

## 4.2 LAND RESOURCES

This section identifies the environmental and safety impacts of the Proposed Project and Alternatives related to the land resources identified in **Section 3.2**. The general topics considered here include topography, soils, seismicity and mineral resources. Mitigation measures are discussed in **Section 5.2.1**. As noted in **Section 3.2**, the geotechnical studies supporting the data below appear in **Appendix F**. At the time of the study conducted by GEOCON (2004), the Wilfred site was not under consideration. Therefore, the nomenclature for the project alternatives described by GEOCON are not consistent with this EIS. What GEOCON references as Alternatives A through D appear in this Environmental Impact Statement (EIS) as Alternatives B through E, respectively.

A geotechnical study of the northeastern portion of the Wilfred site was conducted for Blackman Consulting by Michelucci and Associates, Inc. in 2005 (included in **Appendix F**). In the geotechnical study for Blackman Consulting, the Wilfred site is referenced as a portion of the Northwest Specific Plan Area (NWSP area), for which an Initial Study (IS) has been prepared in 2005 by the City of Rohnert Park as part of the environmental review process for planned development under the California Environmental Quality Act (CEQA). The NWSP area shares considerable overlap with the northeast portion of the Wilfred site. On its southwest portion, the Wilfred site also shares considerable overlap with the Stony Point site, and thus the Wilfred site, the NWSP area and the Stony Point site are substantially similar in soil and geomorphic makeup. This is reflected in the Michelucci geotechnical study, **Section 3.2**, and in area soil maps provided by the Natural Resources Conservation Service (NRCS). Therefore, GEOCON's analysis of impacts posed by the project alternatives on the Stony Point site generally applies to those identified for the southwestern portion of the Wilfred site by Michelucci and Associates, Inc.

Where conditions of land resources would impact the development proposed in the project alternatives, it follows that the resulting damage to facilities could present a hazard affecting the safety of patrons using the facilities. Such impacts as they pertain to land resources are identified below. Impacts to general public safety are discussed within **Section 4.9, Public Services**.

### 4.2.1 ALTERNATIVE A – PROPOSED PROJECT

#### *TOPOGRAPHY*

Build-out of Alternative A would generally entail alterations to the topographical characteristics of the Wilfred site. The Wilfred site is essentially flat, and the result of on-site grading would not alter this characteristic. Fill would be incorporated into on-site grading in order to facilitate

proper drainage. Therefore, a less-than-significant impact to the topography of the site would occur.

### ***Landslides***

As noted above, an analysis of the site of Alternatives B through E (Stony Point) was conducted by GEOCON in 2004. As discussed in **Section 3.2.2**, there is no sloping ground that may be subject to instability or landslides on or adjacent to the Stony Point site (GEOCON, 2004) (**Appendix F**). This analysis applies to the relatively flat and level Wilfred site. Thus, the potential for damage to development under Alternative A or its surrounding areas due to instability of slopes or landslides is low. The side slopes of the Bellevue-Wilfred Channel and Laguna de Santa Rosa are the only exception to the overall topography of the Wilfred site and vicinity. If development were to occur too close to these steep banks the slopes may become compromised and result in slippage into the drainage. Recommendations by GEOCON (2004) to maintain a buffer zone between the developments and the side slopes have been implemented in the project design (**Appendix F**). Therefore, a less-than-significant landslides impact for Alternative A would occur.

### ***SOILS***

#### ***Expansive Soil***

Expansive soils are present on the surface of the Wilfred site. The expansion rating for these near-surface soils ranges from “very low” to “very high.” Generally, the soils on the eastern portion of the site are more expansive, and highly subject to change brought about by seasonal moisture variations. If unmitigated, these expansive soils may cause damage to overlying structures or shallow-depth utilities, creating public hazards. Mitigation measures related to Wilfred site soils are identified in **Section 5.2.1** to reduce any impact to be less than significant.

#### ***Soil Corrosivity***

Corrosion is an electrochemical process affecting degradation of metals or metal-containing materials in contact with water. The rates of corrosion vary depending on the acidity of the water, its electrical conductivity, oxygen concentration, and temperature. Both ground and surface water can be acidic. Surface water tends to have higher oxygen concentrations than groundwater. Groundwater also tends to be more insulated from temperature variation than surface water.

