

4.2 GEOLOGY AND SOILS

4.2.1 ALTERNATIVE A – PREFERRED CASINO-RESORT PROJECT

TOPOGRAPHY

The topography of the La Center Interchange Site consists of gentle slopes in the southeast quadrant transitioning to gentle to steep slopes in the remaining three quadrants. The site has 40 to 50 feet of fall between the east and west property boundaries and from NW 319th Street to the north property boundary (Olson Engineering, 2006a). The main entrance to the casino complex would be located on the high point of the site along the north side of NW 319th Street, with the bulk of the building extending to the north. The finished floor height of the main entrance has been set at 276 feet above mean sea level (amsl); however, the lower level floor elevations would range from 250 feet amsl for the casino complex to 234 feet amsl for the parking garages. The layout of buildings and roads has been designed to take advantage of the topographic features and minimize effects where possible. The main topographic features of the site would be modified, but on the whole preserved; however, due to the steep topography of the site in the northwest, cutting and filling would be necessary.

Alternative A would involve substantial clearing and grading. Topographic features of the site would be altered by earthwork. The preliminary grading plan for Alternative A is included in DEIS Vol. I, **Appendix F** (Sheet A5.0 and A5.1). Grading would consist primarily of excavating soil for project components and filling would occur where cut slopes necessitate additional leveling. On-site grading would result in the excavation of approximately 510,000 cubic yards of soil and the fill of approximately 570,000 cubic yards of soil. This would result in the need to import a total of approximately 60,000 cubic yards of soil. To minimize wetland and wetland buffer impacts, retaining walls would be used where needed.

While some cut-and-fill slopes would be noticeable on the La Center Interchange Site, the project design ensures that the major topographic features (i.e., hills and slopes) would be preserved. Development of Alternative A would result in a less than significant effect on topography. No mitigation is required.

SOILS/GEOLOGY

Alternative A could impact soils due to erosion during construction, operation, and maintenance activities. Such activities include clearing, grading, trenching, and backfilling. The majority of the soils on the La Center Interchange Site have a moderate erosion potential based on soil type and slope gradients. **Table 3.2-1** in **Section 3.2**, Geology and Soils describes the soil types, erosion potential, and general gradients for each of the soil units on the site.

An Erosion Control Plan has been prepared for Alternative A. The Erosion Control Plan, which is included in DEIS Vol. I, **Appendix F** (Sheets A2.0 and A2.1), identifies the locations of erosion control features recommended to direct and filter stormwater runoff. The features to be used during construction include, but are not limited to, silt fences, fiber rolls, and rock bag dams. The locations of permanent erosion control features such as sediment/grease traps, vegetated drainage swales, and riprap are also identified.

The Erosion Control Plan would be implemented during project construction and operation, thus assuring that adverse effects resulting from erosion are minimized. Landscaping of the cut-and-fill slopes and other disturbed areas would also mitigate long-term effects of erosion by covering and stabilizing the soil surface with plants and mulch. Additionally, the Tribe has committed in the Memorandum of Understanding (MOU) with Clark County and the Tribe's Environment, Public Health and Safety (EPHS) Ordinance to develop the property consistent with Clark County Code (CCC) Chapter 40.380, Stormwater and Erosion Control, and Chapter 14.04, Building Code. With incorporation of the Erosion Control Plan and the Preliminary Grading Plan, effects from implementation of Alternative A on soils and geology would be minimal and, therefore, less than significant. Mitigation measures are presented in **Section 5.2.1** to ensure impacts remain less than significant.

Sediment and erosion discharge into navigable (surface) waters of the U.S. is prohibited by the Federal Clean Water Act (CWA) (1972, with modifications in 1977, 1981, and 1987), which establishes water quality goals for sediment control and erosion prevention. One of the mechanisms for achieving the goals of the CWA is the National Pollutant Discharge Elimination System (NPDES) permit program, administered by the United States Environmental Protection Agency (USEPA). As part of the NPDES General Construction permit, a Stormwater Pollution Prevention Plan (SWPPP) must be developed. The SWPPP must make provisions for (1) erosion prevention and sediment control; and (2) control of other potential pollutants. Alternative A would require a NPDES permit from the USEPA and a SWPPP.

