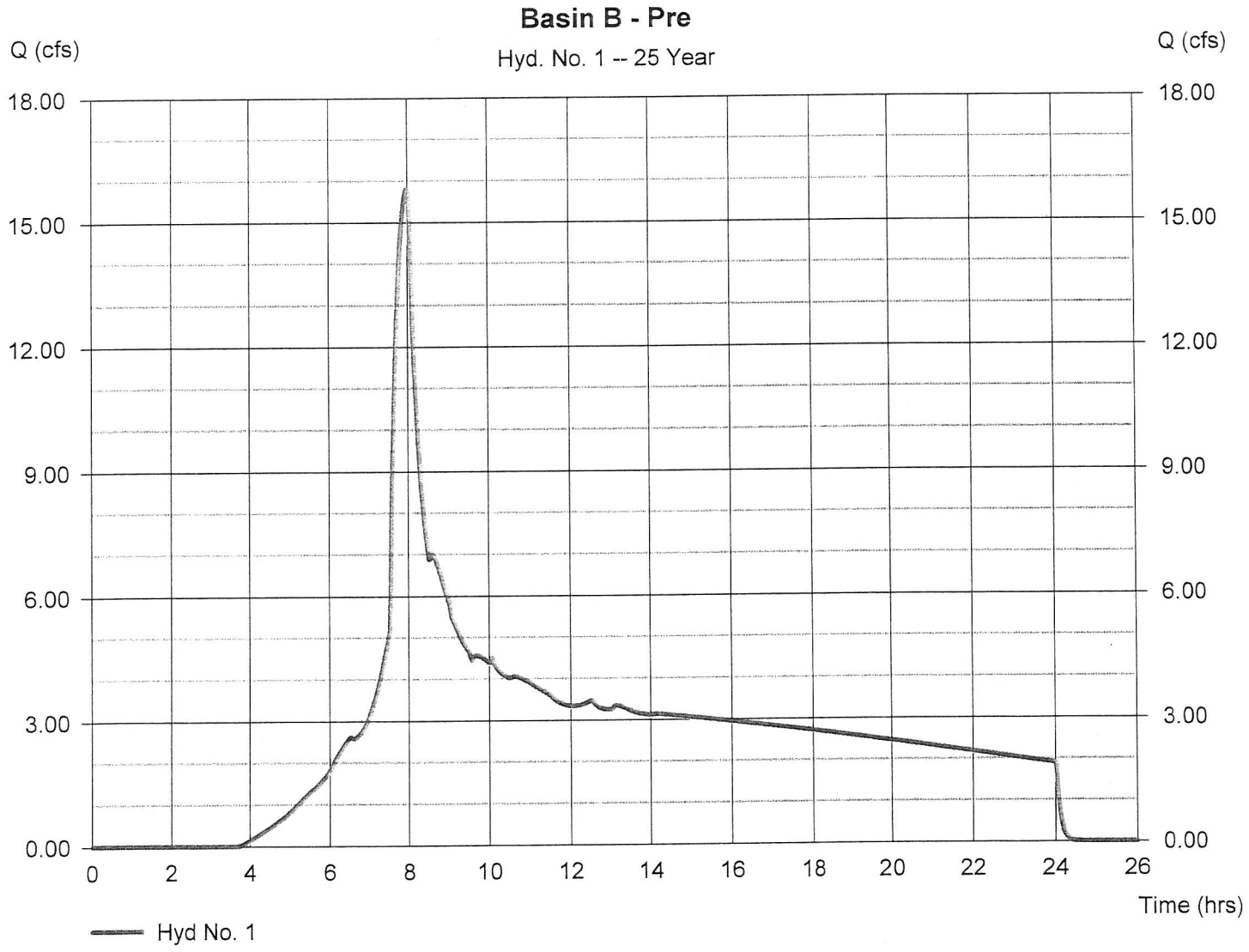
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 — Monday, Dec 7, 2009

Hyd. No. 1

Basin B - Pre

Hydrograph type	= SBUH Runoff	Peak discharge	= 15.81 cfs
Storm frequency	= 25 yrs	Time to peak	= 7.97 hrs
Time interval	= 2 min	Hyd. volume	= 236,607 cuft
Drainage area	= 23.670 ac	Curve number	= 80*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.56 min
Total precip.	= 4.84 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= N/A

* Composite (Area/CN) = [(11.840 x 82) + (11.830 x 77)] / 23.670



Hydrograph Report

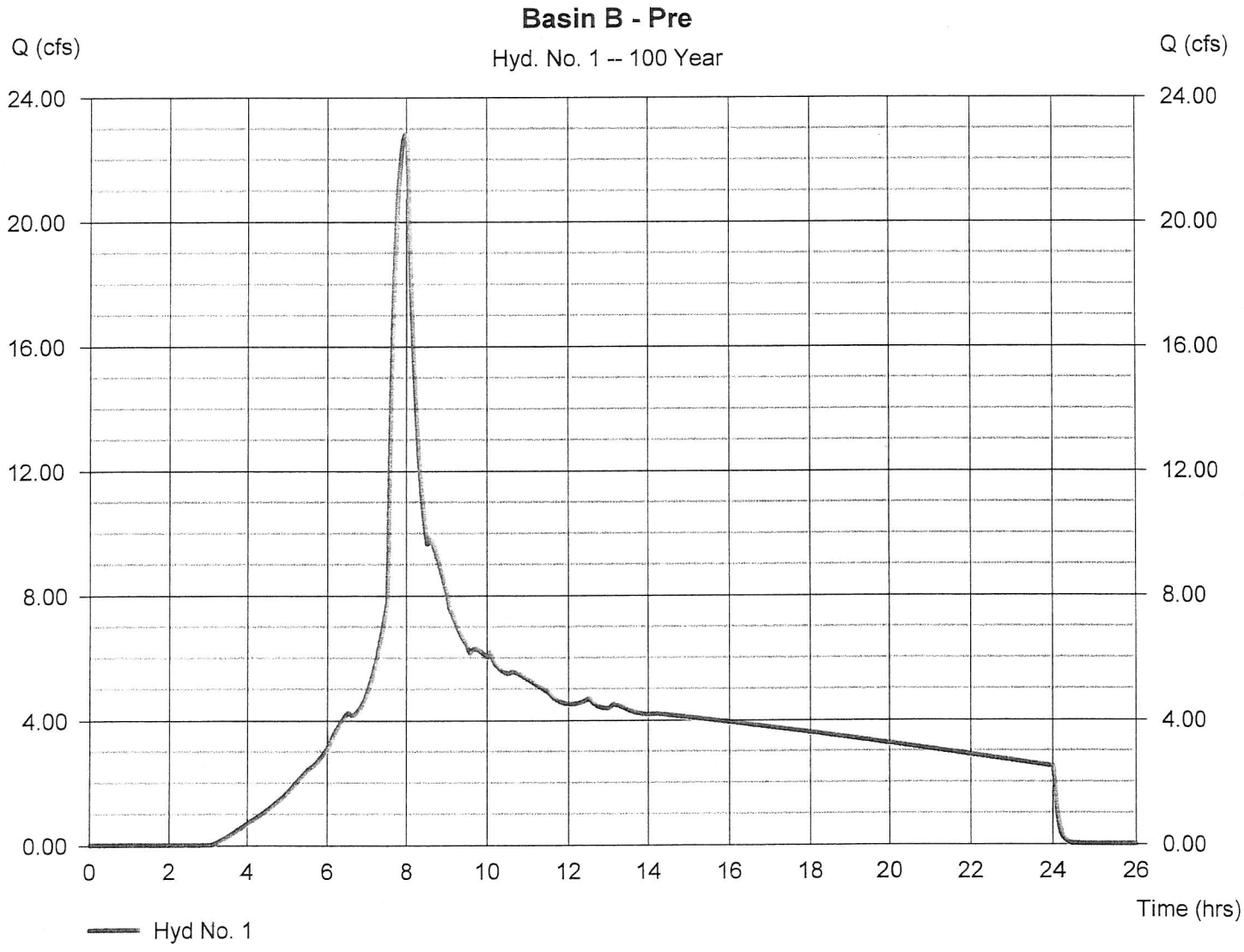
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 — Monday, Dec 7, 2009

Hyd. No. 1

Basin B - Pre

Hydrograph type	= SBUH Runoff	Peak discharge	= 22.82 cfs
Storm frequency	= 100 yrs	Time to peak	= 7.97 hrs
Time interval	= 2 min	Hyd. volume	= 331,879 cuft
Drainage area	= 23.670 ac	Curve number	= 80*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.56 min
Total precip.	= 6.09 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= N/A

* Composite (Area/CN) = [(11.840 x 82) + (11.830 x 77)] / 23.670



BASIN B

POST-DEVELOPMENT CONDITIONS

The post-development run-off flow path will begin flowing as Open Channel Flow in the roadside ditch on the north side of the proposed basin adjecent to proposed Lot 25. It will flow in the roadway ditch to the end of the cul-de-sac located between Lots 9 and 10 and then down a ditch between Lots 9 and 10 to another raodway ditch. The flow will follow this roadway ditch in the westerly direction and will discharge at the proposed detention facility in the vicinity of Lot #1 in the south portion of the proposed basin.

The Soil Survey of Kittitas County Area, Washington identifies the soil in this area as a Type "C" soil.

CALCULATE TIME OF CONCENTRATION

Total area (w/o upstream open space) =	24.45	acres	
Pervious area (w/o upstream open space) =	20.99	acres	80 CN
Impervious area =	3.46	acres	99 CN

Calculate Time of Concentration assuming Open Channel Flow approach:

$$V = k\sqrt{S_o} \qquad T_t = \frac{L}{60V}$$

L =	2687	ft
S_0 =	0.089	ft/ft
k_s =	17	
V =	5.07	fps
T_1 =	8.83	min.
Tc=	**8.83**	**min.**

Hydrograph Report

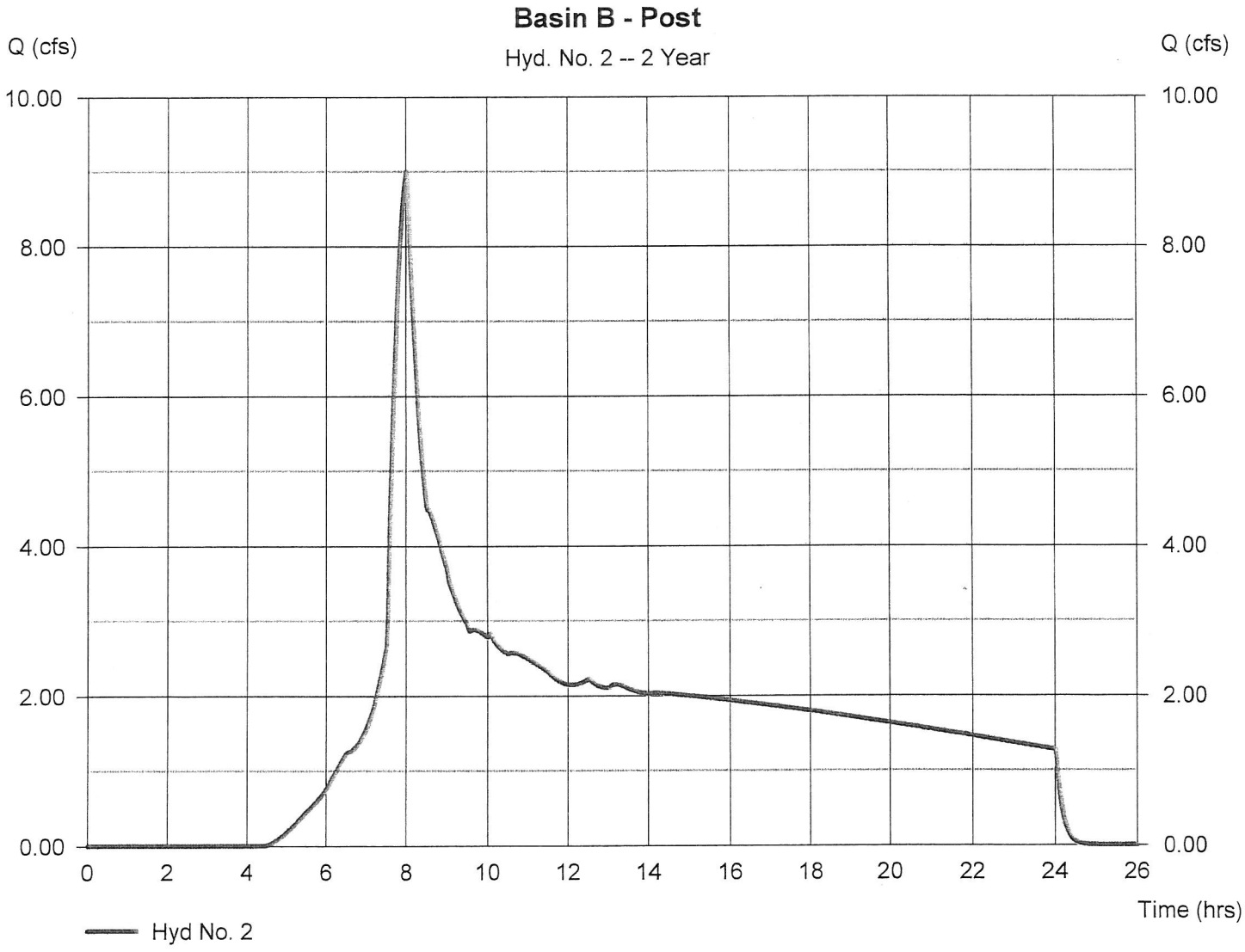
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 — Thursday, Dec 10, 2009

Hyd. No. 2

Basin B - Post

Hydrograph type	= SBUH Runoff	Peak discharge	= 9.003 cfs
Storm frequency	= 2 yrs	Time to peak	= 8.00 hrs
Time interval	= 2 min	Hyd. volume	= 146,567 cuft
Drainage area	= 24.450 ac	Curve number	= 82*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 8.80 min
Total precip.	= 3.34 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= N/A

* Composite (Area/CN) = [(20.040 x 80) + (3.460 x 99) + (0.950 x 74)] / 24.450



Hydrograph Report

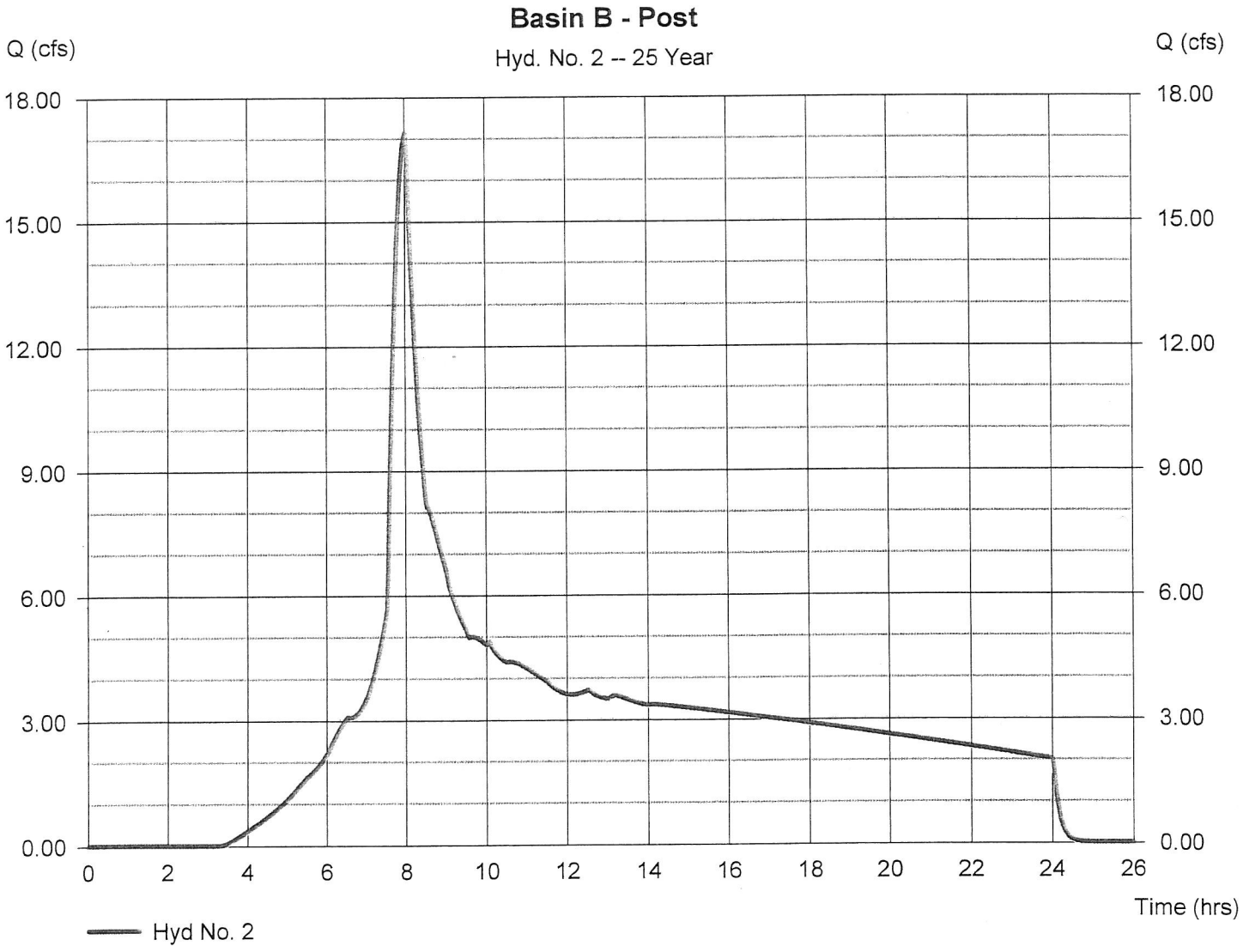
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 — Thursday, Dec 10, 2009

Hyd. No. 2

Basin B - Post

Hydrograph type	= SBUH Runoff	Peak discharge	= 17.15 cfs
Storm frequency	= 25 yrs	Time to peak	= 8.00 hrs
Time interval	= 2 min	Hyd. volume	= 260,613 cuft
Drainage area	= 24.450 ac	Curve number	= 82*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 8.80 min
Total precip.	= 4.84 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= N/A

* Composite (Area/CN) = [(20.040 x 80) + (3.460 x 99) + (0.950 x 74)] / 24.450



Hydrograph Report

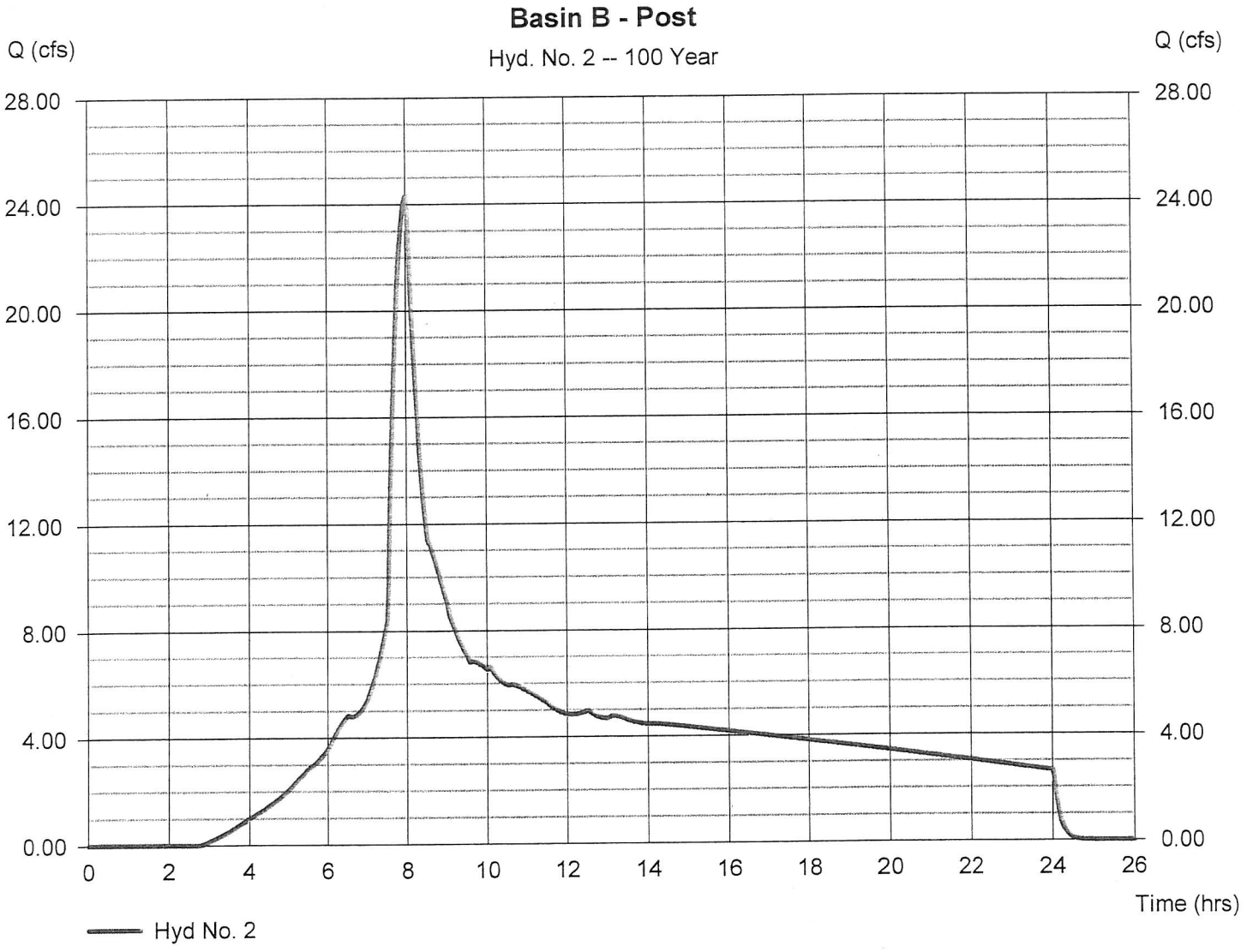
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 — Thursday, Dec 10, 2009

Hyd. No. 2

Basin B - Post

Hydrograph type	= SBUH Runoff	Peak discharge	= 24.32 cfs
Storm frequency	= 100 yrs	Time to peak	= 8.00 hrs
Time interval	= 2 min	Hyd. volume	= 361,226 cuft
Drainage area	= 24.450 ac	Curve number	= 82*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 8.80 min
Total precip.	= 6.09 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= N/A

* Composite (Area/CN) = [(20.040 x 80) + (3.460 x 99) + (0.950 x 74)] / 24.450



FOREST RIDGE
PERFORMANCE BASED CLUSTER PLAT

BASIN C

PRE-DEVELOPMENT CONDITIONS

The pre-development run-off flow path will begin flowing as Shallow Concentrated Flow on the north side of the existing basin. It will flow in the southern direction for the total of 896 feet before converting to an Open Channel Flow. From here it will flow in the southern direction for the total of 2116 feet before reaching the property line.

The Soil Survey of Kittitas County Area, Washington identifies the soil in this area as a Type "C" soil.

CALCULATE TIME OF CONCENTRATION

Total area =	77.04	acres	
Pervious area (w/o upstream open space) =	77.04	acres	80 CN
Impervious area =	0.00	acres	98 CN

Calculate Time of Concentration assuming Shallow Concentrated Flow approach:

$$V = k\sqrt{S_o} \qquad T_t = \frac{L}{60V}$$

L =	896	ft	L =	2116	ft
S_0 =	0.2427	ft/ft	S_0 =	0.15	ft/ft
k_s =	8		k_s =	10	
V =	3.94	fps	V =	3.87	fps
T_1 =	3.79	min.	T_2 =	9.11	min.

Tc= 12.89 min.

Hydrograph Report

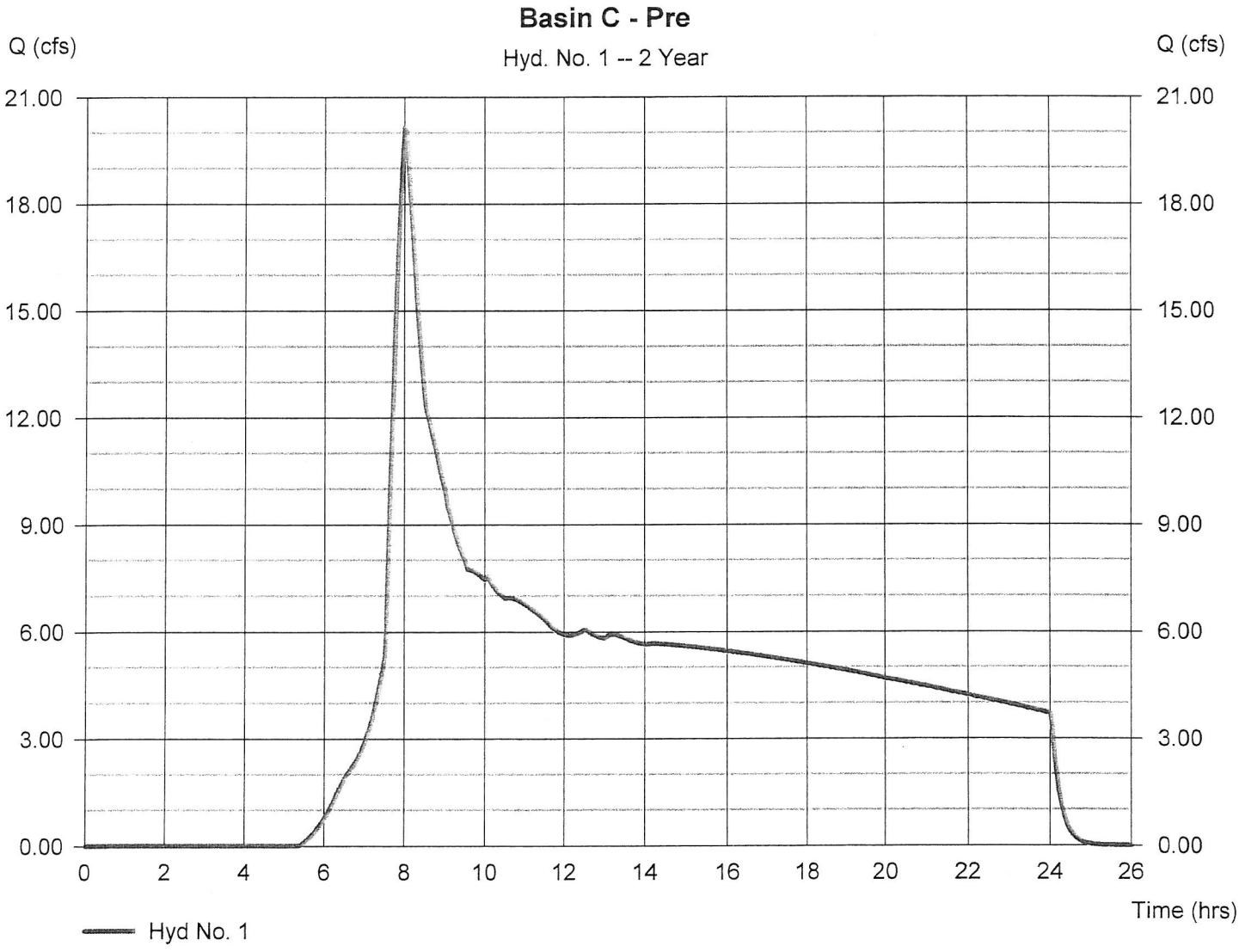
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 — Monday, Dec 7, 2009

Hyd. No. 1

Basin C - Pre

Hydrograph type	= SBUH Runoff	Peak discharge	= 20.15 cfs
Storm frequency	= 2 yrs	Time to peak	= 480 min
Time interval	= 2 min	Hyd. volume	= 385,053 cuft
Drainage area	= 77.040 ac	Curve number	= 78*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 12.90 min
Total precip.	= 3.34 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= N/A

* Composite (Area/CN) = [(46.220 x 80) + (30.820 x 74)] / 77.040



Hydrograph Report

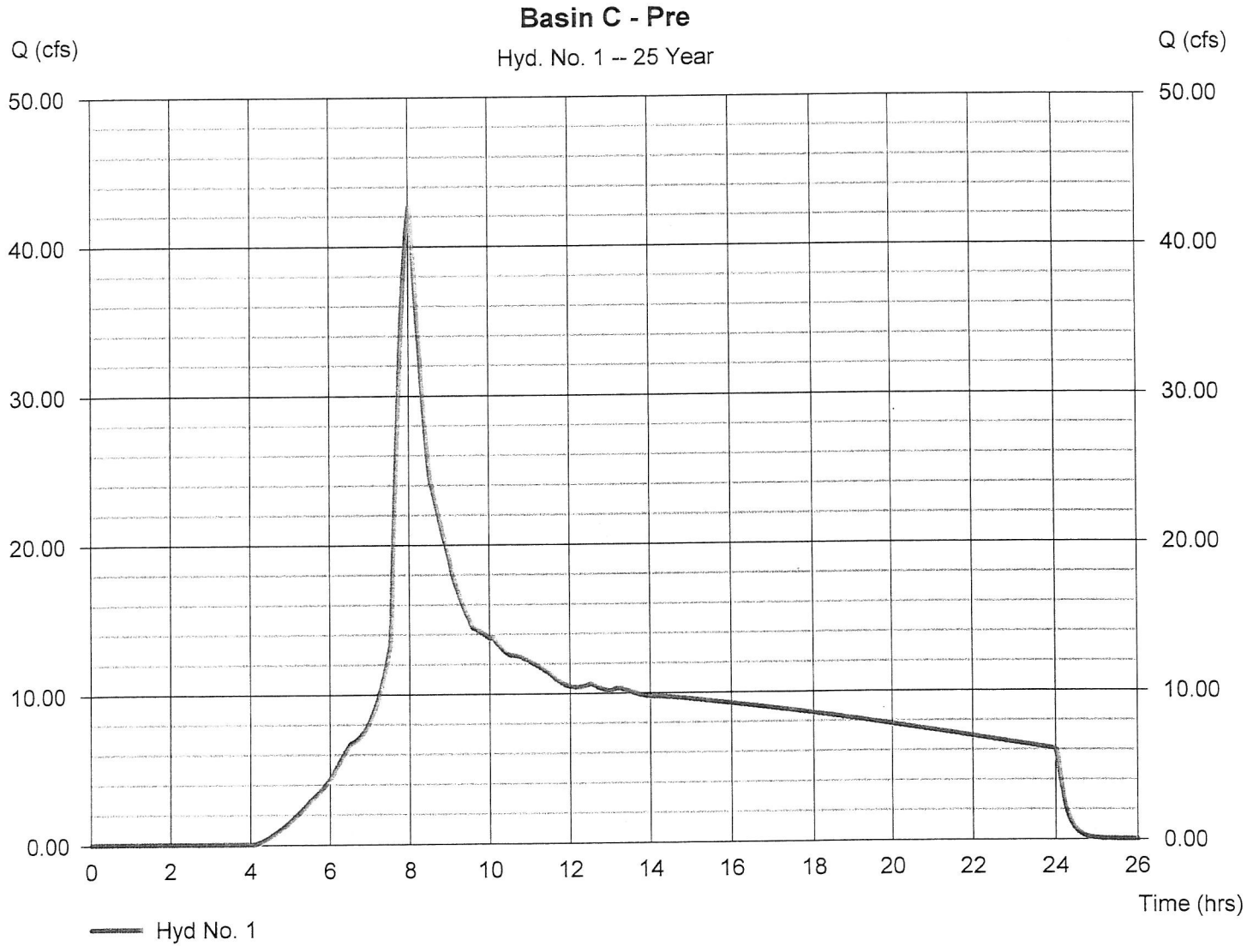
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 — Monday, Dec 7, 2009

Hyd. No. 1

Basin C - Pre

Hydrograph type	= SBUH Runoff	Peak discharge	= 42.66 cfs
Storm frequency	= 25 yrs	Time to peak	= 480 min
Time interval	= 2 min	Hyd. volume	= 720,508 cuft
Drainage area	= 77.040 ac	Curve number	= 78*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 12.90 min
Total precip.	= 4.84 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= N/A

* Composite (Area/CN) = [(46.220 x 80) + (30.820 x 74)] / 77.040



Hydrograph Report

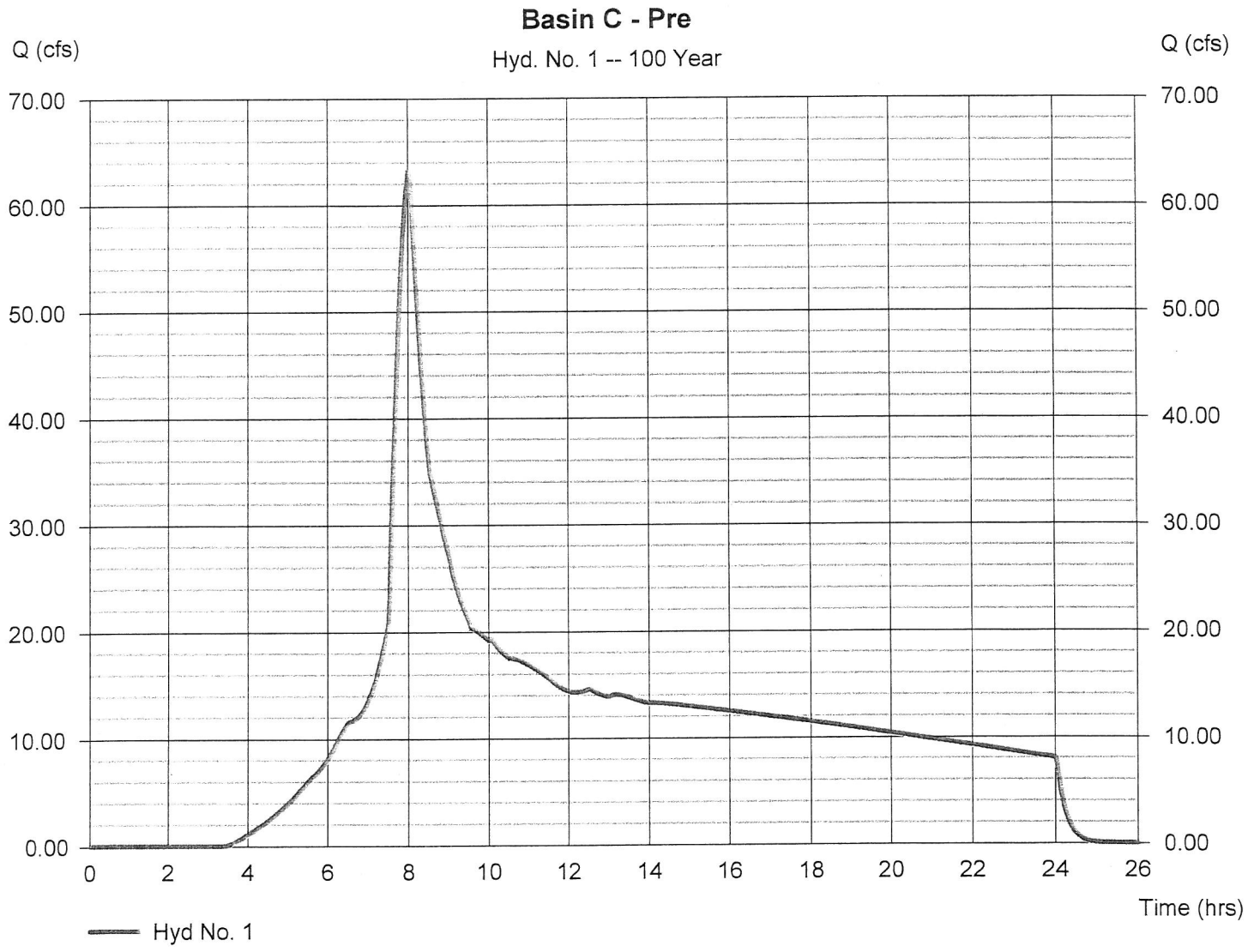
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 — Monday, Dec 7, 2009

Hyd. No. 1

Basin C - Pre

Hydrograph type	= SBUH Runoff	Peak discharge	= 63.23 cfs
Storm frequency	= 100 yrs	Time to peak	= 480 min
Time interval	= 2 min	Hyd. volume	= 1,023,125 cuft
Drainage area	= 77.040 ac	Curve number	= 78*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 12.90 min
Total precip.	= 6.09 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= N/A

* Composite (Area/CN) = [(46.220 x 80) + (30.820 x 74)] / 77.040



BASIN C

POST-DEVELOPMENT CONDITIONS

The post-development run-off flow path will begin flowing as Open Channel Flow in the roadside ditch on the north side of the proposed basin adjecent to proposed Lot 51. It will flow in the roadway ditch to the end of the cul-de-sac, down a proposed ditch between Lots 45 and 46 and will discharge at the proposed detention facility in the vicinity of Lot #45 in the central portion of the proposed basin

The Soil Survey of Kittitas County Area, Washington identifies the soil in this area as a Type "C" soil.

CALCULATE TIME OF CONCENTRATION

Total area (w/o upstream open space) =	81.54	acres	
Pervious area (w/o upstream open space) =	75.34	acres	80 CN
Impervious area =	6.20	acres	98 CN

Calculate Time of Concentration assuming Open Channel Flow approach:

$$V = k\sqrt{S_o} \qquad T_t = \frac{L}{60V}$$

L =	1994	ft
S_0 =	0.104	ft/ft
k_s =	17	
V =	5.48	fps
T_1 =	6.06	min.
Tc=	**6.06**	**min.**

Hydrograph Report

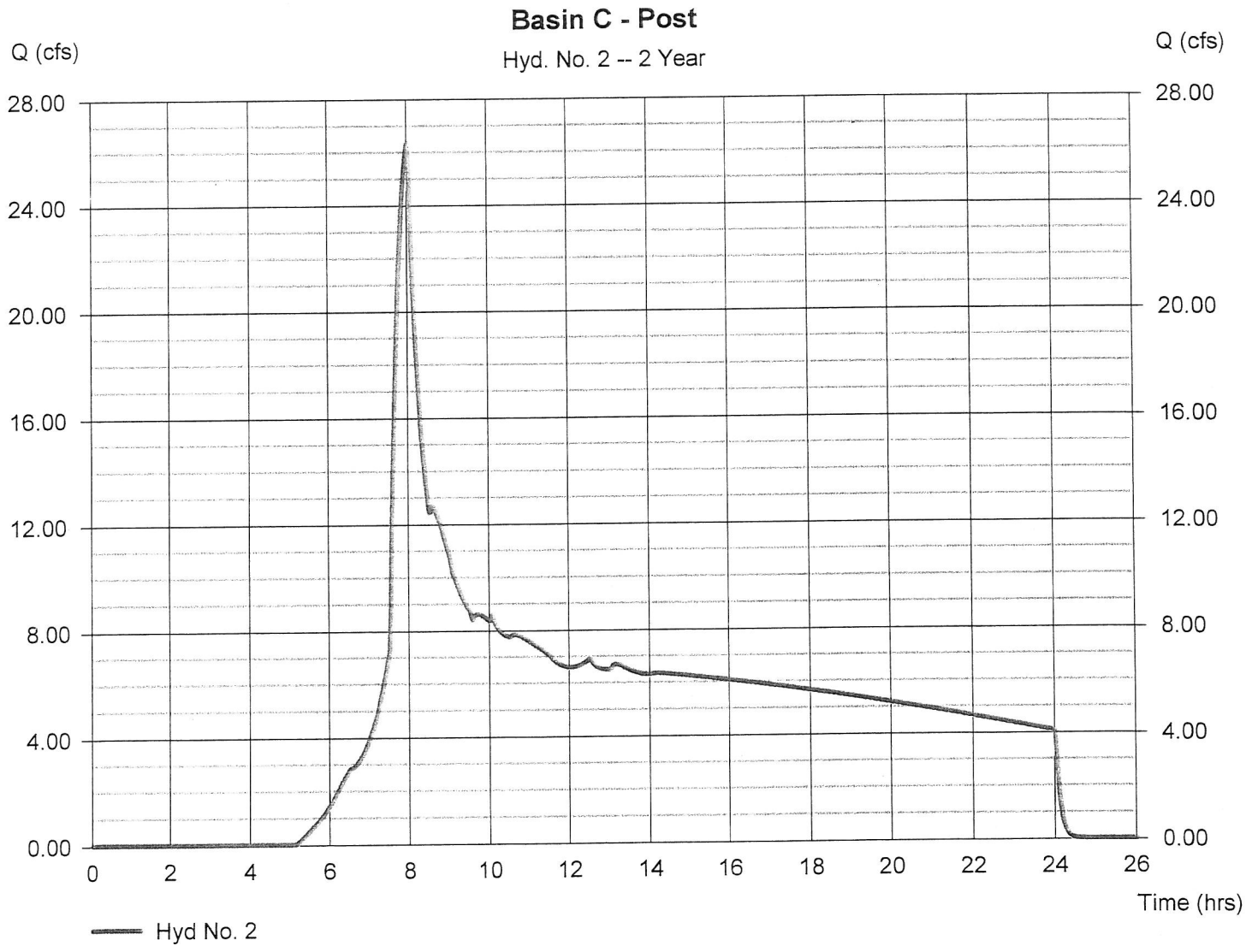
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 — Monday, Dec 7, 2009

Hyd. No. 2

Basin C - Post

Hydrograph type	= SBUH Runoff	Peak discharge	= 26.35 cfs
Storm frequency	= 2 yrs	Time to peak	= 480 min
Time interval	= 2 min	Hyd. volume	= 438,611 cuft
Drainage area	= 83.750 ac	Curve number	= 79*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 6.10 min
Total precip.	= 3.34 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= N/A

* Composite (Area/CN) = [(6.200 x 98) + (75.340 x 78) + (2.210 x 74)] / 83.750



Hydrograph Report

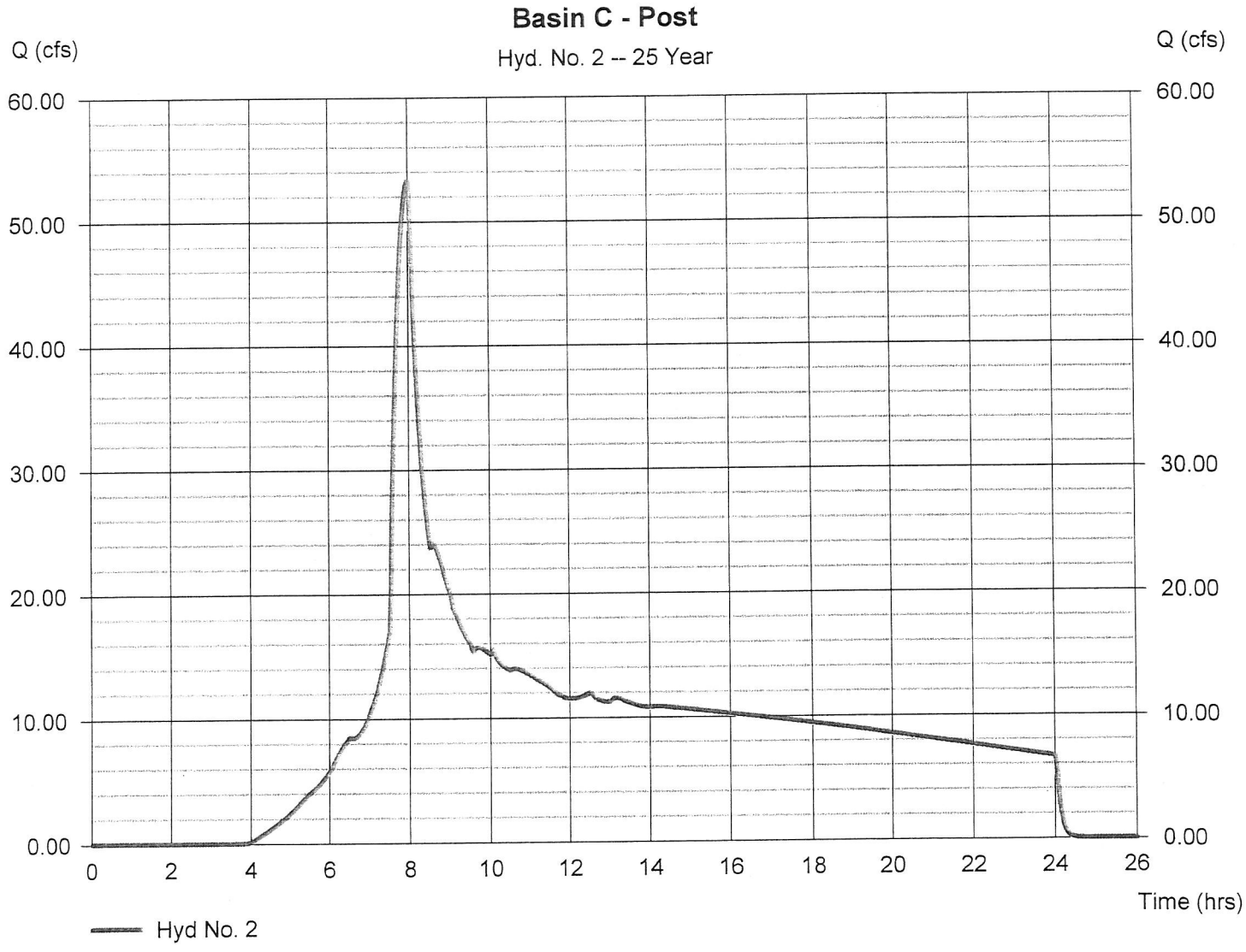
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 — Monday, Dec 7, 2009

Hyd. No. 2

Basin C - Post

Hydrograph type	= SBUH Runoff	Peak discharge	= 53.29 cfs
Storm frequency	= 25 yrs	Time to peak	= 480 min
Time interval	= 2 min	Hyd. volume	= 810,017 cuft
Drainage area	= 83.750 ac	Curve number	= 79*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 6.10 min
Total precip.	= 4.84 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= N/A

* Composite (Area/CN) = [(6.200 x 98) + (75.340 x 78) + (2.210 x 74)] / 83.750



Hydrograph Report

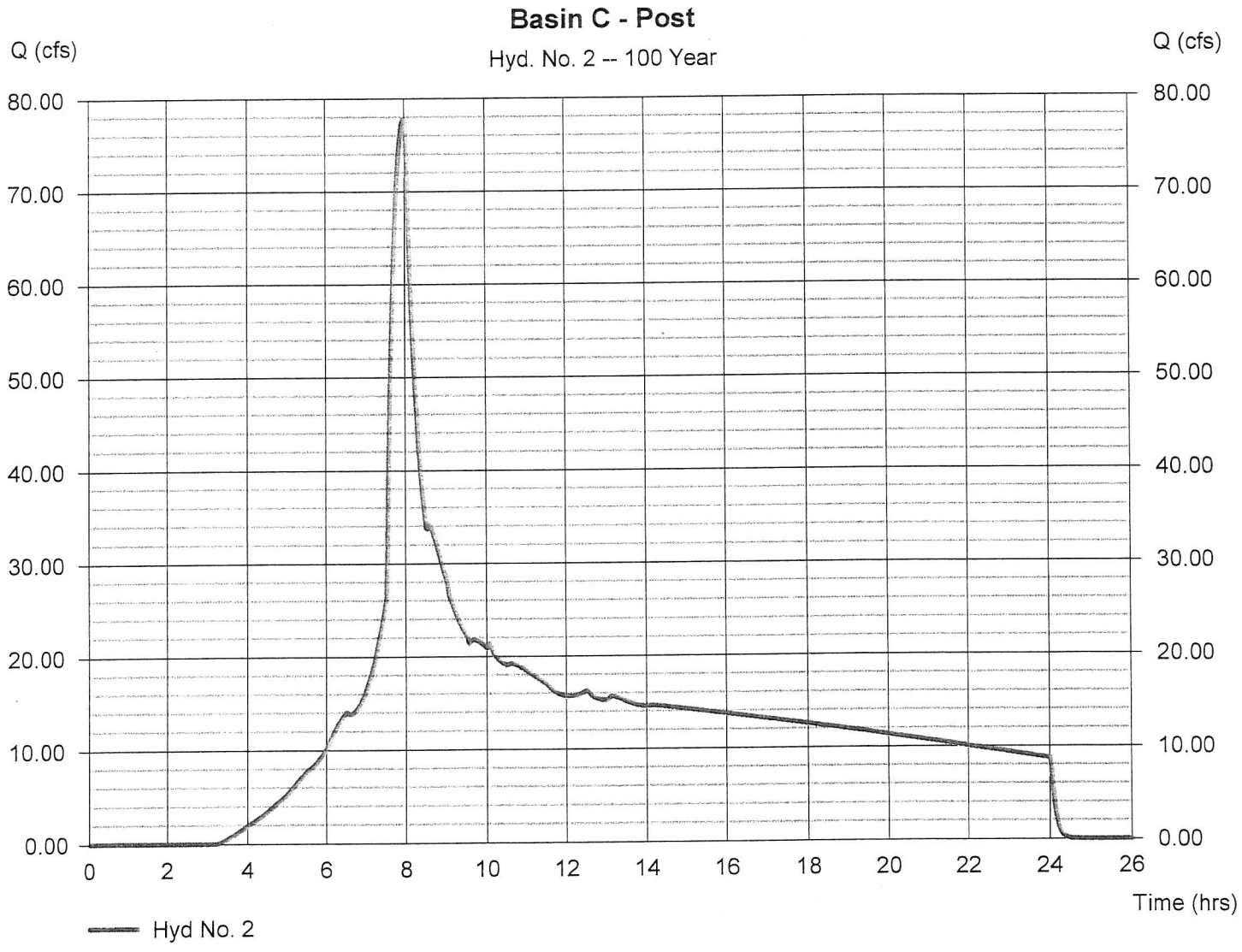
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 — Monday, Dec 7, 2009

Hyd. No. 2

Basin C - Post

Hydrograph type	= SBUH Runoff	Peak discharge	= 77.74 cfs
Storm frequency	= 100 yrs	Time to peak	= 478 min
Time interval	= 2 min	Hyd. volume	= 1,143,122 cuft
Drainage area	= 83.750 ac	Curve number	= 79*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 6.10 min
Total precip.	= 6.09 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= N/A

* Composite (Area/CN) = [(6.200 x 98) + (75.340 x 78) + (2.210 x 74)] / 83.750



BASIN D

PRE-DEVELOPMENT CONDITIONS

The pre-development run-off flow path will begin flowing as Open Channel Flow on the northwest side of the existing basin. It will flow in the southeastern direction for the total of 5272 feet before reaching the property line.

The Soil Survey of Kittitas County Area, Washington identifies the soil in this area as a Type "C" soil.

CALCULATE TIME OF CONCENTRATION

Total area =	169.54	acres	
Pervious area (w/o upstream open space) =	169.54	acres	80 CN
Impervious area =	0.00	acres	98 CN

Calculate Time of Concentration assuming Shallow Concentrated Flow approach:

$$V = k\sqrt{S_o} \qquad T_t = \frac{L}{60V}$$

L =	5272	ft	L =	0	ft
S_0 =	0.098	ft/ft	S_0 =	0.15	ft/ft
k_s =	10		k_s =	10	
V =	3.13	fps	V =	3.87	fps
T_1 =	28.07	min.	T_2 =	0.00	min.

Tc= 28.07 min.

Hydrograph Report

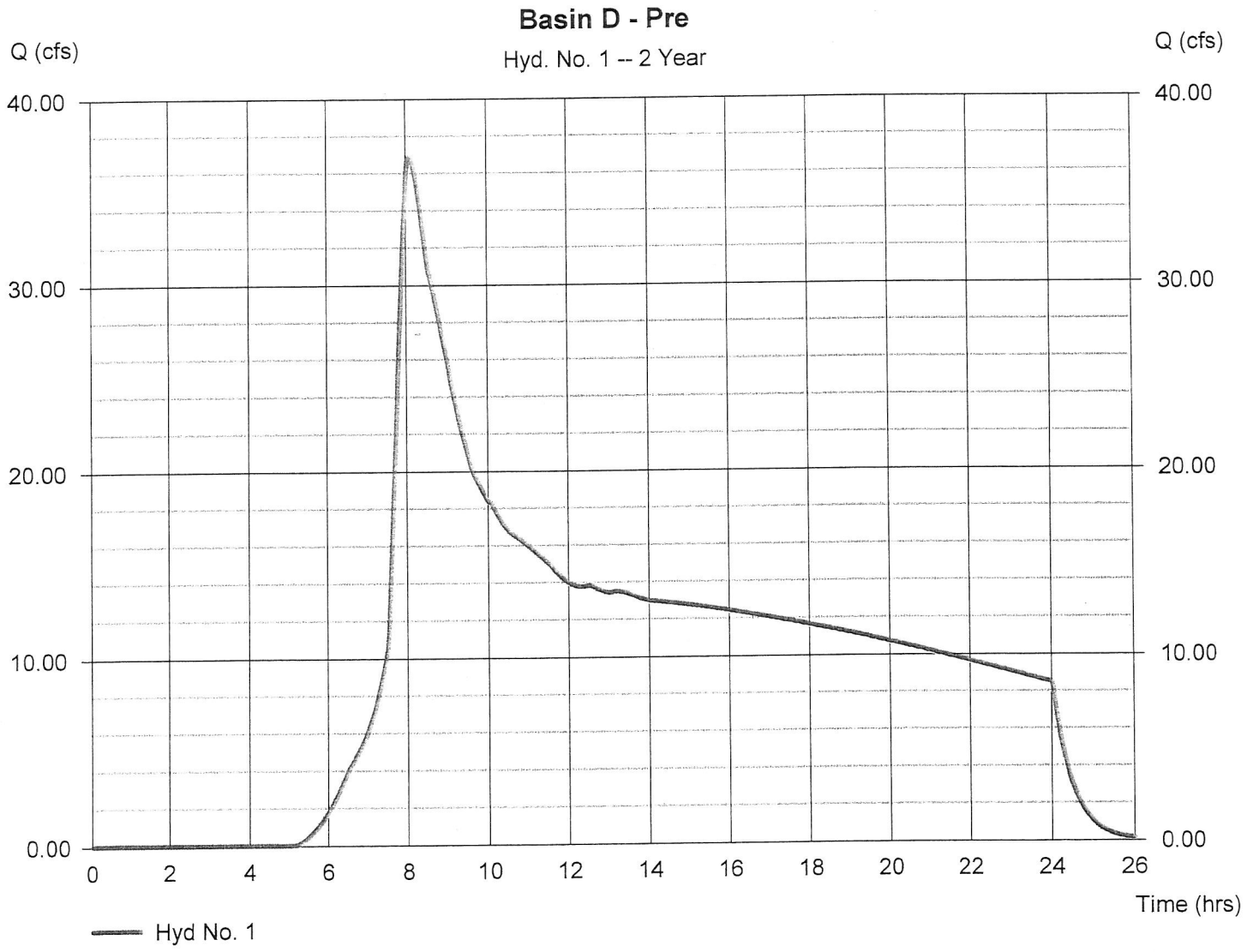
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 — Monday, Dec 7, 2009

Hyd. No. 1

Basin D - Pre

Hydrograph type	= SBUH Runoff	Peak discharge	= 36.85 cfs
Storm frequency	= 2 yrs	Time to peak	= 484 min
Time interval	= 2 min	Hyd. volume	= 887,905 cuft
Drainage area	= 169.540 ac	Curve number	= 79*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 28.07 min
Total precip.	= 3.34 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= N/A

* Composite (Area/CN) = [(127.150 x 81) + (42.390 x 72)] / 169.540



Hydrograph Report

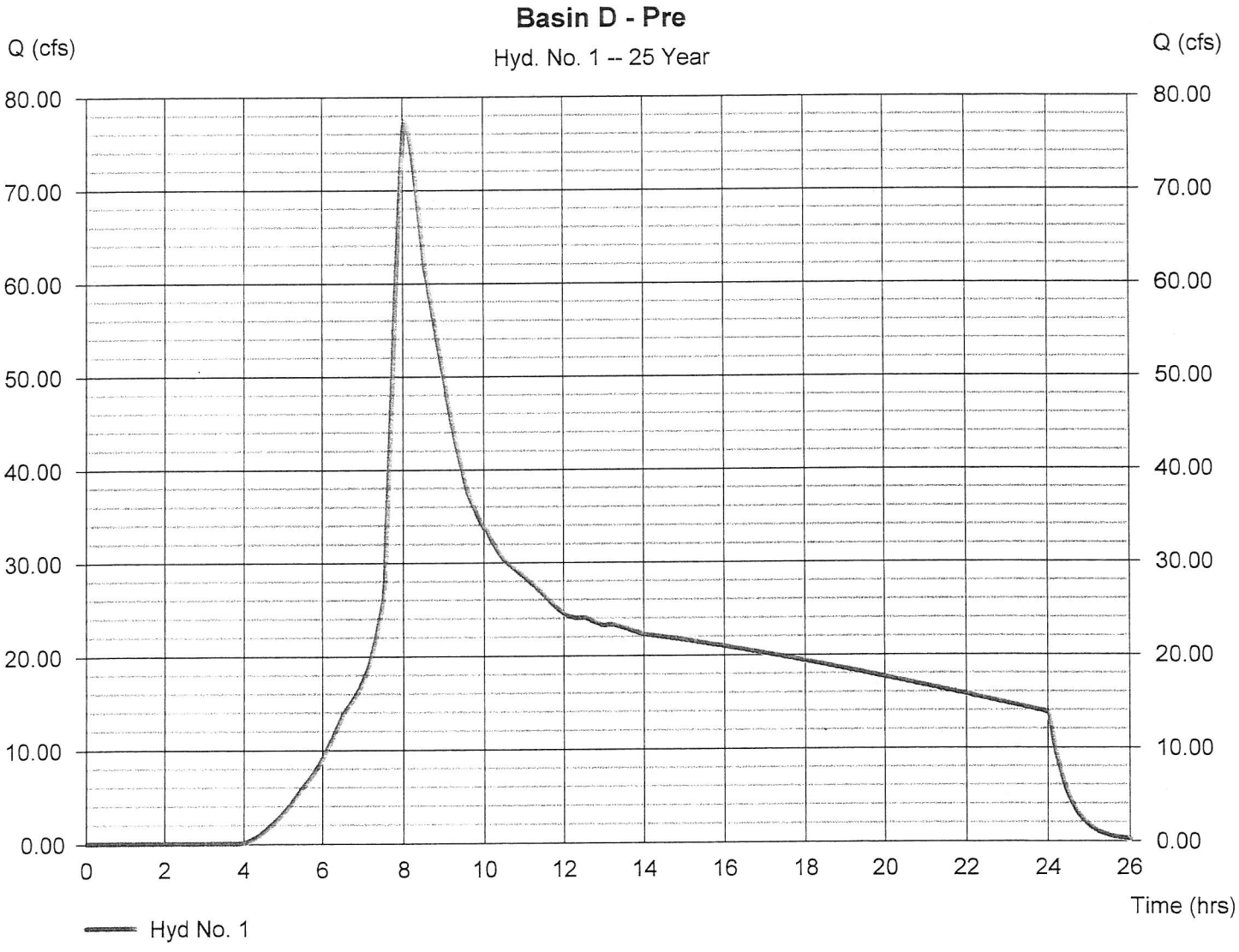
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 — Monday, Dec 7, 2009

Hyd. No. 1

Basin D - Pre

Hydrograph type	= SBUH Runoff	Peak discharge	= 77.45 cfs
Storm frequency	= 25 yrs	Time to peak	= 482 min
Time interval	= 2 min	Hyd. volume	= 1,639,765 cuft
Drainage area	= 169.540 ac	Curve number	= 79*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 28.07 min
Total precip.	= 4.84 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= N/A

* Composite (Area/CN) = [(127.150 x 81) + (42.390 x 72)] / 169.540



Hydrograph Report

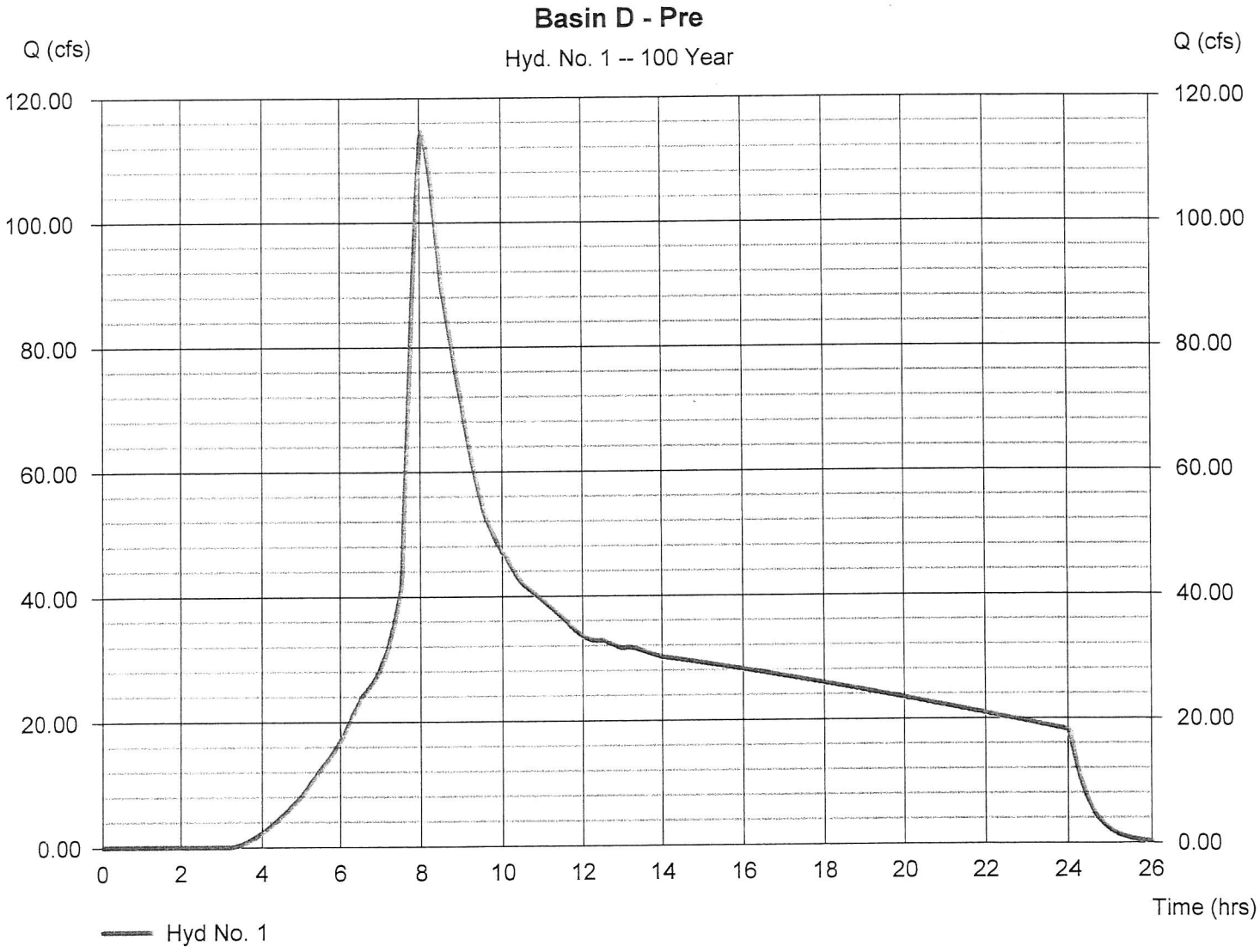
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 — Monday, Dec 7, 2009

Hyd. No. 1

Basin D - Pre

Hydrograph type	= SBUH Runoff	Peak discharge	= 114.55 cfs
Storm frequency	= 100 yrs	Time to peak	= 482 min
Time interval	= 2 min	Hyd. volume	= 2,314,088 cuft
Drainage area	= 169.540 ac	Curve number	= 79*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 28.07 min
Total precip.	= 6.09 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= N/A

* Composite (Area/CN) = [(127.150 x 81) + (42.390 x 72)] / 169.540



BASIN D

POST-DEVELOPMENT CONDITIONS

The post-development run-off flow path will begin flowing as Open Channel Flow in the roadside ditch on the north side of the proposed basin adjecent to proposed Lot 37 and it will flow in the southerly direction for approximately 908 feet to another roadside ditch adjecent to Lot 40. From here it will flow in the roadside ditch in the easterly direction for approximately 2284 feet adjecent to Lot 89. The roadside ditch will change direction toward south for approximately 2045 feet to Lot 149 and then change direction to southwest for approximately 1612 feet to the end of the cul-de-sac terminating at the proposed detention facility in the vicinity of Lot #170 in the south portion of the proposed basin.