Generally, corrosion occurs on structures that are exposed to several types of environments or electrolytes. Such electrolytes include raw and treated water, salt water and fresh water, various soils, rainwater and airborne contaminants. These electrolytes serve to complete electrochemically corrosive circuits between different metals within the same environment. The

flow of electrical current in the corrosion circuit is proportionate to the loss of metal in the corrosion process. Ferrous materials corrode at the rate of 20 pounds per ampere-year.

Soil corrosivity at the Wilfred site is therefore evidenced according to resistivity and conductivity. One of the three soil samples submitted by GEOCON (**Appendix F**) for corrosion potential testing exhibited a low resistivity, or high conductivity. As such, the soil on the Wilfred site may be considered mildly corrosive to concrete or steel. Corrosion could compromise structural integrity, resulting in an impact upon public safety, in this case potentially resulting from soil corrosivity. Standard construction practices would include consultation with a corrosion engineer to minimize any soil corrosion effects to construction materials; therefore, have a less-than-significant effect.

### ***Subsidence***

The Rohnert Park/Cotati Valley area of Sonoma County is a large alluvial valley with significant groundwater storage. As such, numerous groundwater extraction wells are located within the Cotati Valley for domestic use. Continued groundwater withdrawal with limited recharge causes the potential for land mass subsidence, resulting in the descent of the ground surface elevation. There is no on-site evidence that subsidence is occurring; however, any subsidence in the Cotati Valley would be regional; unlike local differential settlement, it would not likely have a significant effect on the proposed building foundations at the Wilfred site or storm/sewer facilities (or other utilities) that rely on gravity-driven flow.

### ***SEISMICITY***

#### ***Regional Faulting and Probability***

**Section 3.2** identifies the probability for a seismic event to cause destructive ground acceleration at the Wilfred site. Based on the associated table (**Table 3.2-1**), a seismic event and related structural damage and resulting hazard to public safety would be considered a potentially significant impact. Mitigation measures related to seismicity on the Wilfred site appear in **Section 5.2.1** to reduce any significant impacts

#### ***Liquefaction***

Based on the liquefaction analyses appearing in **Section 3.2**, there is the potential for liquefaction to occur in localized lenses of liquefiable soils on the Wilfred site. This poses a potentially significant impact. Mitigation measures respondent to liquefaction appear in **Section 5.2.1** to reduce any impact to a less-than-significant level.

### ***Lateral Spreading***

Based on the analysis in **Section 3.2**, there is a low potential for lateral spreading on the Wilfred site. This low potential indicates that any lateral spreading effect will result in a less-than-significant impact.

### ***Seismically Induced Flooding***

Based on the Wilfred site's spatial and topographical distance from the Pacific Ocean, the Wilfred site is well protected from tsunamis from an offshore seismic event. Moreover, the site is not located downstream from any major dams or reservoirs that could inundate the site in the event of seismically induced breakage, and would not cause any significant impact.

### ***MINERAL RESOURCES***

The alterations in land use on the Wilfred site would not result in a loss of economically viable aggregate rock or diminish the extraction of important ores or minerals. There are no known or mapped mineral resources within the Wilfred site; and the development and use of the land would not affect or be affected by such resources. There are no abandoned mines, shafts, or tailing that would affect development.

## **4.2.2 ALTERNATIVE B – NORTHWEST STONY POINT CASINO**

### ***TOPOGRAPHY***

Build-out of Alternative B would generally entail alterations to the topographical characteristics of the Stony Point site. It is estimated that 150,000-cubic yards of earthwork would be required, but it is anticipated that on-site grading will be balanced based upon detention basin excavation and borrowing from other locations on-site (Robert A. Karn & Associates, Inc., 2004). The Stony Point site is essentially flat and the proposed grading and excavation activities would balance the amount of fill; therefore a less-than-significant impact would occur. Additional issues or consequences related to the alteration of site topography are discussed below.

