



**SUNCADIA**  
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***Preliminary Site and Utility  
Engineering Summary***

**Phase 2 Division 6  
(Nelson Ridge)  
Site Development Plan**

**Suncadia  
Master Planned Resort**

**New Suncadia, L.L.C.  
Cle Elum, Washington**

**November 20, 2020**

**Prepared by**

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Information presented in this document pertains to preliminary infrastructure design of proposed roads, illumination, drainage, water and sewer facilities, and solid waste management program to serve the Nelson Ridge plat.

Information on the proposed roads reflects the requirements of Exhibit J to the Development Agreement. Information on storm drainage reflects the requirements of the Department of Ecology Stormwater Management Manuals, the 1999 Master Drainage Plan and preliminary stormwater engineering for Phase 2.

Information on the proposed water supply, storage, and distribution system is taken from the 2013 Water System Plan as revised January 2016. The development has a Group A water system regulated by the Department of Health which will be served by Suncadia Water Company, LLC (Suncadia Water).

Information on the proposed sewage collection, treatment and disposal system is taken from preliminary engineering for Phase 2 and the March 2000 Site Engineering Technical Summary document for the MPR (Appendix A of the FEIS).

Discussed in this part are the classification of Nelson Ridge plat roads, proposed road sections, roadway illumination and emergency access.

### Roadway Classifications

Nelson Ridge's roads shown in the Site Development Plan are classified as follows:

Road	Conceptual Master Plan Classification
Nelson Ridge Trail	Secondary Traffic Circulation
Nelson Grove Way	Secondary Traffic Circulation

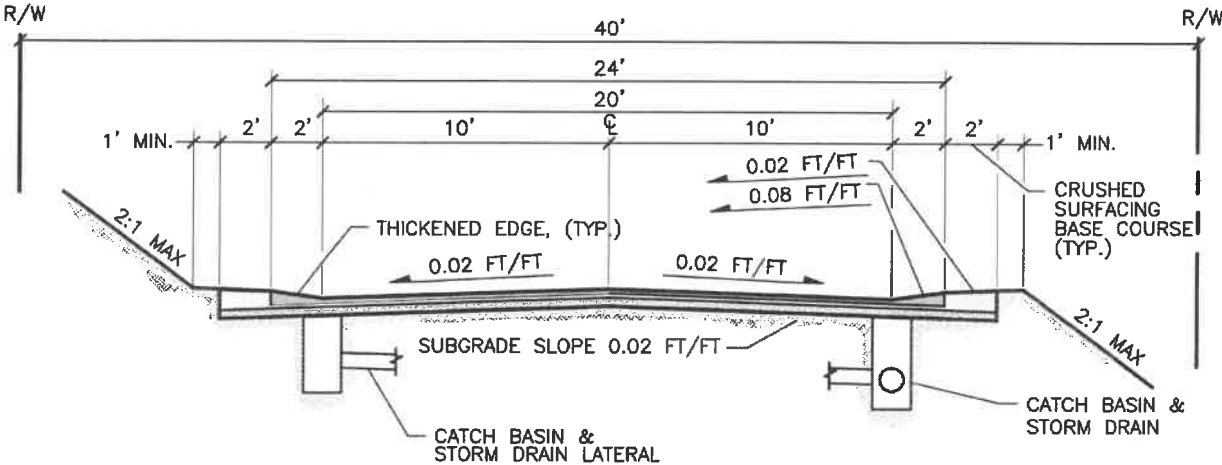
### Roadway Sections

The proposed roadway section for the Nelson Ridge plat is shown in Figure 2-1. Applicability of the sections is as follows:

Road	Type	Figure
Nelson Ridge Trail	R-II - Minor Residential – Two-Way	2-1
Nelson Grove Way	R-II - Minor Residential – Two-Way	2-1

### Access

**PRIMARY ACCESS:** As illustrated on the Site Development Plan, primary access to the Nelson Ridge plat will be from Swiftwater Drive.



**TYPE R-II  
MINOR RESIDENTIAL ROADWAY**

NOT TO SCALE

Figure 2-1

### Illumination

Street lighting designs will conform to the principles of preserving dark skies while providing lighting levels appropriate for roadway safety and security. Street lighting will conform to the following planning criteria.

- a) Use of full-cutoff shielding on outdoor light fixtures;
- b) Mounting of light fixture luminaries at a height of not greater than 30 feet;
- c) Establishment of roadway lighting standards based on needed light distribution and the luminance of roadway surfaces;
- d) Use of LED street lights;
- e) Use of timer or photo-cell controls to regulate when and where lighting would occur; and
- f) Avoiding unnecessary lighting of building facades.

Streetlights will be located at intersections, pedestrian trail crossings, and other locations where needed. Alternative luminary styles will be considered during project design.

### Introduction

The preliminary Stormwater Management Plan for Phase 2 Division 6 (Nelson Ridge) of the Suncadia Master Planned Resort (MPR) is described in this part. The Stormwater Management Plan reflects application of design guidelines detailed in the Department of Ecology Stormwater Management Manuals as well as information presented in the April 1999 (Rev. July 1999) Master Drainage Plan (MDP) that was prepared by W&H Pacific for the MPR. The MDP outlines stormwater design procedures, guidelines, and protocols for the development.

Updates to the MDP include;

- (1) adoption of the drainage standards set forth in Washington State Department of Ecology's Stormwater Management Manual for Western Washington August 2001 (DOE SMM),
- (2) an addendum to the MDP dated August 2002 that provides (a) water quality protocol information for golf course areas that discharge to surface waters, and (b) revision of golf course water quality protocol summary information for infiltration to conform with the detailed protocol information.