The Soil Survey of Kittitas County Area, Washington identifies the soil in this area as a Type "C" soil.

CALCULATE TIME OF CONCENTRATION

Total area (w/o upstream open space) =	162.13	acres	
Pervious area (w/o upstream open space) =	148.09	acres	80 CN
Impervious area =	14.04	acres	98 CN

Calculate Time of Concentration assuming Open Channel Flow approach:

$$V = k\sqrt{S_o} \qquad T_t = \frac{L}{60V}$$

L =	908	ft
S_0 =	0.1156	ft/ft
k_s =	17	
V =	5.78	fps
T_1 =	2.62	min.

L =	2284	ft
S_0 =	0.048	ft/ft
k_s =	17	
V =	3.72	fps
T_2 =	10.22	min.

L =	2045	ft
S_0 =	0.104	ft/ft
k_s =	17	
V =	5.48	fps
T_3 =	6.22	min.

L =	1612	ft
S_0 =	0.073	ft/ft
k_s =	17	
V =	4.59	fps
T_4 =	5.85	min.

Tc= 24.91 min.

Hydrograph Report

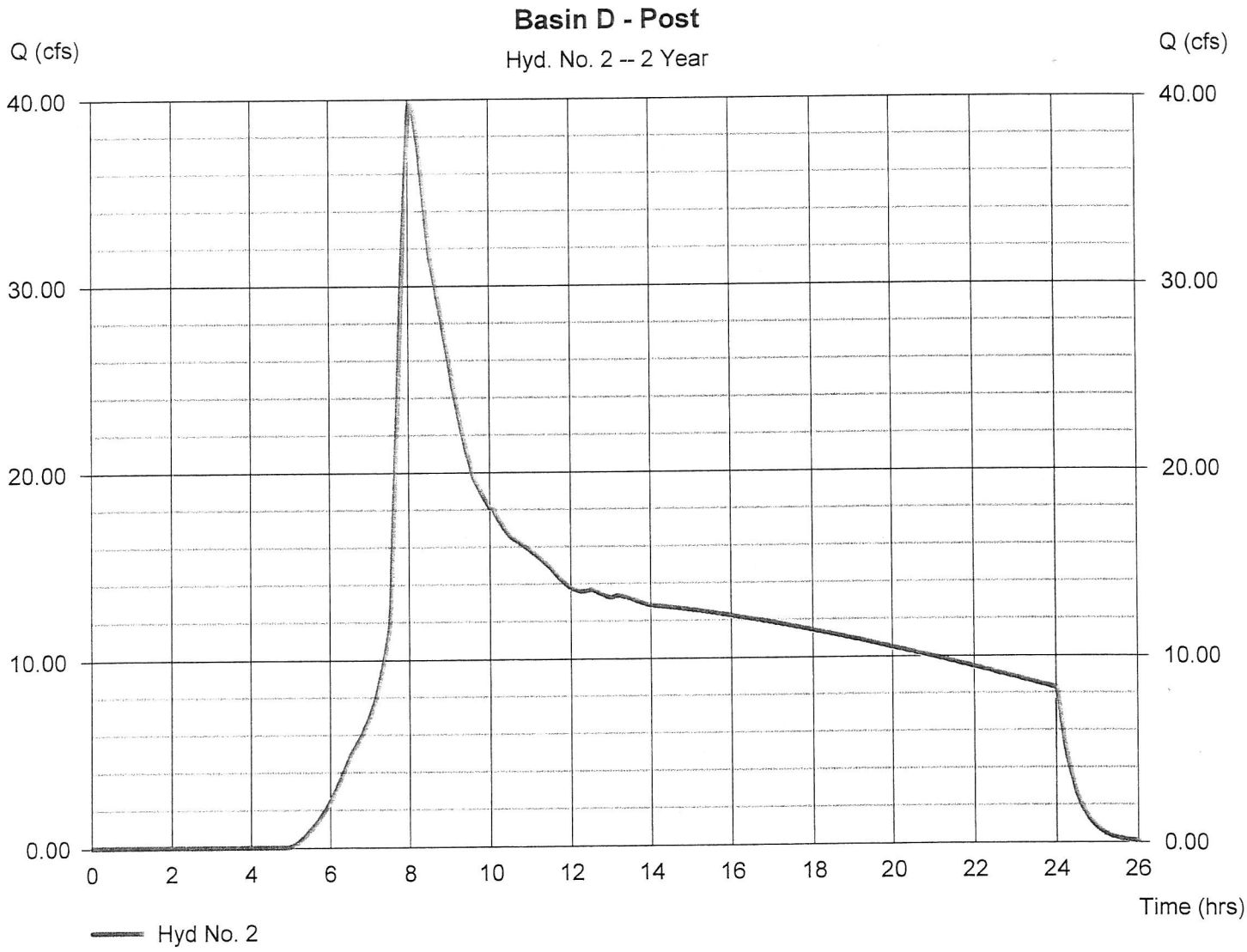
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 — Monday, Dec 7, 2009

Hyd. No. 2

Basin D - Post

Hydrograph type	= SBUH Runoff	Peak discharge	= 39.85 cfs
Storm frequency	= 2 yrs	Time to peak	= 482 min
Time interval	= 2 min	Hyd. volume	= 888,925 cuft
Drainage area	= 162.130 ac	Curve number	= 80*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 24.90 min
Total precip.	= 3.34 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= N/A

* Composite (Area/CN) = [(14.040 x 98) + (143.020 x 79) + (5.070 x 74)] / 162.130



Hydrograph Report

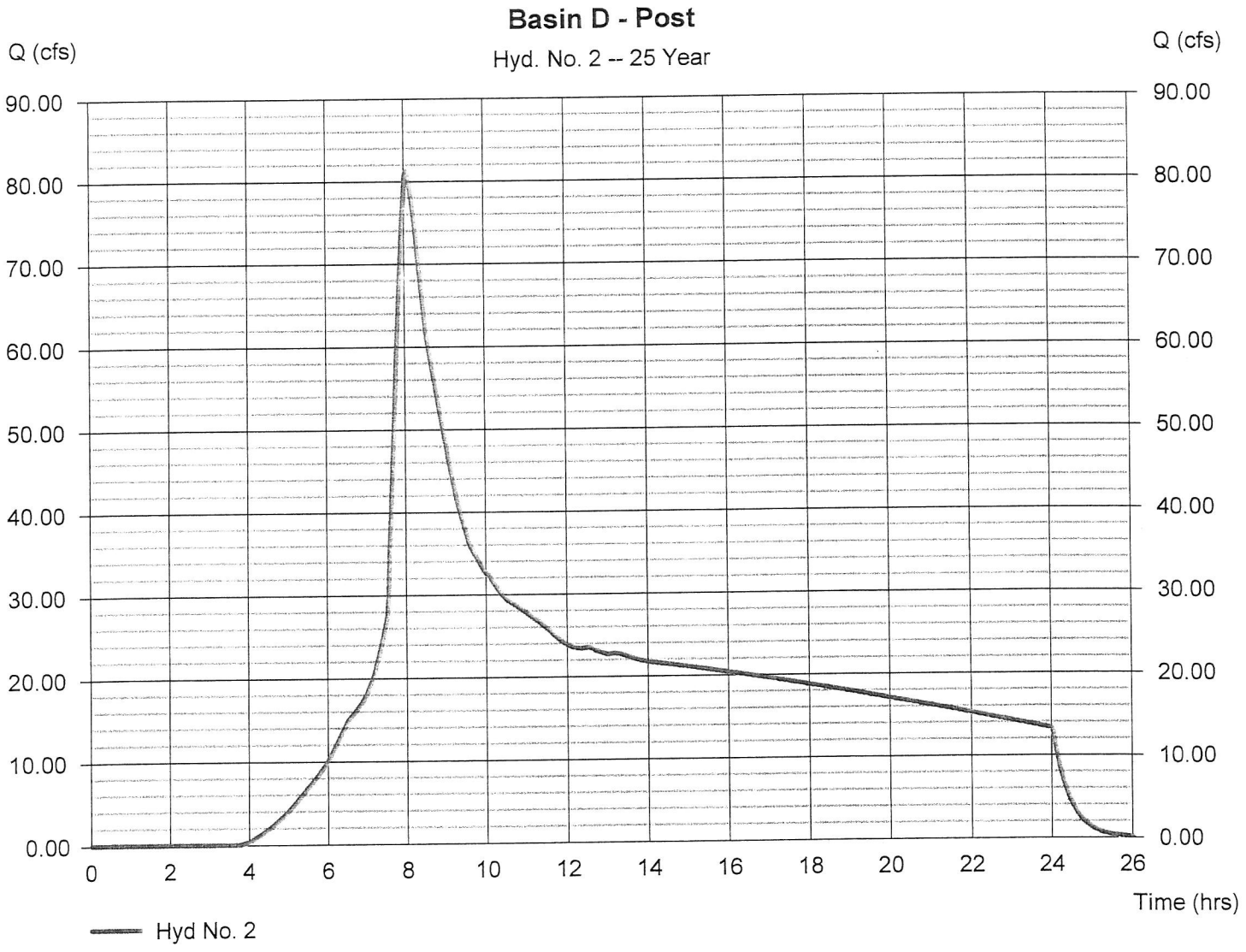
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 — Monday, Dec 7, 2009

Hyd. No. 2

Basin D - Post

Hydrograph type	= SBUH Runoff	Peak discharge	= 81.31 cfs
Storm frequency	= 25 yrs	Time to peak	= 482 min
Time interval	= 2 min	Hyd. volume	= 1,620,664 cuft
Drainage area	= 162.130 ac	Curve number	= 80*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 24.90 min
Total precip.	= 4.84 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= N/A

* Composite (Area/CN) = [(14.040 x 98) + (143.020 x 79) + (5.070 x 74)] / 162.130



Hydrograph Report

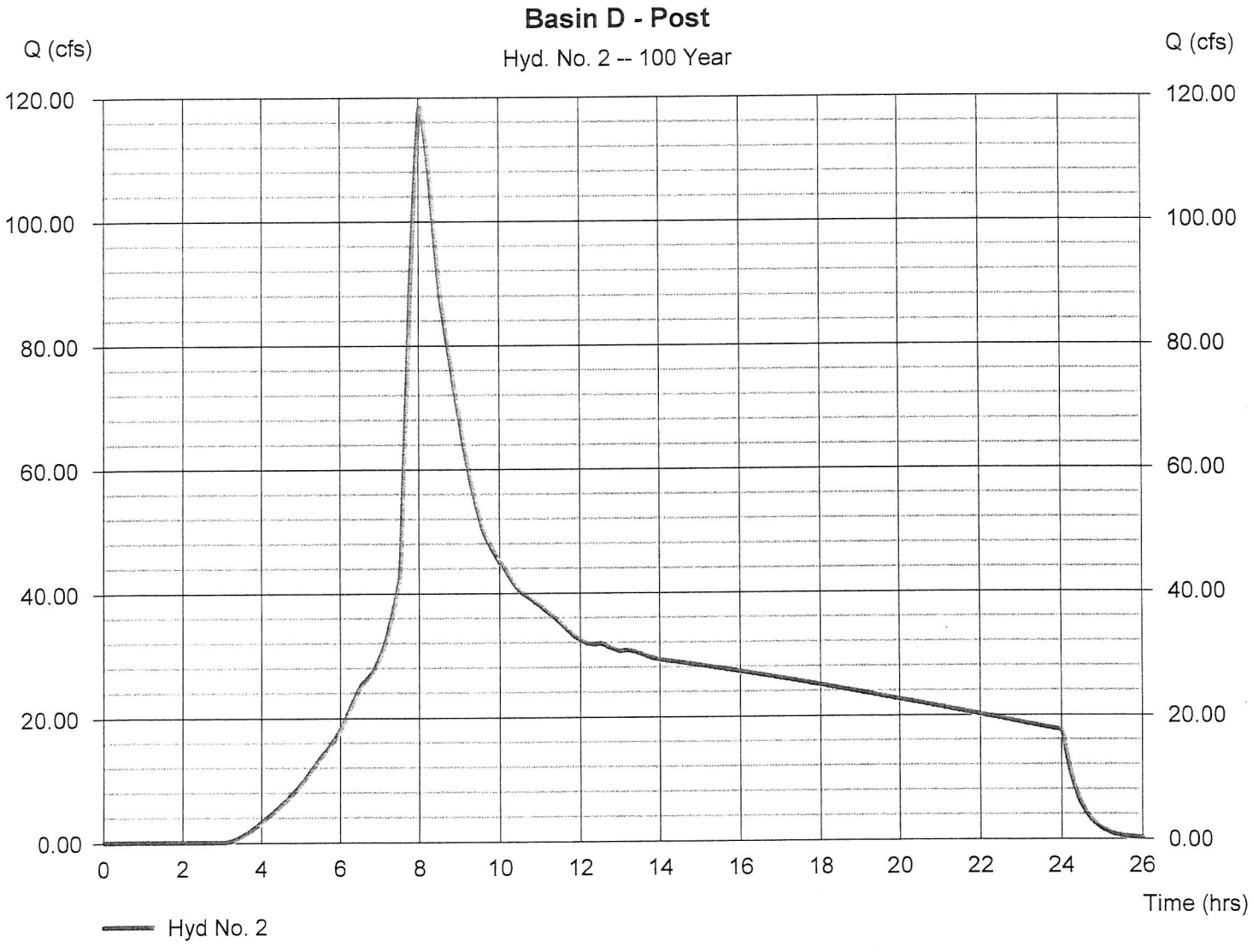
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 — Monday, Dec 7, 2009

Hyd. No. 2

Basin D - Post

Hydrograph type	= SBUH Runoff	Peak discharge	= 118.74 cfs
Storm frequency	= 100 yrs	Time to peak	= 482 min
Time interval	= 2 min	Hyd. volume	= 2,273,238 cuft
Drainage area	= 162.130 ac	Curve number	= 80*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 24.90 min
Total precip.	= 6.09 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= N/A

* Composite (Area/CN) = [(14.040 x 98) + (143.020 x 79) + (5.070 x 74)] / 162.130



BASIN E

PRE-DEVELOPMENT CONDITIONS

The pre-development run-off flow path will begin flowing as Open Channel Flow on the north side of the existing basin. It will flow in the southeastern direction for the total of 4379 feet before reaching the property line.

The Soil Survey of Kittitas County Area, Washington identifies the soil in this area as a Type "C" soil.

CALCULATE TIME OF CONCENTRATION

Total area =	138.66	acres	
Pervious area (w/o upstream open space) =	138.66	acres	80 CN
Impervious area =	0.00	acres	98 CN

Calculate Time of Concentration assuming Shallow Concentrated Flow approach:

$$V = k\sqrt{S_o} \qquad T_t = \frac{L}{60V}$$

L =	4379	ft	L =	0	ft
S_0 =	0.102	ft/ft	S_0 =	0.15	ft/ft
k_s =	10		k_s =	10	
V =	3.19	fps	V =	3.87	fps
T_1 =	22.85	min.	T_2 =	0.00	min.

Tc= 22.85 min.

Hydrograph Report

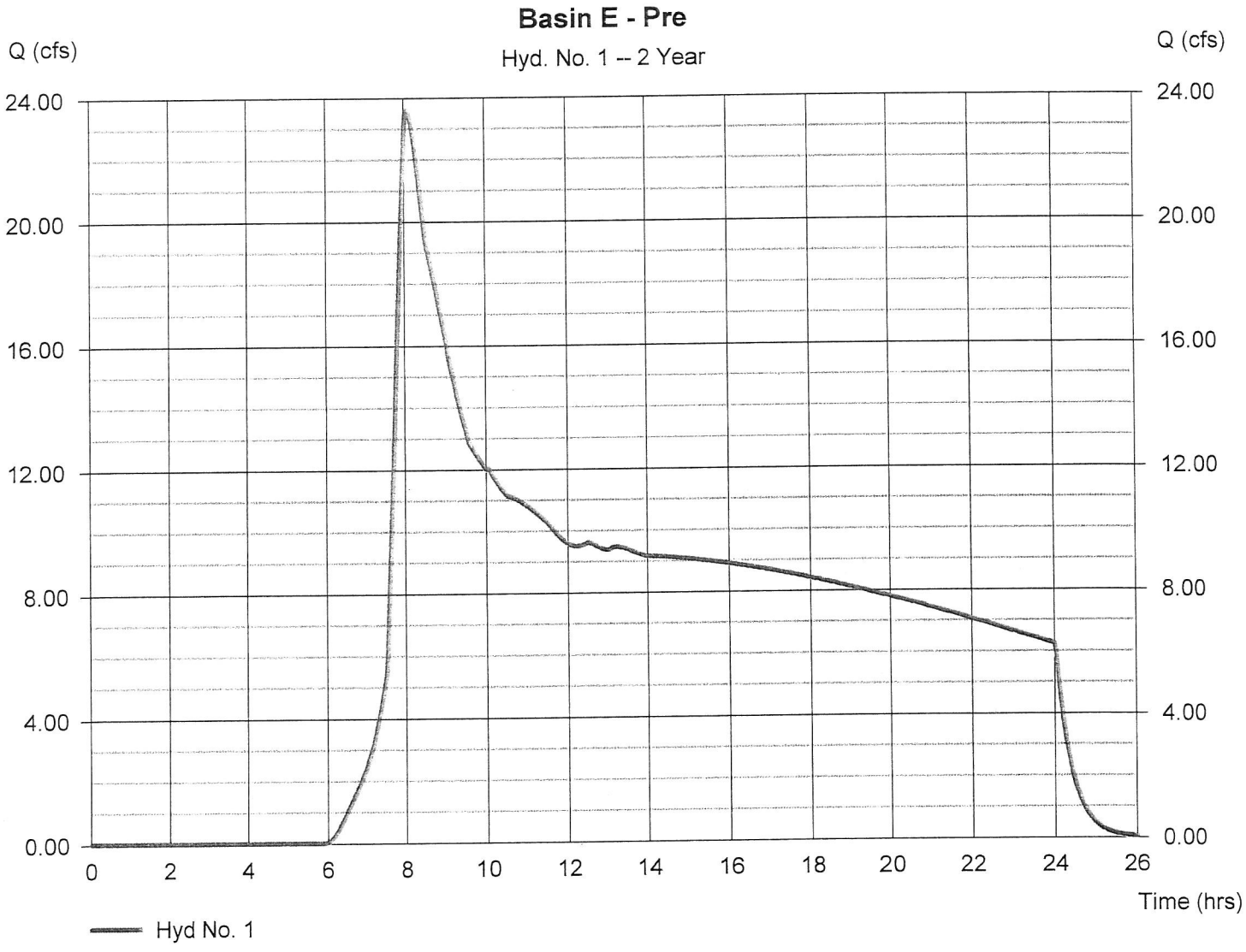
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 — Monday, Dec 7, 2009

Hyd. No. 1

Basin E - Pre

Hydrograph type	= SBUH Runoff	Peak discharge	= 23.61 cfs
Storm frequency	= 2 yrs	Time to peak	= 482 min
Time interval	= 2 min	Hyd. volume	= 598,867 cuft
Drainage area	= 138.660 ac	Curve number	= 75*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 22.85 min
Total precip.	= 3.34 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= N/A

* Composite (Area/CN) = [(46.220 x 81) + (92.440 x 72)] / 138.660



Hydrograph Report

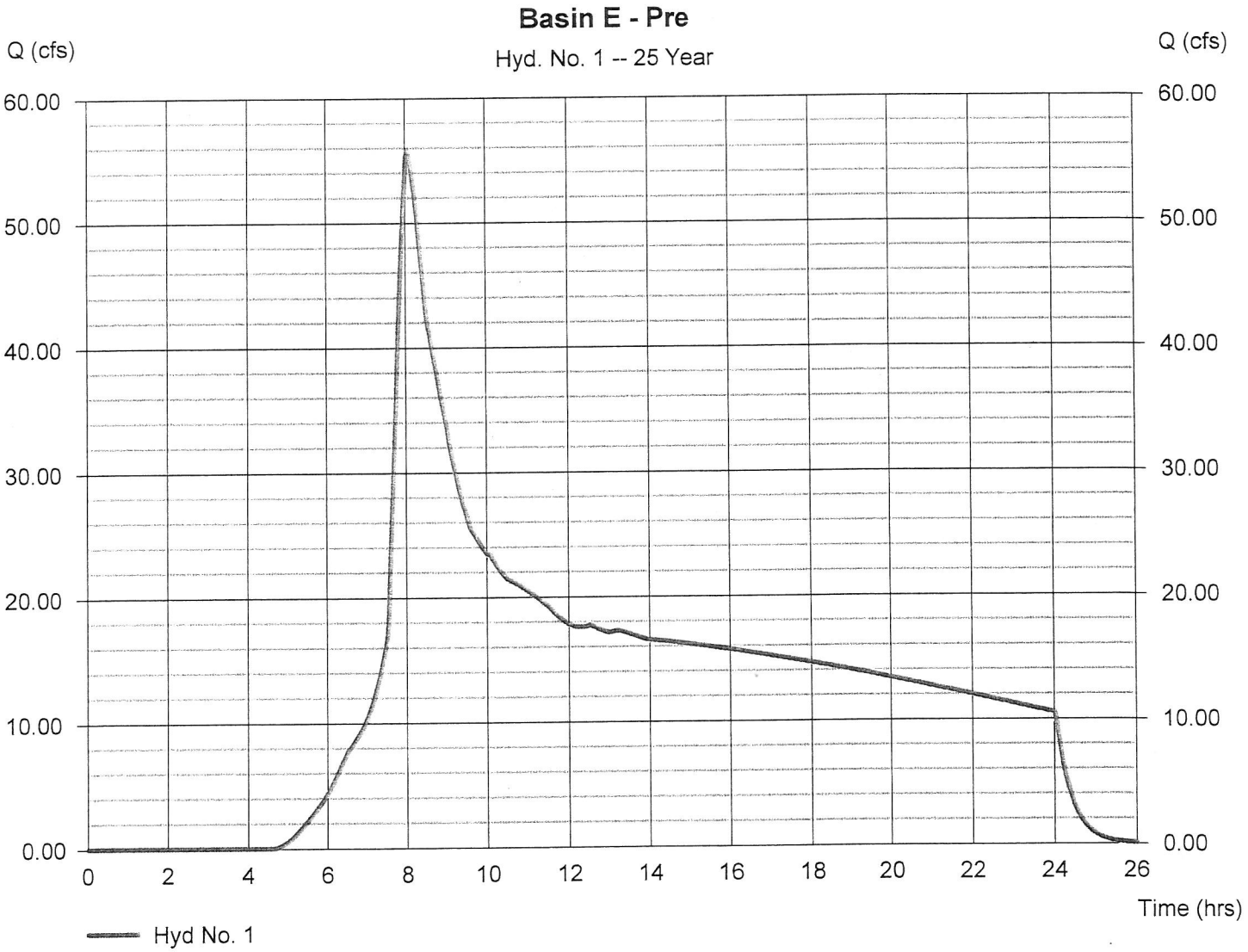
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 — Monday, Dec 7, 2009

Hyd. No. 1

Basin E - Pre

Hydrograph type	= SBUH Runoff	Peak discharge	= 55.87 cfs
Storm frequency	= 25 yrs	Time to peak	= 482 min
Time interval	= 2 min	Hyd. volume	= 1;167,822 cuft
Drainage area	= 138.660 ac	Curve number	= 75*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 22.85 min
Total precip.	= 4.84 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= N/A

* Composite (Area/CN) = [(46.220 x 81) + (92.440 x 72)] / 138.660



Hydrograph Report

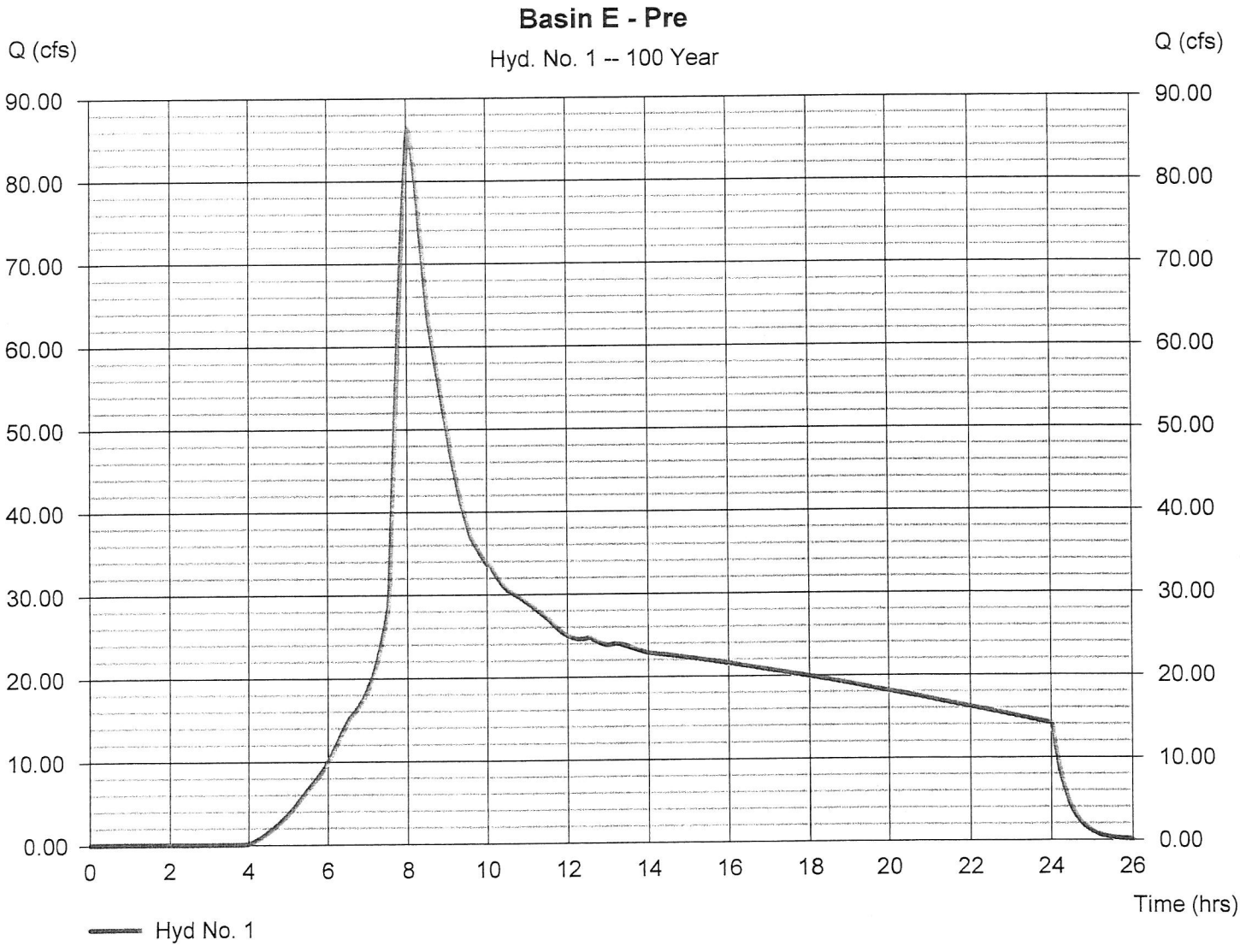
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 — Monday, Dec 7, 2009

Hyd. No. 1

Basin E - Pre

Hydrograph type	= SBUH Runoff	Peak discharge	= 86.34 cfs
Storm frequency	= 100 yrs	Time to peak	= 482 min
Time interval	= 2 min	Hyd. volume	= 1,690,642 cuft
Drainage area	= 138.660 ac	Curve number	= 75*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 22.85 min
Total precip.	= 6.09 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= N/A

* Composite (Area/CN) = [(46.220 x 81) + (92.440 x 72)] / 138.660



BASIN E

POST-DEVELOPMENT CONDITIONS

The post-development run-off flow path will begin flowing as Open Channel Flow in the roadside ditch in the northeasty corner of the proposed basin adjecent to proposed Lot 118 and it will flow in the southwesterly direction for approximately 2517 feet to another roadway ditch adjecent to Lot 132. From here it will flow in the roadside ditch in the northwesterly direction for approximately 162 feet adjecent to Lot 149. The roadside ditch will enter another roadside ditch and will start to flow toward southwest for approximately 592 feet to Lot 152 and then enter a cul-de-sac and start flowing toward south for approximately 333 feet to the end of the cul-de-sac terminating at the proposed detention facility in the vicinity of Lot #154 in the south portion of the proposed basin.

The Soil Survey of Kittitas County Area, Washington identifies the soil in this area as a Type "C" soil.

CALCULATE TIME OF CONCENTRATION

Total area (w/o upstream open space) =	140.60	acres	
Pervious area (w/o upstream open space) =	131.33	acres	80 CN
Impervious area =	9.27	acres	98 CN

Calculate Time of Concentration assuming Open Channel Flow approach:

$$V = k\sqrt{S_o} \qquad T_t = \frac{L}{60V}$$

L =	2517	ft
S_0 =	0.087	ft/ft
k_s =	17	
V =	5.01	fps
T_1 =	8.37	min.

L =	162	ft
S_0 =	0.077	ft/ft
k_s =	17	
V =	4.72	fps
T_2 =	0.57	min.

L =	592	ft
S_0 =	0.055	ft/ft
k_s =	17	
V =	3.99	fps
T_3 =	2.47	min.

L =	333	ft
S_0 =	0.038	ft/ft
k_s =	17	
V =	3.31	fps
T_4 =	1.67	min.

Tc= 13.09 min.

Hydrograph Report

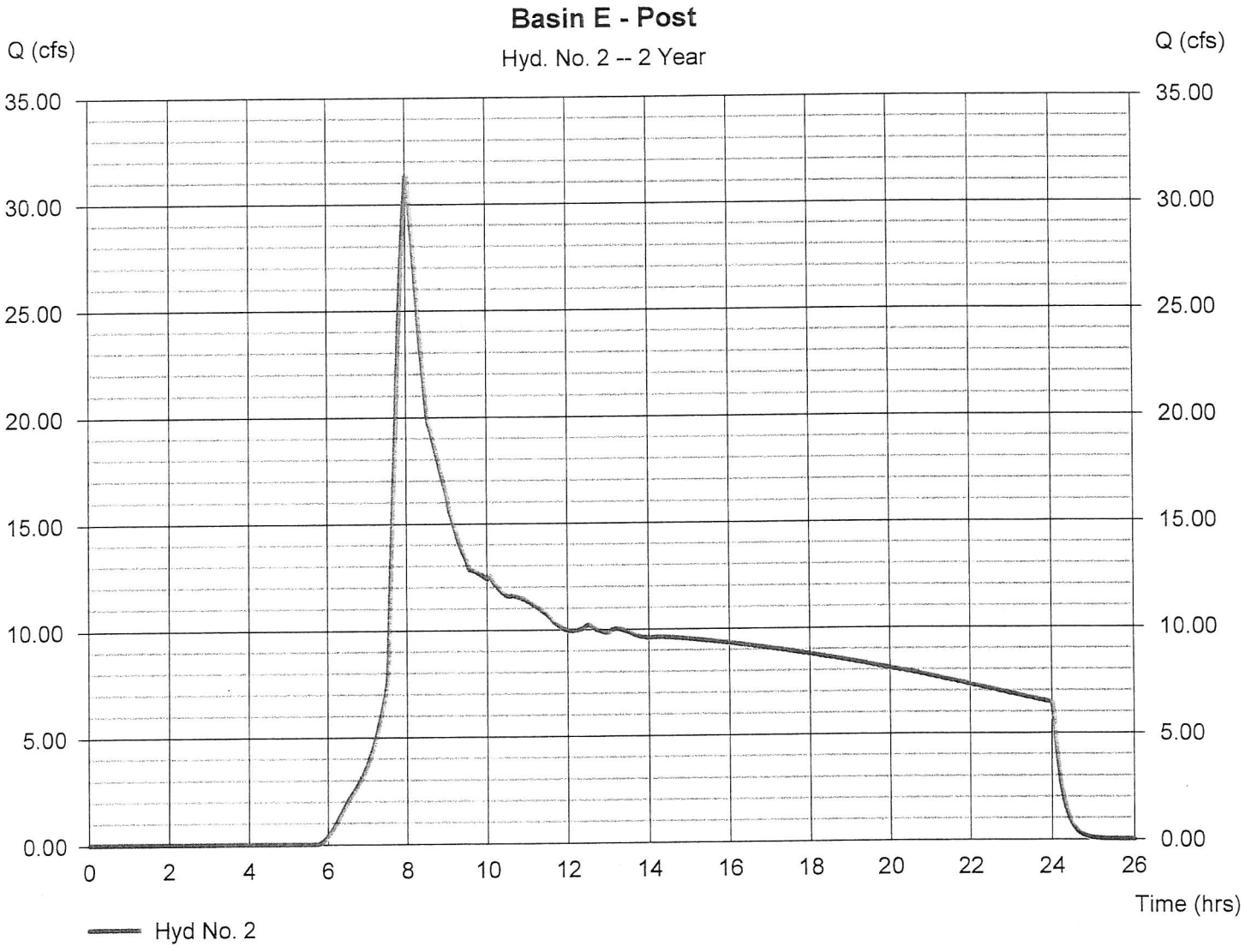
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 — Monday, Dec 7, 2009

Hyd. No. 2

Basin E - Post

Hydrograph type	= SBUH Runoff	Peak discharge	= 31.32 cfs
Storm frequency	= 2 yrs	Time to peak	= 482 min
Time interval	= 2 min	Hyd. volume	= 638,203 cuft
Drainage area	= 140.600 ac	Curve number	= 76*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 13.10 min
Total precip.	= 3.34 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= N/A

* Composite (Area/CN) = [(9.270 x 98) + (127.150 x 75) + (4.180 x 74)] / 140.600



Hydrograph Report

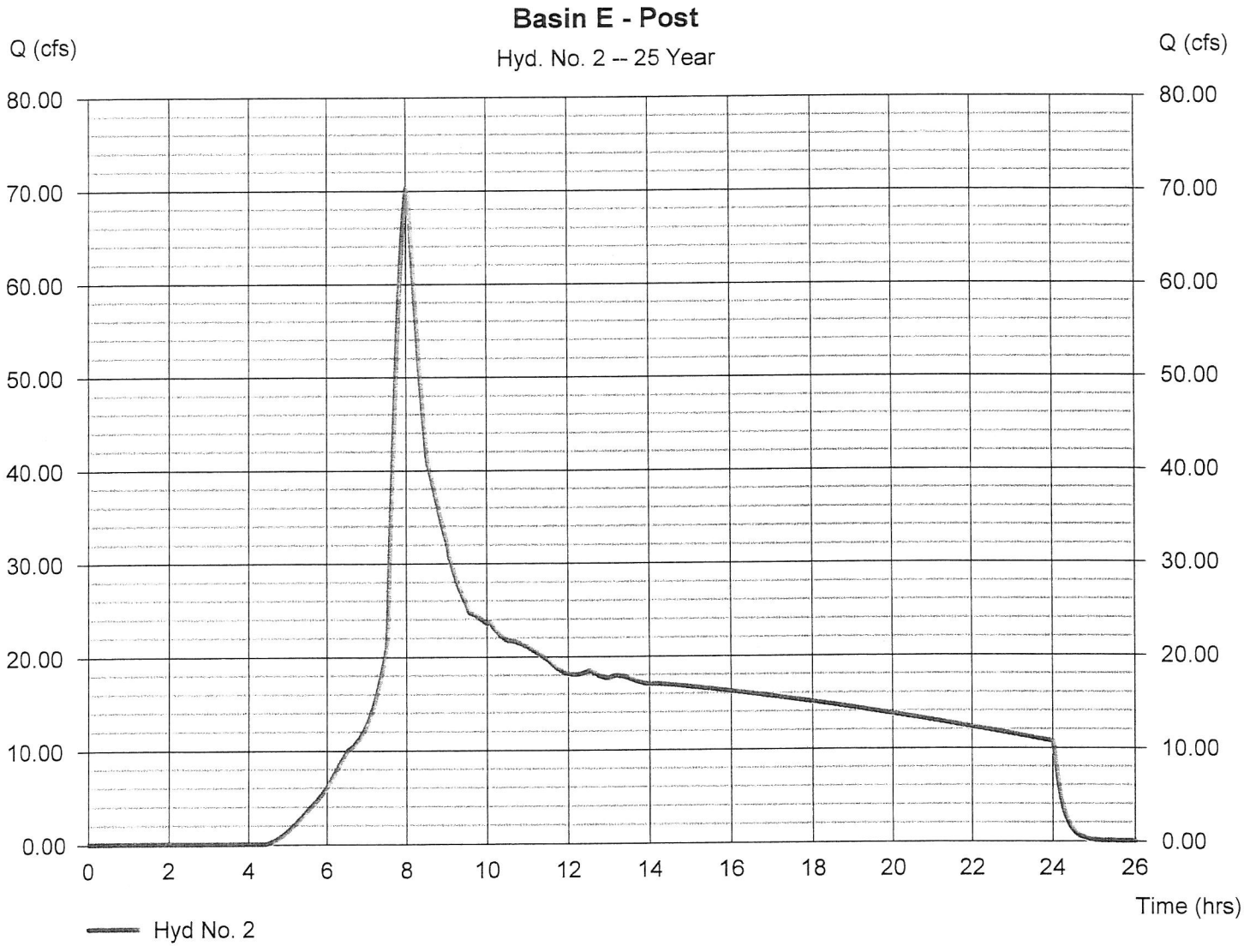
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 — Monday, Dec 7, 2009

Hyd. No. 2

Basin E - Post

Hydrograph type	= SBUH Runoff	Peak discharge	= 70.33 cfs
Storm frequency	= 25 yrs	Time to peak	= 480 min
Time interval	= 2 min	Hyd. volume	= 1,227,100 cuft
Drainage area	= 140.600 ac	Curve number	= 76*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 13.10 min
Total precip.	= 4.84 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= N/A

* Composite (Area/CN) = [(9.270 x 98) + (127.150 x 75) + (4.180 x 74)] / 140.600



Hydrograph Report

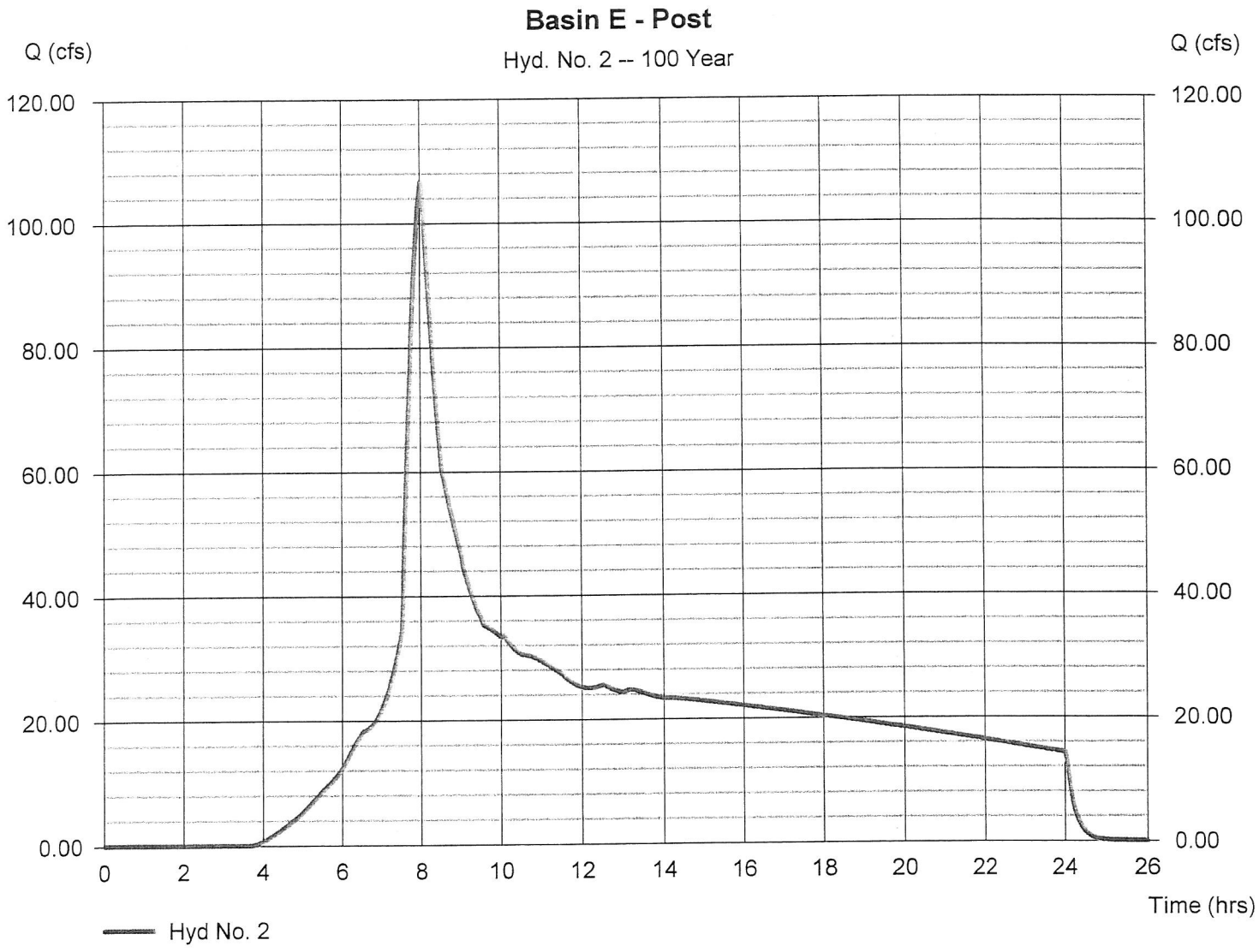
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 — Monday, Dec 7, 2009

Hyd. No. 2

Basin E - Post

Hydrograph type	= SBUH Runoff	Peak discharge	= 106.68 cfs
Storm frequency	= 100 yrs	Time to peak	= 480 min
Time interval	= 2 min	Hyd. volume	= 1,764,836 cuft
Drainage area	= 140.600 ac	Curve number	= 76*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 13.10 min
Total precip.	= 6.09 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= N/A

* Composite (Area/CN) = [(9.270 x 98) + (127.150 x 75) + (4.180 x 74)] / 140.600



FOREST RIDGE
PERFORMANCE BASED CLUSTER PLAT

BASIN F

PRE-DEVELOPMENT CONDITIONS

The pre-development run-off flow path will begin flowing as Shallow Concentrated Flow on the west side of the existing basin. It will flow in the southeastern direction for the total of 518 feet as Shallow Concentrated Flow before reaching the property line.

The Soil Survey of Kittitas County Area, Washington identifies the soil in this area as a Type "C" soil.

CALCULATE TIME OF CONCENTRATION

Total area =	138.66	acres	
Pervious area (w/o upstream open space) =	138.66	acres	80 CN
Impervious area =	0.00	acres	98 CN

Calculate Time of Concentration assuming Shallow Concentrated Flow approach:

$$V = k\sqrt{S_o} \qquad T_t = \frac{L}{60V}$$

L =	518	ft	L =	0	ft
S_0 =	0.135	ft/ft	S_0 =	0.121	ft/ft
k_s =	8		k_s =	7	
V =	2.94	fps	V =	2.43	fps
T_1 =	2.94	min.	T_2 =	0.00	min.

Tc= 2.94 min. → **Assume 5 min.**

Hydrograph Report

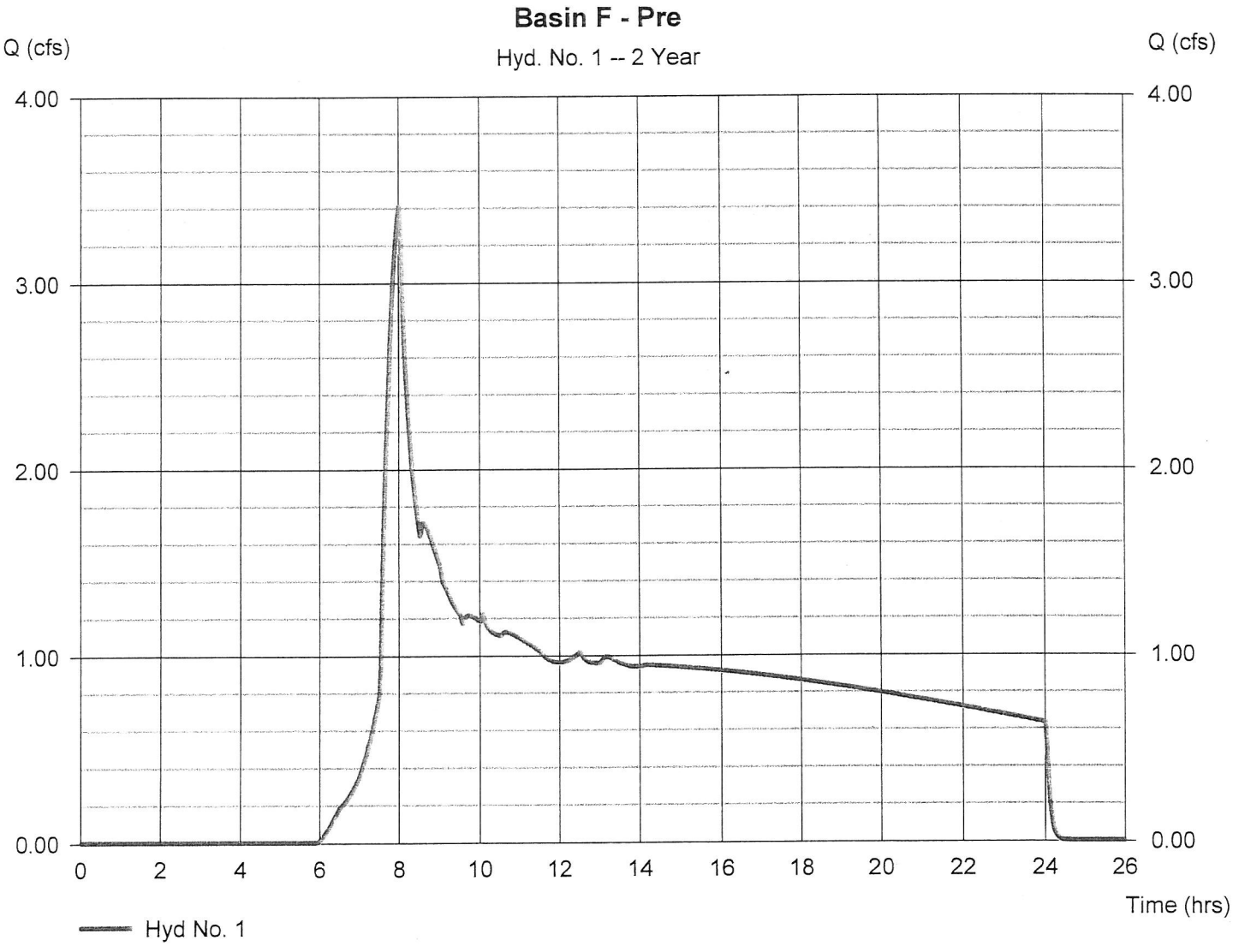
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 — Monday, Dec 7, 2009

Hyd. No. 1

Basin F - Pre

Hydrograph type	= SBUH Runoff	Peak discharge	= 3.414 cfs
Storm frequency	= 2 yrs	Time to peak	= 480 min
Time interval	= 2 min	Hyd. volume	= 62,020 cuft
Drainage area	= 14.360 ac	Curve number	= 75*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.34 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= N/A

* Composite (Area/CN) = [(4.790 x 81) + (9.570 x 72)] / 14.360



Hydrograph Report

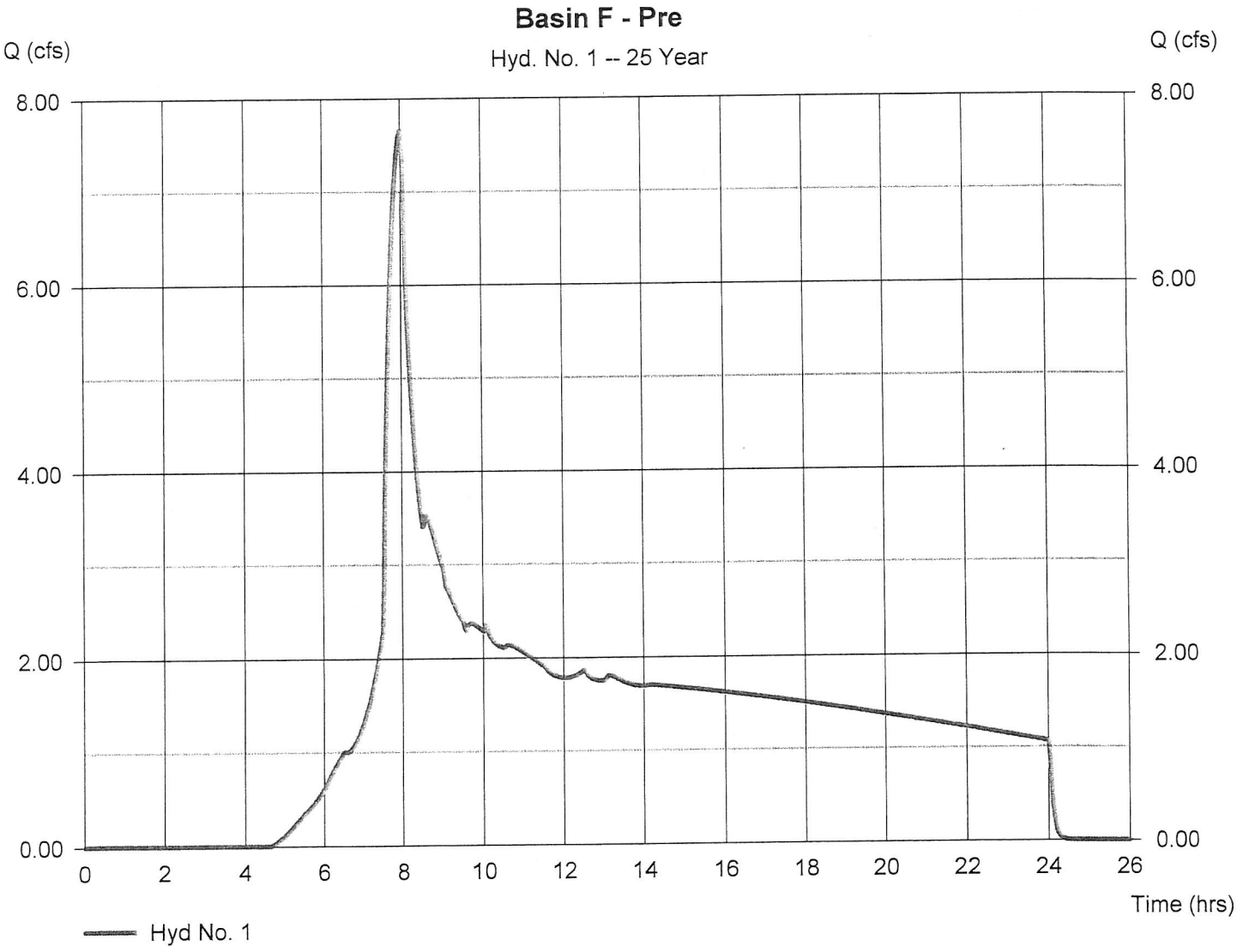
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 — Monday, Dec 7, 2009

Hyd. No. 1

Basin F - Pre

Hydrograph type	= SBUH Runoff	Peak discharge	= 7.657 cfs
Storm frequency	= 25 yrs	Time to peak	= 480 min
Time interval	= 2 min	Hyd. volume	= 120,943 cuft
Drainage area	= 14.360 ac	Curve number	= 75*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 4.84 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= N/A

* Composite (Area/CN) = [(4.790 x 81) + (9.570 x 72)] / 14.360



Hydrograph Report

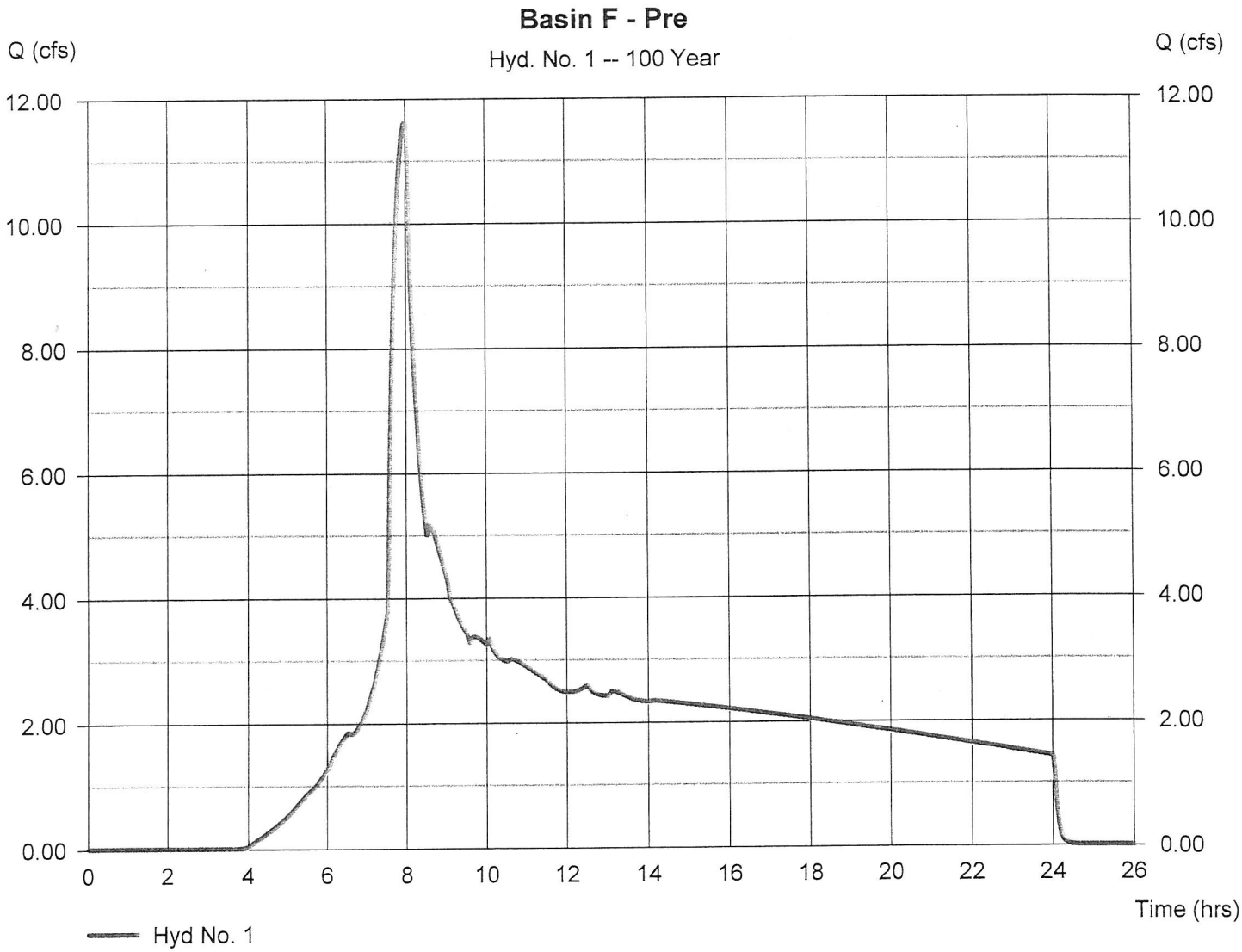
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 — Monday, Dec 7, 2009

Hyd. No. 1

Basin F - Pre

Hydrograph type	= SBUH Runoff	Peak discharge	= 11.64 cfs
Storm frequency	= 100 yrs	Time to peak	= 478 min
Time interval	= 2 min	Hyd. volume	= 175,087 cuft
Drainage area	= 14.360 ac	Curve number	= 75*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 6.09 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= N/A

* Composite (Area/CN) = [(4.790 x 81) + (9.570 x 72)] / 14.360



BASIN F

POST-DEVELOPMENT CONDITIONS

The post-development run-off flow path will begin flowing as Open Channel Flow in the roadside ditch in the northeasterly corner of the proposed basin adjecent to proposed Lot 136 and it will flow in the southwesterly direction for approximately 888 feet to another roadway ditch adjecent to Lot 148. From here it will flow in the roadside ditch in the south and southwesterly direction for approximately 870 feet terminating at the proposed detention facility in the vicinity of Lot #143 in the southeast portion of the proposed basin.

The Soil Survey of Kittitas County Area, Washington identifies the soil in this area as a Type "C" soil.

CALCULATE TIME OF CONCENTRATION

Total area (w/o upstream open space) =	12.71	acres	
Pervious area (w/o upstream open space) =	9.97	acres	80 CN
Impervious area =	2.74	acres	98 CN

Calculate Time of Concentration assuming Open Channel Flow approach:

$$V = k\sqrt{S_o} \qquad T_t = \frac{L}{60V}$$

L =	888	ft	L =	618	ft	L =	0	ft
S_0 =	0.073	ft/ft	S_0 =	0.086	ft/ft	S_0 =	0.055	ft/ft
k_s =	17		k_s =	17		k_s =	17	
V =	4.59	fps	V =	4.99	fps	V =	3.99	fps
T_1 =	3.22	min.	T_2 =	2.07	min.	T_3 =	0.00	min.

L =	0	ft
S_0 =	0.038	ft/ft
k_s =	17	
V =	3.31	fps
T_4 =	0.00	min.

Tc= 5.29 min.