### ***Landslides***

As discussed in **Section 3.2.2** and **Section 4.2.1**, there is no sloping ground that may be subject to instability or landslides on or adjacent to the Stony Point site (GEOCON, 2004) (**Appendix F**). Thus, the potential for damage to development under Alternative B or its surrounding areas due to instability of slopes or landslides is low. The side slopes of the Bellevue-Wilfred Channel and Laguna de Santa Rosa are the only exception to the overall flat and level topography of the Stony Point site and vicinity. Development that occurs too close to these steep slopes could compromise the slopes and result in slippage into the drainage. Recommendations by GEOCON (2004) to maintain a buffer zone between the developments and the side slopes have been

implemented in the project design (**Appendix F**). Therefore, a less-than-significant landslides impact for Alternative B would occur.

## ***SOIL***

### ***Expansive Soil***

Expansive soils are present on the surface of the Stony Point site. The expansion rating for these near-surface soils ranges from “very low” to “very high.” Generally, the soils on the eastern portion of the site are more expansive, and highly subject to change brought about by seasonal moisture variations. If unmitigated, these expansive soils may cause damage to overlying structures or shallow-depth utilities. Mitigation measures related to Stony Point site soils are identified in **Section 5.2.1** to reduce any impacts to a less-than-significant level.

### ***Soil Corrosivity***

Corrosion is an electrochemical process affecting degradation of metals or metal-containing materials in contact with water. The rates of corrosion vary depending on the acidity of the water, its electrical conductivity, oxygen concentration, and temperature. Both ground and surface water can be acidic. Surface water tends to have higher oxygen concentrations than groundwater. Groundwater also tends to be more insulated from temperature variation than surface water.

Generally, corrosion occurs on structures that are exposed to several types of environments or electrolytes. Such electrolytes include raw and treated water, salt water and fresh water, various soils, rainwater and airborne contaminants. These electrolytes serve to complete electrochemically corrosive circuits between different metals within the same environment. The flow of electrical current in the corrosion circuit is proportionate to the loss of metal in the corrosion process. Ferrous materials corrode at the rate of 20 pounds per ampere-year.

Soil corrosivity at the Stony Point site is therefore evidenced according to resistivity and conductivity. One of the three soil samples submitted by GEOCON (**Appendix F**) for corrosion potential testing exhibited a low resistivity, or high conductivity. As such, the soil on the Stony Point site may be considered mildly corrosive to concrete or steel. Standard construction practices would include consultation with a corrosion engineer to minimize effects to construction materials. Therefore a less-than-significant effect would result.

### ***Subsidence***

The Rohnert Park/Cotati Valley area of Sonoma County is a large alluvial valley with significant groundwater storage. As such, numerous groundwater extraction wells are located within the Cotati Valley for domestic use. Continued groundwater withdrawal with limited recharge causes

the potential for land mass subsidence, resulting in the lowering of the ground surface elevation. There is no on-site evidence that subsidence is occurring; however, any subsidence in the Cotati Valley would be regional. Unlike local differential settlement, it would not likely have a significant effect on proposed building foundations at the Stony Point site or storm/sewer facilities (or other utilities) that rely on gravity-driven flow.

### ***SEISMICITY***

#### ***Regional Faulting and Probability***

**Section 3.2** identifies the probability for a seismic event to cause destructive ground acceleration at the site of Alternative B. Based on the associated table (**Table 3.2-1**), a seismic event and related structural damage and resulting hazard to public safety would be considered a potentially significant impact. Mitigation measures related to seismicity on the Stony Point site appear in **Section 5.2.1** to reduce any impacts to a less-than-significant level.

#### ***Liquefaction***

Based on the liquefaction analyses appearing in **Section 3.2**, there is the potential for liquefaction to occur in localized lenses of liquefiable soils on the Stony Point site. This poses a potentially significant impact. Mitigation measures respondent to liquefaction appear in **Section 5.2.1** to reduce any impacts to a less-than-significant level.

#### ***Lateral Spreading***

Based on the analysis in **Section 3.2**, there is a low potential for lateral spreading on the Stony Point site. This low potential indicates that any lateral spreading effect will result in a less-than-significant impact.

#### ***Seismically Induced Flooding***

Based on the Stony Point site's spatial and topographical distance from the Pacific Ocean, the Stony Point site is well protected from tsunamis from an offshore seismic event. Moreover, the site is not located downstream from any major dams or reservoirs that could inundate the site in the event of seismically induced breakage and would not result in a significant impact.