SEISMICITY

Construction of the casino and associated facilities would not be significantly affected by seismicity, as the area has low liquefaction and acceleration characteristics (WSDNR, 2003). Since no known fault traces are mapped as crossing the area, the potential for surface rupturing along an on-site fault trace is considered low and should not be considered a constraint for Alternative A. Additionally, the Tribe has committed in the MOU with Clark County and EPHS Ordinance, to develop the property consistent with CCC Chapter 40.430, Geologic Hazard Areas and Chapter 14.04, Building Code. Impacts from seismicity under Alternative A are considered less than significant. No mitigation is required.

MINERAL RESOURCES

The proposed grading and landform alteration associated with Alternative A would not adversely affect known or recorded mineral resources. Alteration in the land use would not result in a loss of economically viable aggregate rock or diminish the extraction of important ores or minerals. Because there are no known or mapped mineral resources within the La Center Interchange Site, development and use of the land would not affect such resources. There are no abandoned mines, shafts, or tailings that would affect development. Project-related impacts to mineral resources under Alternative A are considered less than significant. No mitigation is required.

4.2.2 ALTERNATIVE B – PREFERRED PROJECT WITHOUT REROUTING NW 319TH STREET

TOPOGRAPHY

Alternative B would involve substantial clearing and grading. Topographic features of the site would be altered by earthwork. The main entrance to the casino complex would be located on the high point of the site along the north side of NW 319th Street, with the building extending to the north. Grading would consist primarily of excavating for project components and filling where cut slopes necessitate additional leveling. On-site grading would result in the excavation of approximately 430,000 cubic yards of soil and the fill of approximately 740,000 cubic yards of soil. This would result in the need to import a total of approximately 310,000 cubic yards of soil. The Preliminary Grading Plan for Alternative B is included in DEIS Vol. I, **Appendix F** (Sheet B3.0 and B3.1).

While some cut-and-fill slopes would be noticeable on the La Center Interchange Site, the major topographic features (i.e., hills and slopes) would be preserved. Development of Alternative B would result in a less than significant impact on topography. No mitigation is required.

SOILS/GEOLOGY

Alternative B could adversely affect soils due to erosion during construction, operation, and maintenance activities. Such activities include clearing, grading, trenching, and backfilling. The majority of the soils at the La Center Interchange Site have a moderate erosion potential based on soil type and slope gradients. **Table 3.2-1** in **Section 3.2**, Geology and Soils describes the soil types, erosion potential, and general gradients for each of the soil units on the site.

An Erosion Control Plan has been prepared for Alternative B (DEIS Vol. I, **Appendix F**, Sheets B2.0 and B2.1). The Erosion Control Plan would be implemented during project construction and operation, thus assuring that adverse effects resulting from erosion are minimized. Additionally, the Tribe has committed in the MOU with Clark County and EPHS Ordinance to develop the property consistent with CCC Chapter 40.380, Stormwater and Erosion Control, and Chapter 14.04, Building Code. With incorporation of the Erosion Control Plan and Preliminary Grading Plan, effects from

implementation of Alternative B on soils and geology would be minimal and, therefore, less than significant. Mitigation measures are presented in **Section 5.2.1** to ensure impacts remain less than significant.

As with Alternative A, Alternative B would also require a NPDES permit from the USEPA for sediment control and erosion prevention into navigable (surface) waters of the U.S. As part of the General Construction NPDES permit, a SWPPP must be developed and include provisions for (1) erosion prevention and sediment control; and (2) control of other potential pollutants.

SEISMICITY

The on-site geological conditions for Alternative B are the same as for Alternative A. Therefore, project-related impacts from seismicity with implementation of Alternative B would also be less than significant. No mitigation is required.

MINERAL RESOURCES

Mineral resources associated with Alternative B are the same as for Alternative A. Therefore, project-related impacts to mineral resources with implementation of Alternative B will be less than significant.

4.2.3 ALTERNATIVE C – REDUCED INTENSITY

TOPOGRAPHY

Alternative C would involve clearing and grading as part of the construction of project components. Topographic features of the site would be altered by earthwork. The main entrance to the casino complex would be located on the high point of the site along the north side of NW 319th Street, with the building extending to the north. Grading would consist primarily of excavating for project components and filling where cut slopes necessitate additional leveling. On-site grading would result in the excavation of approximately 430,000 cubic yards of soil and the fill of approximately 450,000 cubic yards of soil. This would result in the need to import a total of approximately 20,000 cubic yards of soil. The preliminary grading plan for Alternative C is included in DEIS Vol. I, **Appendix F** (Sheet C3.0 and C3.1).

