Hale Avenue Extension Hydrology and Water Quality

REPORT

APPROACH TO ANALYSIS

This impact evaluation identifies potentially significant hydrologic impacts of the project both during project construction and at completion, and describes mitigation measures needed to reduce those impacts to the level of "less than significant".

THRESHOLDS OF SIGNIFICANCE

Appendix G of the CEQA Guidelines and the Regulatory Setting requirements considers the proposed project to have a significant environmental impact with regard to hydrology and water quality if it would:

- Violate any water quality standards or waste discharge requirements;
- Substantially deplete ground water supplies or interfere substantially with ground water recharge such that there would be a net deficit in aquifer volume or a lowering of the local ground water table level (e.g., the production rate of preexisting nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted);
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site;
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site;
- Create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff;
- Otherwise substantially degrade water quality;
- Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map;
- Place within a 100-year flood hazard area structures that would impede or redirect flood flows;
- Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam; or
- Expose people or structures to inundation by seiche, tsunami, or mudflow.

PROJECT DESCRIPTION

Project Site

The Hale Avenue Extension and Santa Teresa Corridor Widening and Realignment project is to be constructed in two phases, Phase I and Phase II. This document only pertains to Phase I of the project, which is the extension of Hale Avenue from West Main Avenue to Dewitt/Spring Avenue intersection. Phase II is the realignment and widening of the Santa Teresa Corridor from the Dewitt/Spring Avenue intersection to Watsonville Road.

Hale Avenue currently terminates at West Main Avenue in the City of Morgan Hill. Phase I of the project proposes to extend Hale Avenue from West Main Avenue to the DeWitt/Spring Avenue intersection. This new segment of roadway would be approximately 4,500 feet (0.85 miles) in length.

The extension would consist of a multi-modal, two-lane road (one lane in each direction), which would include bike lanes with a landscaped center median and a pedestrian/bike path within a right-of-way ranging from 62 to 130 feet wide. Vegetative swales for stormwater collection and treatment and landscaping consisting of trees and shrubs would be located on both sides of the proposed extension. Streetlights would be located within the center median, and sound walls would be constructed along the sections near existing and planned residences.

New and Modified Intersections

The proposed extension of Hale Avenue would modify two existing intersections (DeWitt/Spring Avenue and West Main/Hale Avenue) and construct a new intersection at Dunne Avenue. The extension of Hale Avenue would add a south leg to the intersection of West Main/Hale Avenue. At the DeWitt/Spring Avenue intersection, the Hale Avenue extension would merge with Dewitt Avenue at the north leg of the intersection. At this time, the new intersection at Dunne Avenue is envisioned to operate as a roundabout.

Structures to be Removed or Relocated

Four structures are located within the right-of-way of the proposed Hale Avenue extension and, as a result, would be removed or relocated during construction. Starting from West Main Avenue, these structures include a small concrete block structure on the adjacent PG&E property, the residence located at 230 Warren Avenue, and a small shed located at 310 West Dunne Avenue.

Utility Relocation

Existing utilities in the project area (e.g., water, storm drain, sanitary sewer, and gas lines, electric overhead lines and poles, and telephone/communication lines) would be relocated and/or placed below grade within the proposed Hale Avenue right-of-way.

Hydromodification

The project is also subject to Hydromodification management, because it creates more than 1-acre of impervious surface. In order to meet this requirement, the post-project runoff shall not exceed pre-project flow rates for the 2-year, 24-hour storm. The two retention basins for the project will need to be designed to meet this criteria (in addition to providing a storm water quality treatment function.)

Stormwater Detention

The City of Morgan Hill storm drain design standards have an additional requirement for basins. The basins need to be designed to contain a 24 -hour, 25- year s
will be sized as the larger volume of either the City's criteria or the General Permit's criteria.

Stormwater Treatment

Storm Water Treatment will be achieved with retention basins and bio swales. Each portion of the project will be divided into discreet drainage management areas (DMAs). For the southern portion of the project, the DMA will contain both bioswales and Retention Basin #1. For the northern portion of the project, most of the drainage in this DMA will drain to Retention Basin #2 via storm drain pipes. The basins will be volumetrically sized to meet the treatment goal of the permit as well as retaining runoff.