### ***MINERAL RESOURCES***

The alterations in land use on the Stony Point site would not result in a loss of economically viable aggregate rock or diminish the extraction of important ores or minerals. There are no known or mapped mineral resources within the Stony Point site and the development and use of the land would not affect or be affected by such resources. There are no abandoned mines, shafts, or tailing that would affect development.

### 4.2.3 ALTERNATIVE C – NORTHEAST STONY POINT CASINO

#### *TOPOGRAPHY*

The topographical characteristics of the Stony Point site would be altered in order to provide a suitable building location for Alternative C. It is estimated that 350,000-cubic yards of earthwork would be required. On-site grading will be balanced based upon detention basin excavation and borrowing from other portions of the site (Robert A. Karn & Associates, Inc., 2004) (**Appendix C**). Since the Stony Point site is essentially flat and level, a less-than-significant impact is identified to the topography of the site. Additional issues or consequences related to the alteration of site topography are discussed below.

#### *Landslides*

Landslide impacts are similar to those analyzed for Alternative B. Please see above discussion under Alternative B.

#### *SOILS*

##### *Expansive Soil*

The soils on the eastern portion of the site are more expansive than on the western portion, and highly subject to change brought about by seasonal moisture variations. If unmitigated, these expansive soils may cause damage to overlying structures or shallow-depth utilities. Mitigation measures related to Stony Point site soils are identified in **Section 5.2.1** to reduce any impacts to a less-than-significant level.

##### *Soil Corrosivity*

Conditions would be similar to those under Alternative B and result in a less-than-significant effect.

##### *Subsidence*

As discussed for Alternative B above, geological and subsurface conditions indicate that subsidence would not likely have a significant effect on proposed building foundations at the Stony Point site or storm/sewer facilities (or other utilities) that rely on gravity-driven flow.

#### *SEISMICITY*

The seismic conditions (regional faulting and probability, liquefaction, lateral spreading, and seismically induced flooding), hazards and impacts related to Alternative C are identical to those identified for Alternative B, above.

***MINERAL RESOURCES***

The alternations in land use under Alternative C would not result in a loss of economically viable aggregate rock or diminish the extraction of important ores or minerals. As with Alternative B above, there are no known or mapped mineral resources, abandoned mines, shafts, or tailing that would affect or be affected by development.

**4.2.4 ALTERNATIVE D – REDUCED INTENSITY (STONY POINT SITE)**

***TOPOGRAPHY***

Buildout of Alternative D would entail similar alterations to the topographical characteristics of the Stony Point site as for Alternative B, although at a slightly smaller scale and would not result in any significant impacts.

***SOIL***

***Expansive Soil***

Impacts to project developments from expansive soils are identical to those analyzed for Alternative B. Mitigation measures related to Stony Point site soils are identified in **Section 5.2.1** to reduce any significant impacts.

***Soil Corrosivity***

Effects would be similar to Alternative B and result in a less-than-significant effect.

***Subsidence***

As discussed for Alternative B above, geological and subsurface conditions indicate that subsidence would not likely have a significant effect on proposed building foundations at the Stony Point site or storm/sewer facilities (or other utilities) that rely on gravity-driven flow.

***SEISMICITY***

The seismic conditions (regional faulting and probability, liquefaction, lateral spreading, and seismically induced flooding), hazards and impacts related to Alternative D are identical to those identified for Alternatives B.

***MINERAL RESOURCES***

The alterations in land use under Alternative D would not result in a loss of economically viable aggregate rock or diminish the extraction of important ores or minerals. As with Alternative B above, there are no known or mapped mineral resources, abandoned mines, shafts, or tailing that would affect or be affected by development.

## **4.2.5 ALTERNATIVE E – BUSINESS PARK**

### ***TOPOGRAPHY***

Buildout of Alternative E would entail similar alterations to the topographical characteristics of the Stony Point site as for Alternative B, although at a slightly smaller scale, and would not result in any significant impacts.

### ***SOILS***

#### ***Expansive Soil***

Impacts to project developments from expansive soils are similar to those analyzed for Alternative B. Mitigation measures related to Stony Point site soils are identified in **Section 5.2.1** to reduce any impacts to a less-than-significant level.