Hydrograph Report

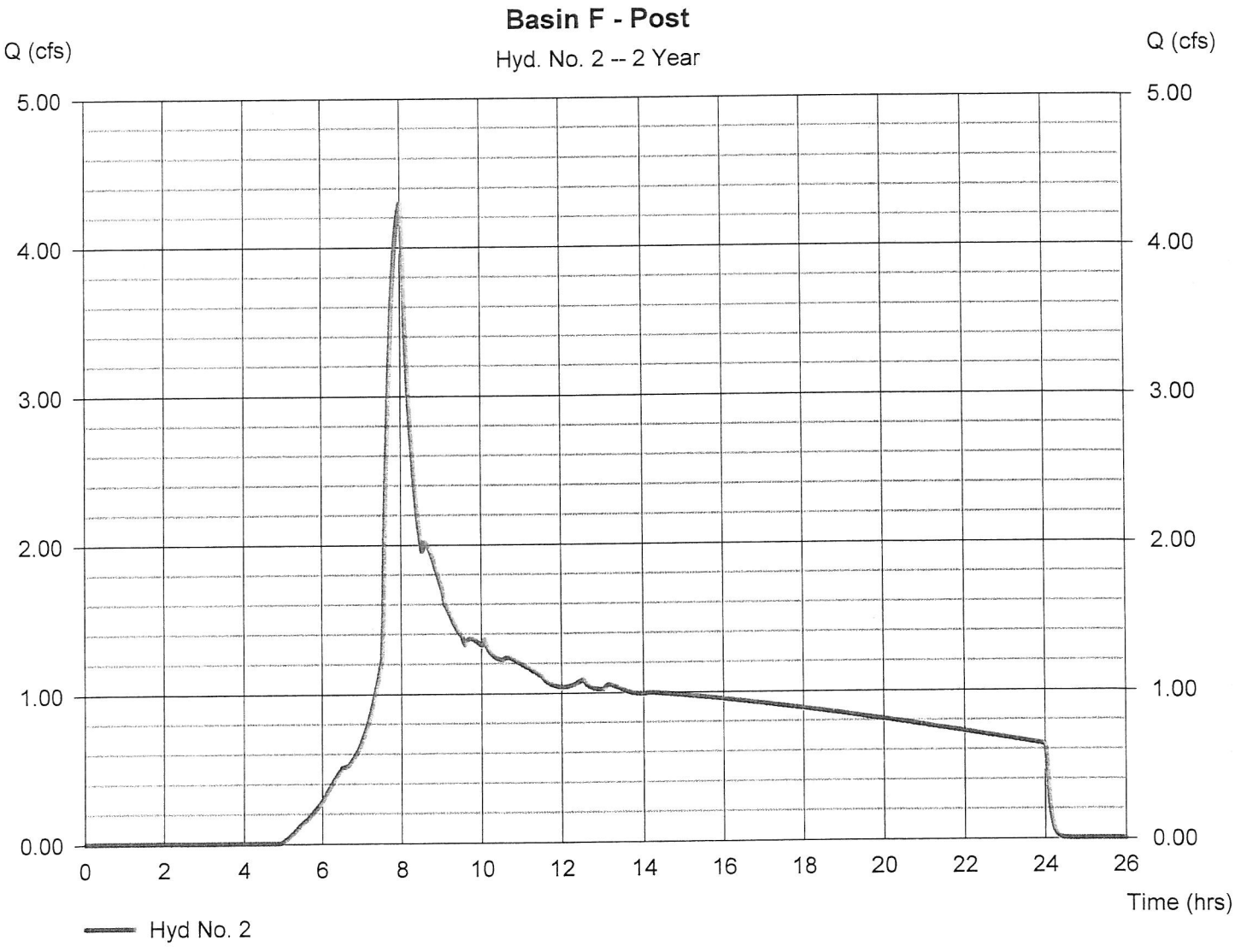
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 — Tuesday, Dec 8, 2009

Hyd. No. 2

Basin F - Post

Hydrograph type	= SBUH Runoff	Peak discharge	= 4.303 cfs
Storm frequency	= 2 yrs	Time to peak	= 480 min
Time interval	= 2 min	Hyd. volume	= 69,686 cuft
Drainage area	= 12.710 ac	Curve number	= 80*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.30 min
Total precip.	= 3.34 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= N/A

* Composite (Area/CN) = [(9.450 x 75) + (2.740 x 99) + (0.520 x 74)] / 12.710



Hydrograph Report

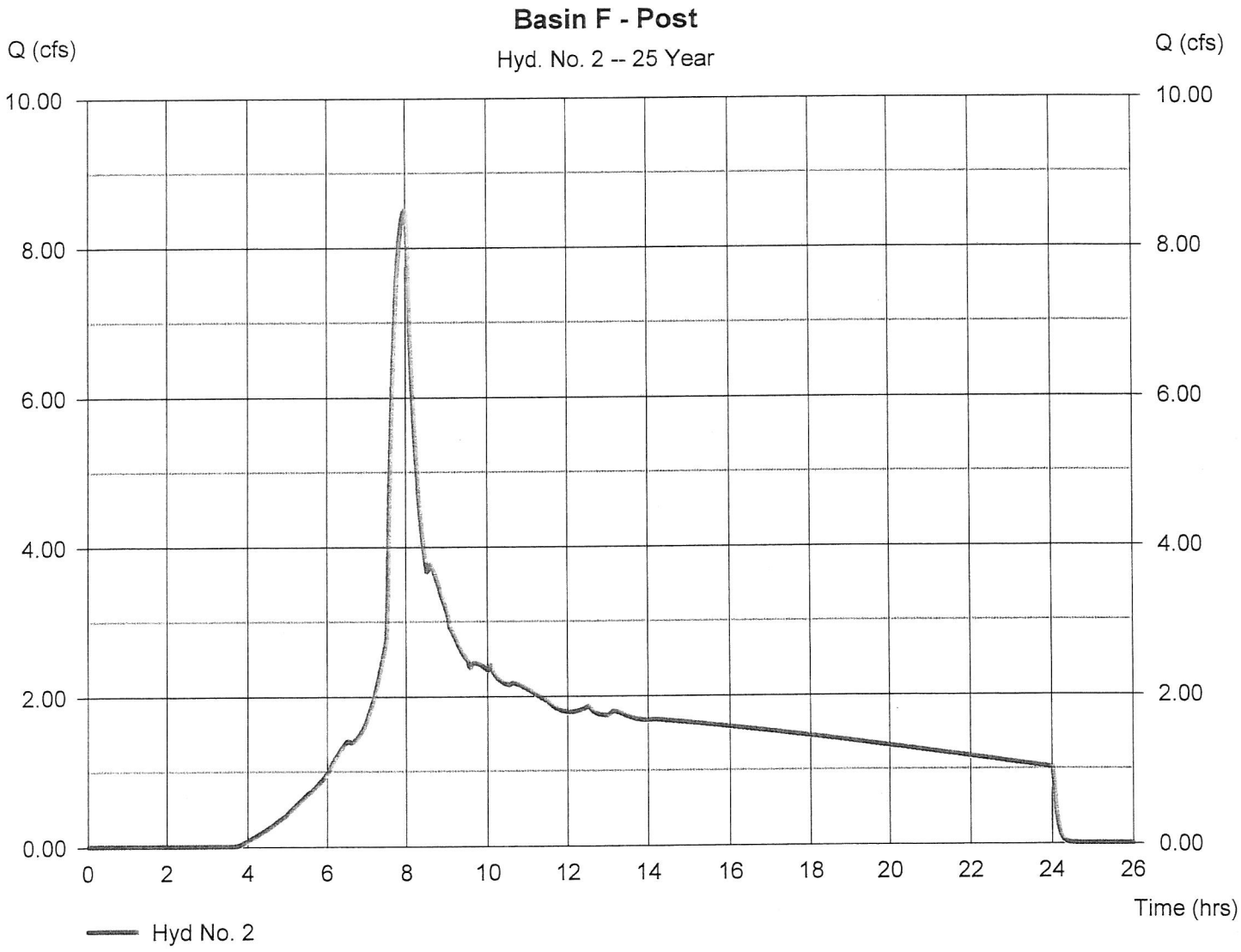
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 — Tuesday, Dec 8, 2009

Hyd. No. 2

Basin F - Post

Hydrograph type	= SBUH Runoff	Peak discharge	= 8.506 cfs
Storm frequency	= 25 yrs	Time to peak	= 478 min
Time interval	= 2 min	Hyd. volume	= 127,050 cuft
Drainage area	= 12.710 ac	Curve number	= 80*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.30 min
Total precip.	= 4.84 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= N/A

* Composite (Area/CN) = [(9.450 x 75) + (2.740 x 99) + (0.520 x 74)] / 12.710



APPENDIX 'F'

Pond Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 — Thursday, Dec 10, 2009

Pond No. 1 - Pond A

Pond Data

Trapezoid - Bottom L x W = 125.0 x 125.0 ft, Side slope = 2.00:1, Bottom elev. = 1000.00 ft, Depth = 5.50 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	1000.00	15,625	0	0
0.55	1000.55	16,180	8,746	8,746
1.10	1001.10	16,744	9,054	17,800
1.65	1001.65	17,319	9,367	27,166
2.20	1002.20	17,902	9,685	36,852
2.75	1002.75	18,496	10,009	46,861
3.30	1003.30	19,099	10,338	57,199
3.85	1003.85	19,712	10,673	67,872
4.40	1004.40	20,335	11,012	78,884
4.95	1004.95	20,967	11,358	90,242
5.50	1005.50	21,609	11,708	101,950

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 36.00	10.80	17.60	0.00
Span (in)	= 36.00	10.80	17.60	0.00
No. Barrels	= 1	1	1	0
Invert El. (ft)	= 1000.00	1000.01	1002.20	0.00
Length (ft)	= 100.00	0.00	0.00	0.00
Slope (%)	= 3.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 18.85	6.00	0.00	0.00
Crest El. (ft)	= 1004.50	1003.30	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Riser	Rect	---	---
Multi-Stage	= Yes	Yes	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	1000.00	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
0.06	875	1000.06	0.01 ic	0.01 ic	0.00	---	0.00	0.00	---	---	---	---	0.009
0.11	1,749	1000.11	0.04 ic	0.04 ic	0.00	---	0.00	0.00	---	---	---	---	0.040
0.17	2,624	1000.17	0.10 ic	0.09 ic	0.00	---	0.00	0.00	---	---	---	---	0.088
0.22	3,498	1000.22	0.16 ic	0.16 ic	0.00	---	0.00	0.00	---	---	---	---	0.157
0.28	4,373	1000.28	0.26 ic	0.25 ic	0.00	---	0.00	0.00	---	---	---	---	0.247
0.33	5,248	1000.33	0.37 ic	0.35 ic	0.00	---	0.00	0.00	---	---	---	---	0.346
0.39	6,122	1000.39	0.46 ic	0.46 ic	0.00	---	0.00	0.00	---	---	---	---	0.462
0.44	6,997	1000.44	0.61 ic	0.60 ic	0.00	---	0.00	0.00	---	---	---	---	0.601
0.50	7,871	1000.50	0.74 ic	0.74 ic	0.00	---	0.00	0.00	---	---	---	---	0.739
0.55	8,746	1000.55	0.89 ic	0.89 ic	0.00	---	0.00	0.00	---	---	---	---	0.889
0.61	9,651	1000.61	1.05 ic	1.05 ic	0.00	---	0.00	0.00	---	---	---	---	1.051
0.66	10,557	1000.66	1.23 ic	1.23 ic	0.00	---	0.00	0.00	---	---	---	---	1.227
0.72	11,462	1000.72	1.42 ic	1.40 ic	0.00	---	0.00	0.00	---	---	---	---	1.398
0.77	12,367	1000.77	1.56 ic	1.56 ic	0.00	---	0.00	0.00	---	---	---	---	1.556
0.83	13,273	1000.83	1.76 ic	1.73 ic	0.00	---	0.00	0.00	---	---	---	---	1.735
0.88	14,178	1000.88	1.89 ic	1.89 ic	0.00	---	0.00	0.00	---	---	---	---	1.891
0.94	15,083	1000.94	2.02 ic	2.00 ic	0.00	---	0.00	0.00	---	---	---	---	2.001
0.99	15,989	1000.99	2.16 ic	2.09 ic	0.00	---	0.00	0.00	---	---	---	---	2.087
1.05	16,894	1001.05	2.18 ic	2.18 ic	0.00	---	0.00	0.00	---	---	---	---	2.182
1.10	17,800	1001.10	2.30 ic	2.28 ic	0.00	---	0.00	0.00	---	---	---	---	2.284
1.16	18,736	1001.16	2.45 ic	2.36 ic	0.00	---	0.00	0.00	---	---	---	---	2.358
1.21	19,673	1001.21	2.46 ic	2.46 ic	0.00	---	0.00	0.00	---	---	---	---	2.459
1.27	20,610	1001.27	2.61 ic	2.53 ic	0.00	---	0.00	0.00	---	---	---	---	2.534
1.32	21,546	1001.32	2.62 ic	2.62 ic	0.00	---	0.00	0.00	---	---	---	---	2.622
1.38	22,483	1001.38	2.77 ic	2.70 ic	0.00	---	0.00	0.00	---	---	---	---	2.697
1.43	23,420	1001.43	2.78 ic	2.78 ic	0.00	---	0.00	0.00	---	---	---	---	2.782
1.49	24,356	1001.49	2.94 ic	2.85 ic	0.00	---	0.00	0.00	---	---	---	---	2.851
1.54	25,293	1001.54	2.94 ic	2.94 ic	0.00	---	0.00	0.00	---	---	---	---	2.939
1.60	26,230	1001.60	3.11 ic	3.00 ic	0.00	---	0.00	0.00	---	---	---	---	2.997
1.65	27,166	1001.65	3.11 ic	3.08 ic	0.00	---	0.00	0.00	---	---	---	---	3.082

Continues on next page...

Pond A

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
1.71	28,135	1001.71	3.15 ic	3.14 ic	0.00	---	0.00	0.00	---	---	---	---	3.145
1.76	29,104	1001.76	3.30 ic	3.22 ic	0.00	---	0.00	0.00	---	---	---	---	3.217
1.82	30,072	1001.82	3.30 ic	3.30 ic	0.00	---	0.00	0.00	---	---	---	---	3.296
1.87	31,041	1001.87	3.48 ic	3.35 ic	0.00	---	0.00	0.00	---	---	---	---	3.346
1.93	32,009	1001.93	3.48 ic	3.42 ic	0.00	---	0.00	0.00	---	---	---	---	3.422
1.98	32,978	1001.98	3.49 ic	3.49 ic	0.00	---	0.00	0.00	---	---	---	---	3.492
2.04	33,946	1002.04	3.68 ic	3.54 ic	0.00	---	0.00	0.00	---	---	---	---	3.544
2.09	34,915	1002.09	3.68 ic	3.62 ic	0.00	---	0.00	0.00	---	---	---	---	3.616
2.15	35,883	1002.15	3.68 ic	3.68 ic	0.00	---	0.00	0.00	---	---	---	---	3.684
2.20	36,852	1002.20	3.73 ic	3.73 ic	0.00	---	0.00	0.00	---	---	---	---	3.731
2.26	37,853	1002.26	3.88 ic	3.80 ic	0.02 ic	---	0.00	0.00	---	---	---	---	3.816
2.31	38,854	1002.31	3.92 ic	3.85 ic	0.07 ic	---	0.00	0.00	---	---	---	---	3.918
2.37	39,855	1002.37	4.09 ic	3.91 ic	0.15 ic	---	0.00	0.00	---	---	---	---	4.057
2.42	40,855	1002.42	4.31 ic	3.95 ic	0.26 ic	---	0.00	0.00	---	---	---	---	4.209
2.48	41,856	1002.48	4.53 ic	3.99 ic	0.41 ic	---	0.00	0.00	---	---	---	---	4.400
2.53	42,857	1002.53	4.76 ic	4.03 ic	0.56 ic	---	0.00	0.00	---	---	---	---	4.589
2.59	43,858	1002.59	4.99 ic	4.07 ic	0.76 ic	---	0.00	0.00	---	---	---	---	4.832
2.64	44,859	1002.64	5.24 ic	4.11 ic	0.97 ic	---	0.00	0.00	---	---	---	---	5.078
2.70	45,860	1002.70	5.49 ic	4.15 ic	1.20 ic	---	0.00	0.00	---	---	---	---	5.351
2.75	46,861	1002.75	5.74 ic	4.19 ic	1.46 ic	---	0.00	0.00	---	---	---	---	5.650
2.81	47,895	1002.81	6.01 ic	4.22 ic	1.75 ic	---	0.00	0.00	---	---	---	---	5.972
2.86	48,929	1002.86	6.31 ic	4.25 ic	2.06 ic	---	0.00	0.00	---	---	---	---	6.307
2.92	49,962	1002.92	6.84 ic	4.27 ic	2.38 ic	---	0.00	0.00	---	---	---	---	6.655
2.97	50,996	1002.97	7.13 ic	4.31 ic	2.73 ic	---	0.00	0.00	---	---	---	---	7.033
3.03	52,030	1003.03	7.43 ic	4.34 ic	3.03 ic	---	0.00	0.00	---	---	---	---	7.371
3.08	53,064	1003.08	7.76 ic	4.37 ic	3.39 ic	---	0.00	0.00	---	---	---	---	7.760
3.14	54,098	1003.14	8.36 ic	4.39 ic	3.76 ic	---	0.00	0.00	---	---	---	---	8.145
3.19	55,132	1003.19	8.68 ic	4.42 ic	4.12 ic	---	0.00	0.00	---	---	---	---	8.545
3.25	56,165	1003.25	9.01 ic	4.46 ic	4.48 ic	---	0.00	0.00	---	---	---	---	8.941
3.30	57,199	1003.30	9.37 ic	4.49 ic	4.88 ic	---	0.00	0.00	---	---	---	---	9.369
3.36	58,266	1003.36	10.04 ic	4.50 ic	5.22 ic	---	0.00	0.26	---	---	---	---	9.980
3.41	59,334	1003.41	10.84 ic	4.49 ic	5.62 ic	---	0.00	0.73	---	---	---	---	10.84
3.47	60,401	1003.47	11.86 ic	4.49 ic	5.94 ic	---	0.00	1.34	---	---	---	---	11.78
3.52	61,468	1003.52	13.02 ic	4.48 ic	6.29 ic	---	0.00	2.06	---	---	---	---	12.83
3.58	62,536	1003.58	13.92 ic	4.46 ic	6.57 ic	---	0.00	2.88	---	---	---	---	13.92
3.63	63,603	1003.63	15.08 ic	4.46 ic	6.83 ic	---	0.00	3.79	---	---	---	---	15.08
3.69	64,670	1003.69	16.29 ic	4.45 ic	7.05 ic	---	0.00	4.77	---	---	---	---	16.28
3.74	65,737	1003.74	17.57 ic	4.44 ic	7.30 ic	---	0.00	5.83	---	---	---	---	17.57
3.80	66,805	1003.80	18.92 ic	4.41 ic	7.55 ic	---	0.00	6.96	---	---	---	---	18.92
3.85	67,872	1003.85	20.62 ic	4.38 ic	7.79 ic	---	0.00	8.15	---	---	---	---	20.32
3.91	68,973	1003.91	21.94 ic	4.37 ic	8.02 ic	---	0.00	9.40	---	---	---	---	21.79
3.96	70,074	1003.96	23.30 ic	4.34 ic	8.24 ic	---	0.00	10.71	---	---	---	---	23.30
4.02	71,176	1004.02	25.00 ic	4.31 ic	8.46 ic	---	0.00	12.08	---	---	---	---	24.85
4.07	72,277	1004.07	26.71 ic	4.28 ic	8.67 ic	---	0.00	13.50	---	---	---	---	26.45
4.13	73,378	1004.13	28.37 ic	4.25 ic	8.88 ic	---	0.00	14.97	---	---	---	---	28.10
4.18	74,479	1004.18	29.97 ic	4.22 ic	9.08 ic	---	0.00	16.49	---	---	---	---	29.79
4.23	75,581	1004.24	31.53 ic	4.19 ic	9.28 ic	---	0.00	18.06	---	---	---	---	31.53
4.29	76,682	1004.29	33.30 ic	4.14 ic	9.47 ic	---	0.00	19.68	---	---	---	---	33.30
4.34	77,783	1004.35	35.20 ic	4.09 ic	9.66 ic	---	0.00	21.34	---	---	---	---	35.10
4.40	78,884	1004.40	36.94 ic	4.04 ic	9.85 ic	---	0.00	23.05	---	---	---	---	36.94
4.46	80,020	1004.46	38.89 ic	3.97 ic	10.03 ic	---	0.00	24.80	---	---	---	---	38.80
4.51	81,156	1004.51	40.76 ic	3.87 ic	10.21 ic	---	0.06	26.59	---	---	---	---	40.74
4.57	82,292	1004.57	43.03 ic	3.71 ic	9.85 ic	---	1.04	28.43	---	---	---	---	43.03
4.62	83,427	1004.62	45.74 ic	3.51 ic	9.32 ic	---	2.61	30.30 s	---	---	---	---	45.74
4.67	84,563	1004.68	48.19 ic	3.31 ic	8.80 ic	---	4.59	31.49 s	---	---	---	---	48.19
4.73	85,699	1004.73	50.45 ic	3.11 ic	8.27 ic	---	6.92	32.14 s	---	---	---	---	50.45
4.78	86,835	1004.79	52.57 ic	2.90 ic	7.71 ic	---	9.55	32.40 s	---	---	---	---	52.57
4.84	87,970	1004.84	54.55 ic	2.69 ic	7.14 ic	---	12.44	32.28 s	---	---	---	---	54.55
4.89	89,106	1004.90	56.40 ic	2.47 ic	6.55 ic	---	15.58	31.80 s	---	---	---	---	56.40
4.95	90,242	1004.95	58.11 ic	2.24 ic	5.94 ic	---	18.95	30.98 s	---	---	---	---	58.11
5.01	91,413	1005.01	59.58 ic	2.03 ic	5.39 ic	---	22.12 s	30.04 s	---	---	---	---	59.58
5.06	92,583	1005.06	60.70 ic	1.88 ic	5.00 ic	---	24.31 s	29.51 s	---	---	---	---	60.70
5.12	93,754	1005.12	61.68 ic	1.76 ic	4.67 ic	---	26.16 s	29.08 s	---	---	---	---	61.68
5.17	94,925	1005.17	62.56 ic	1.65 ic	4.39 ic	---	27.80 s	28.72 s	---	---	---	---	62.56
5.22	96,096	1005.23	63.36 ic	1.56 ic	4.13 ic	---	29.28 s	28.39 s	---	---	---	---	63.36
5.28	97,267	1005.28	64.12 ic	1.47 ic	3.90 ic	---	30.63 s	28.10 s	---	---	---	---	64.11
5.33	98,437	1005.34	64.82 ic	1.39 ic	3.70 ic	---	31.88 s	27.84 s	---	---	---	---	64.81
5.39	99,608	1005.39	65.49 ic	1.32 ic	3.51 ic	---	33.05 s	27.60 s	---	---	---	---	65.48
5.44	100,779	1005.45	66.13 ic	1.26 ic	3.35 ic	---	34.13 s	27.38 s	---	---	---	---	66.12
5.50	101,950	1005.50	66.74 ic	1.20 ic	3.19 ic	---	35.15 s	27.18 s	---	---	---	---	66.73

...End

Hydrograph Report

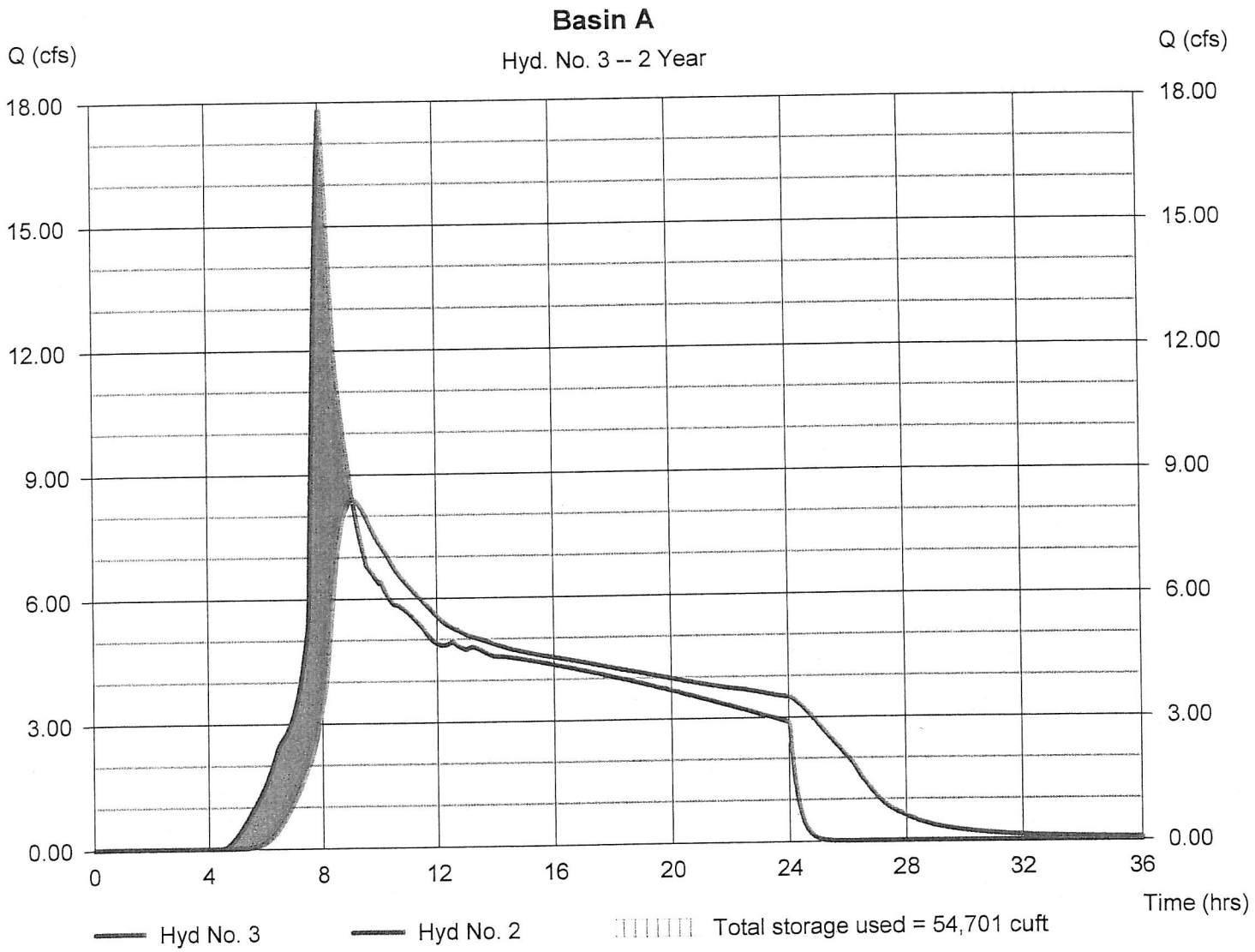
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 — Thursday, Dec 10, 2009

Hyd. No. 3

Basin A

Hydrograph type	= Reservoir	Peak discharge	= 8.378 cfs
Storm frequency	= 2 yrs	Time to peak	= 9.10 hrs
Time interval	= 2 min	Hyd. volume	= 328,404 cuft
Inflow hyd. No.	= 2 - Basin A - Post	Max. Elevation	= 1003.17 ft
Reservoir name	= Pond A	Max. Storage	= 54,701 cuft

Storage Indication method used.



Hydrograph Report

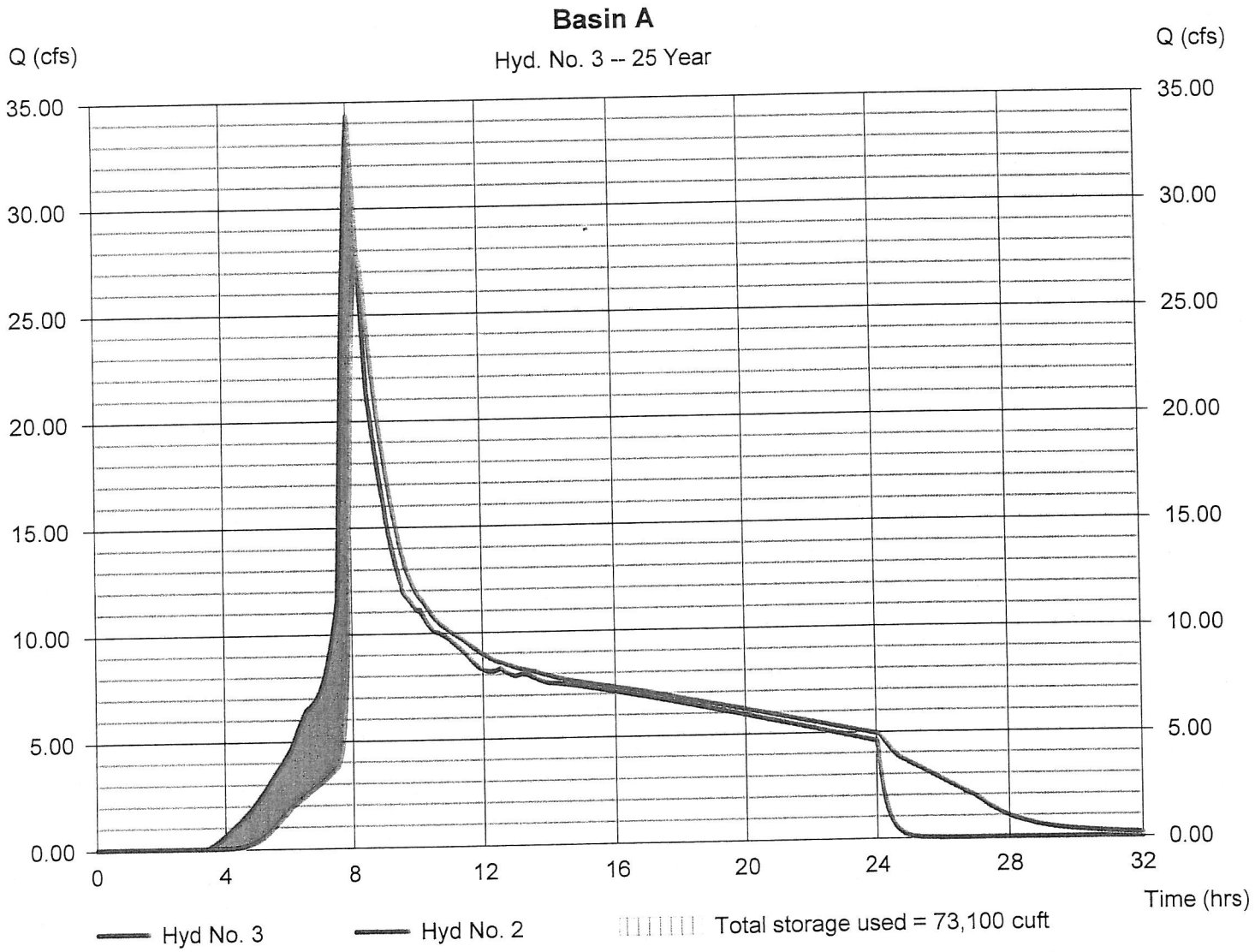
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 — Thursday, Dec 10, 2009

Hyd. No. 3

Basin A

Hydrograph type	= Reservoir	Peak discharge	= 27.68 cfs
Storm frequency	= 25 yrs	Time to peak	= 8.27 hrs
Time interval	= 2 min	Hyd. volume	= 584,060 cuft
Inflow hyd. No.	= 2 - Basin A - Post	Max. Elevation	= 1004.11 ft
Reservoir name	= Pond A	Max. Storage	= 73,100 cuft

Storage Indication method used.



Hydrograph Report

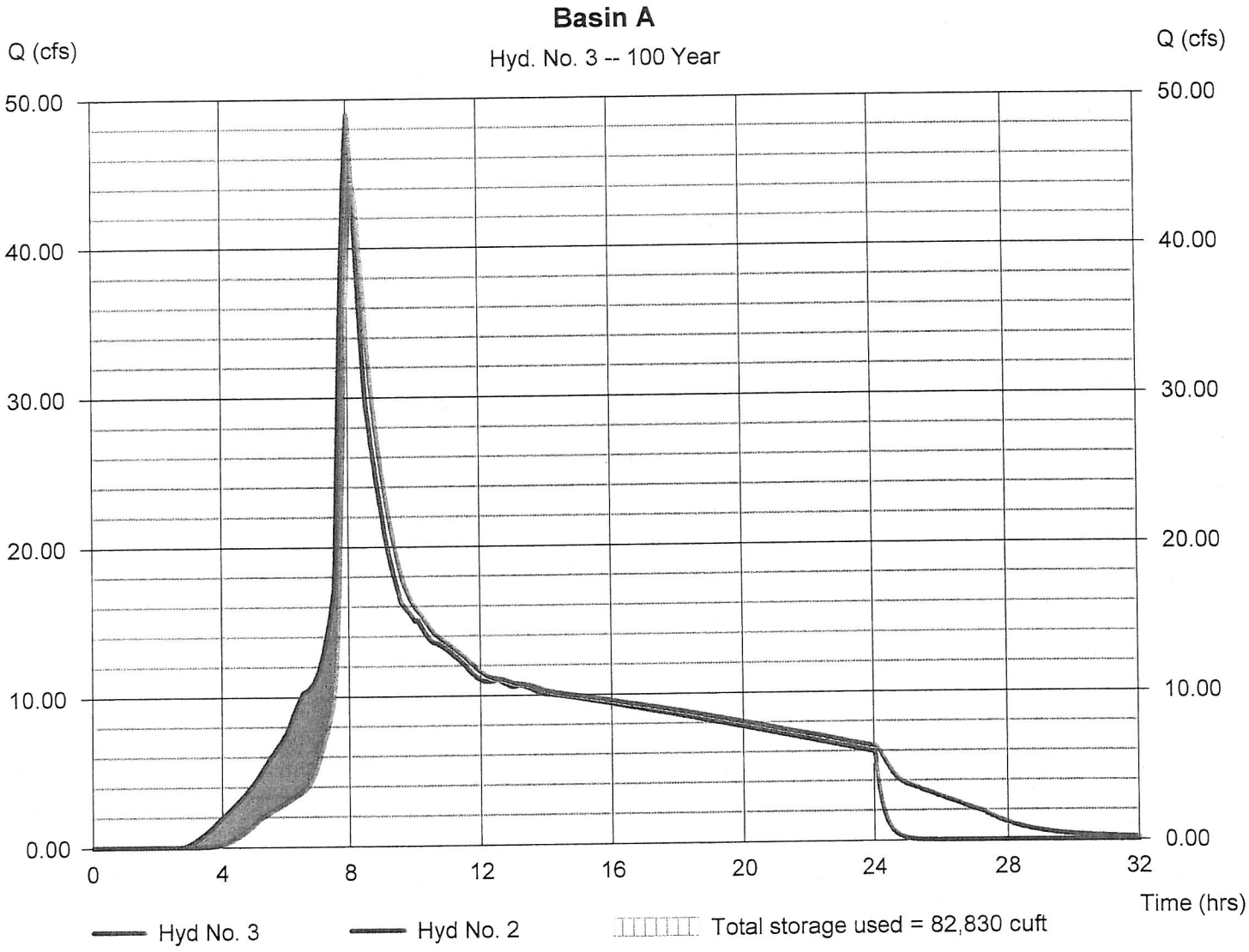
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 — Thursday, Dec 10, 2009

Hyd. No. 3

Basin A

Hydrograph type	= Reservoir	Peak discharge	= 44.31 cfs
Storm frequency	= 100 yrs	Time to peak	= 8.13 hrs
Time interval	= 2 min	Hyd. volume	= 809,602 cuft
Inflow hyd. No.	= 2 - Basin A - Post	Max. Elevation	= 1004.59 ft
Reservoir name	= Pond A	Max. Storage	= 82,830 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 — Thursday, Dec 10, 2009

Pond No. 1 - Pond B

Pond Data

Trapezoid - Bottom L x W = 97.0 x 97.0 ft, Side slope = 2.00:1, Bottom elev. = 1000.00 ft, Depth = 5.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	1000.00	9,409	0	0
0.50	1000.50	9,801	4,802	4,802
1.00	1001.00	10,201	5,000	9,802
1.50	1001.50	10,609	5,202	15,005
2.00	1002.00	11,025	5,408	20,413
2.50	1002.50	11,449	5,618	26,031
3.00	1003.00	11,881	5,832	31,863
3.50	1003.50	12,321	6,050	37,913
4.00	1004.00	12,769	6,272	44,185
4.50	1004.50	13,225	6,498	50,683
5.00	1005.00	13,689	6,728	57,412

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 30.00	8.58	12.50	0.00
Span (in)	= 30.00	8.58	12.50	0.00
No. Barrels	= 1	1	1	0
Invert El. (ft)	= 1000.00	1000.01	1001.50	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.57	4.50	0.00	0.00
Crest El. (ft)	= 1004.00	1002.70	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Riser	Rect	---	---
Multi-Stage	= Yes	Yes	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	1000.00	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
0.05	480	1000.05	0.01 ic	0.01 ic	0.00	---	0.00	0.00	---	---	---	---	0.006
0.10	960	1000.10	0.03 ic	0.03 ic	0.00	---	0.00	0.00	---	---	---	---	0.029
0.15	1,441	1000.15	0.07 ic	0.06 ic	0.00	---	0.00	0.00	---	---	---	---	0.064
0.20	1,921	1000.20	0.11 ic	0.11 ic	0.00	---	0.00	0.00	---	---	---	---	0.113
0.25	2,401	1000.25	0.18 ic	0.18 ic	0.00	---	0.00	0.00	---	---	---	---	0.177
0.30	2,881	1000.30	0.26 ic	0.25 ic	0.00	---	0.00	0.00	---	---	---	---	0.251
0.35	3,362	1000.35	0.35 ic	0.33 ic	0.00	---	0.00	0.00	---	---	---	---	0.332
0.40	3,842	1000.40	0.43 ic	0.43 ic	0.00	---	0.00	0.00	---	---	---	---	0.429
0.45	4,322	1000.45	0.56 ic	0.52 ic	0.00	---	0.00	0.00	---	---	---	---	0.524
0.50	4,802	1000.50	0.66 ic	0.64 ic	0.00	---	0.00	0.00	---	---	---	---	0.638
0.55	5,302	1000.55	0.77 ic	0.75 ic	0.00	---	0.00	0.00	---	---	---	---	0.748
0.60	5,802	1000.60	0.90 ic	0.85 ic	0.00	---	0.00	0.00	---	---	---	---	0.854
0.65	6,302	1000.65	0.97 ic	0.97 ic	0.00	---	0.00	0.00	---	---	---	---	0.971
0.70	6,802	1000.70	1.06 ic	1.06 ic	0.00	---	0.00	0.00	---	---	---	---	1.060
0.75	7,302	1000.75	1.13 ic	1.13 ic	0.00	---	0.00	0.00	---	---	---	---	1.134
0.80	7,802	1000.80	1.20 ic	1.20 ic	0.00	---	0.00	0.00	---	---	---	---	1.203
0.85	8,302	1000.85	1.28 ic	1.26 ic	0.00	---	0.00	0.00	---	---	---	---	1.262
0.90	8,802	1000.90	1.37 ic	1.31 ic	0.00	---	0.00	0.00	---	---	---	---	1.313
0.95	9,302	1000.95	1.38 ic	1.38 ic	0.00	---	0.00	0.00	---	---	---	---	1.376
1.00	9,802	1001.00	1.46 ic	1.43 ic	0.00	---	0.00	0.00	---	---	---	---	1.429
1.05	10,323	1001.05	1.48 ic	1.48 ic	0.00	---	0.00	0.00	---	---	---	---	1.478
1.10	10,843	1001.10	1.55 ic	1.54 ic	0.00	---	0.00	0.00	---	---	---	---	1.536
1.15	11,363	1001.15	1.58 ic	1.58 ic	0.00	---	0.00	0.00	---	---	---	---	1.578
1.20	11,883	1001.20	1.65 ic	1.64 ic	0.00	---	0.00	0.00	---	---	---	---	1.636
1.25	12,403	1001.25	1.68 ic	1.68 ic	0.00	---	0.00	0.00	---	---	---	---	1.676
1.30	12,924	1001.30	1.76 ic	1.73 ic	0.00	---	0.00	0.00	---	---	---	---	1.729
1.35	13,444	1001.35	1.77 ic	1.77 ic	0.00	---	0.00	0.00	---	---	---	---	1.772
1.40	13,964	1001.40	1.86 ic	1.82 ic	0.00	---	0.00	0.00	---	---	---	---	1.818
1.45	14,484	1001.45	1.87 ic	1.87 ic	0.00	---	0.00	0.00	---	---	---	---	1.866
1.50	15,005	1001.50	1.97 ic	1.90 ic	0.00	---	0.00	0.00	---	---	---	---	1.903

Continues on next page...

Pond B

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
1.55	15,545	1001.55	1.97 ic	1.95 ic	0.01 ic	---	0.00	0.00	---	---	---	---	1.964
1.60	16,086	1001.60	2.09 ic	1.98 ic	0.05 ic	---	0.00	0.00	---	---	---	---	2.031
1.65	16,627	1001.65	2.12 ic	2.02 ic	0.10 ic	---	0.00	0.00	---	---	---	---	2.118
1.70	17,168	1001.70	2.23 ic	2.05 ic	0.18 ic	---	0.00	0.00	---	---	---	---	2.228
1.75	17,709	1001.75	2.36 ic	2.08 ic	0.28 ic	---	0.00	0.00	---	---	---	---	2.356
1.80	18,249	1001.80	2.59 ic	2.11 ic	0.39 ic	---	0.00	0.00	---	---	---	---	2.496
1.85	18,790	1001.85	2.73 ic	2.13 ic	0.51 ic	---	0.00	0.00	---	---	---	---	2.645
1.90	19,331	1001.90	2.87 ic	2.16 ic	0.66 ic	---	0.00	0.00	---	---	---	---	2.828
1.95	19,872	1001.95	3.02 ic	2.19 ic	0.82 ic	---	0.00	0.00	---	---	---	---	3.009
2.00	20,413	1002.00	3.19 ic	2.21 ic	0.98 ic	---	0.00	0.00	---	---	---	---	3.193
2.05	20,974	1002.05	3.48 ic	2.23 ic	1.16 ic	---	0.00	0.00	---	---	---	---	3.393
2.10	21,536	1002.10	3.64 ic	2.26 ic	1.35 ic	---	0.00	0.00	---	---	---	---	3.604
2.15	22,098	1002.15	3.82 ic	2.28 ic	1.54 ic	---	0.00	0.00	---	---	---	---	3.817
2.20	22,660	1002.20	4.16 ic	2.30 ic	1.75 ic	---	0.00	0.00	---	---	---	---	4.044
2.25	23,222	1002.25	4.34 ic	2.32 ic	1.94 ic	---	0.00	0.00	---	---	---	---	4.258
2.30	23,784	1002.30	4.52 ic	2.35 ic	2.16 ic	---	0.00	0.00	---	---	---	---	4.503
2.35	24,345	1002.35	4.71 ic	2.37 ic	2.34 ic	---	0.00	0.00	---	---	---	---	4.714
2.40	24,907	1002.40	4.92 ic	2.39 ic	2.53 ic	---	0.00	0.00	---	---	---	---	4.920
2.45	25,469	1002.45	5.12 ic	2.41 ic	2.71 ic	---	0.00	0.00	---	---	---	---	5.123
2.50	26,031	1002.50	5.31 ic	2.44 ic	2.87 ic	---	0.00	0.00	---	---	---	---	5.307
2.55	26,614	1002.55	5.50 ic	2.47 ic	2.98 ic	---	0.00	0.00	---	---	---	---	5.452
2.60	27,197	1002.60	5.71 ic	2.49 ic	3.12 ic	---	0.00	0.00	---	---	---	---	5.613
2.65	27,780	1002.65	5.77 ic	2.51 ic	3.25 ic	---	0.00	0.00	---	---	---	---	5.769
2.70	28,364	1002.70	5.93 ic	2.55 ic	3.38 ic	---	0.00	0.00	---	---	---	---	5.931
2.75	28,947	1002.75	6.36 ic	2.56 ic	3.50 ic	---	0.00	0.17	---	---	---	---	6.230
2.80	29,530	1002.80	6.82 ic	2.57 ic	3.62 ic	---	0.00	0.47	---	---	---	---	6.663
2.85	30,113	1002.85	7.28 ic	2.58 ic	3.74 ic	---	0.00	0.87	---	---	---	---	7.182
2.90	30,697	1002.90	7.77 ic	2.58 ic	3.85 ic	---	0.00	1.34	---	---	---	---	7.768
2.95	31,280	1002.95	8.50 ic	2.58 ic	3.95 ic	---	0.00	1.87	---	---	---	---	8.404
3.00	31,863	1003.00	9.27 ic	2.57 ic	4.06 ic	---	0.00	2.46	---	---	---	---	9.094
3.05	32,468	1003.05	9.84 ic	2.57 ic	4.16 ic	---	0.00	3.10	---	---	---	---	9.836
3.10	33,073	1003.10	10.62 ic	2.57 ic	4.26 ic	---	0.00	3.79	---	---	---	---	10.62
3.15	33,678	1003.15	11.44 ic	2.56 ic	4.36 ic	---	0.00	4.52	---	---	---	---	11.44
3.20	34,283	1003.20	12.30 ic	2.55 ic	4.46 ic	---	0.00	5.30	---	---	---	---	12.30
3.25	34,888	1003.25	13.35 ic	2.54 ic	4.55 ic	---	0.00	6.11	---	---	---	---	13.20
3.30	35,493	1003.30	14.19 ic	2.54 ic	4.64 ic	---	0.00	6.96	---	---	---	---	14.14
3.35	36,098	1003.35	15.10 ic	2.52 ic	4.73 ic	---	0.00	7.85	---	---	---	---	15.10
3.40	36,703	1003.40	16.12 ic	2.51 ic	4.82 ic	---	0.00	8.77	---	---	---	---	16.10
3.45	37,308	1003.45	17.20 ic	2.50 ic	4.90 ic	---	0.00	9.73	---	---	---	---	17.13
3.50	37,913	1003.50	18.24 ic	2.48 ic	4.99 ic	---	0.00	10.72	---	---	---	---	18.19
3.55	38,540	1003.55	19.28 ic	2.46 ic	5.07 ic	---	0.00	11.74	---	---	---	---	19.28
3.60	39,168	1003.60	20.43 ic	2.44 ic	5.16 ic	---	0.00	12.79	---	---	---	---	20.39
3.65	39,795	1003.65	21.52 ic	2.42 ic	5.15 ic	---	0.00	13.87	---	---	---	---	21.44
3.70	40,422	1003.70	22.50 ic	2.41 ic	5.11 ic	---	0.00	14.98	---	---	---	---	22.50
3.75	41,049	1003.75	23.56 ic	2.38 ic	5.06 ic	---	0.00	16.12	---	---	---	---	23.56
3.80	41,676	1003.80	24.66 ic	2.35 ic	5.00 ic	---	0.00	17.29	---	---	---	---	24.64
3.85	42,304	1003.85	25.71 ic	2.32 ic	4.92 ic	---	0.00	18.48	---	---	---	---	25.71
3.90	42,931	1003.90	26.76 ic	2.26 ic	4.80 ic	---	0.00	19.70	---	---	---	---	26.76
3.95	43,558	1003.95	27.85 ic	2.21 ic	4.70 ic	---	0.00	20.94	---	---	---	---	27.85
4.00	44,185	1004.00	28.91 ic	2.16 ic	4.59 ic	---	0.00	22.15 s	---	---	---	---	28.91
4.05	44,835	1004.05	30.10 ic	2.10 ic	4.45 ic	---	0.47	23.08 s	---	---	---	---	30.10
4.10	45,485	1004.10	31.39 ic	2.01 ic	4.28 ic	---	1.32	23.77 s	---	---	---	---	31.39
4.15	46,135	1004.15	32.67 ic	1.92 ic	4.08 ic	---	2.43	24.24 s	---	---	---	---	32.67
4.20	46,785	1004.20	33.94 ic	1.82 ic	3.87 ic	---	3.74	24.51 s	---	---	---	---	33.94
4.25	47,434	1004.25	35.15 ic	1.72 ic	3.64 ic	---	5.23	24.57 s	---	---	---	---	35.15
4.30	48,084	1004.30	36.31 ic	1.60 ic	3.41 ic	---	6.88	24.43 s	---	---	---	---	36.31
4.35	48,734	1004.35	37.41 ic	1.49 ic	3.16 ic	---	8.66	24.09 s	---	---	---	---	37.41
4.40	49,384	1004.40	38.44 ic	1.37 ic	2.91 ic	---	10.59	23.57 s	---	---	---	---	38.44
4.45	50,034	1004.45	39.38 ic	1.26 ic	2.67 ic	---	12.56 s	22.89 s	---	---	---	---	39.38
4.50	50,683	1004.50	40.12 ic	1.17 ic	2.49 ic	---	13.99 s	22.47 s	---	---	---	---	40.12
4.55	51,356	1004.55	40.77 ic	1.10 ic	2.34 ic	---	15.18 s	22.15 s	---	---	---	---	40.76
4.60	52,029	1004.60	41.35 ic	1.04 ic	2.20 ic	---	16.24 s	21.86 s	---	---	---	---	41.35
4.65	52,702	1004.65	41.89 ic	0.98 ic	2.09 ic	---	17.20 s	21.61 s	---	---	---	---	41.89
4.70	53,375	1004.70	42.39 ic	0.93 ic	1.98 ic	---	18.09 s	21.38 s	---	---	---	---	42.38
4.75	54,048	1004.75	42.86 ic	0.89 ic	1.88 ic	---	18.91 s	21.18 s	---	---	---	---	42.86
4.80	54,720	1004.80	43.31 ic	0.84 ic	1.79 ic	---	19.68 s	20.99 s	---	---	---	---	43.30
4.85	55,393	1004.85	43.74 ic	0.81 ic	1.71 ic	---	20.40 s	20.82 s	---	---	---	---	43.73
4.90	56,066	1004.90	44.15 ic	0.77 ic	1.64 ic	---	21.07 s	20.66 s	---	---	---	---	44.15
4.95	56,739	1004.95	44.55 ic	0.74 ic	1.57 ic	---	21.72 s	20.52 s	---	---	---	---	44.55
5.00	57,412	1005.00	44.93 ic	0.71 ic	1.51 ic	---	22.32 s	20.39 s	---	---	---	---	44.93

...End

Hydrograph Report

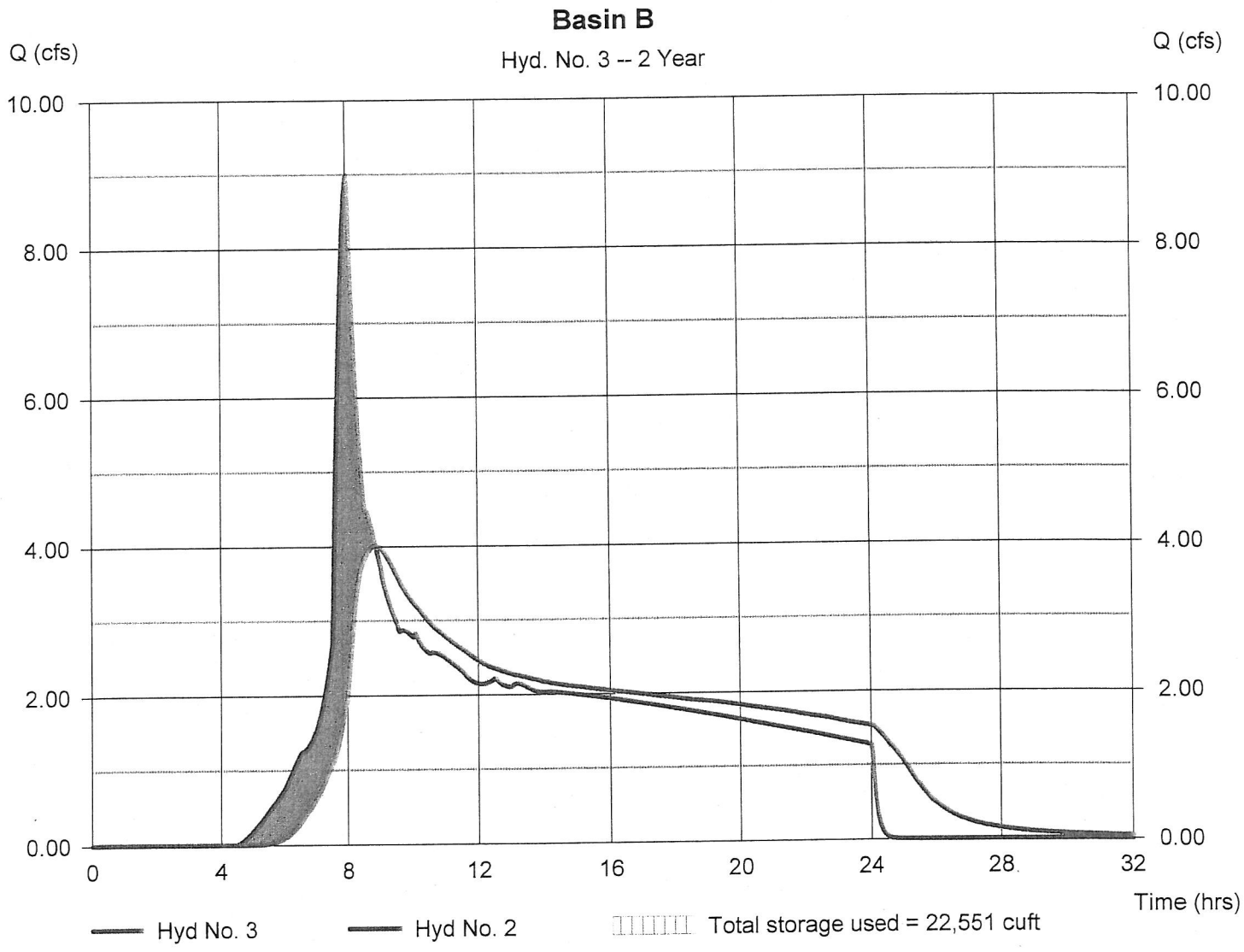
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Thursday, Dec 10, 2009

Hyd. No. 3

Basin B

Hydrograph type	= Reservoir	Peak discharge	= 4.000 cfs
Storm frequency	= 2 yrs	Time to peak	= 8.83 hrs
Time interval	= 2 min	Hyd. volume	= 146,492 cuft
Inflow hyd. No.	= 2 - Basin B - Post	Max. Elevation	= 1002.19 ft
Reservoir name	= Pond B	Max. Storage	= 22,551 cuft

Storage Indication method used.



Hydrograph Report

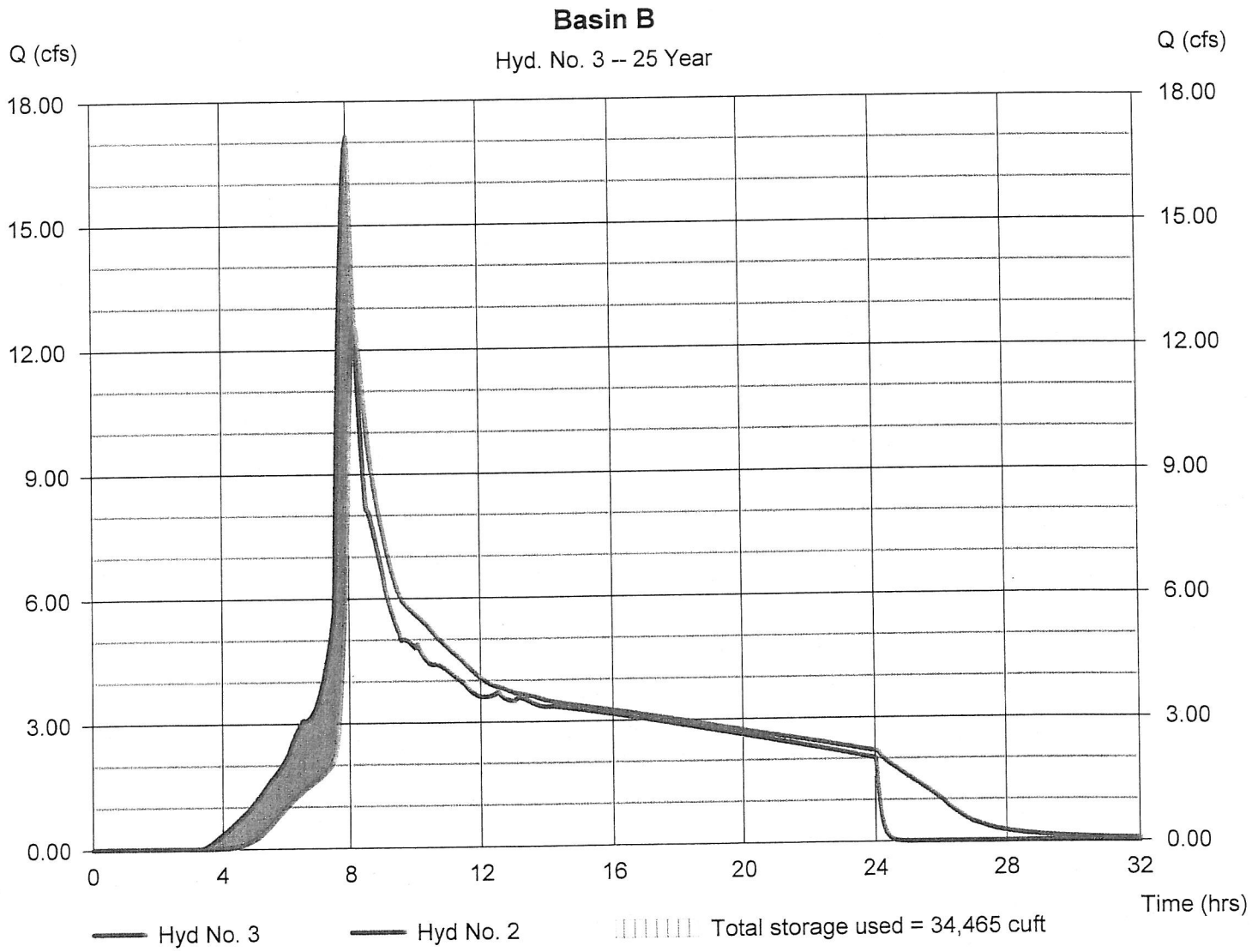
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 — Thursday, Dec 10, 2009

Hyd. No. 3

Basin B

Hydrograph type	= Reservoir	Peak discharge	= 12.57 cfs
Storm frequency	= 25 yrs	Time to peak	= 8.20 hrs
Time interval	= 2 min	Hyd. volume	= 260,538 cuft
Inflow hyd. No.	= 2 - Basin B - Post	Max. Elevation	= 1003.22 ft
Reservoir name	= Pond B	Max. Storage	= 34,465 cuft

Storage Indication method used.