While some cut-and-fill slopes would be noticeable on the La Center Interchange Site, the major topographic features (i.e., hills and slopes) would be preserved. Development of Alternative C would result in a less than significant effect on topography.

SOILS/GEOLOGY

Alternative C could adversely affect soils due to erosion during construction, operation, and maintenance activities. Such activities include clearing, grading, trenching, and backfilling. The

majority of the soils at the La Center Interchange Site have a moderate erosion potential based on soil type and slope gradients. **Table 3.2-1 in Section 3.2, Geology and Soils** describes the soil types, erosion potential, and general gradients for each of the soil units on the site.

An Erosion Control Plan has been prepared for Alternative C (DEIS Vol. I, **Appendix F**, Sheets C2.0 and C2.1). The Erosion Control Plan would be implemented during project construction and operation, thus assuring that adverse effects resulting from erosion are minimized. Additionally, the Tribe has committed in the MOU with Clark County and EPHS Ordinance to develop the property consistent with CCC Chapter 40.380, Stormwater and Erosion Control, and Chapter 14.04, Building Code. With incorporation of the Erosion Control Plan and Preliminary Grading Plan, effects from implementation of Alternative C to soils and geology would be minimal and, therefore, less than significant. Mitigation measures are presented in **Section 5.2.1** to ensure impacts remain less than significant.

As with Alternatives A and B, Alternative C would also require an NPDES permit from the USEPA for sediment control and erosion prevention into navigable (surface) waters of the U.S. As part of the General Construction NPDES permit, a SWPPP must be developed and include provisions for (1) erosion prevention and sediment control; and (2) control of other potential pollutants.

SEISMICITY

The on-site geological conditions for Alternative C are the same as for Alternatives A and B. Therefore, project-related impacts from seismicity with implementation of Alternative C would also be less than significant. No mitigation is required.

MINERAL RESOURCES

Mineral resources associated with Alternative C are the same as for Alternatives A and B. Therefore, project-related impacts to mineral resources with implementation of Alternative C would be less than significant.

4.2.4 ALTERNATIVE D – BUSINESS PARK

TOPOGRAPHY

Under this Alternative, multiple pad areas would be graded, which would require retaining walls for structural support. Grading would consist primarily of excavating for project components and filling where cut slopes necessitate additional leveling. On-site grading would result in the excavation of approximately 385,000 cubic yards of soil and the fill of approximately 220,000 cubic yards of soil. This would result in the need to export a total of approximately 165,000 cubic yards of soil. The preliminary grading plan for Alternative D is included in DEIS Vol. I, **Appendix F** (Sheet D3.0 and D3.1). Significant impacts to topography would result from development of Alternative D as key

topographic features of the site would be substantially altered or eliminated by the cutting and filling of topographic features. Due to the necessity for grading for building pads and parking areas, and to provide adequate drainage to the facilities proposed under this Alternative, the significant impacts identified to topography would be unavoidable. No mitigation is available to reduce this impact to less than significant.

SOILS/GEOLOGY

Alternative D could adversely affect soils due to erosion during construction, operation, and maintenance activities. Such activities include clearing, grading, trenching, and backfilling. The majority of the soils at the La Center Interchange Site have a moderate erosion potential based on soil type and slope gradients. **Table 3.2-1 in Section 3.2, Geology and Soils** describes the soil types, erosion potential, and general gradients for each of the soil units on the site.

An Erosion Control Plan has been prepared for Alternative D (DEIS Vol. I, **Appendix F**, Sheets D2.0 and D2.1). The Erosion Control Plan would be implemented during project construction and operation, thus assuring that adverse effects resulting from erosion are minimized. Additionally, the Tribe has committed in the MOU with Clark County and EPHS Ordinance to develop the property consistent with CCC Chapter 40.380, Stormwater and Erosion Control, and Chapter 14.04, Building Code. With incorporation of the Erosion Control Plan and Preliminary Grading Plan, effects from implementation of Alternative D to soils and geology would be minimal and, therefore, less than significant. Mitigation measures are presented in **Section 5.2.1** to ensure impacts remain less than significant.