Design specifics addressed in this part include:

- Runoff rate/volume estimation methodology
- Infiltration facility collection and conveyance
- Water quality treatment
- Overflow routing
- Conceptual Stormwater Plan

The proposed Nelson Creek land use for the resort is shown in the General Site Plan for Phase 2. The property is located on the west side of Phase 1, northeast side of Phase 3, and north of Phase 2 Division 2.

The Suncadia stormwater system will be owned, operated, and maintained by the Suncadia Community Council. Construction of facilities will be by New Suncadia, L.L.C.

### Conceptual Drainage Plan

Stormwater runoff for Nelson Ridge roadways will be divided into 3 local basins and conveyed downstream, following the natural topography of the site, to water quality treatment, detention & dispersion, and infiltration facilities.

The majority of soil on the site is underlain by Quaternary deposits of Glacial Outwash and Glacial Moraine. For additional information regarding the existing geology and soils, see the EIS Technical Report for Geology, Groundwater and Soils prepared by AESI and dated June 29, 1999. The developed area of Phase 2 Division 6 has been mapped on the Erosion Hazard Map as Zone 3 "Moderate Hazard Risk" and Zone 1 "High to Severe Hazard Risk".

Runoff from Nelson Ridge Trail & Nelson Grove Way will be collected in catch basins and conveyed in pipes along the roadway and will be directed to bio-infiltration swales or gravel dispersion trenches that will provide flow control (by infiltration and dispersion) and water quality treatment. For more information, see the Conceptual Utility Exhibit.

Runoff from the 42 detached resort residential units will be typically handled on the individual lots by dispersion and infiltration.

### Infiltration and Detention Facilities

As discussed in the Conceptual Drainage Plan narrative, detention facilities followed by dispersion trenches or infiltration facilities are proposed onsite. Furthermore, infiltration and dispersion may also be provided for the individual lots.

### Water Quality Treatment

Water quality treatment will be provided for runoff from impervious road surfaces requiring stormwater treatment. Treatment will be provided in one of several Department of Ecology recommended treatment facility types. Water quality treatment options available for Suncadia are wetponds/lakes, stormfilter systems, biofiltration swales, bio-infiltration, and sheet flow dispersion. All water quality facilities are sized to treat the water quality storm. The water quality storm is that storm for which all storms equal or smaller in size account for 90 percent of the average annual runoff. For Phase 2, the water quality design storm is 1.68 inches in 24-hours. Proposed water quality facilities are described below.

#### Sheet Flow Dispersion

Sheet flow dispersion is an approved Department of Ecology water quality and quantity control method for areas that preserve the existing forest duff. D.O.E. allows this treatment when the impervious area is less than 10 percent of the basin and 65 percent

or more of the forest duff is retained. This water quality treatment method will be used for portions of Nelson Ridge Trail & Nelson Grove Way.

### **Bio-Infiltration**

Bio-infiltration can be provided as described in the Department of Ecology Stormwater Management Manuals by routing runoff for the water quality storm through a 6-inch bed of filtration medium with specific characteristics for infiltration rate, cation exchange capacity, and total organics that establish suitability for water quality treatment. This method of providing water quality treatment can be provided by lining roadside ditches or tops of infiltration facilities with a 6-inch bed of filtration medium that meets or exceeds the soil characteristics as follows:

Infiltration rate: Less than 2.4 inches/hour

Cation Exchange Capacity: At least 5 meq/ 100 grams of dry soil

Organic Content: At least 1%

Water quality treatment can also be provided by routing runoff through native soils with infiltration rates greater than 2.4 inches per hour as long as the bed thickness is increased to provide an equivalent residence time.

This water quality treatment and flow control method will be used for Nelson Creek Trail.

### **Overflow Routes**

Each bio-infiltration swale will have a controlled overflow structure. The overflow will discharge through a gravel dispersion trench located near lowest portion of each swale and continue downstream as overland sheetflow or infiltrate where conditions are favorable. This will provide for the infiltration and dispersion of stormwater even if one facility is partially clogged or out of operation.

The overflow routes proposed for Nelson Ridge Trail & Nelson Grove Way are controlled dispersion areas.



### Source of Water Supply

The Phase 2 Division 6 (Nelson Ridge) development has a Group A water system regulated by the Department of Health which will be served by Suncadia Water Company, LLC (Suncadia Water). Suncadia Water has included this parcel in their comprehensive planning and will provide a water availability letter.

### Phase 2 Division 6 Water System Description

The preliminary transmission and distribution system for the Nelson Creek plat is illustrated on the enclosed Conceptual Utility Exhibit. The water for the development will be supplied by the MPR water reservoirs. The reservoirs are located in the northeast section of the MPR.

The Nelson Ridge plat will provide an 8-inch diameter water main to connect to the 12-inch Swiftwater Drive.

All homes are to be fire sprinkled on site. Hydrants will be placed at a maximum of 500 feet spacing. Fire flow calculations were developed using a flow of 1500 gallons per minute at 20 pounds per square inch (psi) pressure. The Resort is served by Fire District 7. A fire station for District 7 is located on the Resort at 31 Firehouse Road, at the northwest intersection of Bullfrog Road.

### General Description

The proposed Nelson Ridge plat consists of 42 detached resort residential vacation homes spaced on approximately 62.08 acres. The collected raw wastewater from this development will be conveyed by means of onsite force main and gravity sewer to the existing gravity sewer in Swiftwater Drive. For more information, see the Conceptual Utility Exhibit. Wastewater will further continue to off-site gravity sewers to the Waste Water Treatment Plant (WWTP) in Cle Elum.

### Suncadia Solid Waste Management Policy

Solid Waste Management is currently being performed per the Solid Waste Management Plan dated April 13, 2006.