Hydrograph Report

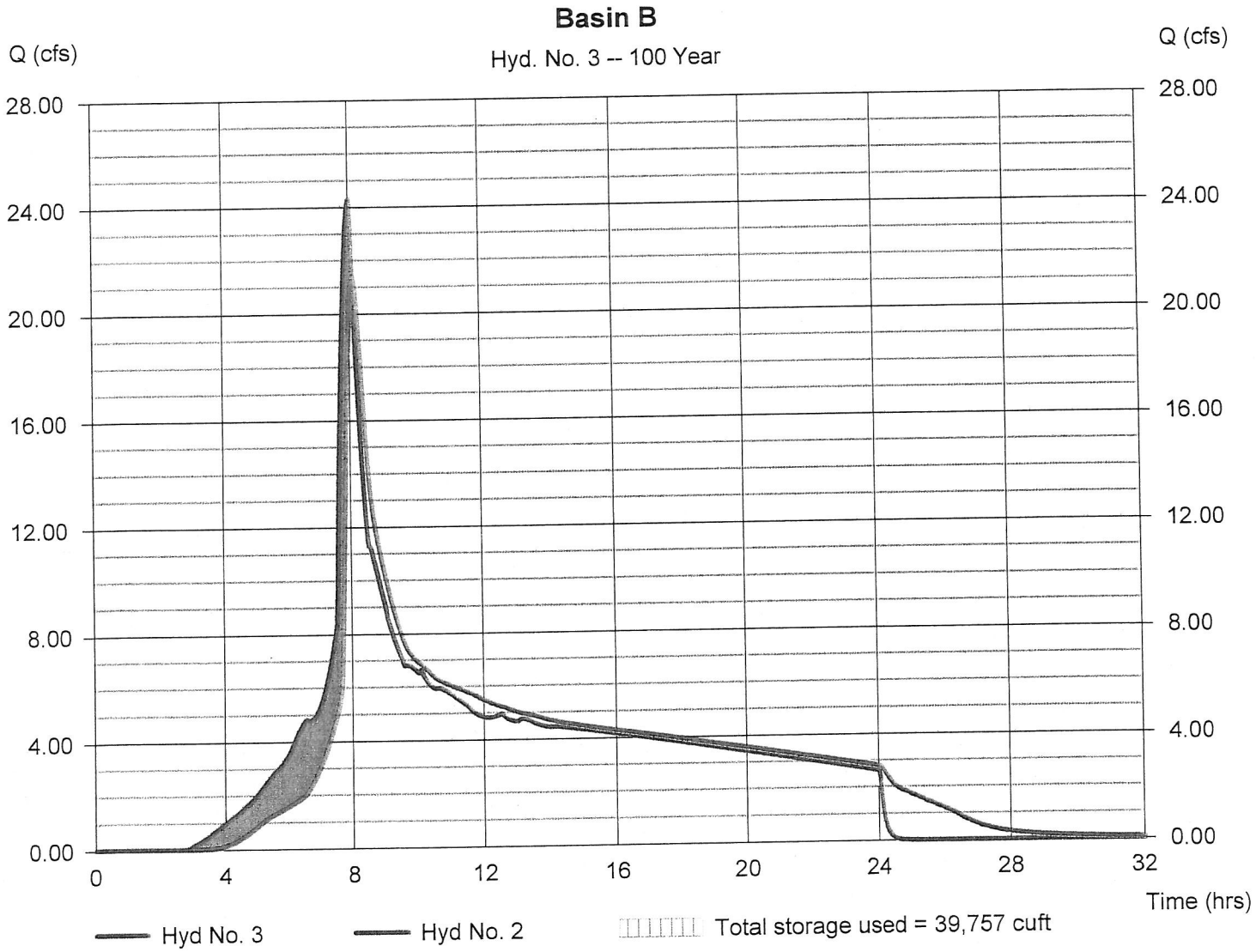
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 — Thursday, Dec 10, 2009

Hyd. No. 3

Basin B

Hydrograph type	= Reservoir	Peak discharge	= 21.38 cfs
Storm frequency	= 100 yrs	Time to peak	= 8.10 hrs
Time interval	= 2 min	Hyd. volume	= 361,151 cuft
Inflow hyd. No.	= 2 - Basin B - Post	Max. Elevation	= 1003.65 ft
Reservoir name	= Pond B	Max. Storage	= 39,757 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 — Tuesday, Dec 8, 2009

Pond No. 1 - Pond C

Pond Data

Trapezoid - Bottom L x W = 156.0 x 156.0 ft, Side slope = 2.00:1, Bottom elev. = 1000.00 ft, Depth = 6.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	1000.00	24,336	0	0
0.60	1000.60	25,091	14,827	14,827
1.20	1001.20	25,857	15,284	30,111
1.80	1001.80	26,634	15,747	45,858
2.40	1002.40	27,423	16,217	62,074
3.00	1003.00	28,224	16,694	78,768
3.60	1003.60	29,036	17,177	95,945
4.20	1004.20	29,860	17,668	113,614
4.80	1004.80	30,695	18,166	131,780
5.40	1005.40	31,542	18,670	150,450
6.00	1006.00	32,400	19,182	169,632

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 36.00	18.30	24.00	0.00
Span (in)	= 36.00	18.30	24.00	0.00
No. Barrels	= 1	1	1	0
Invert El. (ft)	= 1000.00	1000.01	1002.40	0.00
Length (ft)	= 100.00	0.00	0.00	0.00
Slope (%)	= 3.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 18.85	6.50	0.00	0.00
Crest El. (ft)	= 1005.00	1003.30	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Riser	Rect	---	---
Multi-Stage	= Yes	Yes	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	1000.00	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
0.06	1,483	1000.06	0.01 ic	0.01 ic	0.00	---	0.00	0.00	---	---	---	---	0.013
0.12	2,965	1000.12	0.06 ic	0.06 ic	0.00	---	0.00	0.00	---	---	---	---	0.058
0.18	4,448	1000.18	0.13 ic	0.13 ic	0.00	---	0.00	0.00	---	---	---	---	0.132
0.24	5,931	1000.24	0.23 ic	0.23 ic	0.00	---	0.00	0.00	---	---	---	---	0.229
0.30	7,414	1000.30	0.37 ic	0.36 ic	0.00	---	0.00	0.00	---	---	---	---	0.360
0.36	8,896	1000.36	0.51 ic	0.51 ic	0.00	---	0.00	0.00	---	---	---	---	0.508
0.42	10,379	1000.42	0.68 ic	0.68 ic	0.00	---	0.00	0.00	---	---	---	---	0.684
0.48	11,862	1000.48	0.88 ic	0.88 ic	0.00	---	0.00	0.00	---	---	---	---	0.884
0.54	13,345	1000.54	1.13 ic	1.13 ic	0.00	---	0.00	0.00	---	---	---	---	1.128
0.60	14,827	1000.60	1.34 ic	1.34 ic	0.00	---	0.00	0.00	---	---	---	---	1.343
0.66	16,356	1000.66	1.64 ic	1.63 ic	0.00	---	0.00	0.00	---	---	---	---	1.630
0.72	17,884	1000.72	1.90 ic	1.90 ic	0.00	---	0.00	0.00	---	---	---	---	1.904
0.78	19,412	1000.78	2.19 ic	2.19 ic	0.00	---	0.00	0.00	---	---	---	---	2.190
0.84	20,941	1000.84	2.61 ic	2.51 ic	0.00	---	0.00	0.00	---	---	---	---	2.507
0.90	22,469	1000.90	2.94 ic	2.84 ic	0.00	---	0.00	0.00	---	---	---	---	2.842
0.96	23,998	1000.96	3.30 ic	3.18 ic	0.00	---	0.00	0.00	---	---	---	---	3.179
1.02	25,526	1001.02	3.68 ic	3.56 ic	0.00	---	0.00	0.00	---	---	---	---	3.560
1.08	27,054	1001.08	3.92 ic	3.92 ic	0.00	---	0.00	0.00	---	---	---	---	3.920
1.14	28,583	1001.14	4.33 ic	4.32 ic	0.00	---	0.00	0.00	---	---	---	---	4.325
1.20	30,111	1001.20	4.76 ic	4.67 ic	0.00	---	0.00	0.00	---	---	---	---	4.672
1.26	31,686	1001.26	5.05 ic	5.05 ic	0.00	---	0.00	0.00	---	---	---	---	5.047
1.32	33,260	1001.32	5.49 ic	5.44 ic	0.00	---	0.00	0.00	---	---	---	---	5.444
1.38	34,835	1001.38	5.79 ic	5.79 ic	0.00	---	0.00	0.00	---	---	---	---	5.790
1.44	36,410	1001.44	6.28 ic	6.14 ic	0.00	---	0.00	0.00	---	---	---	---	6.143
1.50	37,984	1001.50	6.55 ic	6.50 ic	0.00	---	0.00	0.00	---	---	---	---	6.499
1.56	39,559	1001.56	6.84 ic	6.76 ic	0.00	---	0.00	0.00	---	---	---	---	6.755
1.62	41,134	1001.62	7.13 ic	6.97 ic	0.00	---	0.00	0.00	---	---	---	---	6.969
1.68	42,708	1001.68	7.20 ic	7.20 ic	0.00	---	0.00	0.00	---	---	---	---	7.195
1.74	44,283	1001.74	7.45 ic	7.45 ic	0.00	---	0.00	0.00	---	---	---	---	7.454
1.80	45,858	1001.80	7.73 ic	7.68 ic	0.00	---	0.00	0.00	---	---	---	---	7.683

Continues on next page...

Pond C

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
1.86	47,479	1001.86	8.04 ic	7.87 ic	0.00	---	0.00	0.00	---	---	---	---	7.870
1.92	49,101	1001.92	8.09 ic	8.09 ic	0.00	---	0.00	0.00	---	---	---	---	8.094
1.98	50,723	1001.98	8.36 ic	8.33 ic	0.00	---	0.00	0.00	---	---	---	---	8.335
2.04	52,344	1002.04	8.68 ic	8.51 ic	0.00	---	0.00	0.00	---	---	---	---	8.506
2.10	53,966	1002.10	8.73 ic	8.73 ic	0.00	---	0.00	0.00	---	---	---	---	8.726
2.16	55,588	1002.16	9.01 ic	8.94 ic	0.00	---	0.00	0.00	---	---	---	---	8.937
2.22	57,209	1002.22	9.10 ic	9.10 ic	0.00	---	0.00	0.00	---	---	---	---	9.100
2.28	58,831	1002.28	9.35 ic	9.35 ic	0.00	---	0.00	0.00	---	---	---	---	9.348
2.34	60,453	1002.34	9.69 ic	9.50 ic	0.00	---	0.00	0.00	---	---	---	---	9.500
2.40	62,074	1002.40	9.72 ic	9.72 ic	0.00 ic	---	0.00	0.00	---	---	---	---	9.716
2.46	63,744	1002.46	10.04 ic	9.89 ic	0.03 ic	---	0.00	0.00	---	---	---	---	9.913
2.52	65,413	1002.52	10.13 ic	10.03 ic	0.09 ic	---	0.00	0.00	---	---	---	---	10.13
2.58	67,082	1002.58	10.43 ic	10.22 ic	0.21 ic	---	0.00	0.00	---	---	---	---	10.43
2.64	68,752	1002.64	10.76 ic	10.39 ic	0.38 ic	---	0.00	0.00	---	---	---	---	10.76
2.70	70,421	1002.70	11.12 ic	10.53 ic	0.56 ic	---	0.00	0.00	---	---	---	---	11.09
2.76	72,091	1002.76	11.49 ic	10.67 ic	0.79 ic	---	0.00	0.00	---	---	---	---	11.46
2.82	73,760	1002.82	11.87 ic	10.79 ic	1.08 ic	---	0.00	0.00	---	---	---	---	11.87
2.88	75,429	1002.88	12.30 ic	10.89 ic	1.41 ic	---	0.00	0.00	---	---	---	---	12.30
2.94	77,099	1002.94	12.72 ic	10.98 ic	1.74 ic	---	0.00	0.00	---	---	---	---	12.72
3.00	78,768	1003.00	13.41 ic	11.10 ic	2.10 ic	---	0.00	0.00	---	---	---	---	13.21
3.06	80,486	1003.06	13.81 ic	11.23 ic	2.51 ic	---	0.00	0.00	---	---	---	---	13.74
3.12	82,204	1003.12	14.27 ic	11.32 ic	2.95 ic	---	0.00	0.00	---	---	---	---	14.27
3.18	83,921	1003.18	15.03 ic	11.40 ic	3.42 ic	---	0.00	0.00	---	---	---	---	14.82
3.24	85,639	1003.24	15.45 ic	11.52 ic	3.93 ic	---	0.00	0.00	---	---	---	---	15.45
3.30	87,357	1003.30	16.29 ic	11.56 ic	4.47 ic	---	0.00	0.00	---	---	---	---	16.03
3.36	89,075	1003.36	17.14 ic	11.61 ic	5.03 ic	---	0.00	0.32	---	---	---	---	16.96
3.42	90,792	1003.42	18.10 ic	11.58 ic	5.62 ic	---	0.00	0.90	---	---	---	---	18.10
3.48	92,510	1003.48	19.42 ic	11.54 ic	6.22 ic	---	0.00	1.65	---	---	---	---	19.42
3.54	94,228	1003.54	21.06 ic	11.51 ic	6.73 ic	---	0.00	2.54	---	---	---	---	20.78
3.60	95,945	1003.60	22.39 ic	11.47 ic	7.36 ic	---	0.00	3.56	---	---	---	---	22.39
3.66	97,712	1003.66	24.13 ic	11.38 ic	8.00 ic	---	0.00	4.68	---	---	---	---	24.05
3.72	99,479	1003.72	25.86 ic	11.28 ic	8.63 ic	---	0.00	5.89	---	---	---	---	25.81
3.78	101,246	1003.78	27.62 ic	11.15 ic	9.27 ic	---	0.00	7.20	---	---	---	---	27.62
3.84	103,013	1003.84	29.61 ic	11.02 ic	10.00 ic	---	0.00	8.59	---	---	---	---	29.61
3.90	104,780	1003.90	31.54 ic	10.88 ic	10.60 ic	---	0.00	10.06	---	---	---	---	31.54
3.96	106,546	1003.96	33.61 ic	10.72 ic	11.20 ic	---	0.00	11.61	---	---	---	---	33.52
4.02	108,313	1004.02	35.59 ic	10.52 ic	11.85 ic	---	0.00	13.22	---	---	---	---	35.59
4.08	110,080	1004.08	37.67 ic	10.30 ic	12.46 ic	---	0.00	14.91	---	---	---	---	37.67
4.14	111,847	1004.14	39.78 ic	10.02 ic	13.09 ic	---	0.00	16.66	---	---	---	---	39.78
4.20	113,614	1004.20	41.75 ic	9.61 ic	13.65 ic	---	0.00	18.48	---	---	---	---	41.75
4.26	115,430	1004.26	43.76 ic	9.25 ic	14.14 ic	---	0.00	20.36	---	---	---	---	43.75
4.32	117,247	1004.32	45.77 ic	8.84 ic	14.64 ic	---	0.00	22.29 s	---	---	---	---	45.77
4.38	119,064	1004.38	47.24 ic	8.58 ic	14.74 ic	---	0.00	23.91 s	---	---	---	---	47.24
4.44	120,880	1004.44	48.38 ic	8.43 ic	14.50 ic	---	0.00	25.45 s	---	---	---	---	48.38
4.50	122,697	1004.50	49.46 ic	8.28 ic	14.25 ic	---	0.00	26.93 s	---	---	---	---	49.46
4.56	124,513	1004.56	50.51 ic	8.14 ic	14.01 ic	---	0.00	28.35 s	---	---	---	---	50.50
4.62	126,330	1004.62	51.51 ic	8.01 ic	13.77 ic	---	0.00	29.73 s	---	---	---	---	51.51
4.68	128,146	1004.68	52.48 ic	7.87 ic	13.54 ic	---	0.00	31.06 s	---	---	---	---	52.48
4.74	129,963	1004.74	53.42 ic	7.74 ic	13.32 ic	---	0.00	32.36 s	---	---	---	---	53.42
4.80	131,780	1004.80	54.34 ic	7.62 ic	13.10 ic	---	0.00	33.62 s	---	---	---	---	54.34
4.86	133,647	1004.86	55.23 ic	7.49 ic	12.89 ic	---	0.00	34.85 s	---	---	---	---	55.23
4.92	135,514	1004.92	56.10 ic	7.37 ic	12.68 ic	---	0.00	36.04 s	---	---	---	---	56.09
4.98	137,381	1004.98	56.94 ic	7.25 ic	12.48 ic	---	0.00	37.21 s	---	---	---	---	56.94
5.04	139,248	1005.04	57.87 ic	7.08 ic	12.17 ic	---	0.50	38.12 s	---	---	---	---	57.87
5.10	141,115	1005.10	58.98 ic	6.79 ic	11.68 ic	---	1.98	38.53 s	---	---	---	---	58.98
5.16	142,982	1005.16	60.14 ic	6.44 ic	11.08 ic	---	4.02	38.59 s	---	---	---	---	60.13
5.22	144,849	1005.22	61.30 ic	6.06 ic	10.43 ic	---	6.48	38.33 s	---	---	---	---	61.30
5.28	146,716	1005.28	62.44 ic	5.66 ic	9.73 ic	---	9.30	37.76 s	---	---	---	---	62.44
5.34	148,583	1005.34	63.54 ic	5.23 ic	8.99 ic	---	12.44	36.88 s	---	---	---	---	63.54
5.40	150,450	1005.40	64.52 ic	4.86 ic	8.36 ic	---	15.15 s	36.13 s	---	---	---	---	64.51
5.46	152,368	1005.46	65.38 ic	4.56 ic	7.85 ic	---	17.38 s	35.59 s	---	---	---	---	65.38
5.52	154,286	1005.52	66.17 ic	4.30 ic	7.39 ic	---	19.37 s	35.10 s	---	---	---	---	66.17
5.58	156,205	1005.58	66.92 ic	4.06 ic	6.99 ic	---	21.19 s	34.67 s	---	---	---	---	66.91
5.64	158,123	1005.64	67.62 ic	3.85 ic	6.62 ic	---	22.87 s	34.28 s	---	---	---	---	67.62
5.70	160,041	1005.70	68.29 ic	3.65 ic	6.28 ic	---	24.43 s	33.91 s	---	---	---	---	68.28
5.76	161,959	1005.76	68.94 ic	3.48 ic	5.98 ic	---	25.90 s	33.58 s	---	---	---	---	68.93
5.82	163,877	1005.82	69.56 ic	3.31 ic	5.70 ic	---	27.26 s	33.27 s	---	---	---	---	69.55
5.88	165,796	1005.88	70.16 ic	3.17 ic	5.45 ic	---	28.55 s	32.99 s	---	---	---	---	70.15
5.94	167,714	1005.94	70.74 ic	3.03 ic	5.21 ic	---	29.76 s	32.73 s	---	---	---	---	70.73
6.00	169,632	1006.00	71.31 ic	2.90 ic	4.99 ic	---	30.91 s	32.49 s	---	---	---	---	71.29

...End

Hydrograph Report

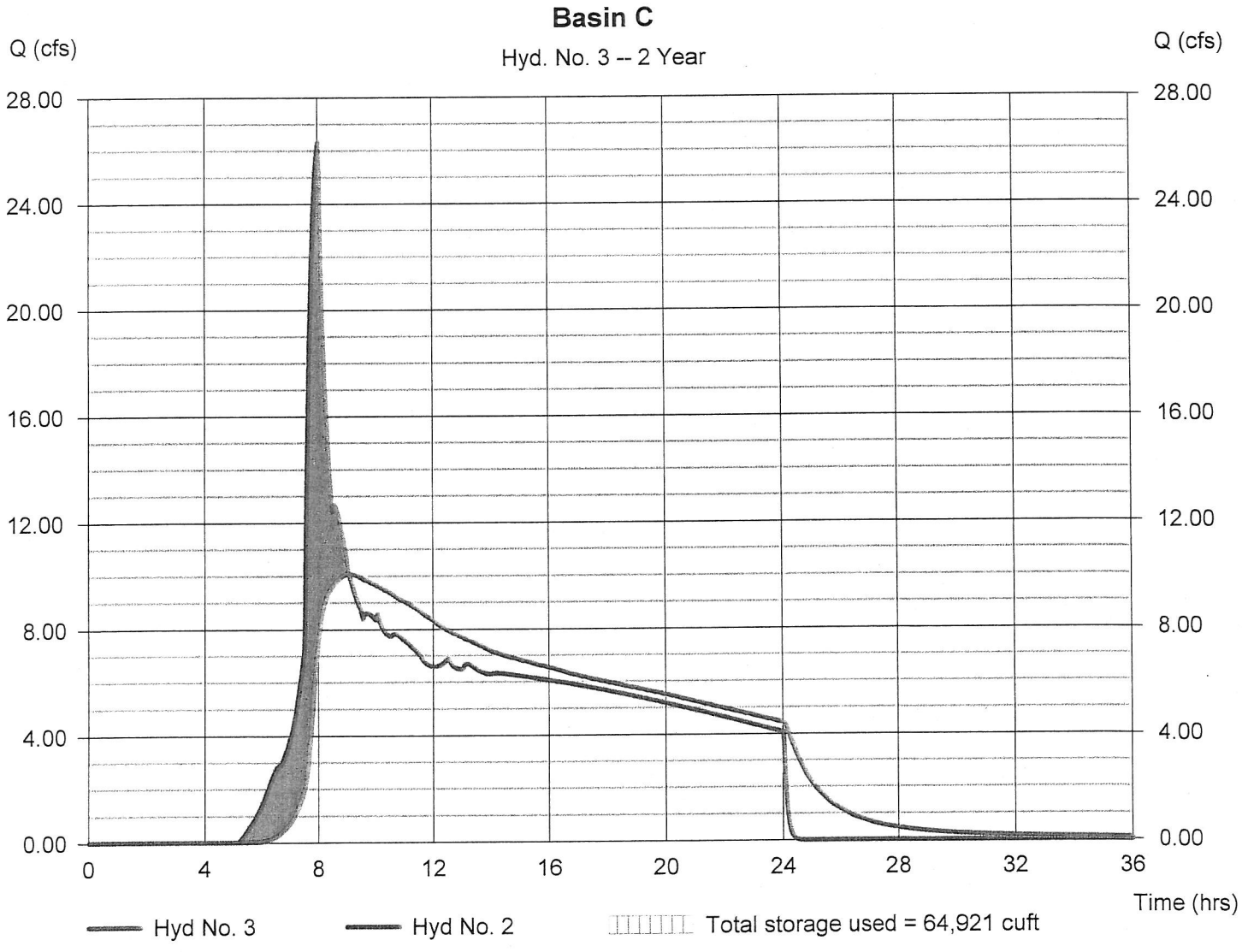
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Dec 8, 2009

Hyd. No. 3

Basin C

Hydrograph type	= Reservoir	Peak discharge	= 10.07 cfs
Storm frequency	= 2 yrs	Time to peak	= 9.10 hrs
Time interval	= 2 min	Hyd. volume	= 438,273 cuft
Inflow hyd. No.	= 2 - Basin C - Post	Max. Elevation	= 1002.50 ft
Reservoir name	= Pond C	Max. Storage	= 64,921 cuft

Storage Indication method used.



Hydrograph Report

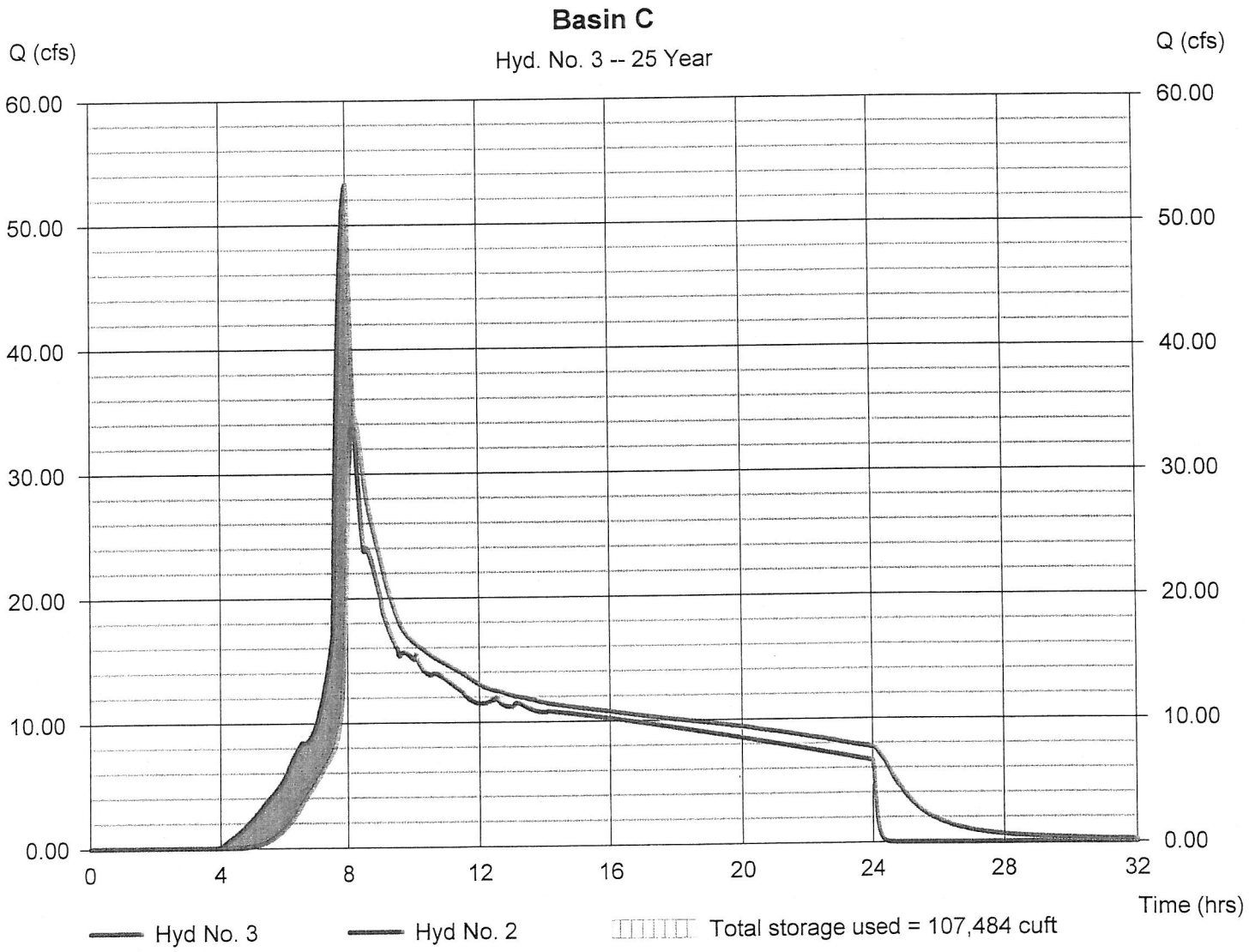
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Dec 8, 2009

Hyd. No. 3

Basin C

Hydrograph type	= Reservoir	Peak discharge	= 34.62 cfs
Storm frequency	= 25 yrs	Time to peak	= 8.23 hrs
Time interval	= 2 min	Hyd. volume	= 809,670 cuft
Inflow hyd. No.	= 2 - Basin C - Post	Max. Elevation	= 1003.99 ft
Reservoir name	= Pond C	Max. Storage	= 107,484 cuft

Storage Indication method used.



Hydrograph Report

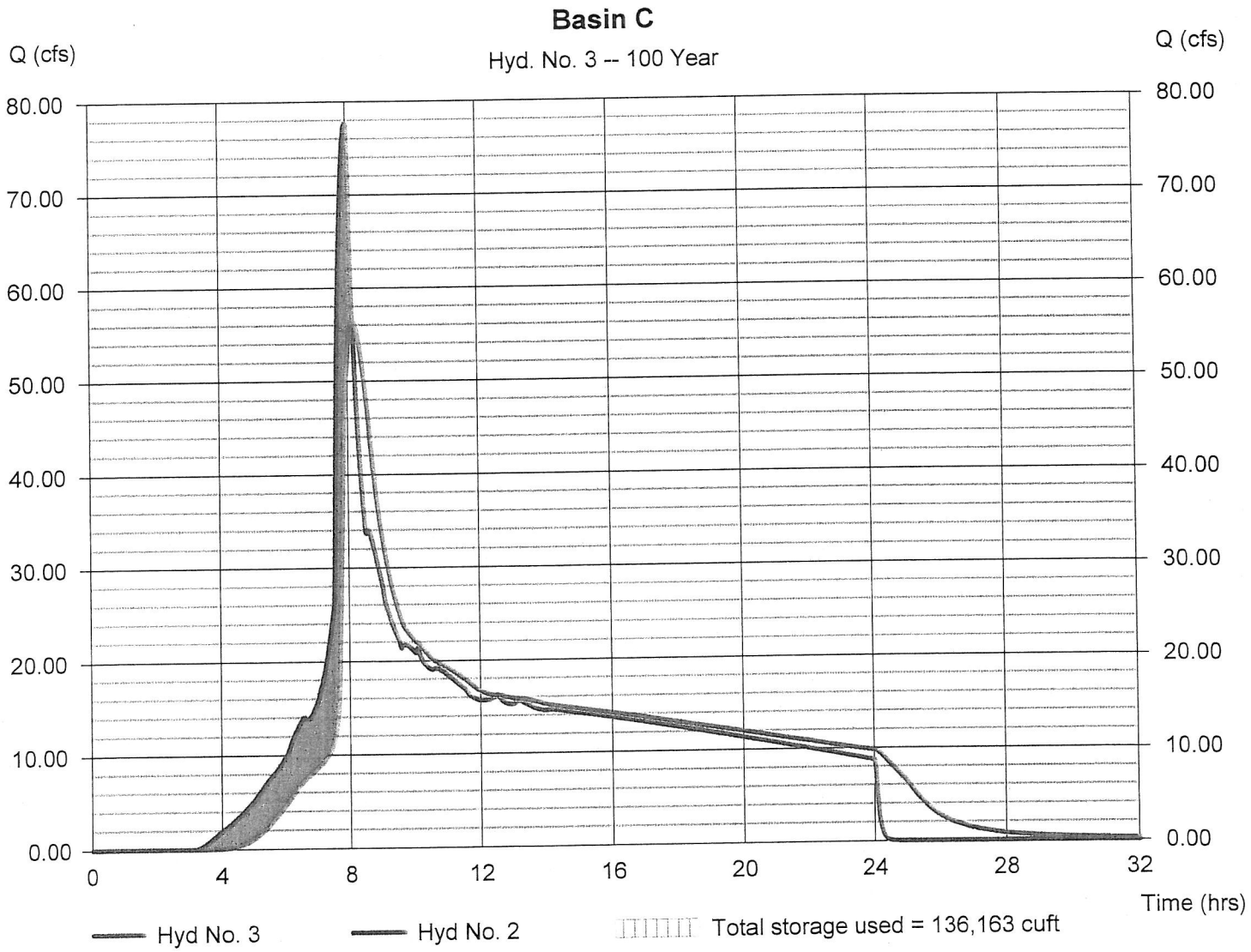
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 — Tuesday, Dec 8, 2009

Hyd. No. 3

Basin C

Hydrograph type	= Reservoir	Peak discharge	= 56.39 cfs
Storm frequency	= 100 yrs	Time to peak	= 8.17 hrs
Time interval	= 2 min	Hyd. volume	= 1,142,768 cuft
Inflow hyd. No.	= 2 - Basin C - Post	Max. Elevation	= 1004.94 ft
Reservoir name	= Pond C	Max. Storage	= 136,163 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 — Tuesday, Dec 8, 2009

Pond No. 1 - Pond D

Pond Data

Trapezoid - Bottom L x W = 200.0 x 200.0 ft, Side slope = 3.00:1, Bottom elev. = 1000.00 ft, Depth = 7.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	1000.00	40,000	0	0
0.70	1000.70	41,698	28,592	28,592
1.40	1001.40	43,431	29,793	58,385
2.10	1002.10	45,199	31,018	89,403
2.80	1002.80	47,002	32,268	121,671
3.50	1003.50	48,841	33,543	155,215
4.20	1004.20	50,715	34,843	190,057
4.90	1004.90	52,624	36,167	226,224
5.60	1005.60	54,569	37,516	263,739
6.30	1006.30	56,549	38,889	302,629
7.00	1007.00	58,564	40,287	342,916

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 36.00	19.45	36.00	0.00
Span (in)	= 36.00	19.45	36.00	0.00
No. Barrels	= 3	1	1	0
Invert El. (ft)	= 1000.00	1000.01	1002.80	0.00
Length (ft)	= 100.00	0.00	0.00	0.00
Slope (%)	= 0.50	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 37.70	16.00	0.00	0.00
Crest El. (ft)	= 1006.00	1004.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Riser	Rect	---	---
Multi-Stage	= Yes	Yes	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	1000.00	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
0.07	2,859	1000.07	0.02 ic	0.02 ic	0.00	---	0.00	0.00	---	---	---	---	0.021
0.14	5,718	1000.14	0.10 ic	0.10 ic	0.00	---	0.00	0.00	---	---	---	---	0.099
0.21	8,578	1000.21	0.25 ic	0.23 ic	0.00	---	0.00	0.00	---	---	---	---	0.227
0.28	11,437	1000.28	0.41 ic	0.41 ic	0.00	---	0.00	0.00	---	---	---	---	0.409
0.35	14,296	1000.35	0.68 ic	0.64 ic	0.00	---	0.00	0.00	---	---	---	---	0.636
0.42	17,155	1000.42	0.98 ic	0.92 ic	0.00	---	0.00	0.00	---	---	---	---	0.925
0.49	20,014	1000.49	1.24 ic	1.24 ic	0.00	---	0.00	0.00	---	---	---	---	1.236
0.56	22,874	1000.56	1.66 ic	1.60 ic	0.00	---	0.00	0.00	---	---	---	---	1.597
0.63	25,733	1000.63	2.02 ic	1.95 ic	0.00	---	0.00	0.00	---	---	---	---	1.951
0.70	28,592	1000.70	2.42 ic	2.40 ic	0.00	---	0.00	0.00	---	---	---	---	2.396
0.77	31,571	1000.77	2.88 ic	2.88 ic	0.00	---	0.00	0.00	---	---	---	---	2.879
0.84	34,551	1000.84	3.38 ic	3.33 ic	0.00	---	0.00	0.00	---	---	---	---	3.328
0.91	37,530	1000.91	3.96 ic	3.86 ic	0.00	---	0.00	0.00	---	---	---	---	3.863
0.98	40,509	1000.98	4.35 ic	4.35 ic	0.00	---	0.00	0.00	---	---	---	---	4.347
1.05	43,489	1001.05	4.93 ic	4.90 ic	0.00	---	0.00	0.00	---	---	---	---	4.904
1.12	46,468	1001.12	5.67 ic	5.46 ic	0.00	---	0.00	0.00	---	---	---	---	5.459
1.19	49,447	1001.19	6.06 ic	6.00 ic	0.00	---	0.00	0.00	---	---	---	---	6.003
1.26	52,426	1001.26	6.53 ic	6.53 ic	0.00	---	0.00	0.00	---	---	---	---	6.527
1.33	55,406	1001.33	7.35 ic	7.07 ic	0.00	---	0.00	0.00	---	---	---	---	7.073
1.40	58,385	1001.40	7.82 ic	7.57 ic	0.00	---	0.00	0.00	---	---	---	---	7.571
1.47	61,487	1001.47	8.31 ic	8.08 ic	0.00	---	0.00	0.00	---	---	---	---	8.076
1.54	64,589	1001.54	8.81 ic	8.50 ic	0.00	---	0.00	0.00	---	---	---	---	8.505
1.61	67,690	1001.61	8.87 ic	8.87 ic	0.00	---	0.00	0.00	---	---	---	---	8.866
1.68	70,792	1001.68	9.34 ic	9.21 ic	0.00	---	0.00	0.00	---	---	---	---	9.210
1.75	73,894	1001.75	9.89 ic	9.58 ic	0.00	---	0.00	0.00	---	---	---	---	9.578
1.82	76,996	1001.82	9.93 ic	9.93 ic	0.00	---	0.00	0.00	---	---	---	---	9.932
1.89	80,098	1001.89	10.45 ic	10.27 ic	0.00	---	0.00	0.00	---	---	---	---	10.27
1.96	83,199	1001.96	11.04 ic	10.60 ic	0.00	---	0.00	0.00	---	---	---	---	10.60
2.03	86,301	1002.03	11.04 ic	10.93 ic	0.00	---	0.00	0.00	---	---	---	---	10.93
2.10	89,403	1002.10	11.64 ic	11.24 ic	0.00	---	0.00	0.00	---	---	---	---	11.24

Continues on next page...

Pond D

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
2.17	92,630	1002.17	11.64 ic	11.54 ic	0.00	---	0.00	0.00	---	---	---	---	11.54
2.24	95,857	1002.24	12.27 ic	11.84 ic	0.00	---	0.00	0.00	---	---	---	---	11.84
2.31	99,084	1002.31	12.27 ic	12.12 ic	0.00	---	0.00	0.00	---	---	---	---	12.12
2.38	102,310	1002.38	12.41 ic	12.41 ic	0.00	---	0.00	0.00	---	---	---	---	12.41
2.45	105,537	1002.45	12.92 ic	12.68 ic	0.00	---	0.00	0.00	---	---	---	---	12.68
2.52	108,764	1002.52	12.95 ic	12.95 ic	0.00	---	0.00	0.00	---	---	---	---	12.95
2.59	111,991	1002.59	13.58 ic	13.21 ic	0.00	---	0.00	0.00	---	---	---	---	13.21
2.66	115,218	1002.66	13.58 ic	13.47 ic	0.00	---	0.00	0.00	---	---	---	---	13.47
2.73	118,445	1002.73	13.73 ic	13.73 ic	0.00	---	0.00	0.00	---	---	---	---	13.73
2.80	121,671	1002.80	14.27 ic	13.98 ic	0.00	---	0.00	0.00	---	---	---	---	13.98
2.87	125,026	1002.87	14.27 ic	14.22 ic	0.04 ic	---	0.00	0.00	---	---	---	---	14.26
2.94	128,380	1002.94	14.98 ic	14.46 ic	0.16 ic	---	0.00	0.00	---	---	---	---	14.62
3.01	131,734	1003.01	15.05 ic	14.68 ic	0.37 ic	---	0.00	0.00	---	---	---	---	15.05
3.08	135,089	1003.08	15.71 ic	14.87 ic	0.62 ic	---	0.00	0.00	---	---	---	---	15.49
3.15	138,443	1003.15	16.46 ic	15.03 ic	0.97 ic	---	0.00	0.00	---	---	---	---	15.99
3.22	141,797	1003.22	16.56 ic	15.22 ic	1.34 ic	---	0.00	0.00	---	---	---	---	16.56
3.29	145,152	1003.29	17.23 ic	15.41 ic	1.80 ic	---	0.00	0.00	---	---	---	---	17.21
3.36	148,506	1003.36	18.02 ic	15.57 ic	2.34 ic	---	0.00	0.00	---	---	---	---	17.90
3.43	151,860	1003.43	18.83 ic	15.72 ic	2.97 ic	---	0.00	0.00	---	---	---	---	18.68
3.50	155,215	1003.50	19.66 ic	15.87 ic	3.69 ic	---	0.00	0.00	---	---	---	---	19.56
3.57	158,699	1003.57	20.52 ic	16.02 ic	4.34 ic	---	0.00	0.00	---	---	---	---	20.36
3.64	162,183	1003.64	21.39 ic	16.16 ic	5.06 ic	---	0.00	0.00	---	---	---	---	21.22
3.71	165,667	1003.71	22.32 ic	16.30 ic	6.03 ic	---	0.00	0.00	---	---	---	---	22.32
3.78	169,152	1003.78	23.30 ic	16.42 ic	6.87 ic	---	0.00	0.00	---	---	---	---	23.30
3.85	172,636	1003.85	24.33 ic	16.54 ic	7.78 ic	---	0.00	0.00	---	---	---	---	24.32
3.92	176,120	1003.92	26.05 ic	16.67 ic	8.74 ic	---	0.00	0.00	---	---	---	---	25.41
3.99	179,604	1003.99	27.04 ic	16.81 ic	9.76 ic	---	0.00	0.00	---	---	---	---	26.57
4.06	183,089	1004.06	28.97 oc	16.88 ic	10.83 ic	---	0.00	0.78	---	---	---	---	28.49
4.13	186,573	1004.13	31.54 oc	16.88 ic	11.94 ic	---	0.00	2.50	---	---	---	---	31.32
4.20	190,057	1004.20	35.05 oc	16.81 ic	13.10 ic	---	0.00	4.77	---	---	---	---	34.68
4.27	193,674	1004.27	38.61 oc	16.74 ic	14.30 ic	---	0.00	7.48	---	---	---	---	38.52
4.34	197,290	1004.34	43.08 oc	16.60 ic	15.53 ic	---	0.00	10.56	---	---	---	---	42.70
4.41	200,907	1004.41	47.52 oc	16.46 ic	16.79 ic	---	0.00	13.99	---	---	---	---	47.24
4.48	204,524	1004.48	52.72 oc	16.25 ic	18.08 ic	---	0.00	17.72	---	---	---	---	52.05
4.55	208,140	1004.55	57.69 oc	16.05 ic	19.39 ic	---	0.00	21.74	---	---	---	---	57.17
4.62	211,757	1004.62	63.07 oc	15.78 ic	20.71 ic	---	0.00	26.01	---	---	---	---	62.50
4.69	215,374	1004.69	68.52 oc	15.47 ic	22.04 ic	---	0.00	30.54	---	---	---	---	68.05
4.76	218,990	1004.76	74.08 oc	15.08 ic	23.37 ic	---	0.00	35.31	---	---	---	---	73.75
4.83	222,607	1004.83	79.56 oc	14.50 ic	24.70 ic	---	0.00	40.29	---	---	---	---	79.49
4.90	226,224	1004.90	85.29 oc	13.48 ic	26.31 ic	---	0.00	45.49	---	---	---	---	85.29
4.97	229,975	1004.97	91.93 oc	13.41 ic	27.61 ic	---	0.00	50.90	---	---	---	---	91.92
5.04	233,727	1005.04	98.70 oc	13.30 ic	28.89 ic	---	0.00	56.51	---	---	---	---	98.70
5.11	237,478	1005.11	105.86 oc	13.15 ic	30.40 ic	---	0.00	62.31	---	---	---	---	105.86
5.18	241,230	1005.18	112.88 oc	12.97 ic	31.61 ic	---	0.00	68.30	---	---	---	---	112.88
5.25	244,982	1005.25	120.21 oc	12.73 ic	33.01 ic	---	0.00	74.47	---	---	---	---	120.21
5.32	248,733	1005.32	127.61 oc	12.46 ic	34.34 ic	---	0.00	80.81	---	---	---	---	127.60
5.39	252,485	1005.39	135.05 oc	12.14 ic	35.59 ic	---	0.00	87.32	---	---	---	---	135.05
5.46	256,236	1005.46	142.43 oc	11.78 ic	36.91 ic	---	0.00	93.74 s	---	---	---	---	142.43
5.53	259,988	1005.53	148.42 oc	11.51 ic	37.77 ic	---	0.00	99.14 s	---	---	---	---	148.42
5.60	263,739	1005.60	153.35 oc	11.32 ic	37.69 ic	---	0.00	104.33 s	---	---	---	---	153.34
5.67	267,628	1005.67	158.04 oc	11.13 ic	37.61 ic	---	0.00	109.30 s	---	---	---	---	158.04
5.74	271,517	1005.74	162.46 oc	10.96 ic	37.38 ic	---	0.00	114.11 s	---	---	---	---	162.45
5.81	275,406	1005.81	166.63 oc	10.80 ic	37.00 ic	---	0.00	118.82 s	---	---	---	---	166.63
5.88	279,295	1005.88	170.59 oc	10.65 ic	36.49 ic	---	0.00	123.44 s	---	---	---	---	170.59
5.95	283,184	1005.95	174.44 oc	10.50 ic	35.99 ic	---	0.00	127.94 s	---	---	---	---	174.44
6.02	287,073	1006.02	178.31 oc	10.34 ic	35.42 ic	---	0.36	132.18 s	---	---	---	---	178.31
6.09	290,962	1006.09	183.03 oc	10.05 ic	34.42 ic	---	3.39	135.17 s	---	---	---	---	183.03
6.16	294,851	1006.16	188.07 oc	9.68 ic	33.16 ic	---	8.04	137.18 s	---	---	---	---	188.06
6.23	298,740	1006.23	193.19 oc	9.27 ic	31.74 ic	---	13.85	138.33 s	---	---	---	---	193.19
6.30	302,629	1006.30	198.26 oc	8.82 ic	30.20 ic	---	20.63	138.61 s	---	---	---	---	198.26
6.37	306,657	1006.37	203.23 oc	8.34 ic	28.57 ic	---	28.25	138.06 s	---	---	---	---	203.22
6.44	310,686	1006.44	208.04 oc	7.84 ic	26.87 ic	---	36.64	136.68 s	---	---	---	---	208.03
6.51	314,715	1006.51	212.66 oc	7.33 ic	25.11 ic	---	45.72	134.48 s	---	---	---	---	212.65
6.58	318,744	1006.58	216.77 oc	6.88 ic	23.56 ic	---	53.87 s	132.45 s	---	---	---	---	216.75
6.65	322,772	1006.65	220.36 oc	6.51 ic	22.29 ic	---	60.43 s	131.12 s	---	---	---	---	220.35
6.72	326,801	1006.72	223.65 oc	6.18 ic	21.17 ic	---	66.31 s	129.99 s	---	---	---	---	223.65
6.79	330,830	1006.79	226.73 oc	5.88 ic	20.15 ic	---	71.72 s	128.98 s	---	---	---	---	226.73
6.86	334,859	1006.86	229.25 ic	5.60 ic	19.18 ic	---	76.63 s	127.84 s	---	---	---	---	229.24
6.93	338,887	1006.93	231.50 ic	5.34 ic	18.28 ic	---	81.15 s	126.71 s	---	---	---	---	231.47
7.00	342,916	1007.00	233.63 ic	5.10 ic	17.45 ic	---	85.38 s	125.70 s	---	---	---	---	233.63

...End

Hydrograph Report

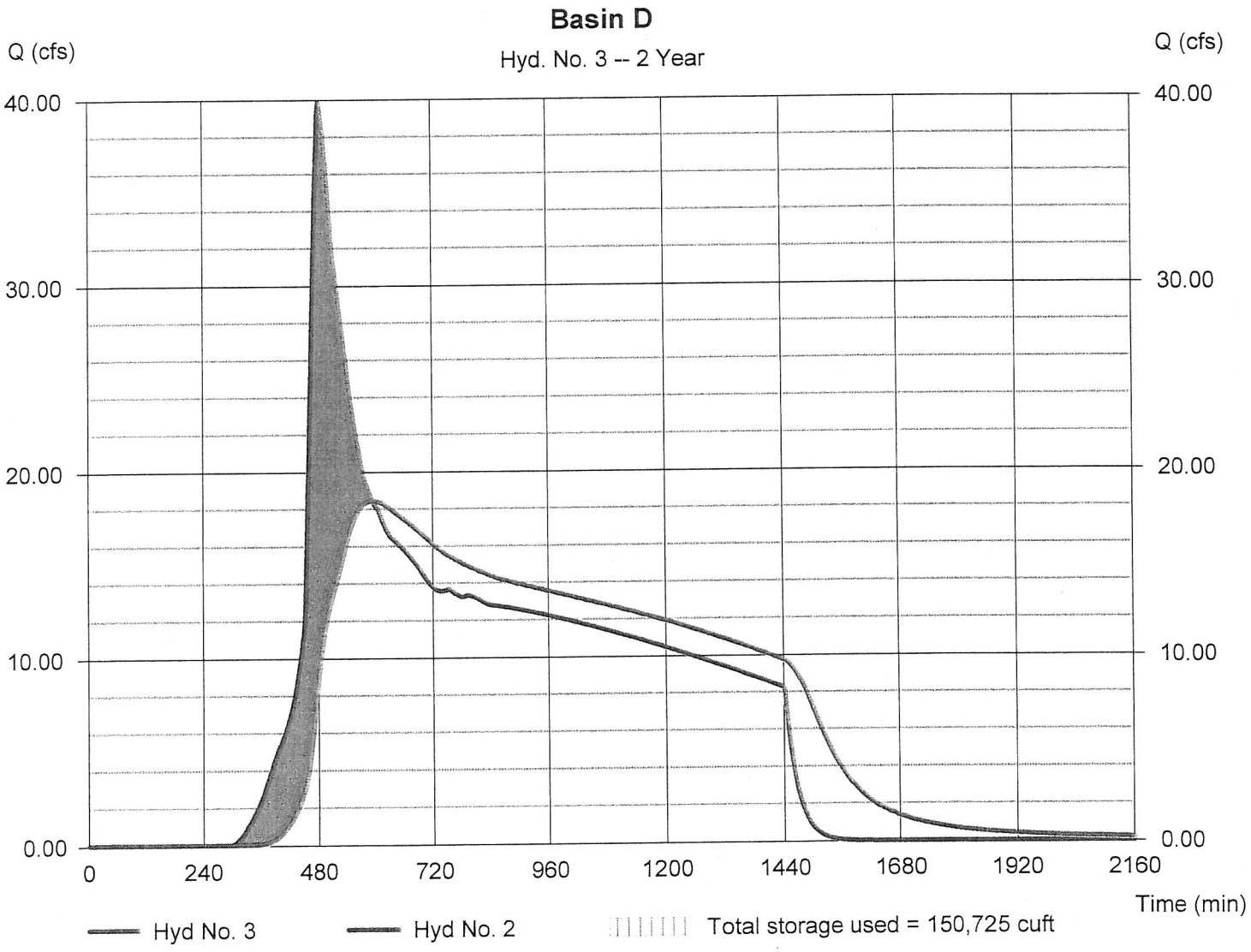
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 — Tuesday, Dec 8, 2009

Hyd. No. 3

Basin D

Hydrograph type	= Reservoir	Peak discharge	= 18.42 cfs
Storm frequency	= 2 yrs	Time to peak	= 594 min
Time interval	= 2 min	Hyd. volume	= 887,982 cuft
Inflow hyd. No.	= 2 - Basin D - Post	Max. Elevation	= 1003.41 ft
Reservoir name	= Pond D	Max. Storage	= 150,725 cuft

Storage Indication method used.



Hydrograph Report

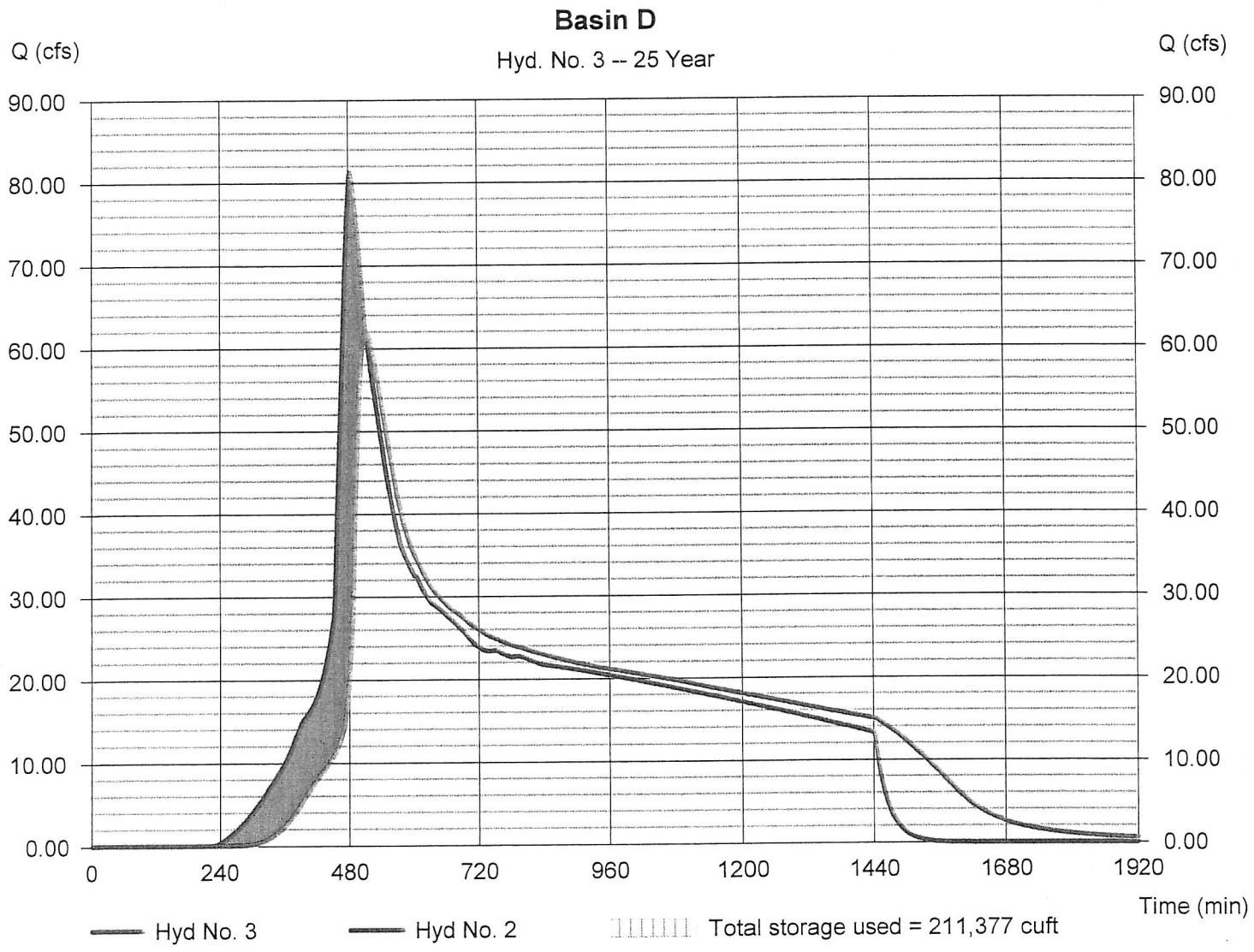
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 — Tuesday, Dec 8, 2009

Hyd. No. 3

Basin D

Hydrograph type	= Reservoir	Peak discharge	= 61.94 cfs
Storm frequency	= 25 yrs	Time to peak	= 510 min
Time interval	= 2 min	Hyd. volume	= 1,619,687 cuft
Inflow hyd. No.	= 2 - Basin D - Post	Max. Elevation	= 1004.61 ft
Reservoir name	= Pond D	Max. Storage	= 211,377 cuft

Storage Indication method used.



Hydrograph Report

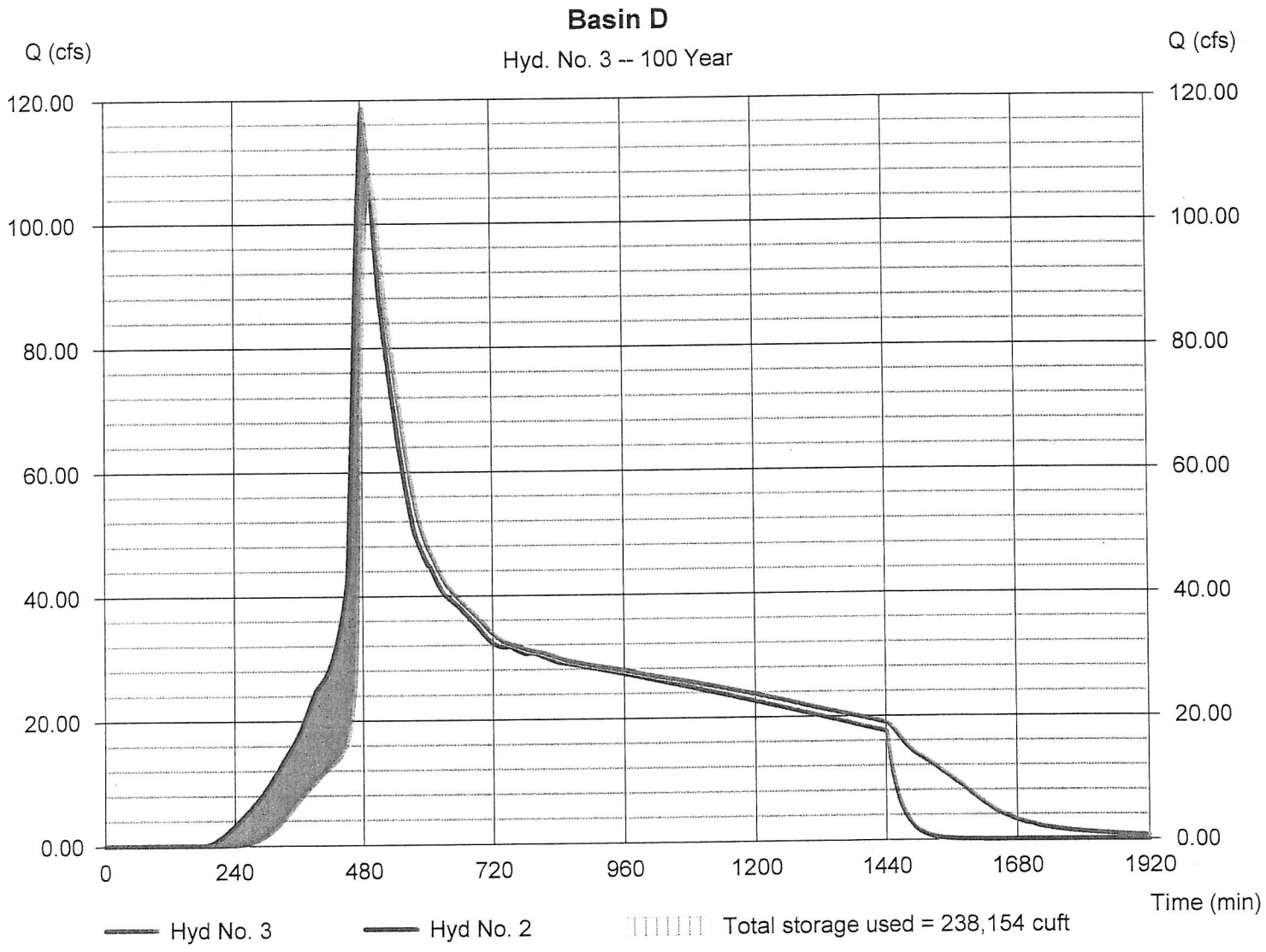
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Dec 8, 2009

Hyd. No. 3

Basin D

Hydrograph type	= Reservoir	Peak discharge	= 107.12 cfs
Storm frequency	= 100 yrs	Time to peak	= 496 min
Time interval	= 2 min	Hyd. volume	= 2,272,256 cuft
Inflow hyd. No.	= 2 - Basin D - Post	Max. Elevation	= 1005.12 ft
Reservoir name	= Pond D	Max. Storage	= 238,154 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 — Tuesday, Dec 8, 2009

Pond No. 1 - Pond E

Pond Data

Trapezoid - Bottom L x W = 145.0 x 145.0 ft, Side slope = 2.00:1, Bottom elev. = 1000.00 ft, Depth = 8.50 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	1000.00	21,025	0	0
0.85	1000.85	22,023	18,294	18,294
1.70	1001.70	23,043	19,151	37,445
2.55	1002.55	24,087	20,029	57,474
3.40	1003.40	25,154	20,926	78,399
4.25	1004.25	26,244	21,842	100,242
5.10	1005.10	27,357	22,779	123,021
5.95	1005.95	28,493	23,735	146,756
6.80	1006.80	29,653	24,711	171,466
7.65	1007.65	30,835	25,706	197,172
8.50	1008.50	32,041	26,721	223,893

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 36.00	15.50	36.00	0.00
Span (in)	= 36.00	15.50	36.00	0.00
No. Barrels	= 1	1	1	0
Invert El. (ft)	= 1000.00	1000.01	1003.93	0.00
Length (ft)	= 100.00	0.00	0.00	0.00
Slope (%)	= 3.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 31.42	10.00	0.00	0.00
Crest El. (ft)	= 1007.00	1005.80	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Riser	Rect	---	---
Multi-Stage	= Yes	Yes	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	1000.00	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
0.09	1,829	1000.09	0.03 ic	0.03 ic	0.00	---	0.00	0.00	---	---	---	---	0.026
0.17	3,659	1000.17	0.11 ic	0.11 ic	0.00	---	0.00	0.00	---	---	---	---	0.107
0.26	5,488	1000.26	0.26 ic	0.24 ic	0.00	---	0.00	0.00	---	---	---	---	0.243
0.34	7,317	1000.34	0.45 ic	0.42 ic	0.00	---	0.00	0.00	---	---	---	---	0.424
0.43	9,147	1000.43	0.67 ic	0.66 ic	0.00	---	0.00	0.00	---	---	---	---	0.657
0.51	10,976	1000.51	0.96 ic	0.93 ic	0.00	---	0.00	0.00	---	---	---	---	0.931
0.60	12,806	1000.60	1.24 ic	1.24 ic	0.00	---	0.00	0.00	---	---	---	---	1.241
0.68	14,635	1000.68	1.64 ic	1.58 ic	0.00	---	0.00	0.00	---	---	---	---	1.583
0.76	16,464	1000.77	2.02 ic	1.95 ic	0.00	---	0.00	0.00	---	---	---	---	1.948
0.85	18,294	1000.85	2.45 ic	2.35 ic	0.00	---	0.00	0.00	---	---	---	---	2.347
0.94	20,209	1000.94	2.79 ic	2.79 ic	0.00	---	0.00	0.00	---	---	---	---	2.786
1.02	22,124	1001.02	3.30 ic	3.21 ic	0.00	---	0.00	0.00	---	---	---	---	3.212
1.11	24,039	1001.11	3.68 ic	3.65 ic	0.00	---	0.00	0.00	---	---	---	---	3.647
1.19	25,954	1001.19	4.09 ic	4.08 ic	0.00	---	0.00	0.00	---	---	---	---	4.084
1.28	27,869	1001.28	4.53 ic	4.43 ic	0.00	---	0.00	0.00	---	---	---	---	4.430
1.36	29,784	1001.36	4.76 ic	4.73 ic	0.00	---	0.00	0.00	---	---	---	---	4.729
1.45	31,700	1001.45	4.99 ic	4.99 ic	0.00	---	0.00	0.00	---	---	---	---	4.992
1.53	33,615	1001.53	5.24 ic	5.24 ic	0.00	---	0.00	0.00	---	---	---	---	5.238
1.62	35,530	1001.62	5.49 ic	5.48 ic	0.00	---	0.00	0.00	---	---	---	---	5.477
1.70	37,445	1001.70	5.74 ic	5.70 ic	0.00	---	0.00	0.00	---	---	---	---	5.703
1.79	39,448	1001.79	6.01 ic	5.92 ic	0.00	---	0.00	0.00	---	---	---	---	5.920
1.87	41,451	1001.87	6.28 ic	6.13 ic	0.00	---	0.00	0.00	---	---	---	---	6.129
1.96	43,454	1001.96	6.34 ic	6.34 ic	0.00	---	0.00	0.00	---	---	---	---	6.341
2.04	45,456	1002.04	6.58 ic	6.58 ic	0.00	---	0.00	0.00	---	---	---	---	6.575
2.13	47,459	1002.13	6.84 ic	6.78 ic	0.00	---	0.00	0.00	---	---	---	---	6.781
2.21	49,462	1002.21	7.13 ic	6.96 ic	0.00	---	0.00	0.00	---	---	---	---	6.963
2.30	51,465	1002.30	7.17 ic	7.17 ic	0.00	---	0.00	0.00	---	---	---	---	7.170
2.38	53,468	1002.38	7.43 ic	7.37 ic	0.00	---	0.00	0.00	---	---	---	---	7.373
2.47	55,471	1002.47	7.73 ic	7.54 ic	0.00	---	0.00	0.00	---	---	---	---	7.540
2.55	57,474	1002.55	7.75 ic	7.75 ic	0.00	---	0.00	0.00	---	---	---	---	7.749

