

To:	Glenda Fossum-Smith	From:	Shawn M. Dimke, P.E., G.E. and Stephen P. Palmer, C.E.G.
Company:	Providence Health & Services - Oregon	Date:	June 9, 2010
Address:	1235 NE 47 <sup>th</sup> Avenue, Suite 160 Portland, OR 97213		
cc:	Matt Dolan, KPFF Consulting Engineers (via email only) Wade Scarbrough, Kittelson and Associates (via email only) John Thompson, Zimmer Gunsul Frasca Partnership (via email only)		
GDI Project:	Providence-38-02		
RE:	Providence Hospital and Seaside School Potential Site One Access and Development Considerations		

## INTRODUCTION

We have prepared the following memorandum to document site access and development considerations identified during our meeting with design team members and tour of the potential site one on June 4, 2010. The potential site one for the Seaside School District and Providence Hospital is located east and upslope of the existing Seaside Heights Elementary School.

## SITE STRIPPING, GRADING, AND DRAINAGE

The lower portion of the site is forested and the upper portion of the site is vegetated with smaller trees and thick shrubs and brush. Based on the current and past dense vegetation, we expect significant stripping with an average depth of up to a few feet would be required in structural areas of the site. We expect the required stripping depth would be similar for other undeveloped forest areas in the vicinity.

The site has an average slope gradient of roughly 10 percent and several drainages. Based on the slope grades at the site and grade requirements for new access roads and structures, we expect the volume of grading will be a significant consideration for the site. Once light detection and ranging (LiDAR) data is available, it can be used to develop more accurate topographic contours as well as grading cut and fill estimates as indicated in the "LiDAR Data" section of this memorandum.

The near-surface geologic unit consists of the Astoria Formation, which is identified as primarily siltstone and mudstone in the project area. Based on the existing site conditions and anticipated low permeability of the near-surface soils, we expect french drains will likely be required in cut areas of the site and to intercept preferred areas of seepage across the site. In addition, foundation drains will also likely be required for shallow foundations at the site.

**FOUNDATION CONSIDERATIONS**

We understand the existing Providence Seaside Hospital and Seaside Heights Elementary School have experienced foundation distress from the shrinking and swelling of the underlying soils. The Astoria Formation is the mapped near-surface geologic unit at the site as well as the existing Providence Seaside Hospital and Seaside Heights Elementary School. Accordingly, we expect granular pads with a thickness of approximately 2 feet would be necessary to minimize the potential of shrink and swell effects on shallow foundations at the site.

**STREAM CHANNEL SETBACKS**

The streams in the vicinity are generally deeply incised and slope hazards and landslide scarps have been identified at several locations along the edge of the drainages. Accordingly, a buffer will be required between structural developments and the steep drainages. Preliminary layout plans appear to account for a sufficient buffer from the stream channels. The actual setbacks from the stream channels should be based on a detailed site investigation and more accurate topography of the site, which can be obtained from the LiDAR data once it is available as discussed below.

**SITE ACCESS**

A number of potential access roads have been identified for the site. Only the road extending up from the existing Seaside Heights Elementary School would not require a new stream crossing and some of the proposed access roads would require two or more stream crossings. In addition to land acquisition and grading expenses, we expect new bridge crossings would be a significant development cost that should be considered for proposed new access roads.

***POTENTIAL FOREST DRIVE ACCESS ROUTE***

During our site visit, a new potential access route was identified through several vacant residential lots at the end of Forest Drive. The Forest Drive route would access the site from the north. The geologic unit for the slope at the end of Forest Drive is mapped as basalt consisting of the Frenchman Springs Member Pillow Palagonite Complexes. We observed a small outcrop of rock near the end of Forest Drive, which was consistent with the mapped pillow palagonite basalt unit. The end of the road is, however, near the mapped contact with fine-grained rock of the Astoria Formation and the basalt observed in the field could be a large boulder that moved down slope. Significant cuts in basalt would be more difficult than in the sedimentary rock and may require rock blasting. The map indicates there is approximately a 30 percent grade over a distance of approximately 300 feet above the end of Forest Drive, so we expect significant cutting would be required to maintain a road grade of 12 or even 15 percent from the end of the road. If site access considerations and potential roadway development costs indicate the Forest Drive access may be a preferred option, we can develop an investigation and/or site reconnaissance plan to evaluate the type and consistency of the underlying rock and potential feasibility of the required cuts for an access road extending from the east end of Forest Drive.

**LIDAR DATA**

We understand the LIDAR data for the site and vicinity is scheduled for release by Oregon Department of Geology and Mineral Industries sometime this year. Once available, the LIDAR data can be used to generate topographic contours significantly more accurate than current contours available from the U.S. Geological Survey 10-meter Digital Elevation Model. Accordingly, the LIDAR data will be useful in identifying potential slope hazards and necessary setbacks from incised drainage slopes, determining potential site layouts and site access, and developing more accurate grading estimates.

We hope this memorandum meets your requirements at this time. Please give us a call if you need further information.

SMD:SPP:kt

One copy submitted (via email only)

Document ID: Providence-38-02-060910-geom.doc

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