#### ***Soil Corrosivity***

Conditions would be similar to those under Alternative B and result in a less-than-significant effect.

#### ***Subsidence***

As discussed for Alternative B above, geological and subsurface conditions indicate that subsidence would not likely have a significant effect on proposed building foundations at the Stony Point site or storm/sewer facilities (or other utilities) that rely on gravity-driven flow.

### ***SEISMICITY***

The seismic conditions (regional faulting and probability, liquefaction, lateral spreading, and seismically induced flooding), hazards and impacts related to Alternative E are identical to those identified for Alternative B.

### ***MINERAL RESOURCES***

The alterations in land use under Alternative E would not result in a loss of economically viable aggregate rock or diminish the extraction of important ores or minerals. As with Alternative B above, there are no known or mapped mineral resources, abandoned mines, shafts, or tailing that would affect or be affected by development.

## **4.2.6 ALTERNATIVE F – LAKEVILLE CASINO**

### ***TOPOGRAPHY***

Build-out of Alternative F would entail alterations to the topographical characteristics of the Lakeville site. It is estimated that 404,000-cubic yards of earthwork would be required. On-site

excavation would yield approximately 338,000-cubic yards. Thus, an additional 66,000 cubic yards would need to be imported to the site (Robert A. Karn & Associates, Inc., 2004). Although moderately hilly portions of the Lakeville site would be subject to grading for Alternative F, major topographic changes to the site or area would not result. Therefore, a less-than-significant impact is identified to the topography of the site. Specific issues or consequences related to the alteration of site topography are discussed below.

### ***Landslides***

According to geologic literature, the Upper Petaluma Formation within the upland area of the Lakeville site is prone to landslides. However, the existing slopes within the Lakeville site are not considered steep enough to present an unstable condition. Additionally, the formational material encountered in the exploratory test pits and borings was severely weathered with no evident bedding plains. However, adverse bedding plains can exist in less weathered portions of this formation. Deep cuts within this material may expose adverse bedding plains, which can lead to unstable slope conditions particularly when saturated and subjected to seismic activity. Deep cuts are not anticipated within this material and a less-than-significant landslides impact would occur.

### ***SOILS***

#### ***Expansive Soil***

Expansive soils are present across the surface of both the lowland and upland portions of the Lakeville site. If unmitigated, these expansive soils could cause damage to overlying structures or shallow-depth utilities. Mitigation measures related to Lakeville site soils are identified in **Section 5.2.1** and will minimize any associated impacts to a less-than-significant level. .

#### ***Soil Corrosivity***

Typically, soil is considered corrosive to reinforced concrete and steel if the soluble salt (chloride and sulfate) content is high. In general, cohesive soils are more corrosive than granular soils, especially cohesive soils that are close to saltwater bodies. Therefore, the Bay Mud materials within the lowland portion of the site may be potentially corrosive. Soil within the upland portion of the site is less likely to be corrosive. Most development of Alternative F is proposed for the upland portion of the site. For development planned on the lowland portion of the site, standard construction practices would include consultation with a corrosion engineer to minimize any soil effects to construction materials and result in a less-than-significant effect.

#### ***Subsidence***

Bay Mud deposits in the lowland areas of the site are underlain at deeper levels by a relatively thick plane of alluvium. While supply wells are deemed unlikely to pose subsidence-related

impacts (**Appendix F**), construction-related dewatering activities could potentially cause displacement of deeper alluvial matter, resulting in the subsidence of the Bay Mud strata. Therefore, subsidence would be a potential impact during construction activities on-site. Given the temporary and localized nature of this potential impact, a less-than-significant impact would result.

### ***Mudwaves***

Mudwaves can occur when fill embankments are constructed rapidly over a relatively thick layer of weak Bay Mud. A mudwave is the displacement of the soft Bay Mud supporting an embankment under the weight of a new fill load. Due to the presence of the thick layer of Younger Bay Mud, mudwaves are possible within the lowland areas of the site. Since the development is primarily planned in the upland portion of the Lakeville site, a less-than-significant impact would result from mudwaves.