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Pond E

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
2.64	59,566	1002.64	8.04 ic	7.92 ic	0.00	---	0.00	0.00	---	---	---	---	7.920
2.72	61,659	1002.72	8.10 ic	8.10 ic	0.00	---	0.00	0.00	---	---	---	---	8.096
2.81	63,751	1002.81	8.36 ic	8.28 ic	0.00	---	0.00	0.00	---	---	---	---	8.282
2.89	65,844	1002.89	8.44 ic	8.44 ic	0.00	---	0.00	0.00	---	---	---	---	8.436
2.98	67,937	1002.98	8.68 ic	8.63 ic	0.00	---	0.00	0.00	---	---	---	---	8.629
3.06	70,029	1003.06	9.01 ic	8.77 ic	0.00	---	0.00	0.00	---	---	---	---	8.771
3.15	72,122	1003.15	9.01 ic	8.96 ic	0.00	---	0.00	0.00	---	---	---	---	8.962
3.23	74,214	1003.23	9.10 ic	9.10 ic	0.00	---	0.00	0.00	---	---	---	---	9.100
3.32	76,307	1003.32	9.35 ic	9.28 ic	0.00	---	0.00	0.00	---	---	---	---	9.283
3.40	78,399	1003.40	9.42 ic	9.42 ic	0.00	---	0.00	0.00	---	---	---	---	9.424
3.49	80,584	1003.49	9.69 ic	9.59 ic	0.00	---	0.00	0.00	---	---	---	---	9.593
3.57	82,768	1003.57	9.74 ic	9.74 ic	0.00	---	0.00	0.00	---	---	---	---	9.742
3.66	84,952	1003.66	10.04 ic	9.89 ic	0.00	---	0.00	0.00	---	---	---	---	9.893
3.74	87,136	1003.74	10.05 ic	10.05 ic	0.00	---	0.00	0.00	---	---	---	---	10.05
3.83	89,321	1003.83	10.39 ic	10.18 ic	0.00	---	0.00	0.00	---	---	---	---	10.18
3.91	91,505	1003.91	10.39 ic	10.35 ic	0.00	---	0.00	0.00	---	---	---	---	10.35
4.00	93,689	1004.00	10.75 ic	10.47 ic	0.03 ic	---	0.00	0.00	---	---	---	---	10.50
4.08	95,873	1004.08	10.79 ic	10.61 ic	0.18 ic	---	0.00	0.00	---	---	---	---	10.79
4.17	98,058	1004.17	11.17 ic	10.72 ic	0.45 ic	---	0.00	0.00	---	---	---	---	11.17
4.25	100,242	1004.25	11.86 ic	10.81 ic	0.81 ic	---	0.00	0.00	---	---	---	---	11.63
4.34	102,520	1004.34	12.24 ic	10.93 ic	1.24 ic	---	0.00	0.00	---	---	---	---	12.17
4.42	104,798	1004.42	13.02 ic	11.00 ic	1.80 ic	---	0.00	0.00	---	---	---	---	12.79
4.51	107,076	1004.51	13.81 ic	11.06 ic	2.48 ic	---	0.00	0.00	---	---	---	---	13.54
4.59	109,353	1004.59	14.62 ic	11.13 ic	3.30 ic	---	0.00	0.00	---	---	---	---	14.43
4.68	111,631	1004.68	15.45 ic	11.20 ic	4.11 ic	---	0.00	0.00	---	---	---	---	15.31
4.76	113,909	1004.76	16.29 ic	11.26 ic	5.03 ic	---	0.00	0.00	---	---	---	---	16.29
4.85	116,187	1004.85	17.57 ic	11.29 ic	6.04 ic	---	0.00	0.00	---	---	---	---	17.33
4.93	118,465	1004.93	18.50 ic	11.34 ic	7.16 ic	---	0.00	0.00	---	---	---	---	18.50
5.02	120,743	1005.02	19.75 ic	11.38 ic	8.37 ic	---	0.00	0.00	---	---	---	---	19.75
5.10	123,021	1005.10	21.06 ic	11.41 ic	9.43 ic	---	0.00	0.00	---	---	---	---	20.84
5.19	125,394	1005.19	22.38 ic	11.44 ic	10.81 ic	---	0.00	0.00	---	---	---	---	22.25
5.27	127,768	1005.27	23.73 ic	11.46 ic	12.26 ic	---	0.00	0.00	---	---	---	---	23.72
5.36	130,141	1005.36	25.00 ic	11.50 ic	13.50 ic	---	0.00	0.00	---	---	---	---	25.00
5.44	132,515	1005.44	26.71 ic	11.50 ic	15.08 ic	---	0.00	0.00	---	---	---	---	26.58
5.53	134,888	1005.53	28.37 ic	11.50 ic	16.71 ic	---	0.00	0.00	---	---	---	---	28.21
5.61	137,262	1005.61	29.61 ic	11.53 ic	18.08 ic	---	0.00	0.00	---	---	---	---	29.61
5.70	139,635	1005.70	31.49 ic	11.52 ic	19.78 ic	---	0.00	0.00	---	---	---	---	31.30
5.78	142,009	1005.78	32.93 ic	11.53 ic	21.19 ic	---	0.00	0.00	---	---	---	---	32.72
5.87	144,382	1005.87	34.95 ic	11.48 ic	22.91 ic	---	0.00	0.55	---	---	---	---	34.95
5.95	146,756	1005.95	37.91 ic	11.34 ic	24.64 ic	---	0.00	1.94	---	---	---	---	37.91
6.04	149,227	1006.04	41.21 ic	11.08 ic	26.34 ic	---	0.00	3.79	---	---	---	---	41.21
6.12	151,698	1006.12	44.77 ic	10.72 ic	28.02 ic	---	0.00	6.03	---	---	---	---	44.77
6.21	154,169	1006.21	48.55 ic	10.31 ic	29.65 ic	---	0.00	8.59	---	---	---	---	48.54
6.29	156,640	1006.29	52.46 ic	9.80 ic	31.23 ic	---	0.00	11.43	---	---	---	---	52.46
6.38	159,111	1006.38	56.65 ic	9.15 ic	32.98 ic	---	0.00	14.52	---	---	---	---	56.65
6.46	161,582	1006.46	60.85 ic	8.38 ic	34.61 ic	---	0.00	17.86	---	---	---	---	60.85
6.55	164,053	1006.55	64.99 ic	7.46 ic	36.11 ic	---	0.00	21.42	---	---	---	---	64.99
6.63	166,524	1006.63	67.50 ic	6.90 ic	35.41 ic	---	0.00	25.19	---	---	---	---	67.50
6.72	168,995	1006.72	69.45 ic	6.47 ic	33.82 ic	---	0.00	29.16	---	---	---	---	69.45
6.80	171,466	1006.80	71.23 ic	6.05 ic	32.17 ic	---	0.00	33.00 s	---	---	---	---	71.23
6.89	174,037	1006.89	72.62 ic	5.75 ic	30.94 ic	---	0.00	35.93 s	---	---	---	---	72.62
6.97	176,607	1006.97	73.83 ic	5.51 ic	29.73 ic	---	0.00	38.58 s	---	---	---	---	73.83
7.06	179,178	1007.06	75.15 ic	5.20 ic	28.04 ic	---	1.35	40.56 s	---	---	---	---	75.15
7.14	181,748	1007.14	76.73 ic	4.71 ic	25.40 ic	---	5.49	41.13 s	---	---	---	---	76.72
7.23	184,319	1007.23	78.28 ic	4.15 ic	22.41 ic	---	11.17	40.55 s	---	---	---	---	78.28
7.31	186,890	1007.31	79.74 ic	3.57 ic	19.23 ic	---	18.07	38.87 s	---	---	---	---	79.73
7.40	189,460	1007.40	80.90 ic	3.12 ic	16.83 ic	---	23.44 s	37.51 s	---	---	---	---	80.89
7.48	192,031	1007.48	81.85 ic	2.78 ic	15.02 ic	---	27.49 s	36.56 s	---	---	---	---	81.85
7.57	194,601	1007.57	82.71 ic	2.51 ic	13.54 ic	---	30.91 s	35.75 s	---	---	---	---	82.70
7.65	197,172	1007.65	83.49 ic	2.28 ic	12.30 ic	---	33.85 s	35.05 s	---	---	---	---	83.48
7.74	199,844	1007.74	84.23 ic	2.08 ic	11.24 ic	---	36.44 s	34.45 s	---	---	---	---	84.21
7.82	202,516	1007.82	84.93 ic	1.92 ic	10.34 ic	---	38.73 s	33.91 s	---	---	---	---	84.90
7.91	205,188	1007.91	85.59 ic	1.77 ic	9.55 ic	---	40.79 s	33.44 s	---	---	---	---	85.56
7.99	207,860	1007.99	86.24 ic	1.64 ic	8.87 ic	---	42.66 s	33.03 s	---	---	---	---	86.20
8.08	210,532	1008.08	86.87 ic	1.53 ic	8.27 ic	---	44.38 s	32.68 s	---	---	---	---	86.86
8.16	213,204	1008.16	87.48 ic	1.43 ic	7.74 ic	---	45.93 s	32.34 s	---	---	---	---	87.43
8.25	215,877	1008.25	88.08 ic	1.35 ic	7.27 ic	---	47.39 s	32.07 s	---	---	---	---	88.07
8.33	218,549	1008.33	88.68 ic	1.27 ic	6.84 ic	---	48.72 s	31.80 s	---	---	---	---	88.63
8.42	221,221	1008.42	89.26 ic	1.20 ic	6.45 ic	---	49.96 s	31.57 s	---	---	---	---	89.17
8.50	223,893	1008.50	89.83 ic	1.13 ic	6.11 ic	---	51.12 s	31.36 s	---	---	---	---	89.73

...End

Hydrograph Report

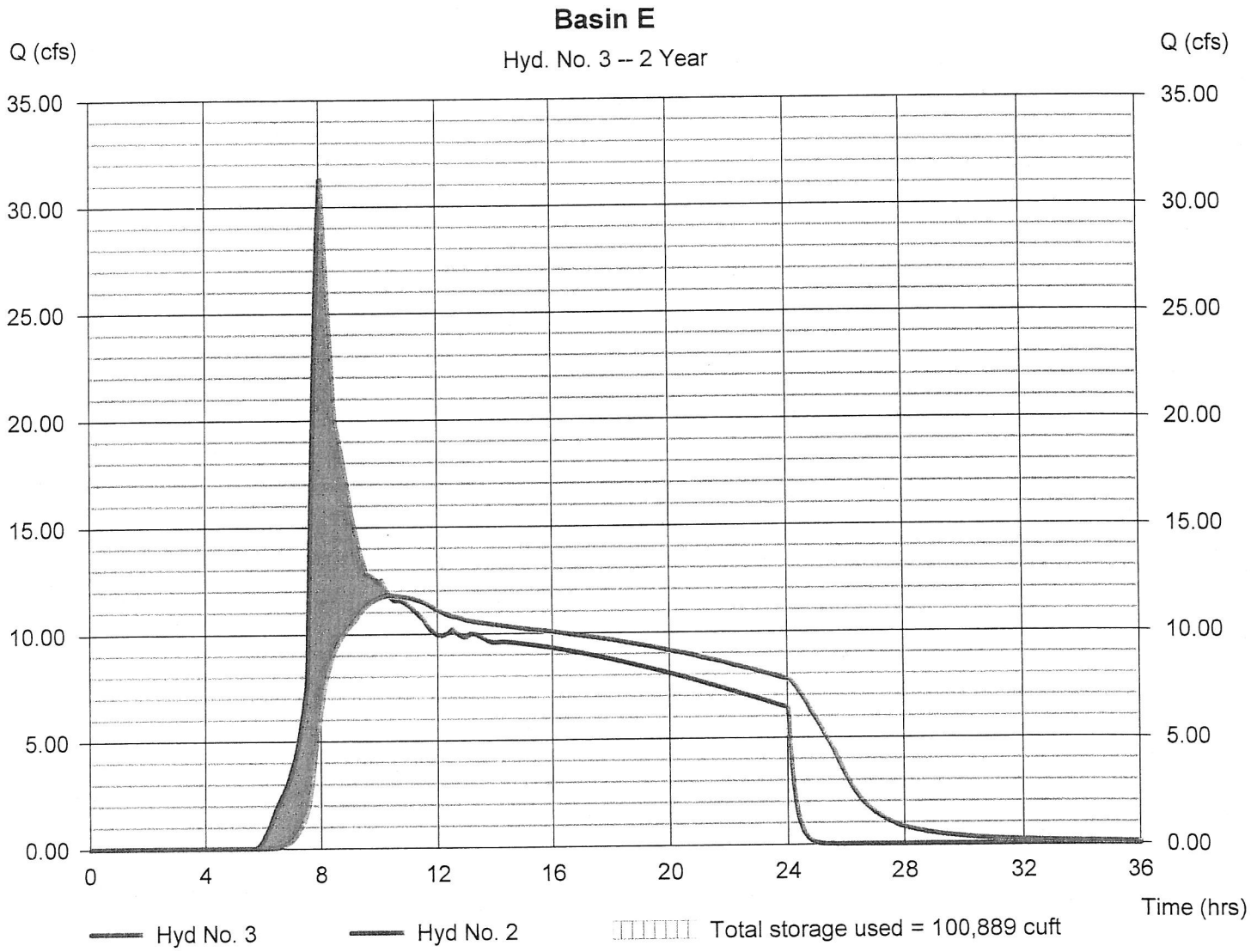
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Dec 8, 2009

Hyd. No. 3

Basin E

Hydrograph type	= Reservoir	Peak discharge	= 11.78 cfs
Storm frequency	= 2 yrs	Time to peak	= 10.37 hrs
Time interval	= 2 min	Hyd. volume	= 638,086 cuft
Inflow hyd. No.	= 2 - Basin E - Post	Max. Elevation	= 1004.27 ft
Reservoir name	= Pond E	Max. Storage	= 100,889 cuft

Storage Indication method used.



Hydrograph Report

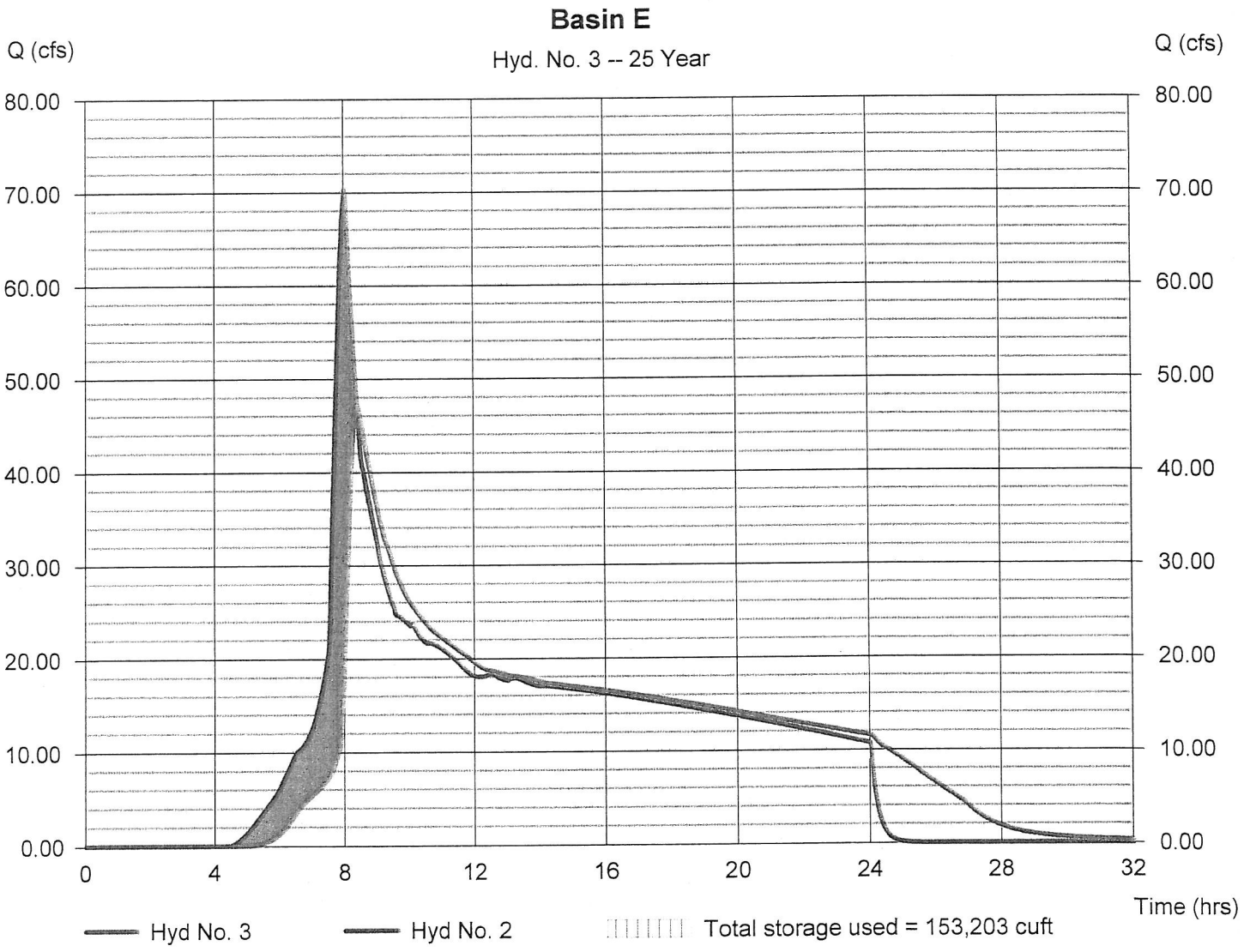
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Dec 8, 2009

Hyd. No. 3

Basin E

Hydrograph type	= Reservoir	Peak discharge	= 47.07 cfs
Storm frequency	= 25 yrs	Time to peak	= 8.40 hrs
Time interval	= 2 min	Hyd. volume	= 1,226,975 cuft
Inflow hyd. No.	= 2 - Basin E - Post	Max. Elevation	= 1006.17 ft
Reservoir name	= Pond E	Max. Storage	= 153,203 cuft

Storage Indication method used.



Hydrograph Report

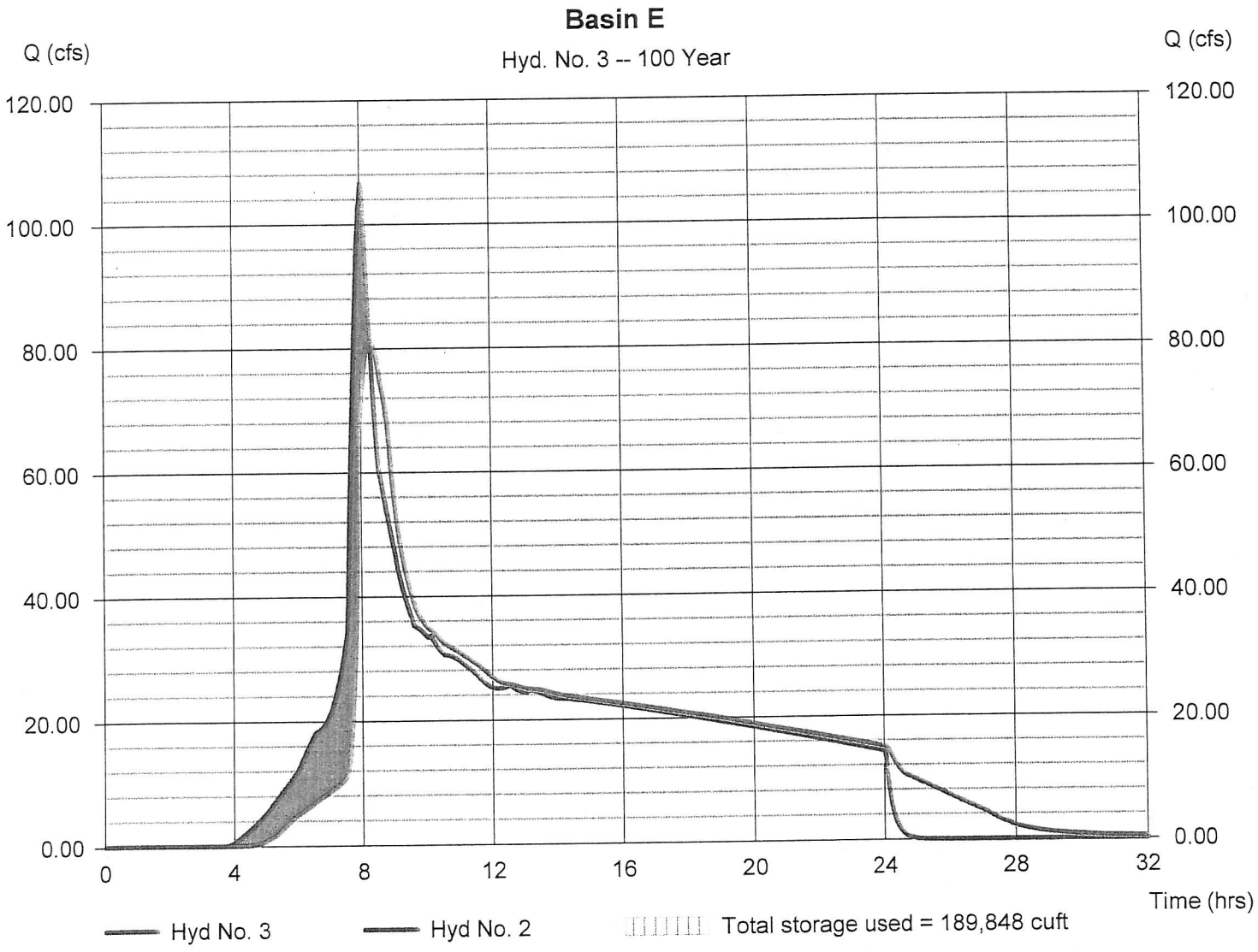
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 — Tuesday, Dec 8, 2009

Hyd. No. 3

Basin E

Hydrograph type	= Reservoir	Peak discharge	= 81.03 cfs
Storm frequency	= 100 yrs	Time to peak	= 8.27 hrs
Time interval	= 2 min	Hyd. volume	= 1,764,708 cuft
Inflow hyd. No.	= 2 - Basin E - Post	Max. Elevation	= 1007.41 ft
Reservoir name	= Pond E	Max. Storage	= 189,848 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 — Tuesday, Dec 8, 2009

Pond No. 1 - Pond F

Pond Data

Trapezoid - Bottom L x W = 70.0 x 70.0 ft, Side slope = 3.00:1, Bottom elev. = 1000.00 ft, Depth = 4.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	1000.00	4,900	0	0
0.40	1000.40	5,242	2,028	2,028
0.80	1000.80	5,595	2,167	4,195
1.20	1001.20	5,960	2,311	6,506
1.60	1001.60	6,336	2,459	8,964
2.00	1002.00	6,724	2,612	11,576
2.40	1002.40	7,123	2,769	14,345
2.80	1002.80	7,534	2,931	17,276
3.20	1003.20	7,957	3,098	20,374
3.60	1003.60	8,391	3,269	23,643
4.00	1004.00	8,836	3,445	27,088

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	7.50	Inactive	0.00
Span (in)	= 18.00	7.50	6.00	0.00
No. Barrels	= 1	1	1	0
Invert El. (ft)	= 1000.00	1000.01	1001.00	0.00
Length (ft)	= 100.00	0.00	0.00	0.00
Slope (%)	= 3.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 6.28	3.00	0.00	0.00
Crest El. (ft)	= 1003.00	1001.90	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Riser	Rect	---	---
Multi-Stage	= Yes	Yes	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	1000.00	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
0.04	203	1000.04	0.00	0.00 ic	0.00	---	0.00	0.00	---	---	---	---	0.003
0.08	406	1000.08	0.00	0.02 ic	0.00	---	0.00	0.00	---	---	---	---	0.017
0.12	608	1000.12	0.00	0.04 ic	0.00	---	0.00	0.00	---	---	---	---	0.041
0.16	811	1000.16	0.00	0.07 ic	0.00	---	0.00	0.00	---	---	---	---	0.075
0.20	1,014	1000.20	0.00	0.12 ic	0.00	---	0.00	0.00	---	---	---	---	0.117
0.24	1,217	1000.24	0.00	0.17 ic	0.00	---	0.00	0.00	---	---	---	---	0.167
0.28	1,420	1000.28	0.00	0.22 ic	0.00	---	0.00	0.00	---	---	---	---	0.224
0.32	1,622	1000.32	0.00	0.29 ic	0.00	---	0.00	0.00	---	---	---	---	0.288
0.36	1,825	1000.36	0.00	0.36 ic	0.00	---	0.00	0.00	---	---	---	---	0.356
0.40	2,028	1000.40	0.00	0.43 ic	0.00	---	0.00	0.00	---	---	---	---	0.428
0.44	2,245	1000.44	0.00	0.50 ic	0.00	---	0.00	0.00	---	---	---	---	0.503
0.48	2,461	1000.48	0.00	0.58 ic	0.00	---	0.00	0.00	---	---	---	---	0.578
0.52	2,678	1000.52	0.00	0.65 ic	0.00	---	0.00	0.00	---	---	---	---	0.652
0.56	2,895	1000.56	0.00	0.72 ic	0.00	---	0.00	0.00	---	---	---	---	0.722
0.60	3,111	1000.60	0.00	0.78 ic	0.00	---	0.00	0.00	---	---	---	---	0.785
0.64	3,328	1000.64	0.00	0.83 ic	0.00	---	0.00	0.00	---	---	---	---	0.832
0.68	3,545	1000.68	0.00	0.88 ic	0.00	---	0.00	0.00	---	---	---	---	0.883
0.72	3,762	1000.72	0.00	0.93 ic	0.00	---	0.00	0.00	---	---	---	---	0.931
0.76	3,978	1000.76	0.00	0.98 ic	0.00	---	0.00	0.00	---	---	---	---	0.977
0.80	4,195	1000.80	0.00	1.02 ic	0.00	---	0.00	0.00	---	---	---	---	1.021
0.84	4,426	1000.84	0.00	1.06 ic	0.00	---	0.00	0.00	---	---	---	---	1.062
0.88	4,657	1000.88	0.00	1.10 ic	0.00	---	0.00	0.00	---	---	---	---	1.103
0.92	4,888	1000.92	0.00	1.14 ic	0.00	---	0.00	0.00	---	---	---	---	1.142
0.96	5,119	1000.96	0.00	1.18 ic	0.00	---	0.00	0.00	---	---	---	---	1.179
1.00	5,350	1001.00	0.00	1.22 ic	0.00	---	0.00	0.00	---	---	---	---	1.216
1.04	5,581	1001.04	0.00	1.25 ic	0.00	---	0.00	0.00	---	---	---	---	1.251
1.08	5,812	1001.08	0.00	1.29 ic	0.00	---	0.00	0.00	---	---	---	---	1.285
1.12	6,043	1001.12	0.00	1.32 ic	0.00	---	0.00	0.00	---	---	---	---	1.319
1.16	6,274	1001.16	0.00	1.35 ic	0.00	---	0.00	0.00	---	---	---	---	1.352
1.20	6,506	1001.20	0.00	1.38 ic	0.00	---	0.00	0.00	---	---	---	---	1.384

Continues on next page...

Pond F

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
1.24	6,751	1001.24	0.00	1.41 ic	0.00	---	0.00	0.00	---	---	---	---	1.415
1.28	6,997	1001.28	0.00	1.45 ic	0.00	---	0.00	0.00	---	---	---	---	1.445
1.32	7,243	1001.32	0.00	1.48 ic	0.00	---	0.00	0.00	---	---	---	---	1.475
1.36	7,489	1001.36	0.00	1.50 ic	0.00	---	0.00	0.00	---	---	---	---	1.504
1.40	7,735	1001.40	0.00	1.53 ic	0.00	---	0.00	0.00	---	---	---	---	1.533
1.44	7,981	1001.44	0.00	1.56 ic	0.00	---	0.00	0.00	---	---	---	---	1.561
1.48	8,227	1001.48	0.00	1.59 ic	0.00	---	0.00	0.00	---	---	---	---	1.589
1.52	8,473	1001.52	0.00	1.62 ic	0.00	---	0.00	0.00	---	---	---	---	1.616
1.56	8,718	1001.56	0.00	1.64 ic	0.00	---	0.00	0.00	---	---	---	---	1.643
1.60	8,964	1001.60	0.00	1.67 ic	0.00	---	0.00	0.00	---	---	---	---	1.669
1.64	9,226	1001.64	0.00	1.70 ic	0.00	---	0.00	0.00	---	---	---	---	1.695
1.68	9,487	1001.68	0.00	1.72 ic	0.00	---	0.00	0.00	---	---	---	---	1.721
1.72	9,748	1001.72	0.00	1.75 ic	0.00	---	0.00	0.00	---	---	---	---	1.746
1.76	10,009	1001.76	0.00	1.77 ic	0.00	---	0.00	0.00	---	---	---	---	1.771
1.80	10,270	1001.80	0.00	1.80 ic	0.00	---	0.00	0.00	---	---	---	---	1.795
1.84	10,531	1001.84	0.00	1.82 ic	0.00	---	0.00	0.00	---	---	---	---	1.819
1.88	10,793	1001.88	0.00	1.84 ic	0.00	---	0.00	0.00	---	---	---	---	1.843
1.92	11,054	1001.92	0.03 ic	1.87 ic	0.00	---	0.00	0.03	---	---	---	---	1.895
1.96	11,315	1001.96	0.16 ic	1.89 ic	0.00	---	0.00	0.15	---	---	---	---	2.036
2.00	11,576	1002.00	0.32 ic	1.91 ic	0.00	---	0.00	0.32	---	---	---	---	2.229
2.04	11,853	1002.04	0.52 ic	1.94 ic	0.00	---	0.00	0.52	---	---	---	---	2.459
2.08	12,130	1002.08	0.76 ic	1.96 ic	0.00	---	0.00	0.76	---	---	---	---	2.721
2.12	12,407	1002.12	1.06 ic	1.98 ic	0.00	---	0.00	1.03	---	---	---	---	3.010
2.16	12,684	1002.16	1.32 ic	2.00 ic	0.00	---	0.00	1.32	---	---	---	---	3.326
2.20	12,961	1002.20	1.65 ic	2.02 ic	0.00	---	0.00	1.64	---	---	---	---	3.664
2.24	13,237	1002.24	1.98 ic	2.05 ic	0.00	---	0.00	1.98	---	---	---	---	4.024
2.28	13,514	1002.28	2.37 ic	2.07 ic	0.00	---	0.00	2.34	---	---	---	---	4.405
2.32	13,791	1002.32	2.73 ic	2.09 ic	0.00	---	0.00	2.72	---	---	---	---	4.805
2.36	14,068	1002.36	3.11 ic	2.11 ic	0.00	---	0.00	3.11	---	---	---	---	5.223
2.40	14,345	1002.40	3.57 ic	2.13 ic	0.00	---	0.00	3.53	---	---	---	---	5.661
2.44	14,638	1002.44	3.96 ic	2.15 ic	0.00	---	0.00	3.96	---	---	---	---	6.113
2.48	14,931	1002.48	4.42 ic	2.17 ic	0.00	---	0.00	4.41	---	---	---	---	6.582
2.52	15,224	1002.52	4.88 ic	2.19 ic	0.00	---	0.00	4.88	---	---	---	---	7.066
2.56	15,518	1002.56	5.37 ic	2.21 ic	0.00	---	0.00	5.36	---	---	---	---	7.565
2.60	15,811	1002.60	5.88 ic	2.23 ic	0.00	---	0.00	5.85	---	---	---	---	8.078
2.64	16,104	1002.64	6.38 ic	2.25 ic	0.00	---	0.00	6.36	---	---	---	---	8.606
2.68	16,397	1002.68	6.88 ic	2.27 ic	0.00	---	0.00	6.88	---	---	---	---	9.148
2.72	16,690	1002.72	7.42 ic	2.29 ic	0.00	---	0.00	7.42	---	---	---	---	9.703
2.76	16,983	1002.76	7.96 ic	2.31 ic	0.00	---	0.00	7.96	---	---	---	---	10.27
2.80	17,276	1002.80	8.53 ic	2.32 ic	0.00	---	0.00	8.53	---	---	---	---	10.85
2.84	17,586	1002.84	9.10 ic	2.34 ic	0.00	---	0.00	9.10	---	---	---	---	11.45
2.88	17,896	1002.88	9.55 ic	2.36 ic	0.00	---	0.00	9.55 s	---	---	---	---	11.91
2.92	18,206	1002.92	9.91 ic	2.38 ic	0.00	---	0.00	9.91 s	---	---	---	---	12.29
2.96	18,515	1002.96	10.24 ic	2.40 ic	0.00	---	0.00	10.24 s	---	---	---	---	12.64
3.00	18,825	1003.00	10.54 ic	2.42 ic	0.00	---	0.00	10.54 s	---	---	---	---	12.96
3.04	19,135	1003.04	10.88 ic	2.43 ic	0.00	---	0.17	10.72 s	---	---	---	---	13.32
3.08	19,445	1003.08	11.25 ic	2.45 ic	0.00	---	0.47	10.78 s	---	---	---	---	13.70
3.12	19,754	1003.12	11.60 ic	2.47 ic	0.00	---	0.87	10.74 s	---	---	---	---	14.07
3.16	20,064	1003.16	11.94 ic	2.49 ic	0.00	---	1.34	10.61 s	---	---	---	---	14.43
3.20	20,374	1003.20	12.26 ic	2.51 ic	0.00	---	1.87	10.39 s	---	---	---	---	14.76
3.24	20,701	1003.24	12.55 ic	2.52 ic	0.00	---	2.46	10.09 s	---	---	---	---	15.08
3.28	21,028	1003.28	12.82 ic	2.54 ic	0.00	---	3.07 s	9.75 s	---	---	---	---	15.36
3.32	21,355	1003.32	13.04 ic	2.56 ic	0.00	---	3.52 s	9.51 s	---	---	---	---	15.59
3.36	21,682	1003.36	13.23 ic	2.57 ic	0.00	---	3.90 s	9.32 s	---	---	---	---	15.80
3.40	22,009	1003.40	13.40 ic	2.59 ic	0.00	---	4.24 s	9.16 s	---	---	---	---	15.99
3.44	22,335	1003.44	13.56 ic	2.61 ic	0.00	---	4.54 s	9.01 s	---	---	---	---	16.16
3.48	22,662	1003.48	13.71 ic	2.62 ic	0.00	---	4.82 s	8.88 s	---	---	---	---	16.33
3.52	22,989	1003.52	13.85 ic	2.64 ic	0.00	---	5.08 s	8.77 s	---	---	---	---	16.49
3.56	23,316	1003.56	13.98 ic	2.66 ic	0.00	---	5.32 s	8.66 s	---	---	---	---	16.64
3.60	23,643	1003.60	14.11 ic	2.67 ic	0.00	---	5.55 s	8.56 s	---	---	---	---	16.79
3.64	23,988	1003.64	14.24 ic	2.69 ic	0.00	---	5.76 s	8.47 s	---	---	---	---	16.93
3.68	24,332	1003.68	14.36 ic	2.71 ic	0.00	---	5.96 s	8.39 s	---	---	---	---	17.06
3.72	24,677	1003.72	14.48 ic	2.72 ic	0.00	---	6.15 s	8.32 s	---	---	---	---	17.20
3.76	25,021	1003.76	14.59 ic	2.74 ic	0.00	---	6.34 s	8.26 s	---	---	---	---	17.33
3.80	25,366	1003.80	14.70 ic	2.75 ic	0.00	---	6.51 s	8.19 s	---	---	---	---	17.45
3.84	25,710	1003.84	14.81 ic	2.77 ic	0.00	---	6.67 s	8.14 s	---	---	---	---	17.58
3.88	26,055	1003.88	14.92 ic	2.79 ic	0.00	---	6.83 s	8.09 s	---	---	---	---	17.70
3.92	26,399	1003.92	15.03 ic	2.80 ic	0.00	---	6.98 s	8.04 s	---	---	---	---	17.82
3.96	26,743	1003.96	15.13 ic	2.82 ic	0.00	---	7.13 s	8.00 s	---	---	---	---	17.94
4.00	27,088	1004.00	15.24 ic	2.83 ic	0.00	---	7.27 s	7.96 s	---	---	---	---	18.05

...End

Hydrograph Report

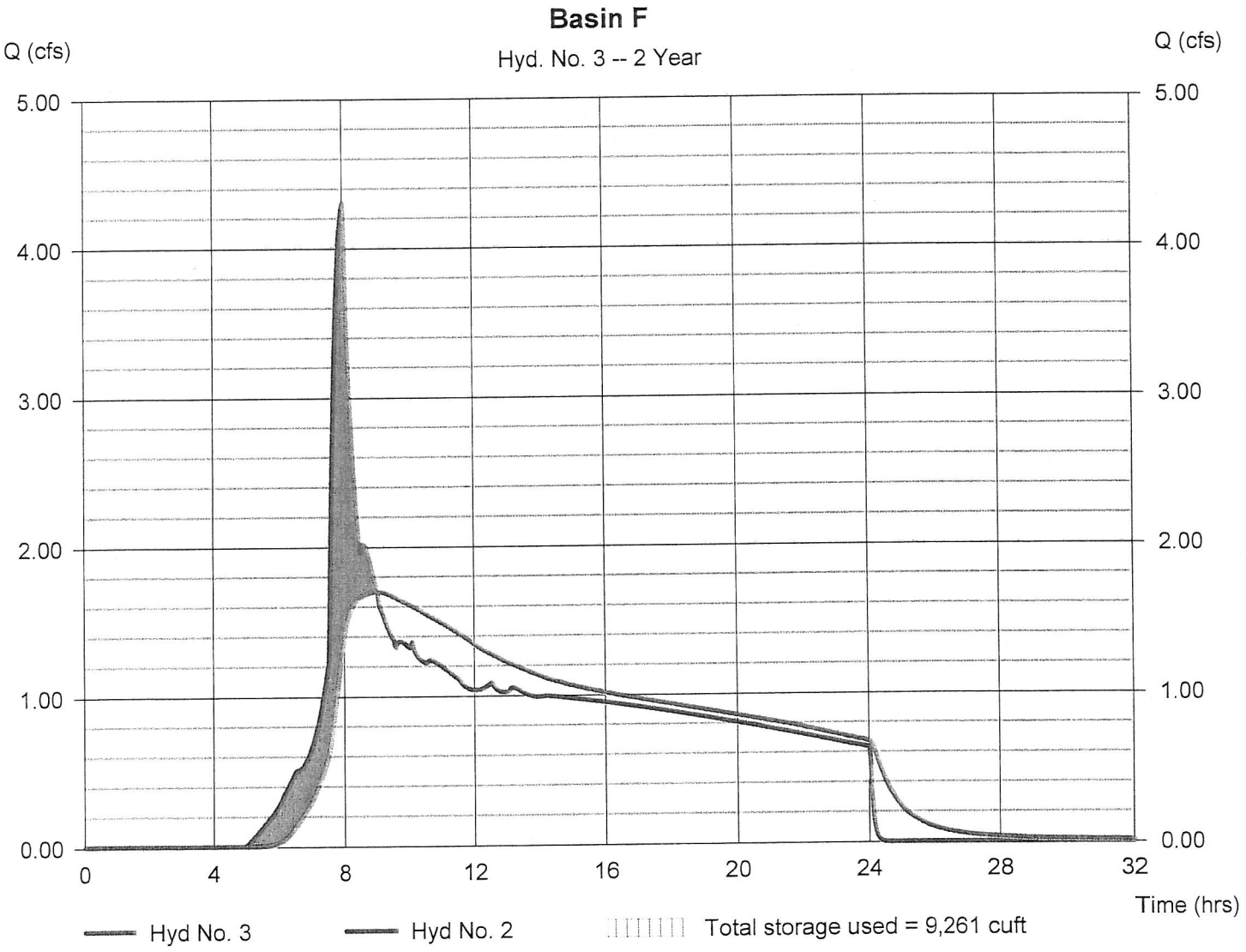
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Tuesday, Dec 8, 2009

Hyd. No. 3

Basin F

Hydrograph type	= Reservoir	Peak discharge	= 1.699 cfs
Storm frequency	= 2 yrs	Time to peak	= 9.00 hrs
Time interval	= 2 min	Hyd. volume	= 69,623 cuft
Inflow hyd. No.	= 2 - Basin F - Post	Max. Elevation	= 1001.65 ft
Reservoir name	= Pond F	Max. Storage	= 9,261 cuft

Storage Indication method used.



Hydrograph Report

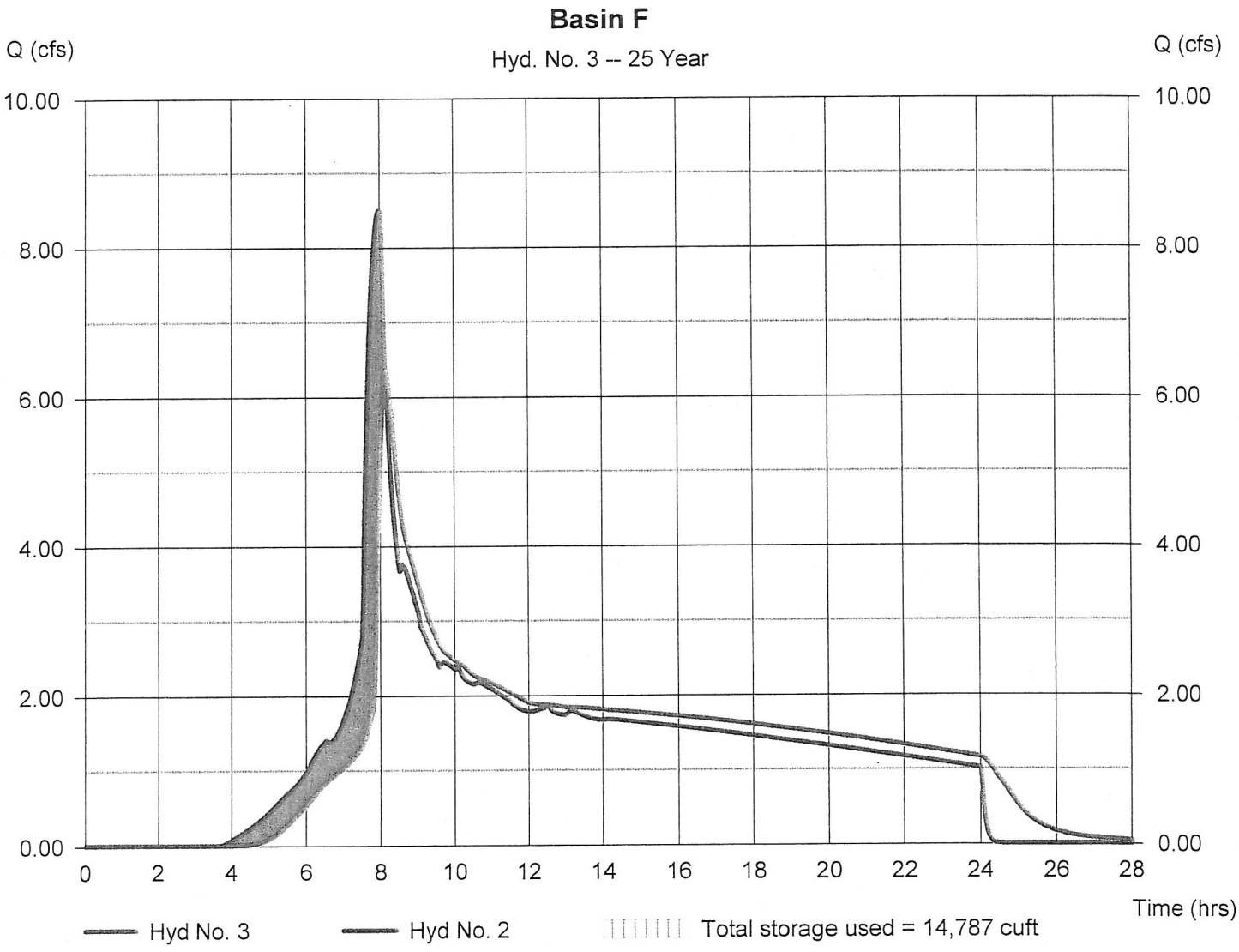
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 — Tuesday, Dec 8, 2009

Hyd. No. 3

Basin F

Hydrograph type	= Reservoir	Peak discharge	= 6.351 cfs
Storm frequency	= 25 yrs	Time to peak	= 8.13 hrs
Time interval	= 2 min	Hyd. volume	= 126,987 cuft
Inflow hyd. No.	= 2 - Basin F - Post	Max. Elevation	= 1002.46 ft
Reservoir name	= Pond F	Max. Storage	= 14,787 cuft

Storage Indication method used.



Hydrograph Report

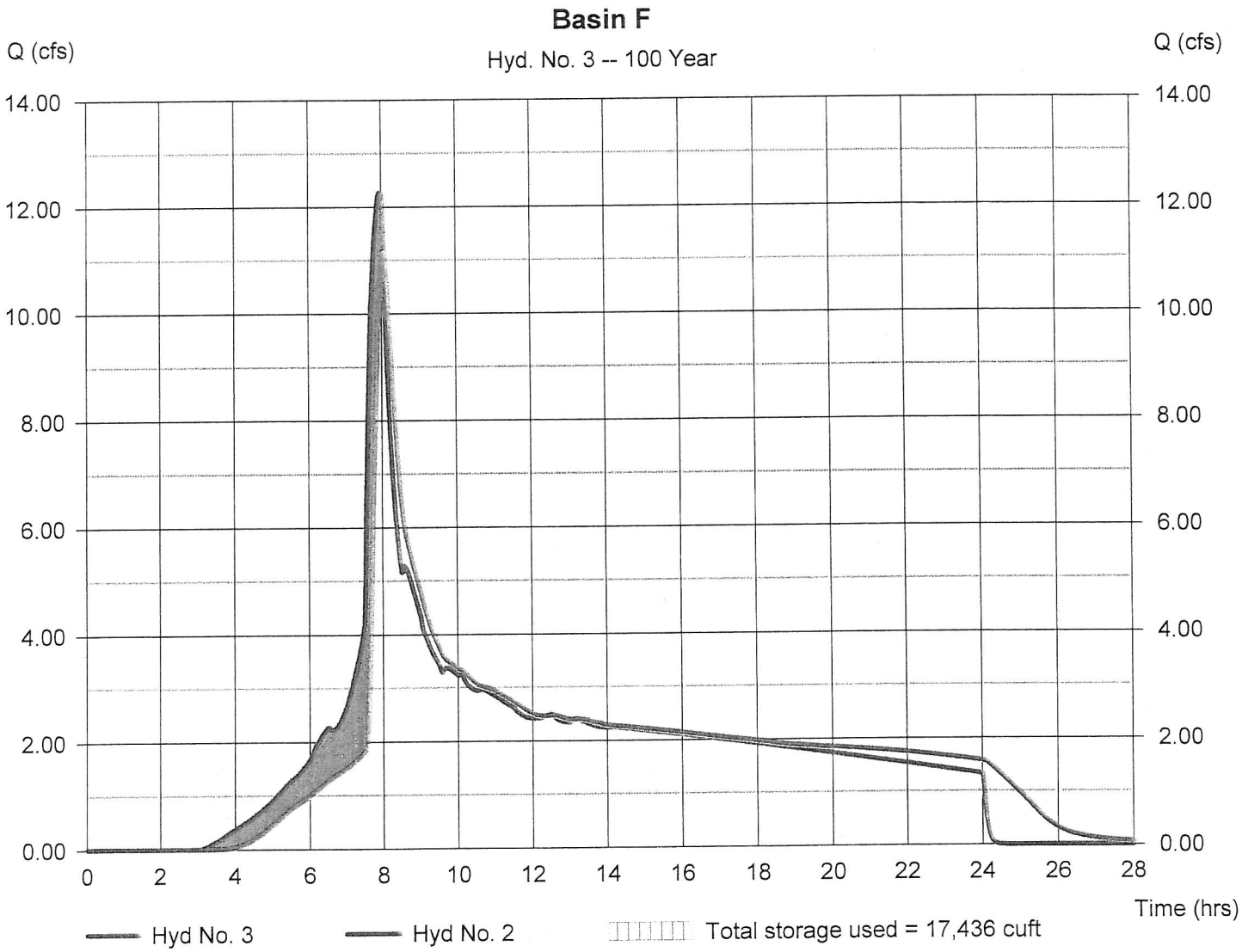
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 — Tuesday, Dec 8, 2009

Hyd. No. 3

Basin F

Hydrograph type	= Reservoir	Peak discharge	= 11.16 cfs
Storm frequency	= 100 yrs	Time to peak	= 8.03 hrs
Time interval	= 2 min	Hyd. volume	= 178,145 cuft
Inflow hyd. No.	= 2 - Basin F - Post	Max. Elevation	= 1002.82 ft
Reservoir name	= Pond F	Max. Storage	= 17,436 cuft

Storage Indication method used.



APPENDIX 'G'

Hydrograph Report

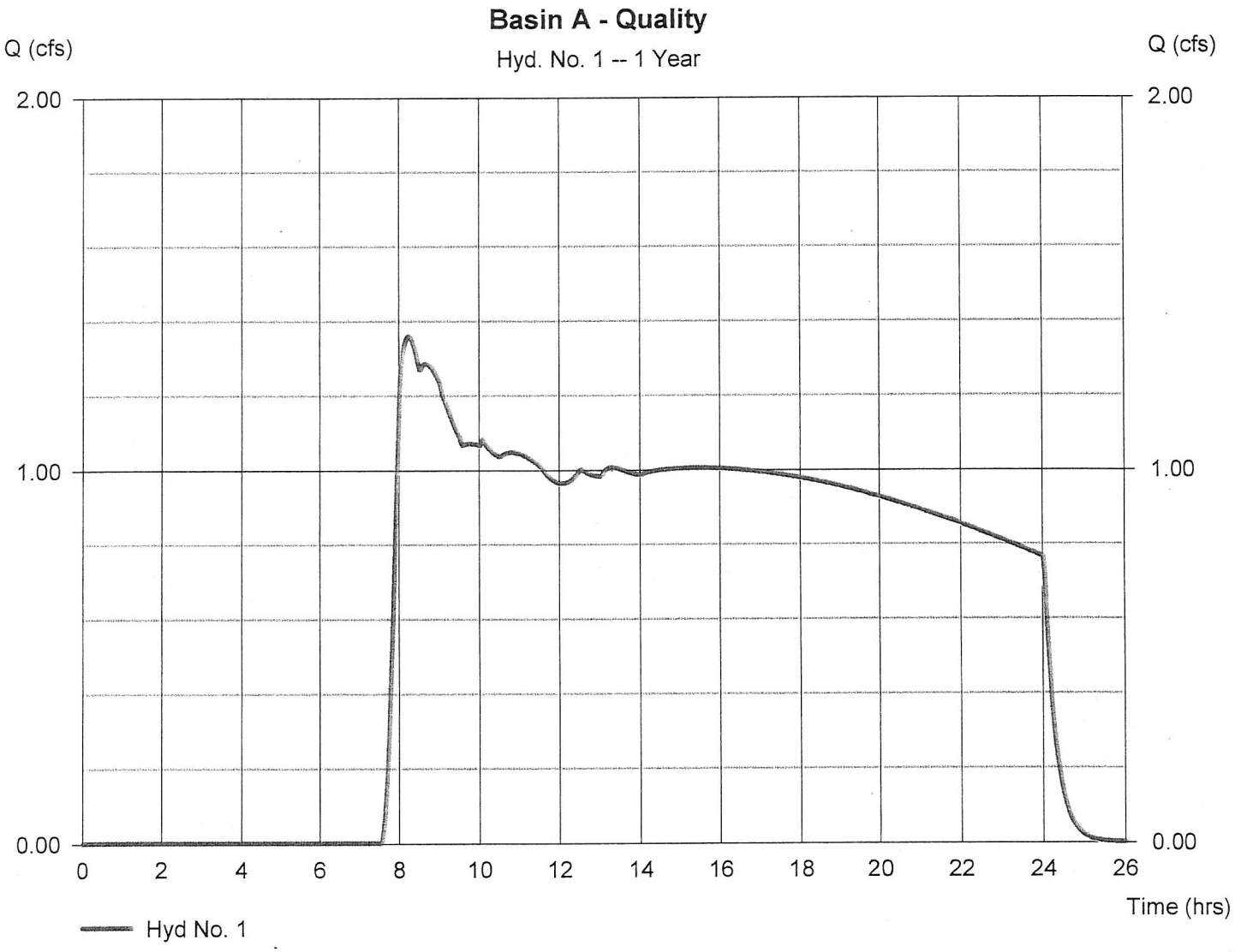
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 — Wednesday, Dec 9, 2009

Hyd. No. 1

Basin A - Quality

Hydrograph type	= SBUH Runoff	Peak discharge	= 1.360 cfs
Storm frequency	= 1 yrs	Time to peak	= 8.23 hrs
Time interval	= 2 min	Hyd. volume	= 58,216 cuft
Drainage area	= 54.810 ac	Curve number	= 82*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 16.10 min
Total precip.	= 1.40 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= N/A

* Composite (Area/CN) = [(5.730 x 98) + (46.960 x 80) + (2.120 x 74)] / 54.810



Hydrograph Report

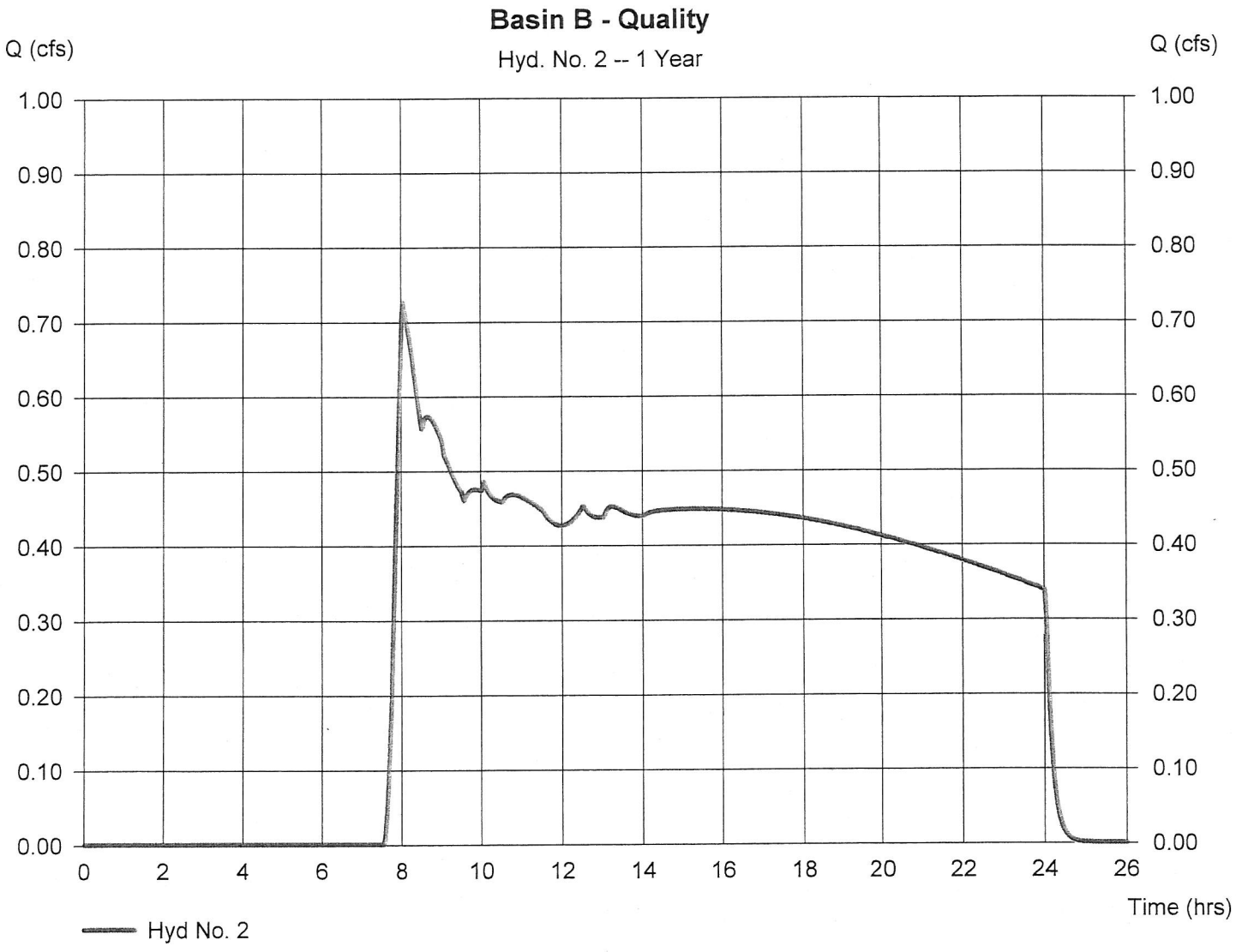
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 — Wednesday, Dec 9, 2009

Hyd. No. 2

Basin B - Quality

Hydrograph type	= SBUH Runoff	Peak discharge	= 0.726 cfs
Storm frequency	= 1 yrs	Time to peak	= 8.03 hrs
Time interval	= 2 min	Hyd. volume	= 25,969 cuft
Drainage area	= 24.450 ac	Curve number	= 82*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 8.83 min
Total precip.	= 1.40 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= N/A

* Composite (Area/CN) = [(3.460 x 99) + (20.040 x 80) + (0.950 x 74)] / 24.450



Hydrograph Report

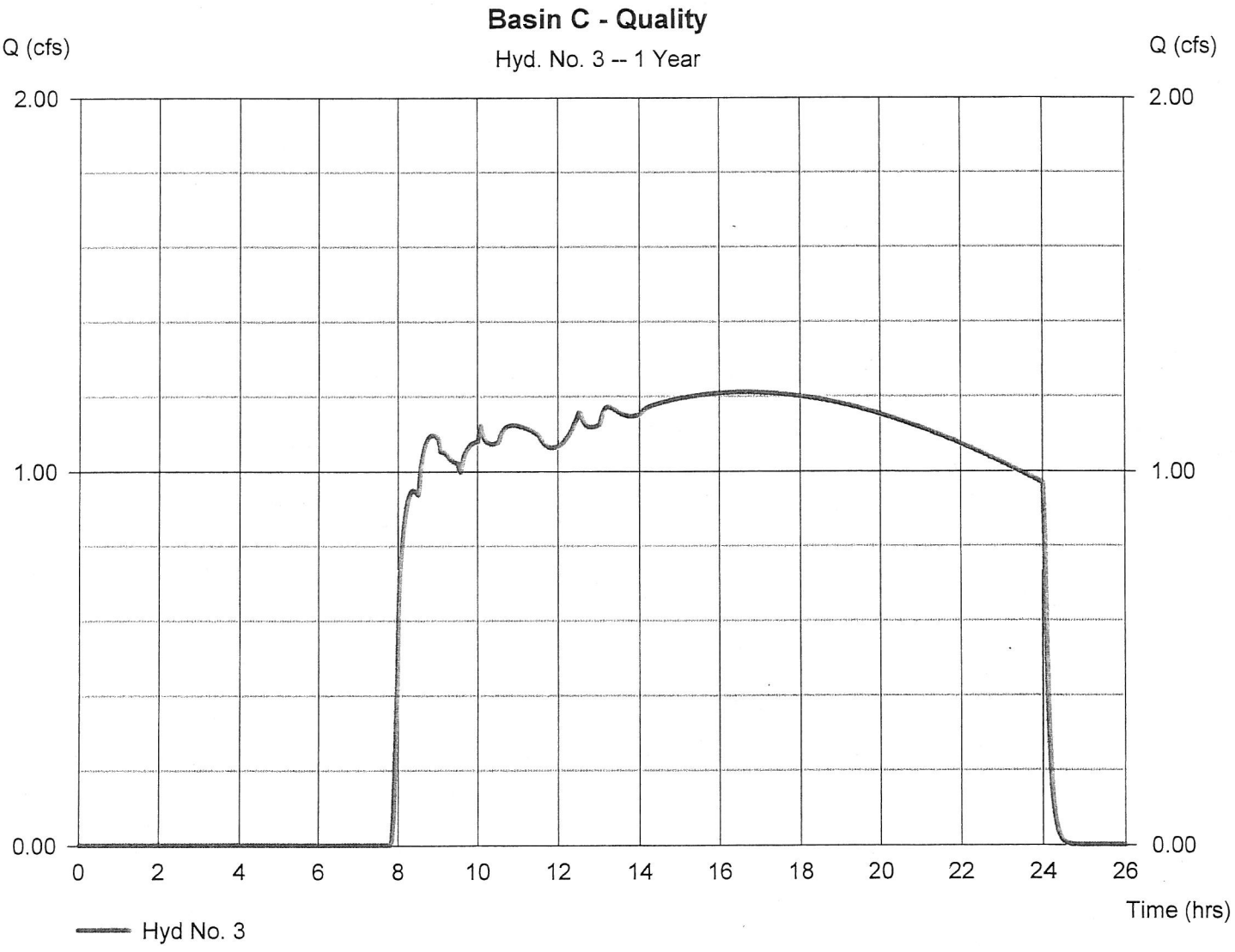
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 — Wednesday, Dec 9, 2009

Hyd. No. 3

Basin C - Quality

Hydrograph type	= SBUH Runoff	Peak discharge	= 1.210 cfs
Storm frequency	= 1 yrs	Time to peak	= 16.60 hrs
Time interval	= 2 min	Hyd. volume	= 65,003 cuft
Drainage area	= 83.750 ac	Curve number	= 79*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 6.06 min
Total precip.	= 1.40 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= N/A

* Composite (Area/CN) = [(6.200 x 98) + (75.340 x 78) + (2.210 x 74)] / 83.750



Hydrograph Report

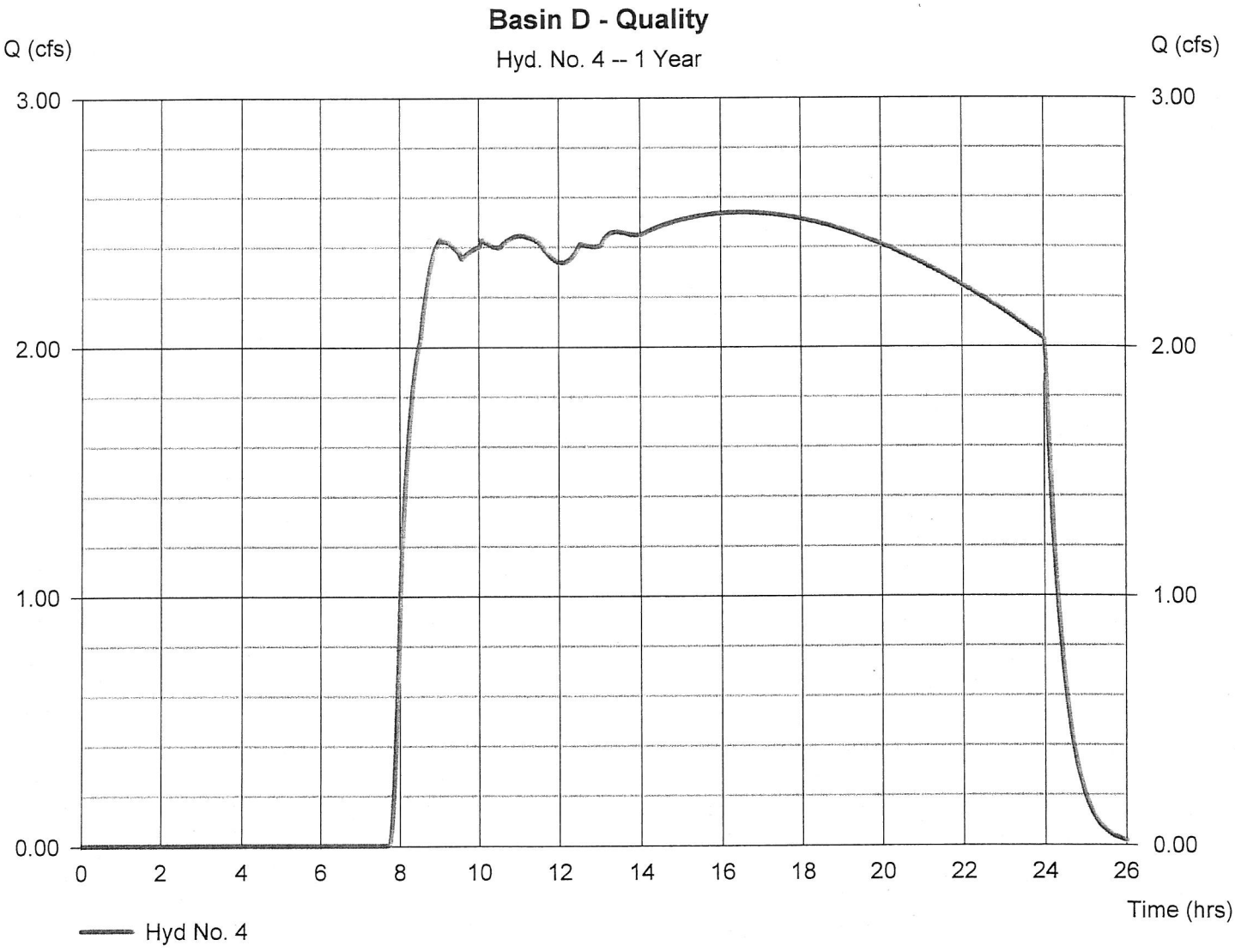
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 — Wednesday, Dec 9, 2009

Hyd. No. 4

Basin D - Quality

Hydrograph type	= SBUH Runoff	Peak discharge	= 2.538 cfs
Storm frequency	= 1 yrs	Time to peak	= 16.50 hrs
Time interval	= 2 min	Hyd. volume	= 140,209 cuft
Drainage area	= 162.130 ac	Curve number	= 80*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 24.91 min
Total precip.	= 1.40 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= N/A

* Composite (Area/CN) = [(14.040 x 98) + (143.020 x 79) + (5.070 x 74)] / 162.130



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 Wednesday, Dec 9, 2009

Hyd. No. 5

Basin E - Quality

Hydrograph type	= SBUH Runoff	Peak discharge	= 1.570 cfs
Storm frequency	= 1 yrs	Time to peak	= 18.10 hrs
Time interval	= 2 min	Hyd. volume	= 76,755 cuft
Drainage area	= 140.600 ac	Curve number	= 76*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 13.09 min
Total precip.	= 1.40 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= N/A

* Composite (Area/CN) = [(9.270 x 98) + (127.150 x 75) + (4.180 x 74)] / 140.600



Hydrograph Report

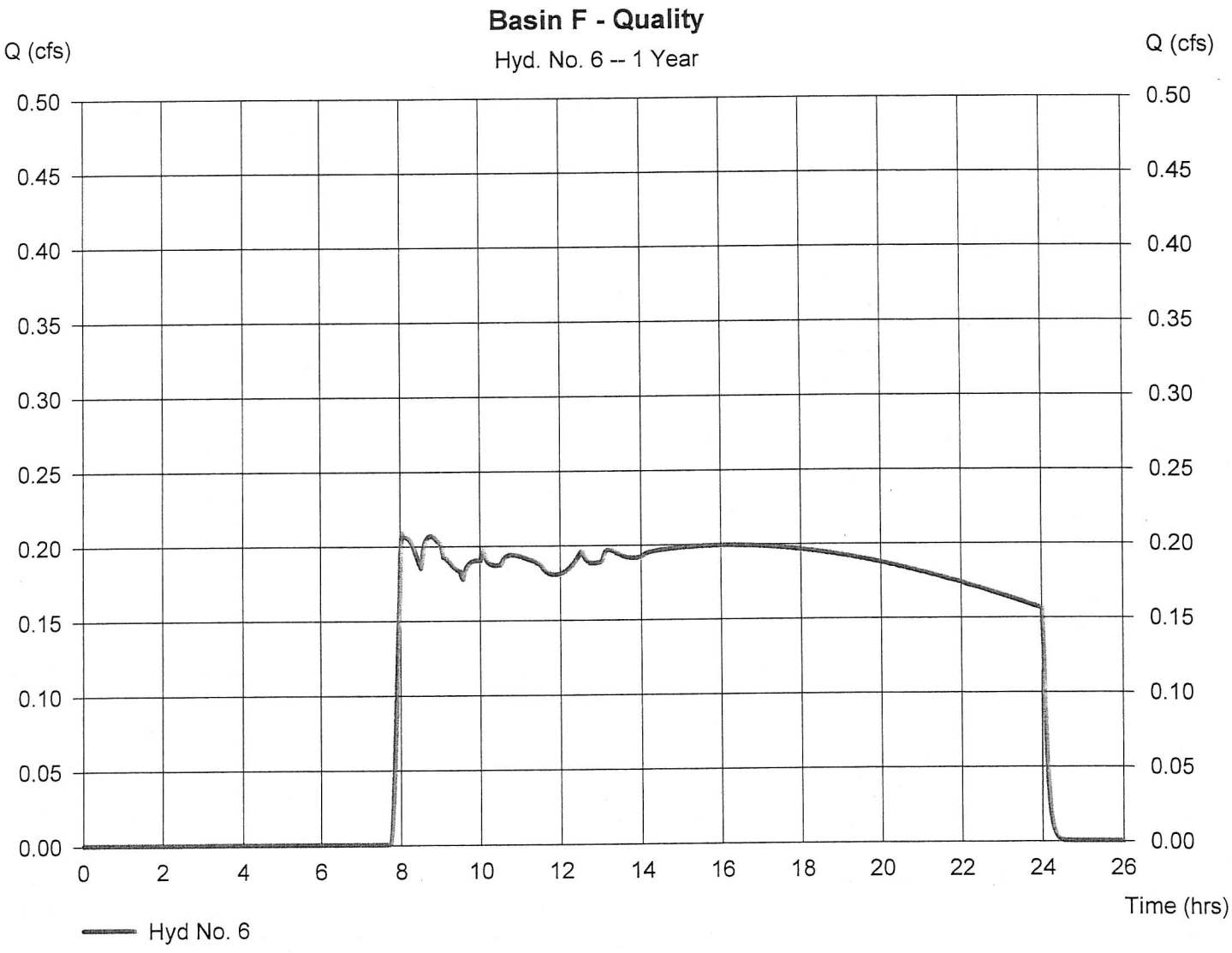
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066 — Wednesday, Dec 9, 2009

Hyd. No. 6

Basin F - Quality

Hydrograph type	= SBUH Runoff	Peak discharge	= 0.209 cfs
Storm frequency	= 1 yrs	Time to peak	= 8.03 hrs
Time interval	= 2 min	Hyd. volume	= 10,992 cuft
Drainage area	= 12.710 ac	Curve number	= 80*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.29 min
Total precip.	= 1.40 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= N/A

* Composite (Area/CN) = [(2.740 x 99) + (9.450 x 75) + (0.520 x 74)] / 12.710



KITTITAS COUNTY COMMUNITY DEVELOPMENT SERVICES
411 N. Ruby St., Suite 2, Ellensburg, WA 98926
CDS@CO.KITTITAS.WA.US
Office (509) 962-7506
Fax (509) 962-7682
"Building Partnerships – Building Communities"

October 28, 2009

Iron Snowshoe, LLC
c/o David Blanchard
PO Box 923
Cle Elum, WA 98922

RE: Forest Ridge Performance Based Cluster Plat (LP-08-00014)

Dear Mr. Blanchard:

Thank you for your letters dated August 19, 2009 and August 31, 2009, in which you indicated that you feel that an EIS is not necessary for the referenced development application. As we discussed at our meeting on September 16, 2009, the County is working toward making a SEPA threshold determination for the Forest Ridge Performance Based Cluster Plat application (County file # LP-08-00014). Staff and agencies have reviewed the application materials available at the time of issuance of the Notice of Application on July 30, 2009. Staff and County consultants are continuing to review revised application materials as they are submitted (e.g. August 27, 2009 revised plat map; August 31, 2009 TIA; August 2009 Downstream Drainage Analysis).