As with Alternatives A, B and C, Alternative D would also require a NPDES permit from the USEPA for sediment control and erosion prevention into navigable (surface) waters of the U.S. As part of the General Construction NPDES permit, a SWPPP must be developed and include provisions for (1) erosion prevention and sediment control; and (2) control of other potential pollutants.

SEISMICITY

The on-site geological conditions for Alternative D are the same as for Alternatives A, B and C. Therefore, project-related impacts from seismicity with implementation of Alternative D would also be less than significant. No mitigation is required.

MINERAL RESOURCES

Mineral resources associated with Alternative D are the same as for Alternatives A, B and C. Therefore, project-related impacts to mineral resources with implementation of Alternative D would be less than significant. No mitigation is required.

4.2.5 ALTERNATIVE E – RIDGEFIELD INTERCHANGE SITE

TOPOGRAPHY

The Ridgefield Interchange Site contains Quaternary periglacial deposits of sand, silt and clay resulting from outbursts from the Great Missoula Floods (USGS, 2004). Near-surface soils are Gee Silt Loam with Odne Silt loam mapped along drainages (USGS, 2004).

Alternative E would entail substantial clearing and grading to accommodate the construction of project components. The layout of buildings and roads has been designed to take advantage of the topographic features and minimize effects where possible. The main topographic features of the Ridgefield Interchange Site would be modified but on the whole preserved; however, due to the steep topography of the site, cutting and filling would be necessary.

Grading would consist primarily of excavating for project components and filling would occur where cut slopes necessitate additional leveling. On-site grading would result in the excavation of approximately 880,000 cubic yards of soil and the fill of approximately 1,200,000 cubic yards of soil. This would result in the need to import a total of approximately 320,000 cubic yards of soil. The preliminary grading plan for Alternative E is included as DEIS Vol. I, **Appendix F** (Sheets E3.0 and E3.1).

Due to the necessity for grading and excavation for project components, and to provide adequate drainage to the facilities proposed under this Alternative, the significant impacts identified to topography would be unavoidable. No mitigation is available to reduce this impact to less than significant.

SOILS/GEOLOGY

Alternative E could adversely affect soils due to erosion during construction, operation, and maintenance activities. Such activities include clearing, grading, trenching, and backfilling. The majority of the soils at the Ridgefield Interchange Site have a moderate erosion potential based on soil type and slope gradients. **Table 3.2-3** in **Section 3.2**, Geology and Soils describes the soil types, erosion potential, and general gradients for each of the soil units on the site.

An Erosion Control Plan has been prepared for Alternative E (DEIS Vol. I, **Appendix F**, Sheets E2.0 and E2.1). The Erosion Control Plan would be implemented during project construction and operation, thus assuring that adverse effects resulting from erosion are minimized. With incorporation of the Erosion Control Plan and Preliminary Grading Plan, effects from implementation of Alternative E to soils and geology would be minimal and, therefore, less than significant. Mitigation measures are presented in **Section 5.2.1** to ensure impacts remain less than significant.

Alternative E would require an NPDES permit from the USEPA for sediment control and erosion prevention into navigable (surface) waters of the U.S. As part of the General Construction NPDES permit, a SWPPP must be developed and include provisions for (1) erosion prevention and sediment control; and (2) control of other potential pollutants.

SEISMICITY

Construction of the casino and associated facilities would not be significantly affected by seismicity, as the area has low liquefaction and acceleration characteristics (WSDNR, 2003). Since no known fault traces are mapped as crossing the area, the potential for surface rupturing along an on-site fault trace is considered low. Impacts from seismicity under Alternative E are considered less than significant. No mitigation is necessary.

MINERAL RESOURCES

The proposed grading and landform alteration associated with Alternative E would not adversely affect known or recorded mineral resources. Alteration in the land use would not result in a loss of economically viable aggregate rock or diminish the extraction of important ores or minerals. Because there are no known or mapped mineral resources within the Ridgefield Interchange Site, development and use of the land would not affect such resources. There are no abandoned mines, shafts, or tailings that would affect development. Project-related impacts to mineral resources under Alternative E are considered less than significant. No mitigation is required.

4.2.6 ALTERNATIVE F – NO ACTION

Under the No Action Alternative, development would not be constructed on either of the alternative project sites. The existing sites would remain in their current use, which includes agricultural uses. The topography and soils would remain undisturbed. No landform, soil, or seismic effects would occur as a result of Alternative F.