### ***SEISMICITY***

#### ***Regional Faulting and Probability***

In **Section 3.2.2**, the possibility that a substantial ground-shaking event could occur in the vicinity of the Lakeville site is identified. Ground acceleration during such an event could fall between a Modified Mercalli Intensity Scale value of Level VIII and Level IX in intensity, which is a potentially significant impact. **Section 5.2.1** introduces mitigation measures to reduce any effects to a less-than-significant level.

#### ***Liquefaction***

Although not observed during GEOCON's investigation, Bay Mud deposits within the lowland portion of the site can contain lenses of saturated, granular material. These materials may be subject to liquefaction during a seismic event. Since the development is primarily planned in the upland portion of the Lakeville site, a less-than-significant impact would result from liquefaction.

#### ***Lateral Spreading***

In **Section 3.2.3** potentially liquefiable sand layers beneath the Lakeville site are described as non-existent or relatively thin and isolated. The resultant potential for lateral spreading is considered low; and a less-than-significant impact in relation to lateral spreading would occur.

#### ***Seismically Induced Flooding***

San Pablo Bay is well protected from tsunamis emanating from the Pacific Ocean. The Lakeville site, located north of undeveloped agricultural land that borders the Bay, is unlikely to be impacted by tsunamis and/or seiche waves and are considered as a less than significant impact.

### ***MINERAL RESOURCES***

The alterations in 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 Lakeville site, development and use of the Lakeville site would not be affected by or affect such resources. There are no abandoned mines, shafts, or tailing that would affect development.

## **4.2.7 ALTERNATIVE G – NO ACTION**

### ***TOPOGRAPHY***

Alternative G would lead to general alterations to the topographical characteristics of the Northwest Specific Plan Area to accommodate planned development. However, the predominant topographical profile of the NWSP Area is essentially flat and level. Therefore, a less-than-significant impact is identified to the topography of the site. Specific issues or consequences related to the alteration of site topography are discussed below.

### ***Landslides***

The Northwest Specific Plan Area, much like the rest of Rohnert Park, has a moderate grade of less than 2 percent from east to west. The steepest slopes in the region are 5 to 8 percent, and located northeast of the City, along Petaluma Hill Road. Approximately 4 miles east of the City, the “eastern ridgeline rise” has an elevation of approximately 2,300 feet above mean sea level (amsl). The generally flat topography, combined with low soil permeability, contribute to the assessment that there is little risk of mudslides or landslides in the area. Thus, landslide-related impacts for Alternative G would be less than significant.

### ***SOILS***

#### ***Expansive Soil***

The Rohnert Park General Plan EIR identified potentially significant impacts related to expansive soils for foundation support in the project area. These findings were confirmed in the geotechnical study for Blackman Consulting located in **Appendix F**. Portions of planned development under Alternative G would be located on this expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994). The resulting risks to public safety would be considered a significant impact. Mitigation appears in **Section 5.2.1** to reduce any impacts to a less-than-significant level.

#### ***Soil Corrosivity***

The soil on the NWSP area may be considered mildly corrosive to concrete or steel (**Appendix F**). Corrosion could compromise structural integrity, resulting in an impact upon public safety, in

this case potentially resulting from soil corrosivity. Standard construction practices would include consultation with a corrosion engineer to minimize any soil effects on construction materials. Therefore, a less-than-significant effect would result.

### ***Subsidence***

The Rohnert Park/Cotati Valley area of Sonoma County is a large alluvial valley with significant groundwater storage. As such, numerous groundwater extraction wells are located within the Cotati Valley for domestic use. Continued groundwater withdrawal with limited recharge causes the potential for land mass subsidence, resulting in the lowering of the ground surface elevation. There is no evidence that subsidence is occurring on any site; however, any subsidence in the Cotati Valley would be regional, unlike local differential settlement, it would not likely have a significant effect on proposed building foundations at the NWSP area or storm/sewer facilities (or other utilities) that rely on gravity-driven flow.

### ***SEISMICITY***

#### ***Regional Faulting and Probability***

In **Section 3.2.2**, the possibility that a substantial ground-shaking event could occur in the vicinity of the NWSP area/Wilfred site is identified. The possibility that ground acceleration during such an event could fall between a Modified Mercalli Intensity Scale value of Level VIII and Level IX in intensity, which is a potentially significant impact. **Section 5.2.1** introduces measures to reduce effects to a less-than-significant-level.