Based on comments received from the Washington Department of Fish and Wildlife on August 14, 2009, the Department of Ecology on August 27, 2009 and from County staff and consultants (see attached comment summary), the County has concluded that insufficient information is available to rule out the possibility that significant adverse environmental impacts will result from development of the Forest Ridge Performance Based Cluster Plat.

Based on a review of the above referenced comments and the current application materials, the County believes a limited scope Environmental Impact Statement may be warranted to address, at a minimum, transportation, surface waters (i.e. streams), habitat, and stormwater management impacts related to this proposal. The County is giving early notice of a possible Determination of Significance, according to WAC 197-11-350. Based on your August letters and subsequent communications, we understand you do not believe a Determination of Significance is warranted and that you intend to submit additional analysis and an updated SEPA environmental checklist demonstrating that the proposal will not result in adverse impacts. All additional studies or background information shall be submitted to the County no later than 60 days from the date of this letter (December 29, 2009).

In addition to the environmental information requested above, please also submit to the County a separate narrative analysis showing how the plat configuration meets the standards of Kittitas County Code 16.09 Performance Based Cluster Platting, including revised calculations according to the Public Benefit Ratings System at KCC 16.09.090. Please submit this information along with the information requested in the previous paragraph.

Please also note that the information indentified in this letter is not all inclusive and is subject to change pending review of the additional requested information. If you have any questions regarding this matter, please feel free to contact me at (206) 382-9540, or by email to anelson@GordonDerr.com.

Sincerely Yours,

Anna Nelson
Contract Planner
cc: Dan Valoff, Kittitas County
Allison Kimball, Brookside Consulting

Environmental Impact/Preliminary Review Comment Summary

Project Description and Timing:

Update the ECL to clarify the proposed and optional elements of the project, and related timing (e.g. pg 2 – "a community recreation center will be completed prior to the end of the seventh phase; pg 13 – "the applicant may construct a recreational/community center..."). Any optional elements shall be included in and evaluated in the environmental analysis and studies identified below. Similarly, the environmental impact analysis includes project phasing and the proposed mitigation based on any such phasing.

Other Pending Applications:

The ECL identifies preliminary approval of a BLA for which final approval has not yet been granted. Please indicate how this application relates to the current approval.

Earth:

The proposed private road system crosses some areas that are mapped with slopes over 30% (i.e. between Lot 28 and Lot 29 and Lot 138 and Lot 139). Provide preliminary road profile information for these areas to demonstrate that the roadway will not exceed 12%. Also provide preliminary information regarding the extent of clearing and grading related to road construction impacts.

As noted in the environmental review for the approved rezone (File Z-06-31), this property is located entirely within areas that have been historically associated with coal mining activities. Provide information regarding the suitability of the property for residential development, including site infrastructure.

ECL Item 1.g. – add impervious surface area for the recreational center and any related parking area.

Air Quality (DOE):

ECL Item 2.c. - In response to public comments from Ecology, you indicated in your August 31, 2009 letter that you intend to amend your application to prohibit the use of wood burning stoves. If still proposed, add this mitigation measure to the updated ECL. We note that you did not provide a response to other potential air quality impacts identified by Ecology. Provide a more complete description of the potential dust impacts and proposed mitigation in the updated ECL.

Water (County Health):

Note: The comments below are from a September 30, 2009 letter and may be revised in response to Sapphire Skies October 21, 2009 letter.

Chapter 173-539A WAC requires that a determination of water neutrality be obtained from the State of Washington, Department of Ecology (Ecology) prior to final approval of plat applications. Under the new aforementioned rule, the application has provided an option that meets the requirements. However, in order to recommend preliminary plat approval, the following information must be provided by the applicant:

- Total amount of water required for the project including indoor residential use, outdoor use including irrigation of lawn and garden areas, ponds, swimming pools, hot tubs, use for fire suppression and/or any other use of water.
- Indications of the numbers of and locations of proposed wells and septic systems.
- Evidence that the proposed withdrawal will yield sufficient potable water. This evidence might take the form of a test well with nitrate and bacteriological tests. This requirement might also be satisfied by a survey of surrounding wells that includes yields and recent (within the last year) nitrate and bacteriological tests.

Final plat approval will then be conditioned upon:

- Documentation from the State of Washington, Department of Ecology verifying the quantity of water

required for the plat has been transferred.
- All proposed wells being placed and well logs showing yields consistent with the requirements above being proven and the required nitrate and bacteriological tests showing potability of that water.

In regard to sewage disposal, clarify what is proposed. The preliminary plat (Sheet 1 of 6) refers to "individual septic", but the SEPA ECL (pg 6) refers to "a combination of on-site septic systems and community systems".

Water (County Public Works):

With the exception of a downstream analysis, the applicant has not provided any preliminary information regarding the potential storm water impacts of the proposed development for review at this time. In review of the Storm Water Management Manual for Eastern Washington (the Manual) this proposed project meets the criteria defined in section 2.1.1 (New Development) of the Manual and therefore must conform to the core elements listed in the referenced section. This development does not meet the criteria for an exemption defined in section 2.1.3 or 2.1.4 of the Manual.

In addition to the August 2009 down stream analysis, a preliminary drainage report must be provided in conformance with the manual for review. This report is necessary to evaluate the applicant's statement in the SEPA ECL (pg 6) that "the stormwater systems will be designed to insure no adverse impacts on adjacent properties or infrastructure." We understand that you intend to have Encompass provide a preliminary drainage report that contains drainage calculations for each on-site drainage basin along with a conceptual detention and water quality plan. This information must be supplemented with a preliminary analysis of construction related stormwater impacts and impacts related to rain on snow events (i.e. consider stormwater impacts from rain on snow events related to the proposed HOA the snow removal plan). The report should be inclusive, clear, legible, and reproducible with a complete set of drainage computations to substantiate the findings and recommendations of the report. In addition, the preliminary plat must be revised, based on the findings and recommendation of the report, to include basic drainage amenities, with necessary drainage tracts or easements defined.

Water and Habitat:

ECL Item 3.a.4) – For purposes of determining impacts and mitigation related to riparian habitat (KCC 17A.07), provide an assessment and mitigation report for the on-site streams and associated wetlands, if any. Also provide a wildlife habitat study utilizing methods incorporated in the April 2009 study for Meadow Springs etal. Refer to the August 14, 2009 comment letter from WDFW for additional guidance regarding habitat and open space mitigation.

Traffic (County Public Works):

The August 31, 2009 traffic impact analysis (TIA) prepared on behalf of Sapphire Skies LLC by Heffron Transportation Inc. has been reviewed and we have the following comments regarding the report:

- Vicinity map and Site map are not congruent, street names are missing and existing features unclear. The trip distribution figure is also missing. Figures shall be revised and updated.

- The Figure 1 Study Area site access roads shall be labeled and accurately depicted. All figures that include this map shall be updated.

- Table 1 residential total is 1,836, not 1,826 as indicated in the text.

- The County does not separate year-round occupied homes from recreational homes. All homes shall be calculated as being occupied year round. Additionally, LU 260 is defined as: "usually located in a resort containing local services and complete recreational facilities." The Forest Ridge Cluster Plat does not meet this definition. All trips shall be calculated using LU 210.

- The City Heights TIA forms the basis for many assumptions, yet ultimately "development related to the City Heights project" is *not* included as a "pipeline project". The City Heights TIA should be included to complete this review.

- Traffic counts are assumed to be 30% higher in summer, however no quantification of this is provided. The study area and consultant's choice of study intersections is selected with no supporting analysis. Trip distribution ratio breakdown into thirds undocumented, and must be quantified with supporting analysis.

- The support data for traffic counts should be included in the appendix.

Fire (County Fire Marshal):

- Design & construction must comply with Kittitas County Code, Kittitas County Zoning, the 2006 International Fire & Building Codes, and all other development agreements.

- Given the provided pre-review documents, these residences will require fire flow of 1000 gpm (Gallons/Minute) for a duration of no less than 30 minutes. A reduction in required fire flow of 50 percent, is allowed when the buildings are provided with an approved automatic sprinkler system.

- An approved water supply capable of supplying the required fire flow for fire protection shall be provided. A standpipe or hydrant system with an adequate source of water (supply), a distribution system and adequate pressure for delivery shall be installed for this plat. Hydrant spacing shall comply with International Fire Code and its appendices' requirements.

- A separate permit & deposit shall be required for installation of a hydrant/standpipe system.

- The Kittitas County Fire Marshal's Office will require a minimum of (3) three complete sets of plans for full review; (1) Office Copy, (1) Permit Copy, (1) Fire Department Copy.

- This property is located outside of a fire district. As such, all future development must meet the International Urban Wild Land Code for building construction, defensible space allocation, access, etc.,

- No slope or grade greater than 12% shall be allowed,

CLE ELUM'S SAPPHIRE SKIES

October 21, 2009

RECEIVED
DEC 2 9 2009
KITTITAS COUNTY
CDS

Cathy Bambrick, Administrator
Public Health
507 N. Nanum Street, Suite 102
Ellensburg, WA 98926

RE: Forest Ridge Plat LP-08-00014

Dear Ms. Bambrick:

This letter is in response to your correspondence to Ms. Nelsen on September 30th, 2009. Pursuant to our conversation on October 8th, I am providing the following information to satisfy the requested conditions for Public Health to recommend preliminary approval.

Total Water Required

Northland Resources has secured four existing water rights (surface water) to cover the water supply requirements of the development project applicable among other things, to WAC 173-539A, UPPER KITTITAS EMERGENCY GROUND WATER RULE.

The total and consumptive use associated with the four water rights available to Northland Resources is 429 and 305 afy, respectively. At full build-out, Forest Ridge will only use a small portion of the total available rights. As calculated by Aspect Consulting, Forest Ridge has a peak estimated consumptive use in July of approximately 9.6 acre-feet or approximately 101,000 gpd (see Aspect Consulting Table, attached). Total annual consumptive use is estimated to be about 33 afy or an average of 29,458 gpd at full build-out.

Total and consumptive use for the project is estimated in Table 4, attached. Relevant details of water rights secured by Northland Resources include:

Yakima River Basin Adjudicated Court Claim No. 02223 (Court Claim No. 02223). This right (Pasco right) was historically used for domestic, stockwater, and seasonal irrigation purposes. The authorized period of use is April 15 – September 30. The current authorized point of withdrawal is in the Spex Arth Creek drainage. Estimated annual total and consumptive use associated with this right are 101 and 97 acre-feet per year (afy), respectively.

Court Claim No. 00365. This right is currently used for seasonal irrigation purposes. The authorized period of use is April 20 – September 30. The current authorized point of diversion is on the Yakima River. Northland Resources has purchased a portion of the total water right with a total use of 210 afy. The estimated consumptive use associated with this portion of the water right is 123 afy.

Court Claim No. 01296. This claim consists of two water rights, referred to for the purposes of this memorandum as Court Claim Nos. 01296A and 01296B. The current authorized points of diversion are two unnamed streams. Estimated annual total and consumptive use associated with these rights are 158 and 110 afy, respectively.

Wells and water supply

Attached are well logs for existing wells on site. Collectively the wells produce a total of approximately 30 gallons per minute. Once the project receives preliminary approval, a Group A water system will be designed to Department of Health specifications, using these wells or possibly others that will be drilled on site. We are confident the wells can produce enough water to supply the system.

Water Quality

Attached is a recent nitrate and bacteriological test for Well ID Tag # AKW 682, which is on a nearby property.

Septic

The project SEPA was circulated, and comments received, with the project being served by either individual or community drainfields. Pursuant to our discussion on October 8th, this project may be processed through preliminary plat, at which time soil logs will be required for final plat. There is a policy in discussion or being adopted by Kittitas County that may require projects not already vested to supply soil logs prior to preliminary plat, but that requirement would not apply to Forest Ridge as it is already vested.
Please confirm that the above and attached information satisfies the requests from Public Health.

Thank you-

Sean Northrop, Principal
SapphireSkies
Northland Resources, LLC
Iron Snowshoe, LLC

Cc: Anna Nelsen, contract planner
Dave Blanchard, President, SapphireSkies

Table 4 - Total Project Water Use

Northland Resources, Kittitas County, WA

Development	Forest Ridge	
potential ERUs on system	190	
Wastewater System	Septic	
Indoor Consumptive Use	30%	
Outdoor Consumptive Use	90%	
Total Consumptive Use	57%	
Water Use in acre-feet	Total	Consumptive
October	2.7	0.8
November	2.6	0.8
December	2.7	0.8
January	2.7	0.8
February	2.4	0.7
March	2.7	0.8
April	2.6	0.8
May	2.7	0.8
June	7.3	5.0
July	12.5	9.6
August	9.9	7.3
September	7.3	5.0
Annual Total	58	33

Notes:
ERU - equivalent residential unit
Net consumptive use includes indoor and outdoor consumptive uses

Aspect Consulting
July 28, 2009
090824-db-NorthlandModifiedProjectWaterDemand

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report. I Report.

WATER WELL REPORT

Original & 1st copy - Ecology, 2nd copy - owner, 3rd copy - driller

Construction/Decommission ("x" in circle)
(X) Construction 176391
( ) Decommission *ORIGINAL CONSTRUCTION Notice of Intent Number*_____

CURRENT Notice of Intent No. W187002
Unique Ecology Well ID Tag No. AKW 682
Water Right Permit No. _____
Property Owner Name Cle Elum Sapphire Skies
Well Street Address Brookside Trails
City Cle Elum County: Kittitas
Location NE 1/4 NE 1/4 Sec 24 Twn 20 R 15 EWM or WWM (circle one)
Lat/Long: (s,t,r still REQUIRED) Lat Deg _____ Lat Min/Sec _____ Long Deg _____ Long Min/Sec _____
Tax Parcel No. 20152500000 2

PROPOSED USE: (X) Domestic ( ) Industrial ( ) Municipal ( ) DeWater ( ) Irrigation ( ) Test Well ( ) Other_____

TYPE OF WORK: Owner's number of well (if more than one)_____
(X) New Well ( ) Reconditioned *Method:* ( ) Dug ( ) Bored ( ) Driven ( ) Deepened ( ) Cable (X) Rotary ( ) Jetted

DIMENSIONS: Diameter of well 6 inches, drilled 69 ft. Depth of completed well 69 ft.

CONSTRUCTION DETAILS
Casing (X) Welded 6" Diam. from +3 ft. to 54' ft.
Installed: (X) Liner installed 5" Diam. from -44 ft. to 59 ft.
( ) Threaded _____" Diam. from _____ ft. to _____ ft.

Perforations: ( ) Yes (X) No
Type of perforator used_____
SIZE of perfs_____in. by_____in. and no. of perfs_____ from _____ft. to _____ft.

Screens: (X) Yes ( ) No (X) K-Pac Location 44
Manufacturer's Name Johnson
Type_____ Model No._____
Diam. 5 Slot Size 20 from -59 ft. to -69 ft.
Diam. 4 Slot Size_____ from_____ft. to_____ft.

Gravel/Filter packed: ( ) Yes (X) No ( ) Size of gravel/sand_____
Materials placed from_____ft. to_____ft.

Surface Seal: ( ) Yes ( ) No To what depth? 27 ft
Materials used in seal Benonite
Did any strata contain unusable water? ( ) Yes (X) No
Type of water?_____ Depth of strata_____
Method of sealing strata off_____

PUMP: Manufacturer's Name_____
Type:_____ H.P._____

WATER LEVELS: Land-surface elevation above mean sea level_____ft.
Static level 42' ft. below top of well Date_____
Artesian pressure_____lbs. per square inch Date_____
Artesian water is controlled by_____ (cap,valve, etc.)

WELL TESTS: Drawdown is amount water level is lowered below static level.
Was a pump test made? ( ) Yes ( ) No If yes, by whom?_____
Yield:_____gal./min. with_____ft. drawdown after_____hrs.
Yield:_____gal./min. with_____ft. drawdown after_____hrs.
Yield:_____gal./min. with_____ft. drawdown after_____hrs.
Recovery data (time taken as zero when pump turned off)(water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level
	Approx 8 gpm				
	Air Lift				

Date of test_____
Bailer test_____gal./min. with _____ft. drawdown after_____hrs.
Airtest _____gal./min. with stem set at_____ft. for _____hrs.
Artesian flow_____g.p.m. Date_____
Temperature of water_____ Was a chemical analysis made? ( ) Yes ( ) No

CONSTRUCTION OR DECOMMISSION PROCEDURE
Formation: Describe by color, character, size of material and structure, and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information. Indicate all water encountered. (USE ADDITIONAL SHEETS IF NECESSARY.)

MATERIAL	FROM	TO
topsoil Br. m	0	3
Sticky clay Br. m	3	34
Clay grav. Br. Mt Co m	34	52
Clay grav Bl gr. m	52	56
Clay Bl. Gr. m	56	59
Sl Hy sand Some grav Br MS 6 gpm	59	68
sandstone Bl. a mast Black MS	68	69

DEPT OF ECOLOGY Received JUL 08 2005 CENTRAL REGION OFFICE

Start Date 6/8/05 Completed Date 6/14/05

WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

(X) Driller ( ) Engineer ( ) Trainee Name (Print) Steve Miller Drilling Company Water Master Well Drill
Driller/Engineer/Trainee Signature _____ Address P.O. Box 246
Driller or Trainee License No. 1335 City, State, Zip Selah WA 98942
Contractor's Registration No. WATERWD922DB Date _____

If trainee, licensed driller's Signature and License no. _____

Ecology is an Equal Opportunity Employer. ECY 050-1-20 (Rev 4/01)

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report.

WATER WELL REPORT

State of Washington Date Printed: 19-Oct-2007 Log No. 0

Construction / Decommission: Original Construction Notice

Construction 275433

PROPOSED USE: DOMESTIC

TYPE OF WORK: Owners's Well Number: (If more than one well) 1

NEW WELL Method: ROTARY

DIMENSIONS Diameter of well: 6 inches

Drilled 120 ft. Depth of completed well 60 ft.

CONSTRUCTION DETAILS:

Liner installed:

" Dia from ft. to ft.

Casing installed WELDED

6 " Dia from +2 ft. to 58 ft.

" Dia from ft. to ft.

" Dia from ft. to ft.

Perforations: Yes Used In: CASING

Type of perforator used STAR

SIZE of perforations 3/8 in. b 1 in.

16 Perforation from 37 ft. to 41 ft.

Perforation from ft. to ft.

Perforation from ft. to ft.

Screens: No K-Pac Location

Manufacture's Name

Type: Model No

Diam. slot size from ft. to ft.

Diam. slot size from ft. to ft.

Gravel/Filter packed: No Size of Gravel

Material placed fro ft. to ft.

Surface seal: Yes To what depth 21 ft.

Seal method: Material used in seal BENTONITE

Did any strata contain unusable water No

Type of water Depth of strata

Method of sealing strata off

PUMP: Manufacture's name

Type: H.P. 0

WATER LEVELS Land-surface elevation above mean sea level: 0 ft.

Static level 35 ft. below top of well Date 08/15/2007

Artesian Pressure lbs per square inch Date

Artesian water controlled by

WELL TESTS: Drawdown is amount water level is lowered below static level.

Was a pump test made No If yes, by whom

Yield gal/min with ft drawdown after

Yield gal/min with ft drawdown after

Yield gal/min with ft drawdown after

Recovery data (time taken as zero when pump turned off)(water level measured from well top to water level

Time:	Water Level	Time:	Water Level	Time:	Water Level

Date of test:

Bailer test gal/min ft drawdown after hrs.

Air test 15 gal/min w/ stem set at 57 ft. for 2 hours

Artesian flow gpm Date

Temperature of water Was a chemical analysis made No

CURRENT

Notice of Intent No.: W250589

Unique Ecology Well I.D. No ALN806

Water Right Permit Number:

OWNER: GALE, TRICIA

OWNER ADD IRON SNOWSHOE LLC 206 WEST FIRST STREET

CLE ELUM, WA 98922

Well Add LITTLE CREEK FSRD-4517 A

City: Cle Elum, WA 98922 County: Kittitas

Location: NE 1/4 NE 1/4 Sec 24 T 20 R 15E EW

Lat/Long: (s, t, r still REQUIRED) Lat Deg Lat Min/Sec

Long Deg Long Min/Se

Tax Parcel No.: 2015240000015

CONSTRUCTION OR DECOMMISSION PROCEDURE

Formation: Describe by color, character, size of material and structure. Show thickness of aquifers and the kind and nature of the material in each stratum penetrated. Show at least one entry for each change in formation.

Material	From	To
TOP SOIL	0	2
CLAY BROWN BOLDERS	2	22
SANDSTONE GRAY	22	37
CONGLOMERATE BROKEN W/ WATER	37	41
SANDSTONE GRAY SOFT	41	116
CLAY STONE BLUE SOFT	116	120

DEPT OF ECOLOGY Received OCT 2 9 2007 CENTRAL REGION OFFICE

Notes:

BOTTOM 60' OF WELL HAD CAVED IN

Work starte 08/14/2007 Complete 08/15/2007

WELL CONSTRUCTION CERTIFICATION:

I constructed and/or accept responsibility for construction of this well and its compliance with all Washington well construction standards. Materials used and the information reported are true to my best knowledge and belief.

☑ Driller ☐ Engineer ☐ Trainee

Name: DAVID MEYER License No.: 2427

Signature:

If trainee, Licensed driller is. License No.:

Licensed Driller Signature

Drilling Company:

NAME: FOGLE PUMP & SUPPLY, INC. Shop: COLVILLE

ADDRESS: 316 W. 5TH

Colville, WA 99114

Phone: 509-684-2569 Toll Free: 800-533-6518

E-Mail: jeanne@foglepump.com

FAX: 509-684-3032 WEB Site: www.foglepump.com

Contractor's Registration No.: FOGLEPS095L4 Date Log Created: 08/24/2007

WATER WELL REPORT

State of Washington Date Printed: 23-Feb-2007 Log No. 0

Construction / Decommission: Original Construction Notice

Construction

CURRENT

Notice of Intent No.: W250591

Unique Ecology Well I.D. No APB228

Water Right Permit Number:

OWNER: OSIADACZ, SKYE

OWNER ADD IRON SNOWSHOE, LLC 301 WEST FIRST STREET

CLE ELUM, WA 98922

Well Add LITTLE CREEK FSRD 4517 AFR A-3

City: Cle Elum, WA 98922 County: Kittitas

Location: NE 1/4 NE 1/4 Sec 4 T 20 R 15E EW

Lat/Long: (s, t, r still REQUIRED) Lat Deg Lat Min/Sec Long Deg Long Min/Se

Tax Parcel No.: 20.15.24000.0016

PROPOSED USE: DOMESTIC

TYPE OF WORK: Owners's Well Number: (If more than one well) 1PG1

NEW WELL Method: ROTARY

DIMENSIONS Diameter of well: 6 inches

Drilled 300 ft. Depth of completed well 300 ft.

CONSTRUCTION DETAILS: Casing installed WELDED

6 " Dia from +2 ft. to 18 ft.

" Dia from ft. to ft.

" Dia from ft. to ft.

Liner installed: PVC

4 " Dia from 8 ft. to 300 ft.

Perforations: Yes Used In: Liner

Type of perforator used SKILL SAW

SIZE of perforations 7 in. b 1/8 in.

100 Perforation from 200 ft. to 300 ft.

Perforation from ft. to ft.

Perforation from ft. to ft.

Screens: No K-Pac Location

Manufacture's Name

Type: Model No

Diam. slot size from ft. to ft.

Diam. slot size from ft. to ft.

Gravel/Filter packed: No Size of Gravel

Material placed fro ft. to ft.

Surface seal: Yes To what depth 18 ft.

Seal method: Material used in seal BENTONITE

Did any strata contain unusable water No

Type of water Depth of strata

Method of sealing strata off

PUMP: Manufacture's name

Type: H.P. 0

WATER LEVELS Land-surface elevation above mean sea level: 0 ft.

Static level 63 ft. below top of well Date 02/06/2007

Artesian Pressure lbs per square inch Date

Artesian water controlled by

WELL TESTS: Drawdown is amount water level is lowered below static level.

Was a pump test made No If yes, by whom

Yield gal/min with ft drawdown after

Yield gal/min with ft drawdown after

Yield gal/min with ft drawdown after

Recovery data (time taken as zero when pump turned off)(water level measured from well top to water level

Time: Water Level Time: Water Level Time: Water Level

Date of test:

Bailer test gal/min ft drawdown after hrs.

Air test 6.5 gal/min w/ stem set at 299 ft. for 1 hours

Artesian flow gpm Date

Temperature of water Was a chemical analysis made No

CONSTRUCTION OR DECOMMISSION PROCEDURE

Formation: Describe by color, character, size of material and structure. Show thickness of aquifiers and the kind and nature of the material in each stratum penetrated. Show at least one entry for each change in formation.

Material	From	To
CLAY BROWN	0	7
CLAY GRAVEL BROWN	7	12
SANDSTONE BROWN MEDIUM	12	22
COAL SANDSTONE BLACK MEDIUM	22	23
SANDSTONE GRAY MEDIUM	23	32
SANDSTONE GRAY MEDIUM DAMP	32	33
SANDSTONE GRAY MEDIUM	33	56
COAL SANDSTONE BLACK MEDIUM	56	57
SANDSTONE GRAY MEDIUM	57	72
SANDSTONE GRAY SOFT W/WATER	72	73
SANDSTONE GRAY MEDIUM	73	98
SANDSTONE GRAY FILITE MEDIUM	98	143
CONTINUED	143	143

Notes:

Work starte 02/02/2007 Complete 02/06/2007

WELL CONSTRUCTION CERTIFICATION:

I constructed and/or accept responsibility for construction of this well and its compliance with all Washington well construction standards. Materials used and the information reported are true to my best knowledge and belief.

✔ Driller Engineer Trainee

Name: AUDIE MCCURDY License No.: 2690

Signature: Audie McCurdy

If trainee, Licensed driller is License No.:

Licensed Driller Signature

Drilling Company:

NAME: FOGLE PUMP & SUPPLY, INC. Shop: COLVILLE

ADDRESS: 316 W. 5TH

Colville, WA 99114

Phone: 509-684-2569 Toll Free: 800-533-6518

E-Mail: jeanne@foglepump.com

FAX: 509-684-3032 WEB Site: www.foglepump.com

Contractor's Registration No.: FOGLEPS095L4 Date Log Created: 02/22/200

AUG 2 8 2009

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
15 W Yakima Ave, Ste 200 • Yakima, WA 98902-3452 • (509) 575-2490

August 27, 2009

Dave Blanchard
206 West First Street
Cle Elum WA 98922-1108

Re: Water Right Change Application Nos. CS4-02223CTCLsb2@1 (Meadow Springs LLC); CS4-01296CTCLsb5@1(A) (Cooper Pass LLC); CS4-01676(B)CTCL@1 (Scatter Creek Resources LLC); CS4-01296CTCLsb5@1(B (Green Canyon LLC); CS4-00365CTCLsb5 (Green Canyon LLC)

Dear Mr. Blanchard:

We have received your trust water right applications and have assigned the application numbers shown above. Please use these numbers in future communications with our office.

If you have any questions, please contact Teresa Mitchell at 509-575-2597.

Sincerely,

Mark C. Schuppe

Mark C. Schuppe
Section Manager
Water Resources Program

MCS:hd
090825

cc: Lisa Pelly, Washington Rivers Conservancy

App-trustwater.doc

[x]

STATE OF WASHINGTON
APPLICATION TO ENTER A WATER RIGHT INTO THE TRUST WATER RIGHT PROGRAM

NOTE: THIS FORM IS ONLY TO BE USED FOR THE ACQUISITION OF WATER INTO THE TRUST WATER RIGHT PROGRAM

(Check all that apply.)
- ☐ Lease
- ☐ Purchase
- ☒ Donation
- ☐ Other

Explain: **For instream flow and mitigation bank**

X Portion of the identified existing water right

IF FOR SEASONAL OR TEMPORARY, START DATE ____/____/____
END DATE ____/____/____

FOR OFFICE USE ONLY

FILE No._____WRIA_____

DATE ACCEPTED____/____/____ BY_____

FEE $_____ REC'D ____/____/____

CHECK No. _____

SEPA: ☐ Exempt ☐ Not exempt

IF MORE SPACE IS NEEDED, ATTACH ADDITIONAL SHEETS (PLEASE PRINT OR TYPE CLEARLY)*

1. Applicant Information:

APPLICANT/BUSINESS NAME	PHONE NO	FAX NO.
Dave Blanchard, Green Canyon LLC	(509) 674-6828	(509) 674-6836
ADDRESS: 206 West First Street		
CITY: Cle Elum	STATE: WA	ZIP CODE: 98922

CONTACT NAME (IF DIFFERENT FROM ABOVE)	PHONE NO.	FAX NO
Washington Rivers Conservancy	(509) 888-0970	(509) 888-4352
ADDRESS: 103 Palouse St. Suite 14		
CITY: Wenatchee	STATE: WA	ZIP CODE: 98801

2. Water Right Information:

WATER RIGHT OR CLAIM NUMBER	RECORDED NAME(S)
Court Claim No. 00365 (214.32 acre/ft of this right is the subject of this application)	The Estate of Hazel Henshaw Bernard I. Henshaw

DO YOU OWN THE RIGHT? YES ☐ X NO IF NO, PROVIDE OWNER(S) NAME and ADDRESS.
Bernie and Pam Henshaw
1011 Airport Rd
Cle Elum WA 98922

HAS THE WATER BEEN PUT TO BENEFICIAL USE IN THE LAST FIVE (5) YEARS? X YES ☐ NO
ARE WATER DIVERSIONS/WITHDRAWALS OF THIS WATER RIGHT METERED OR MEASURED? ☐ YES X× NO

IMPORTANT! PROVIDE INFORMATION SHOWING THE EXTENT OF WATER USE FOR EACH OF THE LAST FIVE YEARS

Please attach copies of any documentation that demonstrates consistent, historical use of water since the right was established. Also, if you have a water system plan or conservation plan, please include a copy with your application.

FOR OFFICE USE ONLY

WATER RIGHT NO. _____ FILE (contract) NO. _____

3. How is Water to be Made Available for Trust?

☐ Alteration in method of diversion	☒ Alteration in water use/ irrigated acreage
☐ Alteration in method of delivery/conveyance	☒ Nonuse of one or more points of diversion
☐ Alteration in method of water application	☒ Nonuse of all or a portion of the named water right
☐ Alteration in type of crop	☒ Other, Explain below:

214.32 acre feet of this water right will be trust water rights available for mitigation of impacts to right applications.

Name of funding source(s):

WATER RIGHT DESCRIPTION *

4. Point(s) of Diversion/Withdrawal:

A. Existing

SOURCE	NO.	¼	¼	SEC.	TWP.	RGE.	PARCEL #	WELL TAG #
Yakima River 750 feet south and 1150 feet east of the north quarter corner of section 35, being within the SE1/4NW1/4NE1/4 of section 35, T. 20 N., R. 15 E.W.M.		SE	SE	35	20	15		

Please include copies of all water well reports involved with this proposal. Also, if you know the distances from the nearest section corner to the above point(s) of diversion/withdrawal, please include that information in Item No. 6 (remarks) or as an attachment.

5. Purpose of Use:

A. Existing Use of the Water Right

PURPOSE OF USE	GPM or CFS	ACRE-FT/YR	PERIOD OF USE
Irrigation	1.5 CFS	450	April 20 – September 30
Stock	.02 CFS	3	Year round
Conveyance loss	.30		

B. Proposed Purpose of the Trust Water Right:

DESCRIBE THE PURPOSE(S) OF USE DURING THE PERIOD OF TRUST:

PURPOSE OF USE	ACRE-FEET/YR
Temporary Instream flow for fish and wildlife benefits, and mitigation of impacts to TWSA resulting from new applications for water rights.	214.32

* If additional space is needed, please continue on the form: Attachment for Application to Enter a Water Right into the Trust Water Right Program.

6. Place of Use:

A. Existing:

LEGAL DESCRIPTION OF LANDS WHERE WATER IS PRESENTLY USED:							
S1/2S1/2 of Government Lot 3, Government Lot 4, and the SE1/4SW1/4, except the SE1/4SW1/4, All in Section 30, T. 20 N., R. 16 E.W.M.							
¼	¼	SEC.	TWP.	RGE.	COUNTY	PARCEL #	# OF ACRES
		30	20	15	Kittitas		75

DO YOU OWN ALL THE LANDS IN THE EXISTING PLACE OF USE? ☐ YES X NO – IF NO, PROVIDE OWNER(S) NAME:
Bernie and Pam Henshaw
1011 Airport Rd
Cle Elum WA 98922

B. Proposed:

IDENTIFY THE WATER BODY TO BE BENEFITED OR OTHER PLACE TO BE BENEFITED
Yakima River and Columbia River

7. Remarks and Other Relevant Information:

We are requesting expedited processing under WAC 173-539A-080 based on trust water used to mitigate for impacts to TWSA from applications for new water rights and under WAC 173-152-050(2)(b) and (3)(a) based on the project having biological benefits and addressing limiting factors for native fish species in Yakima River.

The water right for this project is one of four Northland Resources related Trust Water Right applications being proposed to contribute irrigation water rights to trust. The purpose of the trust, and as a condition of placing the water rights into trust, is to exercise the water rights for benefit instream flows in the short term and thereafter have the trust water available to the applicant as mitigation for any impairment to existing water rights, including the Yakima River Total Water Supply Available (TWSA) as a result of rights or authorizations for Applications for Water Right Permits. As proposed, the impact on the individual project and total impacts of all the projects' impacts will be TWSA neutral.

Applicant is submitting with this application reports from Aspect Consulting describing the current proposal for mitigation.

Included in the file: Water Right and Map

Certain applications may incur a Real Estate Excise Tax liability for the seller of the water rights. The Department of Revenue has requested notification of potential taxable water right related actions and therefore may be provided with a copy of this request.

Please contact the State Department of Revenue for further information. The phone number is (360) 570-3265. The address is: Department of Revenue, Real Estate Excise Tax, PO Box 47477, Olympia, WA 98504-7477.

8. Signatures:

I certify that the information above is true and accurate to the best of my knowledge. I hereby grant staff from the Department of Ecology access to the above site(s) for inspection and monitoring purposes. If assisted in the preparation of the above application, I understand that all responsibility for the accuracy of the information rests with me.

[signature] 7 / 5 / 09
(Applicant) (Date)

Bernard T Henshaw 7 / 16 / 09
(Water Right Holder) (Date)

Bernard T Henshaw 7 / 16 / 09
(Land Owner(s) of Existing Place of Use) (Date)

IMPORTANT! APPLICATION FILING INFORMATION IS PROVIDED ON THE NEXT PAGE.

WE ARE RETURNING YOUR APPLICATION FOR THE FOLLOWING REASON(S):

☐ ADDITIONAL SIGNATURES REQUIRED ☐ SECTION _____ IS INCOMPLETE

☐ OTHER/EXPLANATION _____

STAFF: _____ *DATE:* ____/____/____

STATE OF WASHINGTON
APPLICATION TO ENTER A WATER RIGHT INTO THE TRUST WATER RIGHT PROGRAM

NOTE: THIS FORM IS **ONLY** TO BE USED FOR THE ACQUISITION OF WATER INTO THE TRUST WATER RIGHT PROGRAM

(Check all that apply.)

- ☐ Lease
- ☐ Purchase
- ☒ Donation
- ☐ Other

Explain: **For instream flow and mitigation bank**

☐ Portion of the identified existing water right

IF FOR SEASONAL OR TEMPORARY, START DATE ____/____/____
END DATE ____/____/____

FOR OFFICE USE ONLY

FILE No._____WRIA_____

DATE ACCEPTED____/____/____ BY_____

FEE $_____ REC'D ____/____/____

CHECK No. _____

SEPA: ☐ Exempt ☐ Not exempt

IF MORE SPACE IS NEEDED, ATTACH ADDITIONAL SHEETS (PLEASE PRINT OR TYPE CLEARLY)*

1. Applicant Information:

APPLICANT/BUSINESS NAME	PHONE NO.	FAX NO.
Meadow Springs, LLC- Dave Blanchard	**(509) 674-6828**	**(509) 674-6836**
ADDRESS **206 West First Street**		
CITY **Cle Elum**	STATE **WA**	ZIP CODE **98922**

CONTACT NAME (IF DIFFERENT FROM ABOVE)	PHONE NO.	FAX NO.
Washington Rivers Conservancy, Lisa Pelly	**(509) 888-0970**	**(509) 888-4352**
ADDRESS **103 Palouse St. Suite 14**		
CITY **Wenatchee**	STATE **WA**	ZIP CODE **98801**

2. Water Right Information:

WATER RIGHT OR CLAIM NUMBER	RECORDED NAME(S)
Court Claim No. 02223 / Claim # 118160	**Emil and Lillian Pasco**
DO YOU OWN THE RIGHT? X YES ☐ NO IF NO, PROVIDE OWNER(S) NAME and ADDRESS:	
HAS THE WATER BEEN PUT TO BENEFICIAL USE IN THE LAST FIVE (5) YEARS? X YES ☐ NO ARE WATER DIVERSIONS/WITHDRAWALS OF THIS WATER RIGHT METERED OR MEASURED? ☐ YES X NO IMPORTANT! PROVIDE INFORMATION SHOWING THE EXTENT OF WATER USE FOR EACH OF THE LAST FIVE YEARS	

Please attach copies of any documentation that demonstrates consistent, historical use of water since the right was established. Also, if you have a water system plan or conservation plan, please include a copy with your application.

FOR OFFICE USE ONLY

WATER RIGHT NO. _____ FILE (contract) NO._____

3. How is Water to be Made Available for Trust?

☐ Alteration in method of diversion	☒ Alteration in water use/ irrigated acreage
☐ Alteration in method of delivery/conveyance	☒ Nonuse of one or more points of diversion
☐ Alteration in method of water application	☒ Nonuse of all or a portion of the named water right
☐ Alteration in type of crop	☒ Other, Explain below:
These will be trust water rights available for mitigation of impacts to TWSA resulting from new water right applications.	
Name of funding source(s):	

WATER RIGHT DESCRIPTION *

4. Point(s) of Diversion/Withdrawal:

A. Existing

SOURCE	NO.	¼	¼	SEC.	TWP.	RGE.	PARCEL #	WELL TAG #
Unnamed Spring		SE	SE	2	19	14		

Please include copies of all water well reports involved with this proposal. Also, if you know the distances from the nearest section corner to the above point(s) of diversion/withdrawal, please include that information in Item No. 6 (remarks) or as an attachment.

5. Purpose of Use:

A. Existing Use of the Water Right

PURPOSE OF USE	GPM or CFS	ACRE-FT/YR	PERIOD OF USE
Irrigation	.98 CFS		April 15 to September 30
Domestic	.02 CFS		Year round
Stock	.01 CFS		Year round

B. Proposed Purpose of the Trust Water Right:

DESCRIBE THE PURPOSE(S) OF USE DURING THE PERIOD OF TRUST:	
PURPOSE OF USE	ACRE-FEET/YR
Instream flow for fish and wildlife benefits, and mitigation of impacts to TWSA resulting from new applications for water rights.	101

6. Place of Use:

A. Existing:

LEGAL DESCRIPTION OF LANDS WHERE WATER IS PRESENTLY USED:							
The NE1/4 SE1/4 SW1/4 of Section 1.							
¼	¼	SEC.	TWP.	RGE.	COUNTY	PARCEL #	# OF ACRES
		1	19	14	Kittitas		49
DO YOU OWN ALL THE LANDS IN THE EXISTING PLACE OF USE? X YES ☐ NO – IF NO, PROVIDE OWNER(S) NAME:							

* If additional space is needed, please continue on the form: Attachment for Application to Enter a Water Right into the Trust Water Right Program.

6. Place of Use (continued)

B. Proposed:

IDENTIFY THE WATER BODY TO BE BENEFITED OR OTHER PLACE TO BE BENEFITED
Unnamed Stream, Yakima River and the Columbia River

7. Remarks and Other Relevant Information:

We are requesting expedited processing under WAC 173-539A-080 based on trust water used to mitigate for impacts to TWSA from applications for new water rights and under WAC 173-152-050(2)(b) and (3)(a) based on the project having biological benefits and addressing limiting factors for native fish species in Yakima River.

The water right for this project is one of four Northland Resources related Trust Water Right applications being proposed to contribute irrigation water rights to trust. The purpose of the trust, and as a condition of placing the water rights into trust, is to exercise the water rights for benefit instream flows in the short term and thereafter have the trust water available to the applicant as mitigation for any impairment to existing water rights, including the Yakima River Total Water Supply Available (TWSA) as a result of rights or authorizations for Applications for Water Right Permits. As proposed, the impact on the individual project and total impacts of all the projects' impacts will be TWSA neutral.

Applicant is submitting with this application reports from Aspect Consulting describing the current proposal for mitigation.

Included in the file: Water Right and Map

Certain applications may incur a Real Estate Excise Tax liability for the seller of the water rights. The Department of Revenue has requested notification of potential taxable water right related actions and therefore may be provided with a copy of this request.

Please contact the State Department of Revenue for further information. The phone number is (360) 570-3265. The address is: Department of Revenue, Real Estate Excise Tax, PO Box 47477, Olympia, WA 98504-7477.

8. Signatures:

I certify that the information above is true and accurate to the best of my knowledge. I hereby grant staff from the Department of Ecology access to the above site(s) for inspection and monitoring purposes. If assisted in the preparation of the above application, I understand that all responsibility for the accuracy of the information rests with me.

(Applicant) 6/17/05 (Date)

(Water Right Holder) 6/17/05 (Date)

(Land Owner(s) of Existing Place of Use) 6/17/05 (Date)

IMPORTANT! APPLICATION FILING INFORMATION IS PROVIDED ON THE NEXT PAGE.

WE ARE RETURNING YOUR APPLICATION FOR THE FOLLOWING REASON(S):

☐ ADDITIONAL SIGNATURES REQUIRED ☐ SECTION _____ IS INCOMPLETE

☐ OTHER/EXPLANATION:_____

STAFF: _____ *DATE:* ____/____/____

STATE OF WASHINGTON
APPLICATION TO ENTER A WATER RIGHT INTO THE TRUST WATER RIGHT PROGRAM

NOTE: THIS FORM IS ONLY TO BE USED FOR THE ACQUISITION OF WATER INTO THE TRUST WATER RIGHT PROGRAM

(Check all that apply.)
- ☐ Lease
- ☐ Purchase
- ☒ Donation
- ☐ Other

Explain: For instream flow and mitigation bank

☐ Portion of the identified existing water right

IF FOR SEASONAL OR TEMPORARY, START DATE ____/____/____
END DATE ____/____/____

FOR OFFICE USE ONLY

FILE No._____WRIA_____

DATE ACCEPTED____/____/____ BY_____

FEE $_____ REC'D ____/____/____

CHECK No. _____

SEPA: ☐ Exempt ☐ Not exempt

IF MORE SPACE IS NEEDED, ATTACH ADDITIONAL SHEETS (PLEASE PRINT OR TYPE CLEARLY)

1. Applicant Information:

APPLICANT/BUSINESS NAME	PHONE NO.	FAX NO.
Dave Blanchard, Cooper Pass, LLC	(509) 674-6828	(509) 674-6836
ADDRESS: 206 West First Street		
CITY: Cle Elum	STATE: WA	ZIP CODE: 98922

CONTACT NAME (IF DIFFERENT FROM ABOVE)	PHONE NO.	FAX NO.
Washington Rivers Conservancy, Lisa Pelly	(509) 888-09790	(509) 888-4352
ADDRESS: 103 Palouse St. Suite 14		
CITY: Wenatchee	STATE: WA	ZIP CODE: 98801

2. Water Right Information:

WATER RIGHT OR CLAIM NUMBER	RECORDED NAME(S)
Court Claim No. 01296 (A)	The Estate of John E Rothlisberger (White)

DO YOU OWN THE RIGHT? YES ☐ X NO IF NO, PROVIDE OWNER(S) NAME and ADDRESS:

Mike and Lynda White
661 Godawa Ln
Cle Elum WA 98922

Lonny and Joanne White
280 Iron Mtn Rd
Cle Elum WA 98922

Pete White
8080 Lower Peoh Point Rd
Cle Elum WA 98922

HAS THE WATER BEEN PUT TO BENEFICIAL USE IN THE LAST FIVE (5) YEARS? X YES ☐ NO

ARE WATER DIVERSIONS/WITHDRAWALS OF THIS WATER RIGHT METERED OR MEASURED? X YES ~~X NO~~

IMPORTANT! PROVIDE INFORMATION SHOWING THE EXTENT OF WATER USE FOR EACH OF THE LAST FIVE YEARS

Please attach copies of any documentation that demonstrates consistent, historical use of water since the right was established. Also, if you have a water system plan or conservation plan, please include a copy with your application.

FOR OFFICE USE ONLY

WATER RIGHT NO. _____ FILE (contract) NO._____

3. How is Water to be Made Available for Trust?

☐ Alteration in method of diversion	☒ Alteration in water use/ irrigated acreage
☐ Alteration in method of delivery/conveyance	☒ Nonuse of one or more points of diversion
☐ Alteration in method of water application	☒ Nonuse of all or a portion of the named water right
☐ Alteration in type of crop	☒ Other, Explain below:
These will be trust water rights available for mitigation of impacts to TWSA resulting from new water right applications.	
Name of funding source(s):	

WATER RIGHT DESCRIPTION *

4. Point(s) of Diversion/Withdrawal:

A. Existing

SOURCE	NO.	¼	¼	SEC.	TWP.	RGE.	PARCEL #	WELL TAG #
Unnamed Stream, 750 feet north and 500 feet east of the west quarter corner of Section 1, being within the NW1/4SW1/4NW1/4 of Section 1, T. 19 N., R. 15 E.W.M.				1	19	15		

Please include copies of all water well reports involved with this proposal. Also, if you know the distances from the nearest section corner to the above point(s) of diversion/withdrawal, please include that information in Item No. 6 (remarks) or as an attachment.

5. Purpose of Use:

A. Existing Use of the Water Right

PURPOSE OF USE	GPM or CFS	ACRE-FT/YR	PERIOD OF USE
Irrigation	**.70 CFS**	**212**	**April 1 through October 31**
Stock		**2**	**April 1 through October 31**

B. Proposed Purpose of the Trust Water Right:

DESCRIBE THE PURPOSE(S) OF USE DURING THE PERIOD OF TRUST:	
PURPOSE OF USE	ACRE-FEET/YR
Temporary Instream flow for fish and wildlife benefits, and mitigation of impacts to TWSA resulting from new applications for water rights.	**214**

* If additional space is needed, please continue on the form: Attachment for Application to Enter a Water Right into the Trust Water Right Program.

STATE OF WASHINGTON
APPLICATION TO ENTER A WATER RIGHT INTO THE TRUST WATER RIGHT PROGRAM

NOTE: THIS FORM IS ONLY TO BE USED FOR THE ACQUISITION OF WATER INTO THE TRUST WATER RIGHT PROGRAM

(Check all that apply.)
- ☐ Lease
- ☐ Purchase
- ☒ Donation
- ☐ Other

Explain: **For instream flow and mitigation bank**

☐ Portion of the identified existing water right

IF FOR SEASONAL OR TEMPORARY, START DATE ____/____/____
END DATE ____/____/____

FOR OFFICE USE ONLY

FILE No._____WRIA_____

DATE ACCEPTED____/____/____ BY_____

FEE $_____ REC'D ____/____/____

CHECK No. _____

SEPA: ☐ Exempt ☐ Not exempt

IF MORE SPACE IS NEEDED, ATTACH ADDITIONAL SHEETS (PLEASE PRINT OR TYPE CLEARLY)*

1. Applicant Information:

APPLICANT/BUSINESS NAME	PHONE NO.	FAX NO.
Dave Blanchard- Green Canyon LLC	**(509) 674-6828**	**(509) 674-6836**
ADDRESS **206 West First Street**		
CITY **Cle Elum**	STATE **WA**	ZIP CODE **98922**

CONTACT NAME (IF DIFFERENT FROM ABOVE)	PHONE NO.	FAX NO.
Washington Rivers Conservancy, Lisa Pelly	**(509) 888-0970**	**(509) 888-4352**
ADDRESS **103 Palouse St. Suite 14**		
CITY **Wenatchee**	STATE **WA**	ZIP CODE **98801**

2. Water Right Information:

WATER RIGHT OR CLAIM NUMBER	RECORDED NAME(S)
Court Claim No. 01296 (B)	**The Estate of John E Rothlisberger (White)**

DO YOU OWN THE RIGHT? YES ☐ X NO IF NO, PROVIDE OWNER(S) NAME and ADDRESS:

Mike and Lynda White
661 Godawa Ln
Cle Elum WA 98922

Lonny and Joanne White
280 Iron Mtn Rd
Cle Elum WA 98922

Pete White
8080 Lower Peoh Point Rd
Cle Elum WA 98922

HAS THE WATER BEEN PUT TO BENEFICIAL USE IN THE LAST FIVE (5) YEARS? X YES ☐ NO

ARE WATER DIVERSIONS/WITHDRAWALS OF THIS WATER RIGHT METERED OR MEASURED? ☒ YES ~~☐ NO~~

IMPORTANT! PROVIDE INFORMATION SHOWING THE EXTENT OF WATER USE FOR EACH OF THE LAST FIVE YEARS

Please attach copies of any documentation that demonstrates consistent, historical use of water since the right was established. Also, if you have a water system plan or conservation plan, please include a copy with your application.

FOR OFFICE USE ONLY

WATER RIGHT NO. _____ FILE (contract) NO._____

3. How is Water to be Made Available for Trust?

☐ Alteration in method of diversion	☒ Alteration in water use/ irrigated acreage
☐ Alteration in method of delivery/conveyance	☒ Nonuse of one or more points of diversion
☐ Alteration in method of water application	☒ Nonuse of all or a portion of the named water right
☐ Alteration in type of crop	☒ Other, Explain below:
These will be trust water rights available for mitigation of impacts to TWSA resulting from new water right applications.	
Name of funding source(s):	

WATER RIGHT DESCRIPTION *

4. Point(s) of Diversion/Withdrawal:

A. Existing

SOURCE	NO.	¼	¼	SEC.	TWP.	RGE.	PARCEL #	WELL TAG #
Unnamed Creek, 50 feet north and 400 feet east of Section 1, being within the SW1/4SW1/4NE1/4 of Section 1, T. 19 N., R. 15 E.W.M.				**1**	**19**	**15**		

Please include copies of all water well reports involved with this proposal. Also, if you know the distances from the nearest section corner to the above point(s) of diversion/withdrawal, please include that information in Item No. 6 (remarks) or as an attachment.

5. Purpose of Use:

A. Existing Use of the Water Right

PURPOSE OF USE	GPM or CFS	ACRE-FT/YR	PERIOD OF USE
Irrigation	**.80 CFS**	**160**	**April 1 through October 31**
Stock		**2**	**April 1 through October 31**

B. Proposed Purpose of the Trust Water Right:

DESCRIBE THE PURPOSE(S) OF USE DURING THE PERIOD OF TRUST:	
PURPOSE OF USE	ACRE-FEET/YR
Temporary Instream flow for fish and wildlife benefits, and mitigation of impacts to TWSA resulting from new applications for water rights.	**162**

* If additional space is needed, please continue on the form: Attachment for Application to Enter a Water Right into the Trust Water Right Program.

6. Place of Use:

A. Existing:

LEGAL DESCRIPTION OF LANDS WHERE WATER IS PRESENTLY USED:							
Government Lot 3 and 4 of Section 1, T. 19 N., R. 15 E.W.M.							
¼	¼	SEC.	TWP.	RGE.	COUNTY	PARCEL #	# OF ACRES
		1	19	15	Kittitas		36

DO YOU OWN ALL THE LANDS IN THE EXISTING PLACE OF USE? ☐ YES X NO – IF NO, PROVIDE OWNER(S) NAME:

Mike and Lynda White
661 Godawa Ln
Cle Elum WA 98922

Lonny and Joanne White
280 Iron Mtn Rd
Cle Elum WA 98922

Pete White
8080 Lower Peoh Point Rd
Cle Elum WA 98922

6. Place of Use (continued)

B. Proposed:

IDENTIFY THE WATER BODY TO BE BENEFITED OR OTHER PLACE TO BE BENEFITED
Unnamed Creek, Yakima River and the Columbia River

7. Remarks and Other Relevant Information:

We are requesting expedited processing under WAC 173-539A-080 based on trust water used to mitigate for impacts to TWSA from applications for new water rights and under WAC 173-152-050(2)(b) and (3)(a) based on the project having biological benefits and addressing limiting factors for native fish species in Yakima River.

The water right for this project is one of four Northland Resources related Trust Water Right applications being proposed to contribute irrigation water rights to trust. The purpose of the trust, and as a condition of placing the water rights into trust, is to exercise the water rights for benefit instream flows in the short term and thereafter have the trust water available to the applicant as mitigation for any impairment to existing water rights, including the Yakima River Total Water Supply Available (TWSA) as a result of rights or authorizations for Applications for Water Right Permits. As proposed, the impact on the individual project and total impacts of all the projects' impacts will be TWSA neutral.

Applicant is submitting with this application reports from Aspect Consulting describing the current proposal for mitigation.

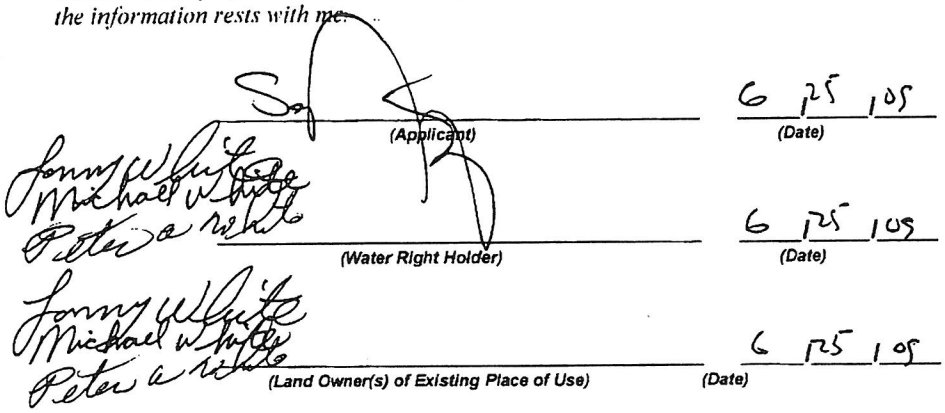
Included in the file: Water Right and Map

Certain applications may incur a Real Estate Excise Tax liability for the seller of the water rights. The Department of Revenue has requested notification of potential taxable water right related actions and therefore may be provided with a copy of this request.

Please contact the State Department of Revenue for further information. The phone number is (360) 570-3265. The address is: Department of Revenue, Real Estate Excise Tax, PO Box 47477, Olympia, WA 98504-7477.

8. Signatures:

I certify that the information above is true and accurate to the best of my knowledge. I hereby grant staff from the Department of Ecology access to the above site(s) for inspection and monitoring purposes. If assisted in the preparation of the above application, I understand that all responsibility for the accuracy of the information rests with me.



(Applicant) 6/25/05 (Date)

(Water Right Holder) 6/25/05 (Date)

(Land Owner(s) of Existing Place of Use) 6/25/05 (Date)

IMPORTANT! APPLICATION FILING INFORMATION IS PROVIDED ON THE NEXT PAGE.

WE ARE RETURNING YOUR APPLICATION FOR THE FOLLOWING REASON(S):

☐ ADDITIONAL SIGNATURES REQUIRED ☐ SECTION _____ IS INCOMPLETE

☐ OTHER/EXPLANATION:_____

STAFF: _____ ***DATE:*** ____/____/____

SAPPHIRE SKIES

July 14, 2009

Anna Nelson
c/o Jan Ollivier
Transportation Manager
Kittitas County Public Works
411 North Ruby
Ellensburg, WA 98926

Re: Explanation of Use of Water Rights for Projects
Forest Ridge, Woods & Steele F & G, Henshaw, Meadow Springs, Tamarack Ridge, and Starlite Estates

Dear Anna:

As indicated in our applications related to the above-referenced projects, it is our intent to serve those projects by "transferring" water rights for use in a Group A water system. In the case of Forest Ridge and Woods & Steele F & G, it is our intent, as the applications state, to phase the projects and to potentially serve the first phase of each of those developments with an exempt groundwater well that would serve 14 lots and then proceed with any additional phases once the relevant water right transfer ("new right") is approved.

The water rights transfers will be accomplished as follows:

We currently own or control several hundred acre-feet of senior water rights.

We have applied to DOE to have those water rights placed into a private water bank thorough Washington Rivers Conservancy.

Once those rights are placed into the water bank, a consumptive use quantity will be assigned to them that can and will be utilized to act as mitigation for the establishment of new water rights.

206 WEST FIRST ST. CLE ELUM, WA 98922
WWW.SAPPHIRESKIES.NET
1-888-844-5263

We have applied to DOE for a new water right to serve each of the above named projects, among others, and they are in the process of reviewing those applications for approval.

We have met with several parties associated with the above plan including representatives of the Yakima Nation, Dept of Fish and Wildlife, Bureau of Reclamation, the Water Transfer Working Group, and several members of the management and staff at DOE and have met with a positive response to the process we are undertaking.

Please let me know if you need any further clarification in this regard or have any questions.

Sincerely,

Dave Blanchard
President
Northland Resources LLC

Kittitas County
Public Health
Department

To Protect and Promote the Health and the Environment of the People of Kittitas County

September 30, 2009

Anna Nelson, Contract Planner
Community Development Services
411 N. Ruby Street, Suite 2
Ellensburg, WA 98926

RE: Forest Ridge Plat LP-08-00014
Dear Ms. Nelson,

On July 16th, 2009 Ecology withdrew the groundwater in Upper Kittitas County from new appropriation. Chapter 173-539A WAC requires that a determination of water neutrality be obtained from the State of Washington, Department of Ecology (Ecology) prior to final approval of plat applications.

Kittitas County Public Health Department's July 30, 2009 recommendation on the Forest Ridge plat application indicated that final approval be conditioned upon the developer/owner of the plat providing proof of water availability. Under the new aforementioned rule, the Forest Ridge Plat application has provided an option that meets the requirements. However, in order to recommend preliminary approval, the following information must to be provided by the applicant.

- Total amount of water required for the project including indoor residential use, outdoor use including irrigation of lawn and garden areas, ponds, swimming pools, hot tubs, use for fire suppression and/or any other use of water.
- Indications of the numbers of and locations of proposed wells and septic systems.
- Evidence that the proposed withdrawal will yield sufficient potable water. This evidence might take the form of a test well with nitrate and bacteriological tests. This requirement might also be satisfied by a survey of surrounding wells that includes yields and recent (within the last year) nitrate and bacteriological tests.

RECEIVED
OCT 01 2009
KITTITAS COUNTY
CDS

Kittitas County
Public Health Deptartment
507 N. Nanum Street, Suite 102
Ellensburg, WA 98926
T: 509.962.7515
F: 509.962.7581

Environmental
Health Services
411 North Ruby Street, Suite 3
Ellensburg, WA 98926
T: 509.962.7698
F: 509.962.7052

Final approval with then be conditioned upon:

- Documentation from the State of Washington, Department of Ecology verifying the quantity of water required for the plat has been transferred.
- All proposed wells being placed and well logs showing yields consistent with the requirements above being proven and the required nitrate and bacteriological tests showing potability of that water.

If you have any questions, please feel free to contact me at (509) 962-7515.

Sincerely,

Catherine Bambrick

Catherine Bambrick, Administrator

Kittitas County
Public Health
Department

To Protect and Promote the Health and the Environment of the People of Kittitas County

January 11th 2009

Dan Valoff, Staff Planner
Community Development Services
411 N Ruby Street, Suite 2
Ellensburg, WA 98926

RE: Forest Ridge Plat LP-08-00014

Dear Mr. Valoff,

Thank you for the opportunity to comment on the Forest Ridge Plat, LP-08-00014 during of project-review meeting on January 6th 2010 we discussed this plat application and more information was needed about wells and septic systems. WAC 246-272A is the regulation that governs on-site sewage systems in the State of Washington. Table 10 is the minimum land area requirement needed for on-site sewage systems, the minimum land area is determined by the soil type on site and the type of water supply (individual wells or a public water system). The minimum lot size for lots with an individual well and septic system depends on the soil type, but 1 acre is the minimum. The minimum lot size of lots with a public water supply and individual septic system again depends on the soil type, but 12,500 square feet is the minimum. I strongly encourage that the applicant conduct soil logs as soon as possible.

For community septic systems with wastewater flows under 3,500 gallons/day can be permitted by our department. However, for flows exceeding 3,500 gallons/day, design review and approval will be needed from the Washington State Department of Health and for flows greater than 14,500 gallons/day, design review and approval will be needed from the Washington State Department of Ecology.

The maximum allowable slope is going to depend on the permit agency. According to Kittitas County code 13.04.150 (5) no drain field disposal system may be designed for a site with a slope of grate than 30% grade. According to WAC 246-272A the maximum allowable slope is 45% grade.

For our department to recommend final plat approval, the final Mylar will need to identify the wastewater disposal option for each lot and the locations of the proposed drain fields that do not exceed the maximum allowable slope.

If you should have any questions or comments, please feel free to contact me at (509) 962-7515.

Sincerely,

James Rivard

James Rivard,

Environmental Health Supervisor

Kittitas County
Public Health Department
507 N. Nanum Street, Suite 102
Ellensburg, WA 98926
T: 509.962.7515
F:509.962.7581

FROM THE CASCADES TO THE COLUMBIA
KITTITAS COUNTY

www.co.kittitas.wa.us/health/

Environmental
Health Services
507 N. Nanum Street, Suite 102
Ellensburg, WA 98926
T: 509.962.7515
F:509.962.7581

CLE ELUM'S

SAPPHIRE SKIES

RECEIVED
SEP 02 2009
Kittitas County
CDS

RECEIVED
SEP 02 2009
KITTITAS COUNTY
DEPT. OF PUBLIC WORKS

August 31, 2009

Mr. Kirk Holmes, Interim Director
Kittitas County Community Development Services
411 N. Ruby Street, Suite 2
Ellensburg, WA 98926

RE: Forest Ridge Plat Comment Letter From Ecology

Dear Kirk:

This letter will serve as our response to the attached comment letter from the Dept of Ecology. We appreciate their comments and we feel very capable of addressing them without completing an EIS.

Air Quality

We will amend our application and include in the project's CC&R's that the use of wood burning stoves is prohibited.

Water Resources

As Ecology suggests, we have submitted applications with Ecology to place water rights that we have placed in trust with Washington Rivers Conservancy into a water bank. As Ecology's letter also references, we have submitted a new water right application to the Department of Ecology to serve the Forest Ridge project and it is being reviewed. This new right will be supported (mitigated) by the mitigation credits within the water bank established by us and approved by Ecology. Specific water rights within the bank will not be assigned to specific new water right applications; rather, once in the bank, the approved consumptive use of each water right in the bank will become a mitigation currency to be used as approved by Ecology to support the water right. You could contact me or Melissa Downes or Mark Shuppe at Ecology for further answers to the five bulleted points within the Ecology letter; however, we are fully complying with all of DOE's requests to process our applications.

Ecology's second Water Resources point revolves around the phasing of water for the project. Since the project will be developed in phases, the application requested that the first phase (14 lots) be allowed to be served by an exempt groundwater well just as any other 14-lot plat could be served. No more than 5,000 gallons per day could be drawn from the well and the remaining 157 lots could never be developed with use of an exempt well. No further development of the next phases would be allowed without the approval of a new water right or a water right transfer to serve the development. As the County issues final plats in phases, the first phase could be served by the exempt well and then that phase, as well as all future phases, could be served by the water rights once approved. This plat application was submitted prior to the recent moratorium issued by Ecology. In an effort to be cooperative, we will withdraw the request that the first phase be served by an exempt well. This should alleviate any concerns Ecology or the County has in this regard.

206 West 1st Street, Cle Elum WA 98922
888.844.LAND
www.sapphireskies.net

Shorelands/Environmental Assistance

There are two seasonal streams identified on site and the plan has provided for sufficient buffers from development. We agree that wetland impacts should be specified and any mitigation should be consistent with Best Available Science documents. Once final design is completed we will follow the prescribed rules and procedures to have any stream crossings reviewed by the appropriate regulatory agencies and seek the appropriate permits. . If the county feels strongly that one should be completed, we will comply but we feel that further review of this topic would not result in any additional wetlands identified or mitigation and would therefore be an unnecessary cost of time and money.

Water Quality- Ground Water Impact

A sewage treatment facility is not financially viable in this region for a project of this scale. The rules and regulations governing septic systems are in place so that septic systems do not have unacceptable impacts to ground water. The project averages just over 2.8 acres per lot, well above the minimum lot size for use of a septic system. Since septic systems are allowed within the county as a means of dealing with residential wastewater, it seems the impacts from our project would be less than average due to our high acreage per lot ratio compared to many developments in the county. We will work with the county to insure all rules and regulations are followed in the design and construction of the septic system.

Water Quality- Construction Stormwater Impact

Best management practices for construction runoff and for storm water management will be followed.

Given these tough economic times, the financial burden and the time necessary to complete an EIS process would deal a significant setback to our efforts to stay in business and would result in no additional impacts or mitigations. As you know, this area needs economic development and areas that are zoned for residential use should be allowed to move forward if they follow the rules. We look forward to a constructive dialogue with you regarding your thoughts and requirements to appropriately assess the impacts of the project; however, we strongly disagree with Ecology and feel an EIS is not necessary for those comments to be appropriately considered. Please call me at 509.674.6828 if you wish to discuss our project or any of the points above.

Please note that we will be forwarding the Traffic Impacts Analysis by Wednesday of this week. Thank you and we'll look forward to working with you and moving this project ahead in an efficient manner.

Sincerely,

Dave Blanchard
President
Northland Resources LLC
(509) 674-6828

Cc: Anna Nelson, Gordon Derr LLP
Allison Kimball, Brookside Consulting

CLE ELUM'S

SAPPHIRE SKIES

August 19, 2009

RECEIVED
AUG 21 2009
KITTITAS COUNTY
DEPT. OF PUBLIC WORKS

Mr. Kirk Holmes, Interim Director
Kittitas County Community Development Services
411 N. Ruby Street, Suite 2
Ellensburg, WA 98926

RE: Forest Ridge Plat
Response to WDFW Comments

Dear Kirk:

Included herewith is our response to the comment letter from WDFW on Forest Ridge. We respect their concerns and feel that where the concerns are warranted, they have been or can be addressed without undertaking the lengthy and complex process of an EIS. We have either completed the studies that would provide the necessary information (stormwater drainage report) or stand ready to do so as part of the process leading to an MDNS. We strongly feel that an EIS would be a waste of time and money given the nature of the project and the fact that all issues of significance can be appropriately analyzed outside that process. Many of the issues that people raise either were or should have been raised when the zoning was modified to Residential from Forest and Range, and again, if requested by the County, we are more than willing to review any issue.

Given these tough economic times, the financial burden and the time necessary to complete an EIS process, especially in light of how long the application has been in process already, would deal a significant setback to our efforts to stay in business. As you know, this area needs economic development and areas that are zoned for residential should be allowed to move forward if they comply with the applicable rules and regulations.

We'll look forward to continuing to review all potential impacts while moving this project ahead in an efficient manner.

Sincerely,

Dave Blanchard
President, Northland Resources LLC
(509) 674-6828

Cc: Anna Nelson, Gordon Derr LLP
Allison Kimball, Brookside Consulting

206 West 1st Street, Cle Elum WA 98922
888.844.LAND
www.sapphireskies.net

(12)

CLE ELUM'S SAPPHIRE SKIES

August 19, 2009

Mr. Mark Teske, WDFW Habitat Biologist
Washington State Department of Fish and Wildlife
South Central Region – Ellensburg District Office
201 North Pearl
Ellensburg, WA 98926

RE: Forest Ridge Plat Comment Letter

Dear Mr. Teske:

Thank you for your thoughts on the Forest Ridge project. We appreciate your comments. Fortunately, we are able to address them in a manner that makes an EIS unwarranted.

You stated that the project does not comply with zoning and land use laws. However, that is incorrect. The proposed density of the subject project is consistent with the zoning and land use codes of Kittitas County. In fact, the cluster provisions, as applied in the R-5 zoning and this project, would allow us to pursue over 190 lots on the property. We consciously chose to apply for a development that was significantly under that number. If the property were developed as 5-acre parcels (ie lower density than proposed) it would include fences and there would be no open space for any forms of wildlife or for the connectivity we provide in the 140 acres of open space. The project's open space is considered both an amenity to the residents of the site as well as a means to protect sensitive areas and benefit existing wildlife.

You stated that the project should be developed with city services as part of a UGA/annexation. It seems that this would have been an argument to be made prior to the zoning of the property, not after private developers have invested money in pursuing development in accordance with the rules and regulations. There is no need for the project to be part of a UGA to facilitate development and the city has no desire to add the property to the UGA or to provide services.

Services equivalent to those normally serving all other projects within the county are available. Water will be provided by senior adjudicated water rights that are already in process, as related to this specific project, with Department of Ecology. The Department of Ecology has indicated this as the preferred method to provide water to a residential development. In fact, the newest language regarding water usage provided by Department of Ecology contains expedited processing for a project such as Forest Ridge in its recent emergency rule, by following the very methods we have proposed. Roads will be built in accordance with County Road Standards. Power is already provided to many homes in the vicinity and is easily accessible. County codes allow for the installation of septic systems for this development in accordance with applicable Department of Health rules and regulations.

We are concerned, as you are, about storm water impacts to the quality of the waters in surrounding streams and rivers. We have voluntarily provided the County with a drainage analysis for the project. Storm water facilities will be designed in accordance with Eastern Washington guidelines and specific County requirements. Best management practices for

construction runoff and for storm water management will be followed. While we are also concerned with current conditions of storm water facilities in the area, a project can only be required to mitigate its impacts to the system and our project will do so in accordance with the applicable rules and regulations.

We believe you are incorrect in your assertion that current population projections do not support this project. We believe an assertion of that nature should be accompanied by a presentation of indisputable facts and sources. If you are in possession of such facts and analysis, we would appreciate a copy of that information. In addition, the Kittitas County Economic Development office has stated on many occasions that tourism is the life-blood of the economy of Upper Kittitas County. This project will facilitate an increase in the tax base as well as economic development from visitors and part time residents enjoying all the things Upper Kittitas County living provides. This means jobs for construction, customers for existing businesses and revenue flowing into a community that can certainly appreciate more business.

A snow removal plan will be designed and implemented by the HOA. If you have some suggestions related to your questions, please provide them at your earliest convenience. I would be happy to meet at our office to discuss your suggestions. The snow plowing plan will be created during the design phase of the project, and at this time no chemicals or other materials are planned to melt snow and any plan will be created by engineers and in consultation with the appropriate agencies. Standard best management snow plowing techniques will be employed.

Regarding wildlife issues, we are in agreement that habitat is affected by human presence; however, this was considered by Kittitas County when the property was rezoned from Forest and Range to R-5 Residential. As far as we are aware, the subject site has not been formally or informally designated by WDFW as a protection area for elk and deer. If any widely accepted and regulatory documentation exists that identifies this site as the only alternative pathway for elk to move in the area, please provide that in a timely manner given the SEPA comment period. There are tens of thousands of acres of undeveloped forest land, zoned Commercial Forest, directly north of the site that serves as potential habitat and paths for movement of the elk if, in fact, they use this general area from time to time. This site has been carefully planned to respect the nature around us. We would appreciate your suggestions about ways to improve the proposed open space for 'free movement' so that we can respond accordingly as well as suggestions on how we can adopt measures and handle conflicts, if they arise in the future.

We look forward to a constructive dialogue with you regarding your thoughts; however, we strongly disagree that an EIS is appropriate, based on the studies, planning and future oversight this project will be subject to. We, as stewards of the land, wish to create a desirable place for people to live in this residential zoned property while respecting the great things our nearby outdoors can provide. Your suggestions regarding measures to prevent problems and conflicts from arising, as you note, would be appreciated but an EIS is not necessary for those comments to be appropriately considered. Please call me at 509.674.6828 if you wish to discuss our project or any of the points above.

Thank you and we'll look forward to working with you and moving this project ahead in an efficient manner.

Sincerely,



Dave Blanchard
President
Northland Resources
(509) 674-6828

Cc: Anna Nelson, Gordon Derr LLP
Kirk Holmes, Kittitas County CDS Interim Director
Allison Kimball, Brookside Consulting

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
15 W Yakima Ave, Ste 200 • Yakima, WA 98902-3452 • (509) 575-2490

RECEIVED
AUG 31 2009
Kittitas County
CDS

August 27, 2009

Kirk Holmes
Kittitas County Community Development
411 N. Ruby St., Suite 2
Ellensburg, WA 98926

Dear Mr. Holmes:

Thank you for the opportunity to comment during the optional determination of nonsignificance process for the Forest Ridge Performance Based Cluster Plat of approximately 479 acres into 171 lots, proposed by Iron Snowshoe, LLC [LP-08-00014]. We have reviewed the documents and have the following comments.

SEPA/Environmental Review

Forest Ridge does not fit the criteria for the optional DNS process (WAC 197-11-355).

In addition to WAC 197-11-355, SEPA Handbook 8.3 Optional DNS states:
It is appropriate to use the optional DNS process when the lead agency has enough information at the time it issues the Notice of Application to be reasonably certain that there are no significant impacts associated with a project. The optional DNS process may also be used when mitigation measures have been identified that will reduce all impacts to a nonsignificant level.

The ODNS process is intended for minor projects that are fully reviewed before issuing the Notice of Application (NOA). The Forest Ridge divide and development is not a minor project.

There is a lack of information provided in the NOA and the SEPA environmental checklist, Ecology recommends that the county provide more details on the project so

that reviewing agencies (and the public) know what the project entails and include any proposed mitigation measures for Forest Ridge. Specific details on:

- Phasing
- Road & Infrastructure
- Trails
- Recreation areas
- Community Center
- Associated amenities

A list of environmental documents or studies should also be included. These may be stormwater management, traffic study, wetland delineation, etc.; all are important information to reviewing agencies and are needed for satisfactory environmental review.

In addition, it appears that a DNS is not an adequate determination and recommend that the county conduct a more detailed analysis of the environmental impacts of this size of development within Kittitas County. I respectfully ask the county to consider an EIS for the Forest Ridge development.

Air Quality

Potential Air Quality Impacts of the Forest Ridge Project

- **Dust**. Dust impacts have been identified in the proposal. See checklist at B.2.a. Significance of dust impacts will depend on the magnitude and duration of the construction phase.

- **Diesel emissions**. Construction will include off road construction equipment that may consume large quantities of diesel fuel. Diesel emissions are toxic, and potentially carcinogenic. Diesel impacts and proposed control measures need to be analyzed and discussed in the checklist under B.2.

- **Wood stove emissions**. The proposal consists of 171 single family homes. See checklist at 6.a. Ecology notes that there is the potential for each household to install and use at least one wood stove. This means that this project could potentially lead to the installation and operation of at least 171 wood stoves. Wood stoves have the potential to emit particulate matter and toxic air pollutants as defined at WAC 173-460-020(8). Trivial levels of toxic air pollutant emissions that do not pose a threat to human health or the environment are called "*De*

minimis emissions". See WAC 173-460-020(8). If the emission of a toxic air pollutant is above the *de minimis emission rate* for that pollutant, but it is below the "*small quantity emission rate*" for that pollutant, no further analysis is required for demonstrating compliance with a health-based acceptable ambient air concentration established for that pollutant. See WAC 173-460-020(7). Through air dispersion modeling, one can identify proposals that could potentially cause adverse air quality impacts.

For this proposal, Ecology's emission estimates and screening dispersion modeling indicate that:

1. At least **16 tons per year of fine particulate matter ("PM2.5")** will be emitted by 171 conventional wood stoves. This is **much greater than** the de minimis emission rate for PM2.5 of 0.5 tons per year. Additionally, Ecology projects that PM2.5 concentrations resulting from the use of conventional wood stoves would exceed Ecology's healthy air goal of 20 micrograms per cubic meter at the property boundary.

2. At least **43 tons per year of volatile organic compounds ("VOC")** will be emitted by 171 conventional wood stoves. This is **much greater than** the de minimis emission rate for VOC of 2 tons per year. Some VOC compounds are carcinogenic and are regulated as toxic air pollutants.

3. At least **118 tons per year of carbon monoxide** will be emitted by 171 conventional wood stoves. Carbon monoxide is a Washington state air toxic. This translates to about 99 pounds per hour of carbon monoxide, which is **greater than** the small quantity emission rate for carbon monoxide of 50 pounds per hour.

4. At least **122 tons per year of toxic air pollutants** will be emitted by 171 conventional wood stoves. Additionally, screening modeling indicates that potential emissions of **benzene could exceed** Washington's health-based acceptable ambient air concentration for benzene **by more than 150%.**

In light of the above findings, Ecology requests a detailed analysis of potential air quality impacts of the Forest Ridge project.

If you have any questions concerning the Air Quality comments, please contact Susan Billings at (509) 575-2486.

Water Resources

Ecology has met with the project proponent recently, and we are currently reviewing the surface water rights change applications which the applicant notes to own or control. However, the SEPA checklist conflicts with the information provided by the project proponent to Ecology.

Water Use for the Proposed Project

In the SEPA checklist, the applicant states "a permitted surface water withdrawal will be made offsite and piped to the property." According to the information provided to Ecology, the proponent will serve the proposed development with a **new groundwater right**. Ecology is currently reviewing the water rights which would serve as mitigation for the proposed new use.

The SEPA checklist inadequately addresses water use under Section B. 3. *Water.* This section should include, but not limited to, the following details:

- The source of water to be used.
- Specific water right authorizations to be used.
- How such authorization may need to be change to accommodate the proposed use.
- The availability and suitability of existing water rights to be used.
- Whether any mitigation is proposed.

The checklist states, "Any lots not served by an exempt groundwater well will be supplied and supported by a surface water right which the applicant currently owns or controls," and "Kittitas County Conservancy Board Approval of Change Application for Water Right once we exceed 14 lots served by an exempt groundwater well." This violates the use of the groundwater exemption for the following reasons:

- The proposed use will use more than 5,000 gallons per day; therefore the exemption may not be used to serve the project. A project may not 'stack' an exempt use of water for the same purpose. Once a project uses more than 5,000 gallons per day, the entire use of water will require a water right, not only the water use beyond 5,000 gallons per day.
- The project property lies within an area which is currently closed to new groundwater appropriations including exempt uses (Chapter 173-539A WAC.)

Water Use for Construction and Dust Suppression

Water use for road construction and dust suppression will likely be necessary. A review of Ecology records does not reveal any water rights which may be used for road construction or dust suppression. The project property lies within an area which is currently closed to new groundwater appropriations including exempt uses. Chapter 173-539A WAC, known as the Upper Kittitas Emergency Ground Water Rule, restricts all new appropriations of groundwater within the upper Kittitas County during the pendency of a groundwater study. The rule does allow for new uses of groundwater if a building permit has been granted and vested prior to July 16, 2009, or for projects which are determined by Ecology to be water budget neutral.

Prospective groundwater users in the area affected by Chapter 173-539A WAC shall apply to Ecology for a permit to appropriate public groundwater or, if seeking to use the groundwater exemption, shall submit to Ecology a request for determination that the proposed exempt use would be water budget neutral. **No new exempt uses under RCW 90.44.050 may commence unless Ecology has approved a request for determination that the proposed exempt use would be water budget neutral.**

If you have any questions concerning the Water Resources comments, please contact Kurt Walker at (509) 454-4237.

Shorelands/Environmental Assistance

The site should be surveyed for the presence of wetlands, and they should be shown on a site map. Potential direct and indirect impacts to wetlands from the development should be discussed in environmental documents. Potential impacts would include direct impacts from activities such as road or trail crossings. Indirect impacts would include introduction of light, noise, and pets to wetland species, changes in buffer size and character, water availability for wetlands, such as water amount, timing or duration of flows, from both surface or groundwater sources. Indirect impacts from potential changes in the water quality (turbidity, de-icers, nutrient inputs from septic systems, etc.) of water which feeds the wetlands should also be identified.

Crossing of stream or wetland areas will require evaluation under section 404 and 401 of

the Clean Water Act – if a 404 permit from the US Army Corps of Engineers is required for the crossing(s) then Ecology will respond with a 401 water quality certification review of the project. Mitigation for wetland impacts and other water-related impacts should be specified and should be consistent with Best Available Science documents.

Site soil and vegetation characteristics should be described as their character will determine how well nutrients are absorbed and how fast water could move through surface and subsurface flows. Of particular interest is whether the cumulative impact of septic systems at full build-out will have a negative effect on water quality of streams in the area.

The characteristics of the trail system (pedestrian versus multi-modal) should also be described. Ideally, pedestrian trails should be kept in a fairly primitive state to reduce impacts. (A "primitive state" could be defined as a path with no fill and a narrow width of less than 3 feet, with water bars along the trail in steeper areas, no removal of vegetation except for minimal pruning, etc). What standards will be used to guide trail construction and maintenance? If trails will be placed in open spaces, buffers between the trails and critical areas should remain intact and should not be reduced from that recommended by Best Available Science for the type of trail use. Different trail types/usage should be depicted differently on site maps.

It would be helpful if different colors were used on maps to show the different phases of the project, and it would be helpful for impact review to superimpose the proposed project onto an aerial photo.

If you have any questions concerning the Shorelands/Environmental Assistance comments, please contact Catherine Reed at (509) 575-2616.

Water Quality – Construction Stormwater Impact

Project Greater-Than 1 Acre with Potential to Discharge Off-Site

This project will require a NPDES Construction Stormwater General Permit from the Washington State Department of Ecology. This permit requires that the SEPA checklist

fully disclose anticipated activities including building, road construction and utility placements. Obtaining a permit is a minimum of a 38 day process and may take up to 60 days if the original SEPA does not disclose all proposed activities.

The permit requires that Stormwater Pollution Prevention Plan (Erosion Sediment Control Plan) is prepared and implemented for all permitted construction sites. These control measures must be able to prevent soil from being carried into surface water (this includes storm drains) by stormwater runoff. Permit coverage and erosion control measures must be in place prior to any clearing, grading or construction.

More information on the stormwater program may be found on Ecology's stormwater website at: http://www.ecy.wa.gov/programs/wq/stormwater/construction/ . Please submit an application or contact Lynda Jamison at the Dept. of Ecology, (509) 575-2434, with questions about this permit.

Erosion control measures must be in place prior to any clearing, grading, or construction. These control measures must be effective to prevent soil from being carried into surface water by storm water runoff. Sand, silt, and soil will damage aquatic habitat and are considered pollutants.

Any discharge of sediment-laden runoff or other pollutants to waters of the state is in violation of Chapter 90.48, Water Pollution Control, and WAC 173-201A, Water Quality Standards for Surface Waters of the State of Washington, and is subject to enforcement action.

Best management practices must be used to prevent any sediment, oil, gas or other pollutants from entering surface or ground water.

If you have any questions concerning the Water Quality comments, please contact Lynda Jamison at (509) 575-2434.

Water Quality – Groundwater Impact

Although Ecology has no jurisdiction over septic systems of this magnitude, we would urge the proponent to consider a sewage treatment system as the ground water will very likely be adversely impacted by additional septic systems in this area.

If you have any questions concerning the Water Quality comments, please contact Rick Frye at (509) 575-2821.

Sincerely,

Gwen Clear

Gwen Clear
Environmental Review Coordinator
Central Regional Office
(509) 575-2012

Cc: Anna Nelson
901

State of Washington
Department of Fish and Wildlife
South Central Region – Ellensburg District Office, 201 North Pearl, Ellensburg, WA 98926
Phone: (509) 962-3421, Fax (509) 925-4702

August 14, 2009

Anna Nelson, Planner
Kittitas County Community Development Services
411 N. Ruby Street
Ellensburg, WA 98926

Dear Ms. Nelson:

The Washington State Department of Fish and Wildlife appreciates the opportunity to provide these comments to Kittitas County as you conduct your threshold analysis of the Forest Ridge (LP-08-00014) plat proposal. This proposal would result in the sub-division of 479 acres into 171 single- family residential lots. The property is currently zoned R –5. The density of development proposed is not consistent with rural development density. Under current zoning approximately 95 lots could be developed if you divide a 479 acre parcel into 5 acre lots. Roads and other infrastructures requirements would reduce that number of parcels to some extent. The proposal would nearly double the number of lots allowed under the current R-5 zone and allow a density more in keeping with an urban setting. This property is outside an urban growth area (UGA). Infrastructure is lacking and services would need to be extended to accommodate growth. The current population growth numbers do not support UGA expansion. This level of development outside a UGA is significant and should properly be analyzed in an environmental impact statement (EIS).

Water

Where the water to service the development will come from is an issue. The source of the water, the quantity of water to be used and how it will get there should be addressed. The method, the route and the impacts to the route (on site / off site) should be analyzed. Wastewater, sewage and stormwater issues should be addressed. The proposed development has several draws that run through the property that have flowing water at least seasonally. These draws ultimately deliver water to fish bearing streams. Whether sediment or pollutants are delivered immediately to fish bearing water or collect in the draws to be mobilized during spring runoff, the impacts are similar. Please address this issue. Construction impacts as well as ongoing impacts should be addressed. How much impervious surface will be created? How much water will be generated from these impervious surfaces? Please address the rain on snow issue and provide the

calculations for the quantities of water that this development and the infrastructure are designed to accommodate. Since this area receives considerable precipitation in the form of snow, plowing and snow removal will be a routine occurrence. Will the snow be removed from the roads and driveways and deposited at another location or pushed to the shoulder of the road? Where will the snow be placed? What chemicals or materials will be used to melt snow or combat ice issues on the running surfaces of the roads comprising the transportation network?

Wildlife

This area is year round habitat and winter range for deer and elk. The habitat of animals will be eliminated by the footprint of the homes and roads that are proposed. The carrying capacity of the area will be reduced. In addition to direct habitat elimination, disturbance effectively reduces the amount of habitat available. The Colockum Elk Herd has over recent years been chronically below targets established in the herd plan. Please address impacts to wildlife and the proposed mitigation. Mountain lion occur in and around this location due to deer and elk use of the area. Spreading urbanization into wildlife habitat negatively impacts wildlife and creates conflict where none formerly existed. Mountain lions, bears or other wildlife in yards in housing developments generally requires involvement of WDFW enforcement or other WDFW personnel. Please detail the measures that will be employed to prevent problems and conflicts from arising that would require commitment of resources to this area as it is developed.

Open Space

In the notice, some percent of the area of the project is proposed to be dedicated as open space. It is encouraging that this issue is being considered. Not all open space is equal however. Open areas with high use or frequent disturbance can go unused by wildlife. We strongly recommend a configuration that provides free movement (permeability) within and through the proposal utilizing the terrain and in consideration of the suite of wildlife that can utilize the area. Please address this issue thoroughly in the EIS.

Thank you for the opportunity to provide these comments. If you have any questions, I can be reached at (509) 962-3421.

Sincerely,

Mark S. Teske

Mark S.Teske
WDFW Habitat Biologist

CC Harvester, WDFW Habitat
Regional Program Manager

KITTITAS COUNTY FIRE MARSHAL'S OFFICE
411 N. Ruby St., Suite 2, Ellensburg, WA 98926

Office (509) 962-7657 Fax (509) 962-7682

August 24, 2009

Anna Nelson
Community Development Services
411 N. Ruby Street, Suite 2
Ellensburg, WA 98926

Re: Forest Ridge, LP-08-00014

Dear Mrs. Nelson:

After conducting a review of the above named project, I have the following comments:

- Design & construction must comply with Kittitas County Code, Kittitas County Zoning, the 2006 International Fire & Building Codes, and all other development agreements.
- Given the provided pre-review documents, these residences will require fire flow of 1000 gpm (Gallons/Minute) for a duration of no less than 30 minutes. A reduction in required fire flow of 50 percent, is allowed when the buildings are provided with an approved automatic sprinkler system.
- An approved water supply capable of supplying the required fire flow for fire protection shall be provided. A standpipe or hydrant system with an adequate source of water (supply), a distribution system and adequate pressure for delivery shall be installed for this plat. Hydrant spacing shall comply with International Fire Code and its appendices' requirements.
- A separate permit & deposit shall be required for installation of a hydrant/standpipe system.
- The Kittitas County Fire Marshal's Office will require a minimum of (3) three complete sets of plans for full review; (1) Office Copy, (1) Permit Copy, (1) Fire Department Copy.
- This property is located outside of a fire district. As such, all future development must meet the International Urban Wild Land Code for building construction, defensible space allocation, access, etc.,
- No slope or grade greater than 12% shall be allowed,

This letter in no way constitutes a formal review of this project. The requirements listed above are not all inclusive and are subject to change pending full review of this project. Any questions or concerns regarding fire service features may be directed to the Kittitas County Fire Marshal's Office. 509-962-7657.

Sincerely,

Barry R Kerth
Deputy Fire Marshal

Kittitas County
Public Health
Department

To Protect and Promote the Health and the Environment of the People of Kittitas County

July 31, 2009

Anna Nelson, Contract Planner
Community Development Services
411 N Ruby Street, Suite 2
Ellensburg, WA 98926

RE: Forest Ridge Plat LP-08-00014

Dear Ms. Nelson,

Thank you for the opportunity to comment on the Forest Ridge Plat, LP-08-00014. Pursuant to the Memorandum of Agreement between Kittitas County and the Washington State Department of Ecology all residential well connections serving the proposed lots shall be required to have meters installed. Metering results shall be recorded in a manner consistent with Kittitas County and Washington State Department of Ecology requirements. The requirement to meter only applies if you rely upon the RCW 90.44.050 exemption from permitting through ecology.

The final plat notes shall include the following two statements:

"The approval of this division of land includes no guarantee that there is a legal right to withdraw groundwater within the land division. The approval of this division of land provides no guarantee that use of water under the ground water exemption (RCW 90.44.050) for this plat or any portion thereof will not be subject to curtailment by the Department of Ecology or a court of law. "

AND

"Metering will be required on all new residential well connections and metering results shall be recorded in a manner consistent with Kittitas County and Washington State Department of Ecology requirements."

The Public Health Department's recommendation shall state that final approval be conditioned upon the developer/owner of the plat providing proof of water availability. Water availability can be provided through several different ways depending on the source of water proposed.

If a public water system is proposed for the plat, the public water system information shall be submitted and reviewed by Kittitas County Public Health Department or Washington State Department of Health which includes final issuance of the well ID number to meet the water availability requirement for plat approval.

Kittitas County
Public Health Department
507 N. Nanum Street, Suite 102
Ellensburg, WA 98926
T: 509.962.7515
F:509.962.7581

FROM THE CASCADES. . .TO THE COLUMBIA
KITTITAS COUNTY

www.co.kittitas.wa.us/health/

Environmental
Health Services
411 North Ruby Street, Suite 3
Ellensburg, WA 98926
T: 509.962.7698
F: 509.962.7052

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Kittitas County
Public Health
Department

To Protect and Promote the Health and the Environment of the People of Kittitas County

If individual wells are proposed for the parcels and there is an existing well located on the plat, a well log from Washington State Department of Ecology will meet the water availability requirement. If there is not an existing well on the plat, then a **water availability report** with documentation and evidence to support the claim regarding adequate availability of groundwater for the proposed number of potable water wells must be submitted for review.

At this time the application does not contain sufficient information to make a determination of adequate water availability or soil assessment to determine if the land area is suitable for onsite sewage systems. The above mentioned items need to be submitted to the Public Health Department in order for the plat application to be recommended for approval.

If you should have any further questions please don't hesitate to contact me by phone 509-962-7005 or email james.rivard@co.kittitas.wa.us.

Sincerely,

James Rivard

James Rivard
Environmental Health Supervisor
Kittitas County Public Health Department

Kittitas County
Public Health Department
507 N. Nanum Street, Suite 102
Ellensburg, WA 98926
T: 509.962.7515
F:509.962.7581

FROM THE CASCADES...TO THE COLUMBIA
KITTITAS COUNTY

www.co.kittitas.wa.us/health/

Environmental
Health Services
411 North Ruby Street, Suite 3
Ellensburg, WA 98926
T: 509.962.7698
F: 509.962.7052

KITTITAS COUNTY
DEPARTMENT OF PUBLIC WORKS

MEMORANDUM

TO: Anna Nelson, CDS Contract Planner
FROM: Christina Wollman, Planner II
DATE: July 17, 2009
SUBJECT: **REVISED**
Request for Additional Information
Forest Ridge Performance Based Cluster Plat P-08-14

The Department of Public Works has completed a preliminary review of the Forest Ridge Performance Based Cluster Plat. In order to fully review the impacts of the development, the applicant shall be required to submit the following:

1. **Traffic Impact Analysis**. A traffic impact analysis that follows the guidelines of the Department of Public Works' Traffic Impact Analysis Requirements shall be required. The traffic impact analysis shall be completed by an engineer licensed to practice in the State of Washington. The applicant and/or consultant should contact the Department of Public Works prior to beginning the traffic impact analysis for additional information.

2. **Stormwater Review**. A stormwater study shall be required. Prior to beginning the study, the applicant shall consult with the Department of Public Works to determine the study's scope and requirements.

411 North Ruby Street, Suite 1
Ellensburg, WA 98926
TEL (509) 962-7523
FAX (509) 962-7663

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KITTITAS COUNTY COMMUNITY DEVELOPMENT SERVICES
411 N. Ruby St., Suite 2, Ellensburg, WA 98926
CDS@CO.KITTITAS.WA.US
Office (509) 962-7506
Fax (509) 962-7682

"Building Partnerships – Building Communities"

Affidavit of Mailing & Publication

PROPOSAL NAME: Forest Ridge (LP-08-00014)

NOTIFICATION OF: Notice of Application

NOTIFICATION MAIL DATE: July 29th, 2009

I certify that the following documentation:

- Notice of Application for the Forest Ridge Plat (LP-08-00014)

has been mailed to the attached list of persons and participants, and that proper notification (as attached) has been published in the Legal Newspaper(s) of Record for Kittitas County.

Signature

Candie Leader
County of Kittitas
State of Washington

Subscribed and sworn to before me this 29 day of July, 2009

Amanda J. Weed
Notary Public for the State of Washington residing in Ellensburg.

My appointment expires: January 9th, 2010

PINE VIEW ESTATES LLC
PO BOX 750
ROSLYN WA 98941-

MAXFIELD, DALE G. ETUX
9605 FIRDALE AVE
EDMONDS WA 98020

DALY, KEVIN ETUX
5626 126TH AVE SE
BELLEVUE WA 98006-

PETERSON, CHARLES A ETUX &
PETERSON, DAVID S ETUX
16954 151ST AVE SE
RENTON WA 98055

JOHNSON, JOHN A ETUX
821 E LK SAMMAMISH SHORE LN SE
SAMMAMISH WA 98075

LEHNERT, MARK A. ETUX
PO BOX 957
CLE ELUM WA 98922

AMERICAN FOREST HOLDINGS LLC
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KINGSTOWN, RI 02852-

PEPPIN, LESLIE D
PO BOX 910
CLE ELUM WA 98922-

DBL COMPANY INC
4444 HILLCREST DR
BOISE ID 93705-

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17915 LULL ST
RESEDA CA 91335-

ASP PROPERTIES LLC
507 WELLS AVE N
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PERSON, ALAN K ETUX
12023 434TH AVE SE
NORTH BEND WA 98045

STUART LOOKOUT LLC
520 43RD AVE NW
GIG HARBOR WA 98335-

P SQUARED LLC
1501 35TH AVE S
SEATTLE WA 98144

JNG LLC
PO BOX 454
MUKILTEO WA 98275-

HUISH, JOHN M TRUSTEE
HUISH LAND TRUST
7300 FUN CENTER WAY
TUKWILA WA 98188

ALPINE MEADOWS LLC
114 17TH PL
KIRKLAND WA 98033-

ROSS, MICHAEL W ETUX
1300 SKYWALL DR
SULTAN WA 98294-

Kittitas County Fire Marshal

Kittitas County Sheriffs Dept.

Kittitas County Board of County Commissioners

Kittitas County Code Enforcement

Kittitas County Environmental Health

Kittitas County Solid Waste Programs

Kittitas County Public Works

Anna Nelson
GordonDerr Attorneys at Law
2025 First Ave. Suite 500
Seattle, WA 98121-3140

Fire District #7
Attn: Fire Chief
PO Box 777
South Cle Elum, WA 98943

Cle Elum- Roslyn School District 404
Administrative Office
2690 SR 903
Cle Elum, WA 98922

WA Dept. Fish and Wildlife
Brent Renfrow/ Mark Teske
201 N. Pearl
Ellensburg, WA 98926

Yakama Nation
P.O. Box 151
Toppenish, WA 98948

James E Brooks Library
Documents Dept.
400 E. University Way
Ellensburg, WA 98926 MS-7548

Washington Dept. of Ecology
Regional Director
15 W. Yakima Ave. Ste. 200
Yakima, WA 98902-3401

DNR
External SEPA Coordinator
P.O. Box 47015
Olympia, WA 98504-7015

WA Dept. of Natural Resources
713 E. Bowers Rd.
Ellensburg, WA 98926

Jonathan & Luanne Osterberg
16241 NE 51 St
Redmond, WA 98052

Rick & Susan Vaughn
880 Alice Road
Cle Elum, WA 98922

Van & Dee Vorwerk
4400 174th St SE
Bothell, WA 98012 – 6724

Tom Justus
WA State Department of Health
Eastern Regional Office
1500 West Fourth Avenue Suite 305
Spokane, Washington 99201

John Marvin
Habitat Biologist
Yakima-Klickitat Fisheries Project
771 Pence Rd.
Yakima, WA, 98908

Washington State Department of Archaeology & Historic Preservation
1063 S. Capitol Way, Suite 106
Olympia, WA 98501

Department of Ecology
Environmental Review Section
PO Box 47703
Olympia, WA 98504-7703

Liz Bryson
Daily Record
401 N Main
Ellensburg, WA 98926

Forest Service
803 West Second Street
Cle Elum, WA 98922

Jim Boyle
PO Box 39
Ronald, WA 98940

Frank & Marcia Haake
31330 – 31st Ave SW
Federal Way, WA 98023

Dick & Pansy Wolf
680 Alice Road
Cle Elum, WA 98922

KITTITAS COUNTY COMMUNITY DEVELOPMENT SERVICES
411 N. Ruby St., Suite 2, Ellensburg, WA 98926
CDS@CO.KITTITAS.WA.US
Office (509) 962-7506
Fax (509) 962-7682
"Building Partnerships – Building Communities"

NOTICE OF APPLICATION

Notice of Application: July 30, 2009
Application Received: April 24, 2008
Application Complete: July 17, 2009

Project Name (File Number): Forest Ridge (LP-08-00014)
Applicant: Property owner – Iron Snowshoe LLC

Location: Twelve tax parcels, located northeast of the city of Cle Elum off of the extension of Columbia Street in Section 24, T.20N, R.15E, W.M.; Kittitas County parcel map numbers 20-15-24000-0001, -0003, -0004, -0007, -0015, -0016, -0017, -0018, -0019, -0020, -0021, and -0022.

Proposal: Landowner Iron Snowshoe LLC has submitted a Preliminary Plat application to subdivide approximately 479 acres into 171 single-family residential lots, with an average lot size of 1.67 acres. The subject property is zoned Rural-5. The project is proposed as a Performance Based Cluster Plat. Final plat approval and building permits will be required.

Materials Available for Review: The submitted application and related filed documents may be examined by the public at the Kittitas County Community Development Services (CDS) office at 411 N. Ruby, Suite 2, Ellensburg, Washington, 98926, or on the CDS website at http://www.co.kittitas.wa.us/cds/current/. Phone: (509) 962-7506

Written Comments on this proposal can be submitted to CDS any time prior to 5:00 p.m. on August 14, 2009. Any person has the right to comment on the application, receive notice of and participate in any hearings, and request a copy of the decision once made. Appeal procedures can vary according to the type of decision being appealed, and are described in Kittitas County Code, Title 15A.

Environmental Review (SEPA): The County expects to issue a Determination of Non-Significance (DNS) for this proposal, and will use the optional DNS process, meaning this may be the only opportunity for the public to comment on the environmental impacts of the proposal. Mitigation measures may be required under applicable codes, such as Title 17 Zoning, Title 16 Subdivisions, and the Fire Code, and the project review process may incorporate or require mitigation measures regardless of whether an EIS is prepared. A copy of the threshold determination may be obtained from the County.

Public Hearing: An open record hearing will be scheduled before the Kittitas County Hearing Examiner after the SEPA environmental threshold determination has been issued. A Public Hearing Notice will be issued establishing the date, time and location of this hearing.

Designated Permit Coordinator (staff contact): Anna Nelson, Contract Planner: (206) 382-9540; email at anelson@GordonDerr.com

NOTICE OF APPLICATION

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Notice of Application:	July 30, 2009
Application Received:	April 24, 2009
Application Complete:	July 17, 2009
Publish Daily Record:	July 30, 2009

SAPPHIRE SKIES

July 14, 2009

RECEIVED
AUG 27 2009
Kittitas County
CDS

Anna Nelson
c/o Jan Ollivier
Transportation Manager
Kittitas County Public Works
411 North Ruby
Ellensburg, WA 98926

Re: Explanation of Use of Water Rights for Projects
Forest Ridge, Woods & Steele F & G, Henshaw, Meadow Springs, Tamarack Ridge, and Starlite Estates

Dear Anna:

As indicated in our applications related to the above-referenced projects, it is our intent to serve those projects by "transferring" water rights for use in a Group A water system. In the case of Forest Ridge and Woods & Steele F & G, it is our intent, as the applications state, to phase the projects and to potentially serve the first phase of each of those developments with an exempt groundwater well that would serve 14 lots and then proceed with any additional phases once the relevant water right transfer ("new right") is approved.

The water rights transfers will be accomplished as follows:

We currently own or control several hundred acre-feet of senior water rights.

We have applied to DOE to have those water rights placed into a private water bank thorough Washington Rivers Conservancy.

Once those rights are placed into the water bank, a consumptive use quantity will be assigned to them that can and will be utilized to act as mitigation for the establishment of new water rights.

206 WEST FIRST ST. CLE ELUM, WA 98922
WWW.SAPPHIRESKIES.NET
1-888-844-5263

(4)

We have applied to DOE for a new water right to serve each of the above named projects, among others, and they are in the process of reviewing those applications for approval.

We have met with several parties associated with the above plan including representatives of the Yakima Nation, Dept of Fish and Wildlife, Bureau of Reclamation, the Water Transfer Working Group, and several members of the management and staff at DOE and have met with a positive response to the process we are undertaking.

Please let me know if you need any further clarification in this regard or have any questions.

Sincerely,



Dave Blanchard
President
Northland Resources LLC

KITTITAS COUNTY COMMUNITY DEVELOPMENT SERVICES
411 N. Ruby St., Suite 2, Ellensburg, WA 98926
CDS@CO.KITTITAS.WA.US
Office (509) 962-7506
Fax (509) 962-7682
"Building Partnerships – Building Communities"

July 17, 2009

Iron Snowshoe, LLC
c/o David Blanchard
PO Box 923
Cle Elum, WA 98922

Allison Kimball
Authorized Agent
Brookside Consulting
P.O. Box 1036
Cle Elum, WA 98922

Subject: Determination of Complete Application
Forest Ridge Preliminary Plat LP-08-00014

Dear Applicant:

Your application for the Forest Ridge Preliminary Plat was received on April 24, 2008, and has been determined complete on the date of this letter.

Your application meets the requirements of KCC 16.12.010 for a complete application. The County may request additional information during review of your application. Continued processing of your application will include, but is not limited to the following actions:

1. According to KCC 15A.030.060 a Notice of Application will be sent to the public (adjacent landowners), Kittitas County departments, and non-County governmental agencies inviting written comments on this proposal. **Note: you have 5 days to contact Community Development Services for instructions for posting notice signs at the site as outlined in KCC 15A.03.110.**

2. Requests for clarification, amendments, or additional information will be sent to you following the public comment period.

3. The consideration of written comments from adjacent property owners and public agencies will be incorporated in the staff report.

4. As requested by the County, additional materials and/or revised preliminary plat drawings may be required before this matter is brought before the Hearing Examiner.

5. A public hearing will be scheduled before the Kittitas County Hearing Examiner. At that hearing a recommendation will be made for approval or denial.

6. A closed-record hearing will be scheduled before the Kittitas County Board of Commissioners where final approval or denial will be given.

If you have any questions regarding this matter, please contact me at (206) 382-9540, or by e-mail at anelson@GordonDerr.com.

Sincerely,



Anna Nelson, AICP
Contract Planner

cc: Jeff Watson, Kittitas County Public Works

KITTITAS COUNTY COMMUNITY DEVELOPMENT SERVICES
411 N. Ruby St., Suite 2, Ellensburg, WA 98926
CDS@CO.KITTITAS.WA.US
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"Building Partnerships – Building Communities"

AFFIDAVIT OF POSTING

Effective July 19, 2007, Kittitas County Code requires all project actions that are not processed administratively to have a notice posted at the site of the project. Per KCC 15A.03.110 the following applies:

1. The applicant shall post the subject property with signs as required by Community Development Services.
2. Signs shall be posted on each road frontage on the subject property and shall be clearly visible and accessible.
3. Signs shall be posted and on-site prior to the issuance of a Notice of Application.
4. The sign shall be posted in a sturdy manner to remain on-site until fifteen days after the expiration of the Notice of Decision appeal period. It shall be the responsibility of the applicant to properly dispose of the sign.
5. At the time of development application, Community Development Services will identify the number of signs needed and the general location of each sign on the subject property.
6. It shall be the responsibility of the applicant to place the structure on which the sign will be posted on site. At such time the structure and sign is in place, the applicant shall contact Community Development Services.

DATE:June 18, 2008	PLANNER: Scott Turnbull
PROJECT NAME:Forest Ridge Cluster Plat	FILE NUMBER:LP-08-14

PLEASE COMPLETE THE FOLLOWING:

I, DAVID BLANCHARD, PRESIDENT, NORTHLAND RESOURCES, LLC (IRON SNOWSHOE LLC), certify that I am the landowner and/or authorized agent responsible for the posting of this land use project site and further certify that the site has been posted as required by Kittitas County Code. I understand that the required posting period begins immediately and ends 15 days after the ending of the appeal period on the Notice of Decision and the sign(s) will be posted at the site until this time. **Failure to post the site and return this form to Community Development Services in a timely manner will result in a delay of the application review for the project.**

Iron Snowshoe LLC

Signature 1st president

6/24/08
Date

Please return the above certification to CDS; Fax at 509-962-7682; or mail to; Community Development Services, 411 North Ruby Street, Suite 2, Ellensburg, WA 98926.

For Staff Use Only:
Received_____

KITTITAS COUNTY COMMUNITY DEVELOPMENT SERVICES
411 N. Ruby St., Suite 2, Ellensburg, WA 98926
CDS@CO.KITTITAS.WA.US
Office (509) 962-7506
Fax (509) 962-7682

LONG PLAT APPLICATION LP-08-00014

(To divide lot into 5 or more lots)

KITTITAS COUNTY ENCOURAGES THE USE OF PRE-APPLICATION MEETINGS. PLEASE CONTACT COMMUNITY DEVELOPMENT SERVICES TO SET UP A PRE-APPLICATION MEETING TO DISCUSS A PROPOSED PROJECT.

PLEASE TYPE OR PRINT CLEARLY IN INK. ATTACH ADDITIONAL SHEETS AS NECESSARY. PURSUANT TO KCC 15A.03.030, A COMPLETE APPLICATION IS DETERMINED WITHIN 28 DAYS OF RECEIPT OF THE APPLICATION SUBMITTAL PACKET AND FEE. THE FOLLOWING ITEMS MUST BE ATTACHED TO THE APPLICATION PACKET:

REQUIRED ATTACHMENTS

- [X] Ten large copies of plat with all preliminary drawing requirements complete (reference KCC Title 16 Subdivision Code for plat drawing requirements) and one small 8.5" x 11" copy
- [X] Address list of all landowners within 500 feet of the subject parcel(s). If adjoining parcels are owned by the applicant, then the 500 foot area shall extend from the farthest parcel. If the parcel is within a subdivision with a Homeowners' or Road Association, then please include the mailing address of the association.
- [X] SEPA Checklist (Only required if your subdivision consists of 9 lots or more. Please pick up a copy of the Checklist if required)

OPTIONAL ATTACHMENTS

(Optional at preliminary submittal, but required at the time of final submittal)

- [X] Certificate of Title (Title Report)
- [ ] Computer lot closures

FEES:

$200 plus $10 per lot for Public Works Department;
$625 plus $75 per hour over 12.5 hours for Environmental Health Department;
$2000 for Community Development Services Department, PLUS $400 if SEPA Checklist is required
*One check made payable to KCCDS

FOR STAFF USE ONLY

RECEIVED
APR 24 2008
Kittitas County
CDS

APPLICATION RECEIVED BY:
(CDS STAFF SIGNATURE)
X _____

DATE: 4.24.08 11:45 AM

RECEIPT # 765

NOTES:

DARRYL PIERCY, DIRECTOR
ALLISON KIMBALL, ASSISTANT DIRECTOR
COMMUNITY PLANNING • BUILDING INSPECTION • PLAN REVIEW • ADMINISTRATION • PERMIT SERVICES • CODE ENFORCEMENT • FIRE INVESTIGATION

1. **Name, mailing address and day phone of land owner(s) of record:**
Landowner(s) signature(s) required on application form.

Name: Iron Snowshoe, LLC.

Mailing Address: PO Box 923

City/State/ZIP: Cle Elum, WA 98922

Day Time Phone: (509) 674-6828

Email Address: _____

2. **Name, mailing address and day phone of authorized agent** (if different from land owner of record):
If an authorized agent is indicated, then the authorized agent's signature is required for application submittal.

Agent Name: Same as Above

Mailing Address: _____

City/State/ZIP: _____

Day Time Phone: _____

Email Address; _____

3. **Street address of property:**

Address: TBD Creekside Road

City/State/ZIP: Cle Elum, WA 98922

4. **Legal description of property:**
See sheet 6 of the attached Preliminary Plat Map

5. **Tax parcel number(s):** See sheet 1 of the attached map

6. **Property size:** 478.45 **(acres)**

7. **Narrative project description:** Please include the following information in your description: describe project size, location, water supply, sewage disposal and all qualitative features of the proposal; include every element of the proposal in the description (be specific, attach additional sheets as necessary):

This is a 478.45 acre preliminary plat containing 171 lots. The project is located north of Cle Elum off of Creekside Road in Sect. 24, T20N., R15E., W.M. Water will be from a Class A water system. Sewage disposal will be from onsite individual septic systems.

8. Are Forest Service roads/easements involved with accessing your development? Yes ✓No (Circle)
If yes, explain: _____

9. What County maintained road(s) will the development be accessing from? Columbia Ave (Cle Elum)

10. Application is hereby made for permit(s) to authorize the activities described herein. I certify that I am familiar with the information contained in this application, and that to the best of my knowledge and belief such information is true, complete, and accurate. I further certify that I possess the authority to undertake the proposed activities. I hereby grant to the agencies to which this application is made, the right to enter the above-described location to inspect the proposed and or completed work.

All correspondence and notices will be mailed to the Land Owner of Record and copies sent to the authorized agent.

Signature of Authorized Agent:
(REQUIRED if indicated on application)

X Iron Snowshoe LLC
David Bond

Date: April 21, 2008

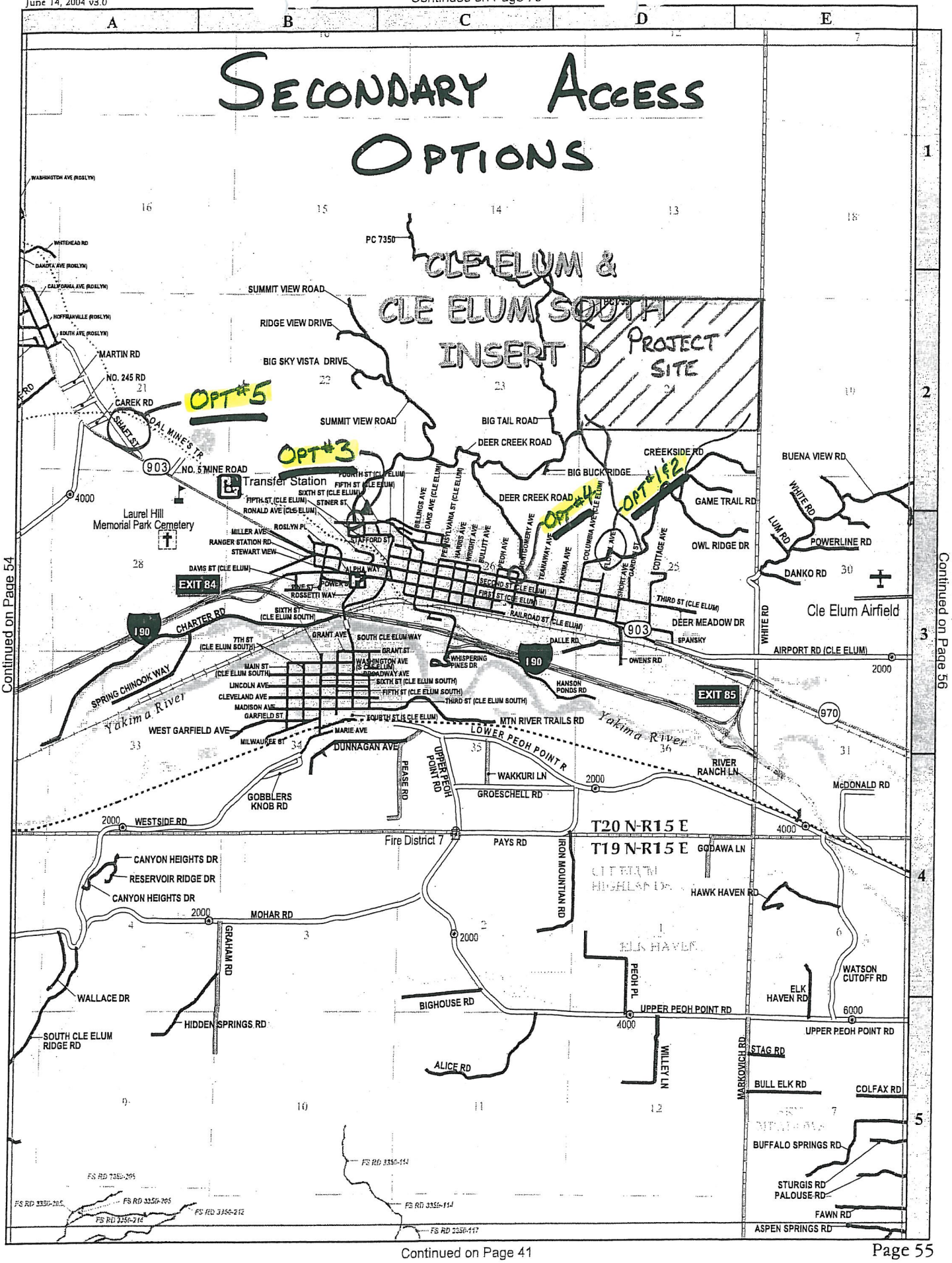
Signature of Land Owner of Record
***(Required for application submittal)*:**

X Iron Snowshoe LLC
David Bond

Date: April 21, 2008

G DRIVE/CDS FORMS/PLANNING/LAND USE APPS/LONG PLAT APP UPDATED: 1/1/08

Continued on Page 70

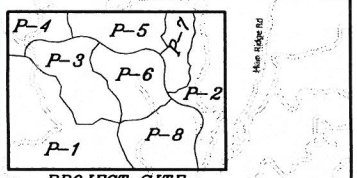


RECEIVING NUMBER_____

P-08-

FOREST RIDGE
PERFORMANCE BASED CLUSTER PLAT
LOCATED IN SECTION 24, T.20N., R.15E., W.M.
KITTITAS COUNTY, STATE OF WASHINGTON

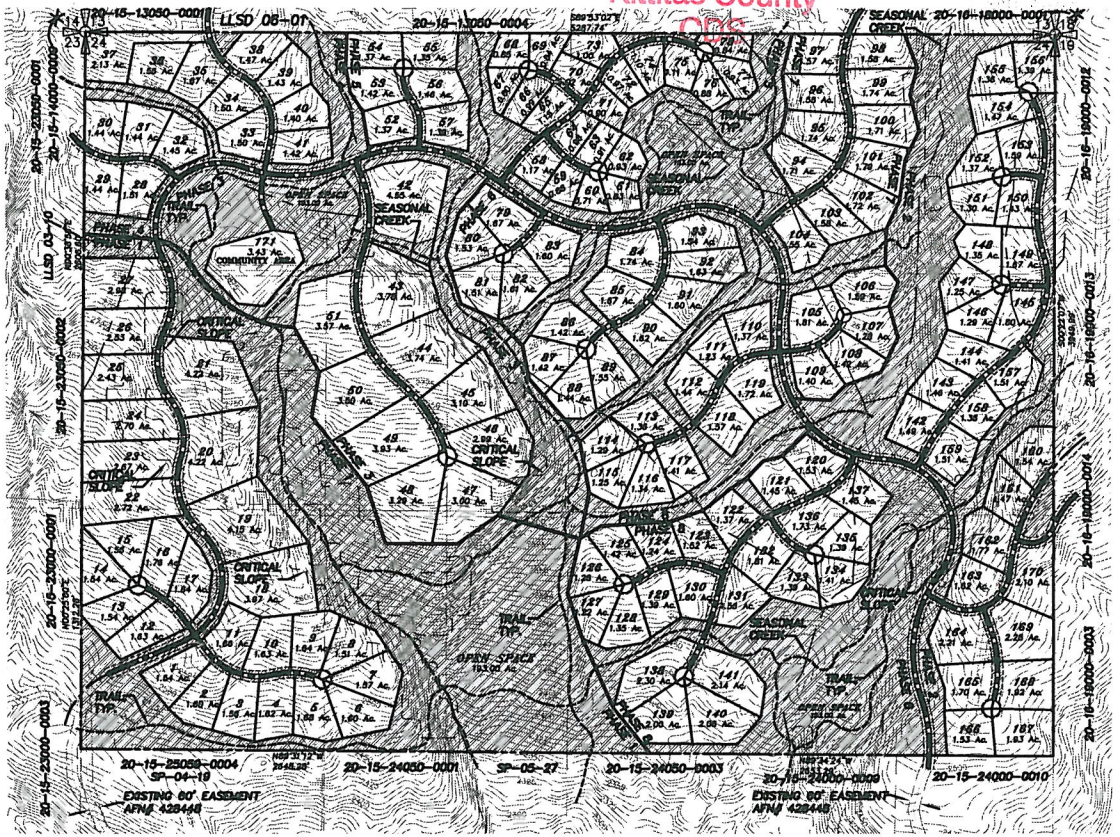
RECEIVED
APR 24 2008
Kittitas County
CDS



OWNER:

IRON SNOWSHOE, LLC
206 WEST 1ST STREET
CLE ELUM, WA 98922

PARCEL #20-15-24000-0001, -0003, 0004, -0007, -0015, -0016, -0017, -0018 -0019, -0020, -0021, -0022
ACREAGE: 478.45 ACRES
171 LOTS
WATER SOURCE: GROUP A SYSTEM
SEWER SOURCE: INDIVIDUAL SEPTIC
STORMWATER: DETENTION/RETENTION
ZONE: R-5



SURVEY NOTES:

1. BASIS OF BEARINGS AND SECTION BREAKDOWN ARE PER A SURVEY BY ESM CONSULTING ENGINEERS, LLC AS FILED IN BOOK 31 OF SURVEYS AT PAGES 224 THRU 225 UNDER AUDITOR'S FILE NUMBER 200510270006, RECORDS OF KITTITAS COUNTY, STATE OF WASHINGTON.