#### ***Liquefaction***

Liquefaction occurs in loose, incohesive sands, silts, and artificial fills that are saturated with water. Because most soils in the Rohnert Park area are clays with low permeability, liquefaction potential is expected to be low (City of Rohnert Park, 2000a) and under Alternative G, a less-than-significant impact is expected.

#### ***Lateral Spreading***

The low potential for lateral spreading described in **Section 3.2** indicates that lateral spreading on the Wilfred site is considered low. The resulting determination is that development under Alternative G presents a less-than-significant impact for this value.

#### ***Seismically Induced Flooding***

San Pablo Bay is well protected from tsunamis emanating from the Pacific Ocean. The NWSP area, located north of undeveloped agricultural land that borders the Bay, is unlikely to be impacted by tsunamis and/or seiche waves. No impact is anticipated under Alternative G.

### ***MINERAL RESOURCES***

The alterations in land use under Alternative G 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 NWSP area, development and use of the NWSP area would not be affected by or affect such resources. There are no abandoned mines, shafts, or tailing that would affect development.

## **4.2.8 ALTERNATIVE H –REDUCED INTENSITY (WILFRED SITE)**

### ***TOPOGRAPHY***

Build-out of Alternative H would entail similar alterations to the topographical characteristics of the Wilfred site, as Alternative D would have to the Stony Point site. Due to the relatively flat characteristic of the Wilfred site, on-site grading would not alter the topography of the site. Therefore, a less-than-significant impact would result from the development of Alternative H.

### ***Landslides***

As noted above, the potential for damage to development under Alternative H or its surrounding areas due to instability of slopes or landslides is low. As discussed above under Alternative A, the side slopes of the Bellevue-Wilfred Channel and the Laguna de Santa Rosa, require mitigation to reduce potential impacts. Similar to Alternative A, the implementation of buffer zones is recommended between the development and side slopes to reduce potential impacts from land slides to a less-than-significant level.

### ***SOILS***

#### ***Expansive Soil***

Expansive soils are present on the surface of the Wilfred site. Therefore, the development of Alternative H would be subject to the mitigation measures related to Wilfred site soils identified in **Section 5.2.1** to reduce any impacts to a less-than-significant level.

#### ***Soil Corrosivity***

Soils on the Wilfred site may be considered mildly corrosive to concrete or steel. Therefore, standard construction practices would include consultation with a corrosion engineer to minimize any soil effects to construction materials. Therefore a less-than-significant effect would result.

#### ***Subsidence***

As stated under Alternative A, there is no evidence that subsidence is occurring on the Wilfred site. Therefore, subsidence would not likely have a significant effect on the development of

Alternative H, including the proposed building foundations at the Wilfred site or storm/sewer facilities (or other utilities) that rely on gravity-driven flow.

### ***SEISMICITY***

#### ***Regional Faulting and Probability***

As stated under Alternative A, a seismic event and related structural damage and resulting hazards to public safety would be considered a potentially significant impact under Alternative H. Mitigation measures are provided in **Section 5.2.1** to reduce any impacts to a less-than-significant level.

#### ***Liquefaction***

As stated under Alternative A, there is the potential for liquefaction to occur in localized lenses of liquefiable soils on the Wilfred site. This poses a potentially significant impact to the development of Alternative H. Mitigation measures respondent to liquefaction appear in **Section 5.2.1**.

#### ***Lateral Spreading***

As with Alternative A, and based on the analysis in Section 3.2, there is low potential for lateral spreading on the Wilfred site. Since Alternative H is a reduced version of Alternative A, the low potential indicates that any lateral spreading effects would result in less-than-significant levels of impact.

#### ***Seismically Induced Flooding***

As stated under Alternative A, the low potential for seismically induced flooding on the Wilfred site would result in a less-than-significant impact to development.

### ***MINERAL RESOURCES***

The alterations in land use on the Wilfred site, under Alternative H, would not result in a loss of economically viable aggregate rock or diminish the extraction of important ores or minerals. As previously discussed under Alternative A, development and use of the land would not affect or be affected by such resources. Therefore, a less-than-significant impact would result from the development of Alternative H.