2. THE PURPOSE OF THIS DOCUMENT IS TO CLUSTER PLAT PARCELS A-1, A-2, A-3, A-4, B-1, B-2, B-3, B-4, C-1, C-2, D-1 AND D-2 OF THAT CERTAIN SURVEY AS RECORDED BY ESM CONSULTING ENGINEERS, LLC AS FILED IN BOOK 31 OF SURVEYS AT PAGES 224 THRU 225 UNDER AUDITOR'S FILE NUMBER 200510270006, RECORDS OF KITTITAS COUNTY, STATE OF WASHINGTON TO THE CONFIGURATION SHOWN HEREON.

3. KITTITAS COUNTY RELIES ON ITS RECORD THAT A SUPPLY OF POTABLE WATER EXISTS. THE APPROVAL OF THIS DIVISION OF LAND INCLUDES NO GUARANTEE OR ASSURANCE THAT THERE IS A LEGAL RIGHT TO WITHDRAW GROUNDWATER WITHIN THE LAND DIVISION.

4. THE CRITICAL SLOPES AND STREAMS SHOWN ON THIS SURVEY WERE TAKEN FROM THE CRITICAL AREA MAP PROVIDED BY KITTITAS COUNTY COMMUNITY DEVELOPMENT SERVICES AND OVERLAYED ONTO THE BOUNDARY.

5. ALL ROADS SHOWN ON THIS PLAT WILL BE WITHIN A 60-FT WIDE EASEMENT AND CONSTRUCTED TO KITTITAS COUNTY PRIVATE ROAD STANDARDS.

APPROVALS

KITTITAS COUNTY DEPARTMENT OF PUBLIC WORKS

EXAMINED AND APPROVED THIS _____ DAY OF _____, A.D., 200___.

_____
KITTITAS COUNTY ENGINEER

KITTITAS COUNTY HEALTH DEPARTMENT

I HEREBY CERTIFY THAT THE FOREST RIDGE PBCP PLAT HAS BEEN EXAMINED BY ME AND I FIND THAT THE SEWAGE AND WATER SYSTEM HEREIN SHOWN DOES MEET AND COMPLY WITH ALL REQUIREMENTS OF THE COUNTY HEALTH DEPARTMENT.

DATED THIS ___ DAY OF _____ A.D., 200___.

_____
KITTITAS COUNTY HEALTH OFFICER

CERTIFICATE OF COUNTY PLANNING DIRECTOR

I HEREBY CERTIFY THAT THE FOREST RIDGE PBCP HAS BEEN EXAMINED BY ME AND FIND THAT IT CONFORMS TO THE COMPREHENSIVE PLAN OF THE KITTITAS COUNTY PLANNING COMMISSION.

DATED THIS ___ DAY OF _____ A.D., 200___.

_____
KITTITAS COUNTY PLANNING DIRECTOR

CERTIFICATE OF KITTITAS COUNTY TREASURER

I HEREBY CERTIFY THAT THE TAXES AND ASSESSMENTS ARE PAID FOR THE PRECEDING YEARS AND FOR THIS YEAR IN WHICH THE PLAT IS NOW TO BE FILED. PARCEL NO. #20-15-24000-0001, -0003, 0004, -0007, -0015, -0016, -0017, -0018, -0019, -0020, -0021, -0022 (893034, 163034, 173034, 203034, 22020, 22021, 22022, 22023, 22024, 22025, 22026 & 22027)

DATED THIS ___ DAY OF _____ A.D., 200___.

_____
KITTITAS COUNTY TREASURER

CERTIFICATE OF KITTITAS COUNTY ASSESSOR

I HEREBY CERTIFY THAT THE FOREST RIDGE PBCP HAS BEEN EXAMINED BY ME AND I FIND THE PROPERTY TO BE IN AN ACCEPTABLE CONDITION FOR PLATTING. PARCEL NO. #20-15-24000-0001, -0003, 0004, -0007, -0015, -0016, -0017, -0018, -0019, -0020, -0021, -0022

DATED THIS ___ DAY OF _____ A.D., 200___.

_____
KITTITAS COUNTY ASSESSOR

KITTITAS COUNTY BOARD OF COMMISSIONERS

EXAMINED AND APPROVED THIS _____ DAY OF _____, A.D., 200___.

BOARD OF COUNTY COMMISSIONERS
KITTITAS COUNTY, WASHINGTON

BY: _____
CHAIRMAN

ATTEST:
_____CLERK OF THE BOARD

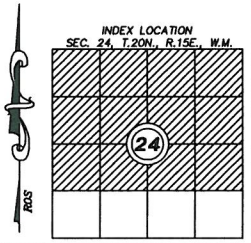
NOTICE: THE APPROVAL OF THIS PLAT IS NOT A GUARANTEE THAT FUTURE PERMITS WILL BE GRANTED.

PERFORMANCE BASED CLUSTER PLATTING TABLE

DESCRIPTION	AREA	BONUS POINTS
OPEN SPACE TOTAL (40%)	193.00 AC.	
OPEN SPACE DENSITY BONUS (26%)	125.00 AC.	26 POINTS
CRITICAL SLOPE OPEN SPACE	38.00 AC.	0 POINTS
SEASONAL STREAM + 20-FT BUFFER OPEN SPACE	18.00 AC.	0 POINTS
ROADWAY WITHIN OPEN SPACE	12.00 AC.	0 POINTS
DEVELOPMENT AREA	285.45 AC.	
GROUP A WATER SYSTEM		50 POINTS
CRITICAL AREA ENHANCEMENT (INCREASED BUFFERS)		10 POINTS
PASSIVE RECREATION		5 POINTS
ACTIVE RECREATION		10 POINTS
TOTAL	478.45 AC.	101 POINTS

GRAPHIC SCALE
500' 0 250' 500'
(IN FEET)
1 inch = 500' ft.

INDEX LOCATION
SEC. 24, T.20N., R.15E., W.M.



DAVID P. NELSON
STATE OF WASHINGTON
LS 18092
REGISTERED
PROFESSIONAL LAND SURVEYOR
EXPIRES: 7/20/08

RECORDER'S CERTIFICATE .....

Filed for record this.....day of ..... 20.....at.....M in book.....of.....at page.....at the request of .....DAVID P. NELSON.....
Surveyor's Name

.....
County Auditor

.....
Deputy County Auditor

SURVEYOR'S CERTIFICATE

This map correctly represents a survey made by me or under my direction in conformance with the requirements of the Survey Recording Act at the request of...IRON SNOWSHOE, LLC.....
in..APRIL.....2008.

.....
DAVID P. NELSON DATE
Certificate No.....18092.....

Encompass
ENGINEERING & SURVEYING
108 EAST 2ND STREET
CLE ELUM, WA 98922
PHONE: (509) 674-7433
FAX: (509) 674-7419

FOREST RIDGE
PERFORMANCE BASED CLUSTER PLAT
LOCATED IN SECTION 24, T. 20N., R. 15E., W.M.
KITTITAS COUNTY, STATE OF WASHINGTON

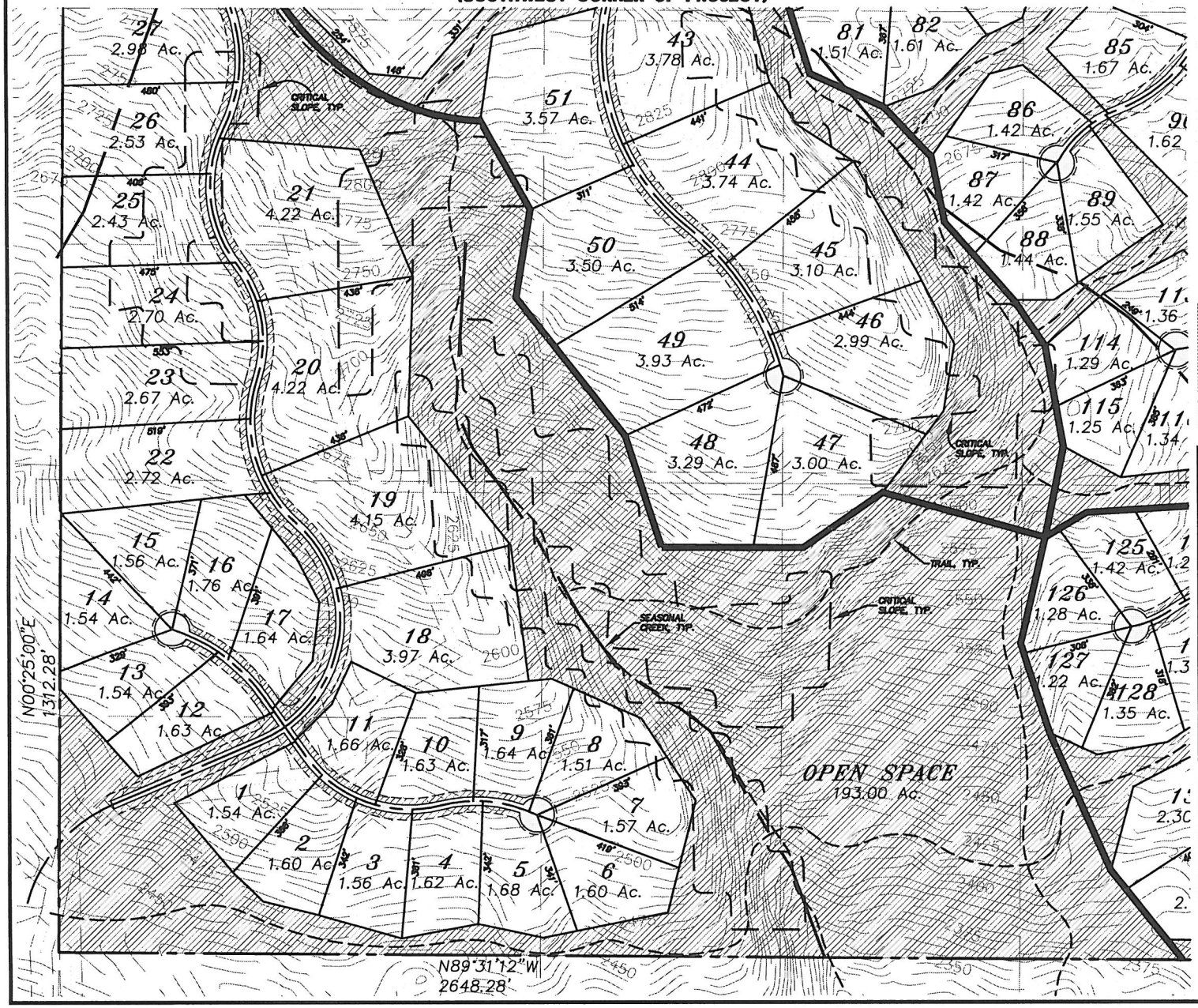
DWN BY	DATE	JOB NO.
MRN/GW	4/08	08008
CHKD BY	SCALE	SHEET
D. NELSON	1"=500'	1 OF 6

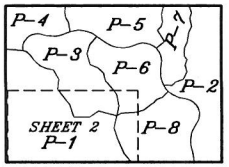
FOREST RIDGE

PERFORMANCE BASED CLUSTER PLAT

LOCATED IN SECTION 24, T.20N., R.15E., W.M.
KITTITAS COUNTY, STATE OF WASHINGTON

(SOUTHWEST CORNER OF PROJECT)



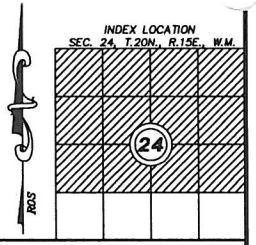


PHASING INDEX

GRAPHIC SCALE

200' 0 100' 200'

(IN FEET)
1 inch = 200' ft.



DAVID P. NELSON
STATE OF WASHINGTON
LS 18092
REGISTERED
PROFESSIONAL LAND SURVEYOR
EXPIRES: 7/20/08

RECORDER'S CERTIFICATE .....

Filed for record this.....day of ..... 20.....at.....M
in book.....of.....at page.....at the request of
DAVID P. NELSON
Surveyor's Name

County Auditor ..... Deputy County Auditor .....

SURVEYOR'S CERTIFICATE

This map correctly represents a survey made by me or under my direction in conformance with the requirements of the Survey Recording Act at the request of IRON SNOWSHOE, LLC in APRIL 2008.

DAVID P. NELSON DATE

Certificate No. 18092

Encompass
ENGINEERING & SURVEYING

108 EAST 2ND STREET
CLE ELUM, WA 98922
PHONE: (509) 674-7433
FAX: (509) 674-7419

FOREST RIDGE
PERFORMANCE BASED CLUSTER PLAT
LOCATED IN SECTION 24, T. 20N., R. 15E., W.M.
KITTITAS COUNTY, STATE OF WASHINGTON

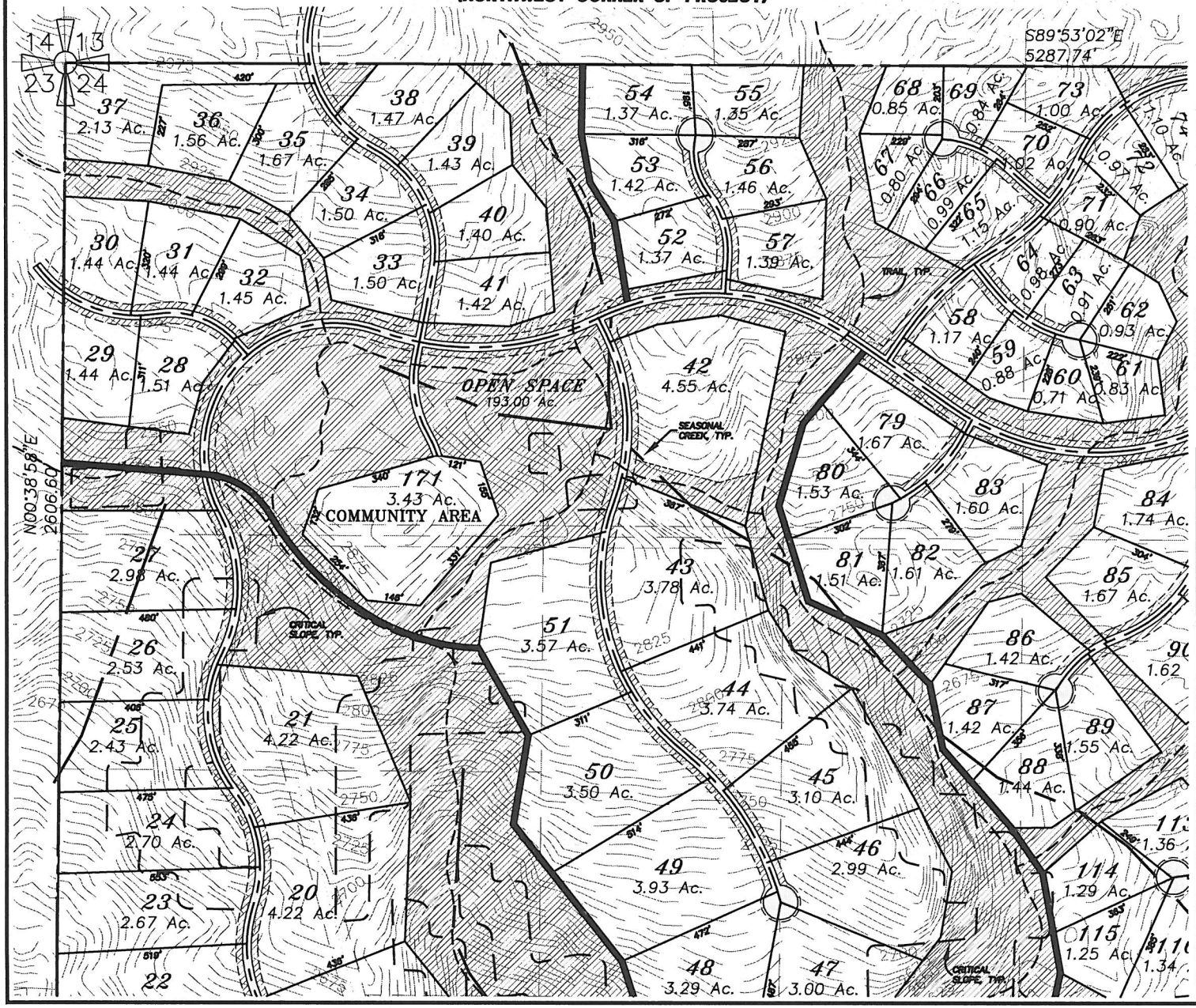
DWN BY	DATE	JOB NO.
MRN/GW	4/08	08008
CHKD BY	SCALE	SHEET
D. NELSON	1"=200'	2 OF 6

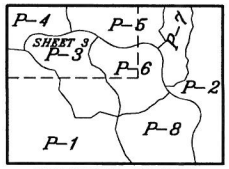
FOREST RIDGE

PERFORMANCE BASED CLUSTER PLAT

LOCATED IN SECTION 24, T.20N., R.15E., W.M.
KITTITAS COUNTY, STATE OF WASHINGTON

(NORTHWEST CORNER OF PROJECT)





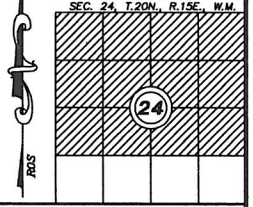
PHASING INDEX

GRAPHIC SCALE

200' 0 100' 200'

(IN FEET)
1 inch = 200' ft.

INDEX LOCATION
SEC. 24, T.20N., R.15E., W.M.



DAVID P. NELSON
STATE OF WASHINGTON
LS 18092
REGISTERED
PROFESSIONAL LAND SURVEYOR
EXPIRES: 7/20/08

RECORDER'S CERTIFICATE .....

Filed for record this.....day of ..... 20.....at.....M
in book.....of.....at page.....at the request of
DAVID P. NELSON
Surveyor's Name

County Auditor ..... Deputy County Auditor .....

SURVEYOR'S CERTIFICATE

This map correctly represents a survey made by me or under my direction in conformance with the requirements of the Survey Recording Act at the request of IRON SNOWSHOE, LLC in APRIL 2008.

DAVID P. NELSON DATE

Certificate No. 18092

Encompass
ENGINEERING & SURVEYING
108 EAST 2ND STREET
CLE ELUM, WA 98922
PHONE: (509) 674-7433
FAX: (509) 674-7419

FOREST RIDGE
PERFORMANCE BASED CLUSTER PLAT
LOCATED IN SECTION 24, T. 20N., R. 15E., W.M.
KITTITAS COUNTY, STATE OF WASHINGTON

DWN BY	DATE	JOB NO.
MRN/GW	4/08	08008
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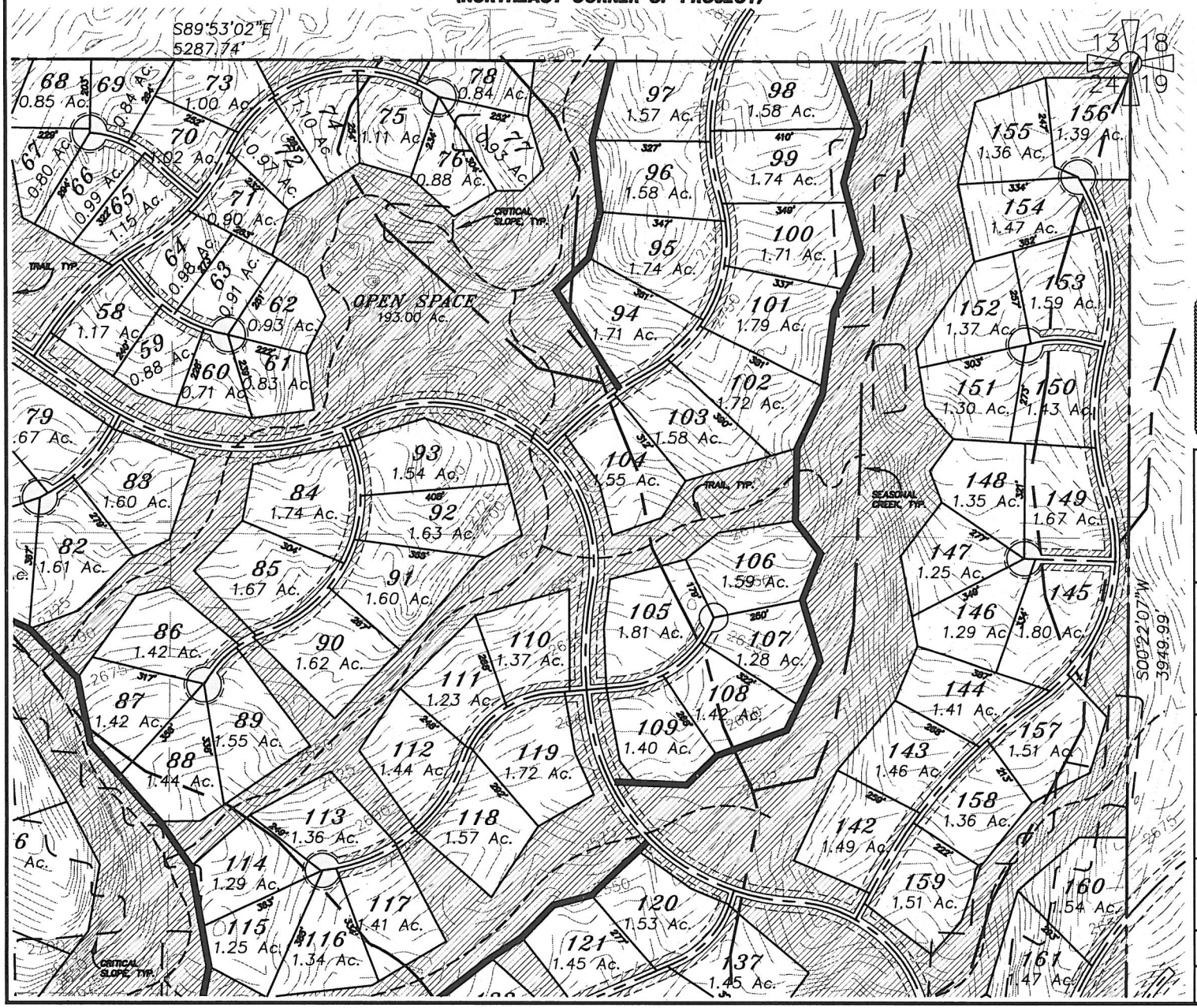
D. NELSON	1"=200'	3 OF 6

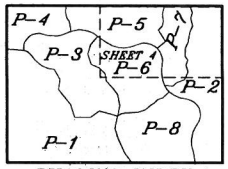
FOREST RIDGE

PERFORMANCE BASED CLUSTER PLAT

LOCATED IN SECTION 24, T.20N., R.15E., W.M.
KITTITAS COUNTY, STATE OF WASHINGTON

(NORTHEAST CORNER OF PROJECT)





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200' 0 100' 200'

(IN FEET)
1 inch = 200' ft.

INDEX LOCATION
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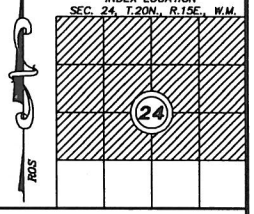

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.....County Auditor .....Deputy County Auditor

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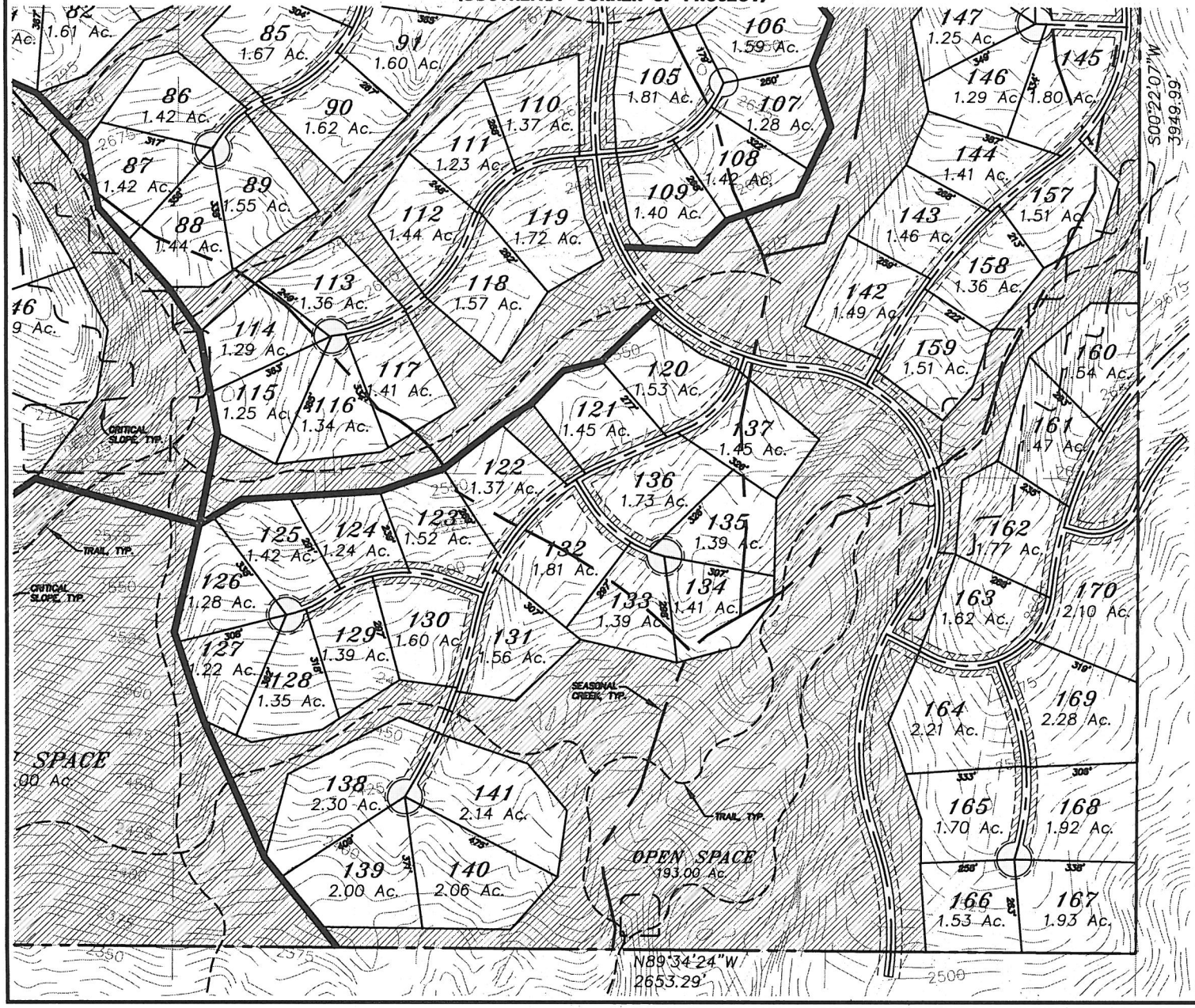
D. NELSON	1"=200'	4 OF 6

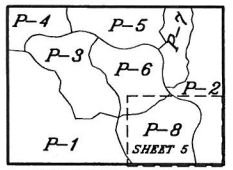
FOREST RIDGE

PERFORMANCE BASED CLUSTER PLAT

LOCATED IN SECTION 24, T.20N., R.15E., W.M.
KITTITAS COUNTY, STATE OF WASHINGTON

(SOUTHEAST CORNER OF PROJECT)





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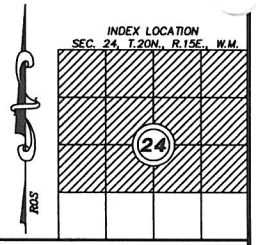

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DAVID P. NELSON DATE
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D. NELSON	1"=200'	5 OF 6

FOREST RIDGE
PERFORMANCE BASED CLUSTER PLAT
LOCATED IN SECTION 24, T.20N., R.15E., W.M.
KITTITAS COUNTY, STATE OF WASHINGTON

DEDICATION

KNOW ALL MEN BY THESE PRESENTS THAT IRON SNOWSHOE, LLC., A WASHINGTON LIMITED LIABILITY COMPANY, THE UNDERSIGNED OWNER IN FEE SIMPLE OF THE HEREIN DESCRIBED REAL PROPERTY, DOES HEREBY DECLARE, SUBDIVIDE AND PLAT AS HEREIN DESCRIBED.

IN WITNESS WHEREOF, WE HAVE SET OUR HANDS THIS ___ DAY OF _____, A.D., 200_.

_____ NAME / TITLE

_____ NAME / TITLE

ACKNOWLEDGEMENT

STATE OF WASHINGTON)
) s.s.
COUNTY OF _____

On this _____ day of _____, 200_, before me, the undersigned, a Notary Public in and for the State of _____, duly commissioned and sworn, personally appeared _____ and _____, to me known to be the _____ and _____ respectively, of _____ the limited liability company that executed the foregoing instrument, and acknowledge the said instrument to be the free and voluntary act and deed of said limited liability company, for the uses and purposes therein mentioned, and on oath stated that _____ authorized to execute the said instrument.

Witness my hand and official seal hereto affixed the day and year first above written.

_____
Notary Public in and for the State of Washington, residing at _____
My appointment expires _____

DEDICATION

KNOW ALL MEN BY THESE PRESENTS THAT AMERICAN STRATEGIC INCOME PORTFOLIO, INC.-II, A MINNESOTA CORPORATION, THE UNDERSIGNED BENEFICIARY OF A DEED OF TRUST DOES HEREBY DECLARE, SUBDIVIDE AND PLAT AS HEREIN DESCRIBED.

IN WITNESS WHEREOF, WE HAVE SET OUR HANDS THIS ___ DAY OF _____, A.D., 200_.

_____ NAME / TITLE

_____ NAME / TITLE

ACKNOWLEDGEMENT

STATE OF WASHINGTON)
) s.s.
COUNTY OF _____

On this _____day of _____, 20_____, before me, the undersigned, a Notary Public in and for the State of Washington, duly commissioned and sworn, personally appeared _____ to me known to be the _____ President and _____ Secretary, respectively, of _____ the corporation that executed the foregoing instrument, and acknowledged the said instrument to be the free and voluntary act and deed of said corporation, for the uses and purposes therein mentioned, and on oath stated that _____ authorized to execute the said instrument and that the seal affixed (if any) is the corporate seal of said corporation.

Witness my hand and official seal hereto affixed the day and year first above written.

_____
Notary Public in and for the State of Washington, residing at _____
My appointment expires _____

EXISTING LEGAL DESCRIPTION:

PARCELS A-1, A-2, A-3, A-4, B-1, B-2, B-3, B-4, C-1, C-2, D-1 AND D-2, OF THAT CERTAIN SURVEY RECORDED OCTOBER 27, 2005 IN BOOK 31 OF SURVEYS, PAGES 224 AND 225, UNDER AUDITOR'S FILE NO. 200510270006, BEING A PORTION OF SECTION 24, TOWNSHIP 20 NORTH, RANGE 15 EAST, W.M., IN THE COUNTY OF KITTITAS, STATE OF WASHINGTON.

NOTES:

1. THIS SURVEY WAS PERFORMED USING A NIKON DTM-521 TOTAL STATION. THE CONTROLLING MONUMENTS AND PROPERTY CORNERS SHOWN HEREON WERE LOCATED, STAKED AND CHECKED FROM A CLOSED FIELD TRAVERSE IN EXCESS OF 1:10,000 LINEAR CLOSURE AFTER AZIMUTH ADJUSTMENT.
2. A PUBLIC UTILITY EASEMENT 10 FEET IN WIDTH IS RESERVED ALONG ALL LOT LINES. THE 10 FOOT EASEMENT SHALL ABUT THE EXTERIOR PLAT BOUNDARY AND SHALL BE DIVIDED 5 FEET ON EACH SIDE OF INTERIOR LOT LINES. SAID EASEMENT SHALL ALSO BE USED FOR IRRIGATION.
3. PER RCW 17.10.140 LANDOWNERS ARE RESPONSIBLE FOR CONTROLLING AND PREVENTING THE SPREAD OF NOXIOUS WEEDS. ACCORDINGLY, THE KITTITAS COUNTY NOXIOUS WEED BOARD RECOMMENDS IMMEDIATE RESEEDING OF AREAS DISTURBED BY DEVELOPMENT TO PRECLUDE THE PROLIFERATION OF NOXIOUS WEEDS.
4. ANY FURTHER SUBDIVISION OR LOTS TO BE SERVED BY PROPOSED ACCESS MAY RESULT IN FURTHER ACCESS REQUIREMENTS. SEE KITTITAS COUNTY ROAD STANDARDS.
5. AN APPROVED ACCESS PERMIT WILL BE REQUIRED FROM THE DEPARTMENT OF PUBLIC WORKS PRIOR TO CREATING ANY NEW DRIVEWAY ACCESS OR PERFORMING WORK WITHIN THE COUNTY ROAD RIGHT-OF-WAY.
6. THIS SURVEY DOES NOT PURPORT TO SHOW ALL EASEMENTS OF RECORD OR OTHERWISE.
7. MAINTENANCE OF THE ACCESS IS THE RESPONSIBILITY OF THE PROPERTY OWNERS WHO BENEFIT FROM ITS USE.
8. PURSUANT TO RCW 90.44.050, THE CUMULATIVE EFFECT OF WATER WITHDRAWALS FOR THIS DEVELOPMENT SHALL NOT EXCEED 5,000 GALLONS PER DAY.
9. ENTIRE PRIVATE ROAD SHALL ACHIEVE 95% COMPACTION AND SHALL BE INSPECTED AND CERTIFIED BY A LICENSED ENGINEER IN THE STATE OF WASHINGTON SPECIFYING THAT THE ROAD MEETS CURRENT KITTITAS COUNTY ROAD STANDARDS PRIOR TO THE ISSUANCE OF A BUILDING PERMIT FOR THIS PLAT.
10. KITTITAS COUNTY WILL NOT ACCEPT PRIVATE ROADS FOR MAINTENANCE AS PUBLIC STREETS OR ROADS UNTIL SUCH STREETS OR ROADS ARE BROUGHT INTO CONFORMANCE WITH CURRENT COUNTY ROAD STANDARDS. THIS REQUIREMENT WILL INCLUDE THE HARD SURFACE PAVING OF ANY STREET OR ROAD SURFACED ORIGINALLY WITH GRAVEL.

NOTE:
THE EXISTING UTILITIES AS SHOWN ARE ONLY APPROXIMATE AND ARE BASED ON THE BEST AVAILABLE INFORMATION. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO VERIFY THE SIZE, TYPE, LOCATION, AND DEPTH OF ALL EXISTING UTILITIES PRIOR TO STARTING CONSTRUCTION, AND INFORM THE DESIGN ENGINEER OF ANY DISCREPANCIES.

Call Before You Dig
1-800-553-4344

ADJACENT PROPERTY OWNERS:

20-15-23000-0003
MICHAEL W. ROSS
1300 SKYWALL DRIVE
SULTAN, WA 98294

20-15-23000-0004
ALAN K PERSON
12023 434TH AVE SE
NORTH BEND, WA 98045

20-15-23000-0001
KEVIN DALY
5626 126TH AVE SE
BELLEVUE, WA 98006

20-15-23050-0002 & 0001
CHARLES A PETERSON
16954 151ST AVE SE
RENTON, WA 98055

20-15-14000-0009
DALE G MAXFIELD
9605 FIRDALE AVE
EDMONDS, WA 98020

20-15-13-050-0001
PINE VIEW ESTATES, LLC
PO BOX 750
ROSLYN, WA 98941

20-15-13050-0004
ALPINE MEADOWS, LLC
114 17TH PL
KIRKLAND, WA 98033

20-16-18000-0001
AMERICAN FOREST HOLDINGS, LLC
660 MADISON AVE 14TH FL
NEW YORK, NY 10065

20-16-19000-0012
CREEKSIDE ACRES, LLC
16954 151ST AVE SE
RENTON, WA 98058

20-16-19000-0013
BROOKS R MCBETH
17915 LULL ST
RESDA, CA 91335

20-16-19000-0014
ASP PROPERTIES, LLC
507 WELLS AVE N
RENTON, WA 98057

20-16-19000-0003
JAY W PEPPIN
PO BOX 910
CLE ELUM, WA 98922

20-16-19000-0001
AUTUMN FRANCESCA
8626 217TH ST SW
EDMONDS, WA 98026

20-15-24000-0013
MARK A LEHNERT
PO BOX 957
CLE ELUM, WA 98922

20-15-24000-0010 & 0009
JOHN JOHNSON
821 E LK SAMMAMISH SHORE LN SE
SAMMAMISH, WA 98057

20-15-24050-0003
JOHN M HUISH
7300 FUN CENTER WAY
TUKWILA, WA 98188

20-15-24050-0002
ASHLEY PIPER, LLC
1703 NW GREENBRIER WAY
SEATTLE, WA 98177

20-15-24050-0001
JNG, LLC
PO BOX 454
MUKILTEO, WA 98275

20-15-25059-0004
P SQUARED, LLC
1501 35TH AVE S
SEATTLE, WA 98144

RECORDER'S CERTIFICATE .....

Filed for record this.....day of ..... 20.....at.....M in book.....of.....at page.....at the request of .....DAVID P. NELSON..... Surveyor's Name

County Auditor ..... Deputy County Auditor .....

SURVEYOR'S CERTIFICATE

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DAVID P. NELSON ..... DATE

Certificate No.....18092.....

DAVID P. NELSON
STATE OF WASHINGTON
LS 18092
REGISTERED
PROFESSIONAL LAND SURVEYOR
EXPIRES: 7/20/08

Encompass
ENGINEERING & SURVEYING
108 EAST 2ND STREET
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FOREST RIDGE
PERFORMANCE BASED CLUSTER PLAT
LOCATED IN SECTION 24, T. 20N., R. 15E., W.M.
KITTITAS COUNTY, STATE OF WASHINGTON

DWN BY	DATE	JOB NO.
MRN/GW	4/08	08008
CHKD BY	SCALE	SHEET
D. NELSON	N.T.S.	6 OF 6

KITTITAS COUNTY COMMUNITY DEVELOPMENT SERVICES
411 N. Ruby St., Suite 2, Ellensburg, WA 98926
CDS@CO.KITTITAS.WA.US
Office (509) 962-7506
Fax (509) 962-7682

PLEASE NOTE: This is a fill-in-and-print PDF form. It cannot be edited and saved to your hard drive unless you have the full version of Adobe Acrobat. If you are not using the full version you must complete this form and then print it, or print it and complete it by hand.

SEPA ENVIRONMENTAL CHECKLIST
FEE $400.00

PURPOSE OF CHECKLIST:

The State Environmental Protection Act (SEPA), chapter 43.21C RCW. Requires all governmental agencies to consider the environmental impacts of a proposal before making decisions. An environmental impact statement (EIS) must be prepared for all proposals with probable significant adverse impacts on the quality of the environment. The purpose of this checklist is to provide information to help you and the agency identify impacts from your proposal (and to reduce or avoid impacts from the proposal, if it can be done) and to help the agency decide whether an EIS is required.

INSTRUCTIONS FOR APPLICANTS:

This environmental checklist asks you to describe some basic information about your proposals. Governmental agencies use this checklist to determine whether the environmental impacts or your proposal are significant, requiring preparation if an EIS. Answer the questions briefly, with the most precise information known, or give the best description you can.

You must answer each question accurately and carefully, to the best of your knowledge. In most cases, you should be able to answer the questions from your own observations or project plans without the need to hire experts. If you really do not know the answer, or if a question does not apply to your proposal, write "don not know" or "does not apply" Complete answers to the questions now may avoid unnecessary delays later.

Some questions ask about governmental regulations, such as zoning, shoreline and landmark designations. Answer these questions if you can. If you have problems, the governmental agencies can assist you.

The checklist questions apply to all parts of your proposal, even if you plan to do them over a period of time or on different parcels of land. Attach any additional information that will help describe your proposal or its environmental effects. The agency to which you submit this checklist may ask you to explain your answers or provide additional information reasonably related to determining if there may be significant adverse impact.

Use of checklist for nonproject proposals:

Complete this checklist for nonproject proposals, even though questions may be answered "does not apply." IN ADDITION, complete the SUPPLEMENTAL SHEET FOR NONPROJECT ACTIONS (part D).

For nonproject actions, the references in the checklist to the words "project," "applicant," and "property or site" should be read as "proposal," "proposer," and "affected geographic area," respectively.

A. BACKGROUND

1. Name of proposed project, if applicable:

Forest Ridge Performance Based Cluster Plat

2. Name of applicant:

Iron Snowshoe, LLC, a Washington limited liability company

3. Address and phone number of applicant and contact person:

206 W. First St., Cle Elum, WA 98922
(509) 674-6828
Contact: David Blanchard

4. Date checklist prepared:

April 21, 2008

5. Agency requesting checklist:

Kittitas County Community Development Services

6. Proposed timing or schedule (including phasing, if applicable):

Project to be completed in up to eight (8) phases to be constructed. Phases will be designed primarily to enable the applicant to complete infrastructure in phases and to time construction to match market conditions. All requisite infrastructure (including two means of access where a road will serve more than 40 lots) for each phase will be constructed prior to obtaining approval to release that phase.

Timing for completion of each phase may depend upon market, but expectation is to release one to two phases each year.

Approximately 50% of the proposed trails and associated amenities will be completed prior to the completion of the fourth (4th) phase, with the remainder being completed by the end of the seventh (7th) phase.

A community recreation center will be completed prior to the end of the seventh phase.

7. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain.

No.

8. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal.

A SEPA Checklist was prepared in conjunction with rezoning of the property in 2006 from Forest and Range 20 to R-5.

A Transportation Analysis of the impacts of the project is being undertaken by the applicant in an effort to assist the County with the SEPA analysis.

9. Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain.

Preliminary approval was granted for a boundary Line Adjustment (BLA-07-136) but final approval not yet granted.

10. List any government approvals or permits that will be needed for your proposal, if known.

- **Kittitas County preliminary plat approval**
- **Kittitas County/State Department of Health approval of Septic Systems**

- **Kittitas County/State Department of Health approval of Group A water system**
- **Kittitas County Conservancy Board Approval of Change Application for Water Right once we exceed 14 lots served by an exempt groundwater well**
- **(Potentially) Hydraulic Project Approval from Dept. of Fish and Wildlife for construction of bridge/culvert allowing crossing over seasonal creeks.**
- **Franchise Agreement from Kittitas County for installation of water transmission line.**

11. Give brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page. (Lead agencies may modify this form to include additional specific information on project description.)

The property consists of approximately 479+- acres located in Section 24, T20N, R15 E, in Kittitas County. The proposed cluster plat would provide 171 single family residential homesites (avg of 1.67 acre homesite), preserve critical areas, and set aside over 193 acres of the property as open space for perpetuity. The proposal will provide for numerous passive recreational opportunities including multi-modal trails, large open expanses for passive and active recreation, critical area enhancement, and a private community recreation center.

12. Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist.

Parcels A-1 through A-4, B-1 through B-4, C-1, C-2, D-1, and D-2 of the survey recorded Oct. 27, 2005 under Auditors File No. 20051027005, in Book 31 of Surveys, pages 224-225, Kittitas County, all in Section 24, T20N, R15 E., W.M. Kittitas County, Washington.

B. ENVIRONMENTAL ELEMENTS

1. **Earth**

a. General description of the site (circle one): Flat, rolling, hilly, steep slopes, mountainous, other . . . . . .

The site is hilly with varied terrain with it generally sloping up from southeast to northwest . Approximately 8% of the site contains slopes that are 30% or greater.

b. What is the steepest slope on the site (approximate percent slope)?

Approximately 35%

c. What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any prime farmland.

Glacial till, sandy loam, cobbles

d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe.

None observable.

e. Describe the purpose, type, and approximate quantities of any filling or grading proposed. Indicate source of fill.

Cut and fill will generally be balanced on-site.

f. Could erosion occur as a result of clearing, construction, or use? If so, generally describe.

No, The area appears stable, and best management practices will be undertaken in conjunction with all clearing and construction activities.

g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)?

Approximately 50 acres will be impervious or semi-impervious surface. This estimate assumes 8,000 square feet of impervious improvements on each lot and 15 acres of roadway improvements.

h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any:

Best management practices will be employed, and a storm water pollution prevention plan will be prepared and implemented prior to and during construction activities. Erosion control likely will include silt fence, straw check dams, retention/detention and covering of exposed soils.

2. Air

a. What types of emissions to the air would result from the proposal (i.e., dust, automobile, odors, industrial wood smoke) during construction and when the project is completed? If any, generally describe and give approximate quantities if known.

Dust and noise typically associated with construction of private roads and infrastructure for residential plats. All dust and noise will be within limits of applicable County regulations.

b. Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe.

None known.

c. Proposed measures to reduce or control emissions or other impacts to air, if any:

Compliance with State and County standards for emissions;

3. **Water**

a. Surface:

1) Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands)? If yes, describe type and provide names. If appropriate, state what stream or river it flows into.

Two unnamed seasonal creeks Creeks/ditches are dry in late summer, and do not appear to be connected to any stream or river within a ¼ mile.

2) Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans.

Two to three crossings over the seasonal creeks for Trail and Road access

3) Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material.

Culverts may be placed in seasonal creeks in order to allow construction of private road across ditch. Up to 2000 cubic yards of fill may be needed for such improvement.

4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known.

A permitted surface water withdrawal will be made offsite and piped to the property.

5) Does the proposal lie within a 100-year floodplain? If so, note location on the site plan.

No.

6) Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge.

No.

b. Ground:

1) Will ground water be withdrawn, or will water be discharged to ground water? Give general description, purpose, and approximate quantities if known.

Yes. Iron Snowshoe, LLC will serve the project with a Group A water system. Any lots not served by an exempt groundwater well will be supplied and supported by a surface water right which the applicant currently owns or controls. With approval of the preliminary plat, Iron Snowshoe will prepare a Comprehensive Water plan to identify the total water need for the project.

2) Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: Domestic sewage; industrial, containing the following chemicals. . . ; agricultural; etc.). Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve.

Each homesite will be served by a combination of on-site septic system, and community systems, constructed and permitted in accordance with applicable regulations.

c. Water runoff (including stormwater):

1) Describe the source of runoff (including storm water) and method of collection and disposal, if any (include quantities, if known). Where will this water flow? Will this water flow into other waters? If so, describe.

An approved stormwater system complying with all applicable County regulations will be constructed to handle runoff from the project. Most runoff likely will be associated with the creation of impervious surface. The stormwater system will be designed to infiltrate or discharge into an appropriate source. The stormwater system will be designed to insure no adverse impact on adjacent properties or infrastructure.

2) Could waste materials enter ground or surface waters? If so, generally describe.

Waste materials will only enter water through approved septic systems.

d. Proposed measures to reduce or control surface, ground, and runoff water impacts, if any:

Impervious surface area will be minimized to the extent practical, with less than 11% of the project site being impervious. Native vegetation will be retained to the maximum extent feasible. If needed, a professionally engineered storm water system will be designed and constructed to serve the project and eliminate potential impacts of runoff.

4. **Plants**

a. Check or circle types of vegetation found on the site:

X deciduous tree: alder, maple, aspen, other
X evergreen tree: fir, cedar, pine, other
X shrubs
X grass
———— pasture
———— crop or grain
———— wet soil plants: cattail, buttercup, bullrush, skunk cabbage, other
———— water plants: water lily, eelgrass, milfoil, other
———— other types of vegetation

b. What kind and amount of vegetation will be removed or altered?

Vegetation will be removed in order to construct infrastructure, including storm drainage and private roadways. Some vegetation may be removed in conjunction with constructing recreational trails, but the trails will primarily wind through the trees and retain native vegetation and topography as much as feasible.

c. List threatened or endangered species known to be on or near the site.

None known.

d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any:

The applicant, with the assistance of a landscaping firm knowledgeable about native plants in the area, will assist in the design and planning for the project. The concept for Forest Ridge is one that embraces nature and seeks to create a feel where homes are nestled within the natural surroundings.

5. **Animals**

a. Circle any birds and animals which have been observed on or near the site or are known to be on or near the site:

birds: **hawk, songbirds**
mammals: **deer, bear, elk,**
fish: **none.**

b. List any threatened or endangered species known to be on or near the site.

None.

c. Is the site part of a migration route? If so, explain.

No.

d. Proposed measures to preserve or enhance wildlife, if any:

More than 190 acres will be dedicated as perpetual open space and left substantially in their natural state.

6. **Energy and natural resources**

a. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc.

Electric, natural gas, wood stoves, solar, and propane energy all are potential sources for serving residential units. It is expected that the majority of energy will be provided by electric and propane sources.

b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe.

No.

c. What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any:

None.

7. **Environmental health**

a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur as a result of this proposal? If so, describe.

None known. The property is subject to common fire danger just as other rural property in Upper Kittitas County. Requisite fire access, including secondary accesses will be provided for the development.

1) Describe special emergency services that might be required.

The project does not present any unique needs in terms of emergency services. Standard emergency services for rural areas will be appropriate.

2) Proposed measures to reduce or control environmental health hazards, if any:

CCRs will be adopted to preserve native vegetation, wildlife areas, and recreational uses. The applicant will provide its own water right to serve the project. Low-impact septic systems will serve the project.

b. **Noise**

1) What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)?

None

2) What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, operation, other)? Indicate what hours noise would come from the site.

Short term noise associated with installation of infrastructure will occur, but will be well within acceptable noise thresholds as established by the County. Construction noise typically associated with single family residential construction will occur over time. The applicant will include in its CCRs and impose upon its contractors restrictions on the hours of construction (i.e. 7am-7pm in

summer; 8am-6pm in winter). Residential traffic traveling at speeds under 35 mph, and passive recreational uses will present negligible noise once houses are constructed.

3) Proposed measures to reduce or control noise impacts, if any:

All noise associated with the proposal will comply with applicable County noise standards. Construction will be restricted to 7am-7pm during the summer, and 8am-6 pm during the winter.

Significant buffering will exist through preservation of open space and native vegetation.

8. **Land and shoreline use**

a. What is the current use of the site and adjacent properties?

The property is zoned R-5, but generally undeveloped. Commercial Forest to the North and Forest and Range to the East and West.

b. Has the site been used for agriculture? If so, describe.

No.

c. Describe any structures on the site.

None.

d. Will any structures be demolished? If so, what?

No.

e. What is the current zoning classification of the site?

R-5.

f. What is the current comprehensive plan designation of the site?

Rural.

g. If applicable, what is the current shoreline master program designation of the site?

Not applicable.

h. Has any part of the site been classified as an "environmentally sensitive" area? If so, specify.

Some steep slopes. See Critical Areas Checklist and attachments.

i. Approximately how many people would reside or work in the completed project?

171 single family homes at full build-out. (Assuming an average of 2.5 people per home: 475 people)

j. Approximately how many people would the completed project displace?

None.

k. Proposed measures to avoid or reduce displacement impacts, if any:

Not applicable.

l. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any:

The applicant has engaged a highly respected, environmentally conscientious landscaping and land planning consultant to assist in the design elements and layout of the project.

Additionally, with assistance from the land planner, the applicant will adopt CCRs designed to maximize compatibility of the project with the surrounding land uses and environment.

9. **Housing**

a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing.

171 single-family units are anticipated. The applicant's goal is to create a range of housing, but it is expected that the housing will generally be geared towards a livable, middle income community.

At this time, we would like to reserve the right for either future landowners or the current landowner, to apply for a Zoning Structural Setback Variance. This would concern those parcels within the 200' setback of the Commercial Forest Zone per KCC 17.30A.055. Where the setback is not feasible, all development will comply with KCC 17.57.050(2).

b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing.

None/NA.

c. Proposed measures to reduce or control housing impacts, if any:

The project will create housing opportunities for people living and recreating in to Upper Kittitas County.

10. **Aesthetics**

a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed?

The CCRs will establish a maximum height of 35 feet.
Exterior building materials will be primarily wood, stone, and other products that are aesthetically pleasing and blend with the surrounding environment.

b. What views in the immediate vicinity would be altered or obstructed?

The entire ~480 acres is, and for years has been, privately owned and occasionally logged. Construction of a single-family residential community within this area will modify the viewshed for

people living south of the property/south of Cle Elum. The development, however, would not obstruct any views.

c. Proposed measures to reduce or control aesthetic impacts, if any:

Impacts will be insignificant, given the enactment of CCRs, a professionally designed landscape and site plan intended to preserve the natural setting, designation of buffers, and most importantly, the perpetual preservation of more than 140 acres of natural or open space in perpetuity. Design standards will help maximize aesthetic suitability and the likelihood that the community blends within the surrounding environment.

11. **Light and glare**

a. What type of light or glare will the proposal produce? What time of day would it mainly occur?

Basic residential night lighting for pathfinding and safety.

b. Could light or glare from the finished project be a safety hazard or interfere with views?

No.

c. What existing off-site sources of light or glare may affect your proposal?

City lights and surrounding lights are not likely to adversely impact the residential development.

d. Proposed measures to reduce or control light and glare impacts, if any:

Through CCRs, residences will be required to comply with Dark Skies standards. Lighting in common areas will also comply with Dark Skies standards.

12. **Recreation**

a. What designated and informal recreational opportunities are in the immediate vicinity?

Hiking, mountain biking, walking, and snowmobiling are common recreational activities in the immediate vicinity. No formal recreational opportunities exist. Much of the recreational activities that occur within the vicinity are on private property/commercial forest.

Suncadia is within close proximity and provides numerous recreational opportunities. National Forest is also nearby, providing recreational opportunities.

b. Would the proposed project displace any existing recreational uses? If so, describe.

No.

c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any:

The proposal will create perpetual recreational opportunities within the 480-acre project. Over 190 acres will be set aside in perpetuity as open space, for residents and guests to enjoy.

The applicant also proposes to create several pedestrian/bicycle/ multi-modal trails.

The applicant may construct a recreational/community center that will provide opportunities for active and passive recreation.

13. **Historic and cultural preservation**

a. Are there any places or objects listed on, or proposed for, national, state, or local preservation registers known to be on or next to the site? If so, generally describe.

No.

b. Generally describe any landmarks or evidence of historic, archaeological, scientific, or cultural importance known to be on or next to the site.

None.

c. Proposed measures to reduce or control impacts, if any:

N/A.

14. **Transportation**

a. Identify public streets and highways serving the site, and describe proposed access to the existing street system. Show on site plans, if any.

See site plan submitted with application. The project will be accessible via at least two public road connections, which access may include the following, all of which would be constructed to meet County Road standards for projects serving more than 40 homesites (unless otherwise noted).

1) **Columbia (then new road west on applicant's private property)**
2) **Columbia (then new road east on applicant's private property)**
3) **Secondary access via 6th Avenue via BPA**
4) **Secondary access only via Montgomery (would require a variance from the County Road standards for an approximately 320-foot segment of roadway).**
5) **Secondary access via Shaft Street**

The applicant reserves the right to designate additional accesses.

A Transportation Study of proposed traffic impacts at the proposed intersections is underway.

c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any:

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No.

b. Generally describe any landmarks or evidence of historic, archaeological, scientific, or cultural importance known to be on or next to the site.

None.

c. Proposed measures to reduce or control impacts, if any:

N/A.

14. **Transportation**

a. Identify public streets and highways serving the site, and describe proposed access to the existing street system. Show on site plans, if any.

The project will be accessible via Columbia Street. The extension of Columbia St. will be improved to City Standards up to the circled area as shown on the attached Secondary Access exhibit. This will eliminate any need to access the site via Montgomery St.

A Transportation Study of proposed traffic impacts at the proposed intersections is underway.

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b. Is site currently served by public transit? If not, what is the approximate distance to the nearest transit stop?

No.

c. How many parking spaces would the completed project have? How many would the project eliminate?

Each single-family residence would be required to provide its own parking on the homesite. A small parking area, consistent with County parking requirements would be provided to serve the planned community/recreational center. No other parking would be permitted within the development.

d. Will the proposal require any new roads or streets, or improvements to existing roads or streets, not including driveways? If so, generally describe (indicate whether public or private).

At least two accesses for the proposal will be improved to meet the County's private road standards. Internal roads with the project would be constructed to applicable standards for private roads serving more than 40 units.

e. Will the project use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe.

No.

f. How many vehicular trips per day would be generated by the completed project? If known, indicate when peak volumes would occur.

Up to 1,710 trips per day may be associated with the project at full build-out. Full-build out is not expected to occur, however, for four to ten years.

The applicant is undertaking a traffic study of the impacts of the proposed development.

g. Proposed measures to reduce or control transportation impacts, if any:

Internal road design and access points will be designed, with the help of a traffic engineer, to maximize efficiency and safety. Roads will be improved to applicable County standards for private roads. The applicant will engage in mitigation that is reasonably necessary to mitigate, and reasonably proportional to, the impacts that the transportation study reveals that the development will actually cause.

15. **Public services**

a. Would the project result in an increased need for public services (for example: fire protection, police protection, health care, schools, other)? If so, generally describe.

Somewhat. The need for fire protection exists even in the predevelopment condition, and the presence of residences is unlikely to increase significantly the fire danger. The need for emergency medical services will increase slightly given the additional residents, but the added expense of such services likely will be offset with the tax revenues. The same can be said with respect to police protection and schools.

b. Proposed measures to reduce or control direct impacts on public services, if any.

Payment of taxes and assessments.

16. **Utilities**

a. Circle utilities currently available at the site: electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system, other.

No utilities currently exist at the site. Telephone and electric will be extended to the site. Water will be provided by the applicant. Refuse collection will be provided by contract with private refuse companies. Individual septic systems, or a group septic system/drainfield will serve each home.

b. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed.

Each homesite will be served by an individual or group septic system, and will receive water through a Group A water system. The applicant will handle extending the electric and telephone services to the residences, with service to be provided by local utility companies.

C. SIGNATURE

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

Signature: .....

Date Submitted: ..... April 21, 2008