Regulatory Setting

All of the storm water runoff drains to Monterrey Bay. The Monterey Bay watershed is regulated by the Central Coast Regional Water Quality Control Board (CCRWQCB), the City of Morgan Hill, and the Santa Clara Valley Watershed District (SCVWD). The Project should adhere to the regulations of the City, SCVWD, and CCRWQCB for both construction and post-construction storm water quality control. The Hale Avenue Extension project must adhere to the requirements set forth in the *Post-Construction Stormwater Management Requirements for Development Projects in the Central Coast Region.* This document outlines four performance requirements as follows:

1. Site Design and Runoff Reduction
2. Water Quality Treatment
3. Runoff Retention
4. Peak Management

Each project in the City of Morgan Hill is required to have a "Stormwater Control Plan" as specified in the *Stormwater Management Guidance Manual.* Construction site controls should be designed per the Bay Area Stormwater Management Agencies Association (BASMAA) Blueprint for a Clean Bay and California Stormwater Quality Association Best Management Practices (CASQA BMP) Handbook.

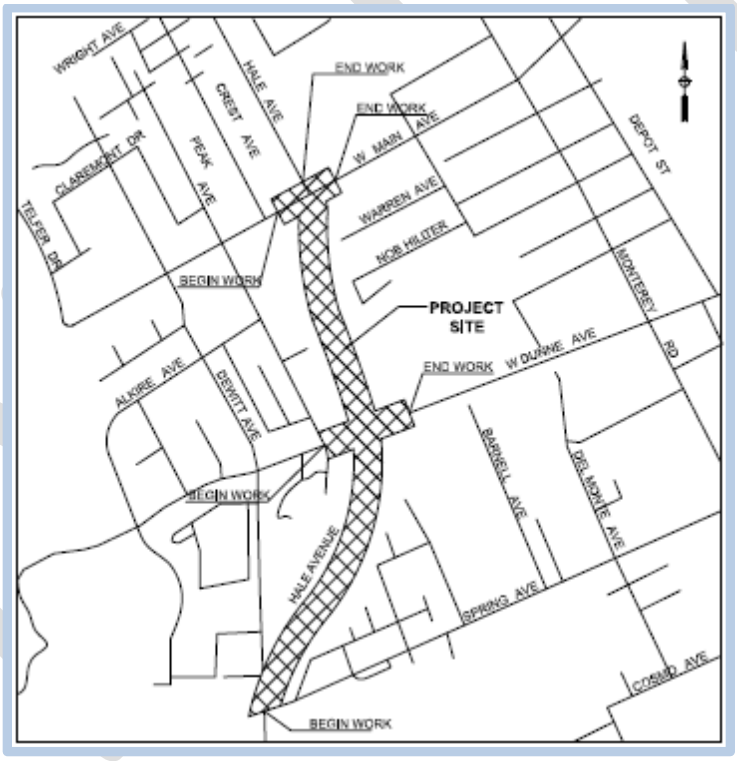

Figure 1: Vicinity Map

Hydrology and Water Quality Issues Not Discussed Further

The following environmental impacts have been determined to be ***less than significant*** and are not analyzed further for the reasons given:

- Violate Waste Discharge Requirements: The wastewater from the project site is planned to be delivered via piped sanitary sewer lines to the sanitary sewer treatment plant.

- Risk of Seiche: The resonant oscillation of water in an enclosed body of water is a seiche. There are no lakes or other enclosed bodies of water in the general vicinity of the project to produce seiche events that would affect the project site.
- Risk of Tsunami: The project is not near the ocean; thus tsunami events would not affect the project site.

PROJECT IMPACTS AND MITIGATION MEASURES

Impact Hydro1: ***Place housing or structures within a 100-year flood hazard area or impede flood flows.***

Finding: ***Less than Significant***

Per the Federal Emergency Management Agency (FEMA) flood insurance rate maps (FIRMs) numbers 06085C0443H and 06085C0606H dated May 18, 2009, nearly all of the project site is located in special flood hazard area (SFHA) Zone X, designating an area of 0.2% (i.e. 500-year) chance flood. According to the FEMA map 06085C0443H, the intersection of Hale Avenue and West Main Avenue is located within Zone AE, which represents 1% (i.e. 100-year) chance flood with elevations determined. However, the project does not place housing or structures within this designated SFHA. Because this intersection is already in existence, it is not anticipated to have any flow blockage in the Zone AE. As such, the project has a ***less than significant*** impact on the regulatory floodplain. The FEMA SFHA designations are shown on Figure 2.

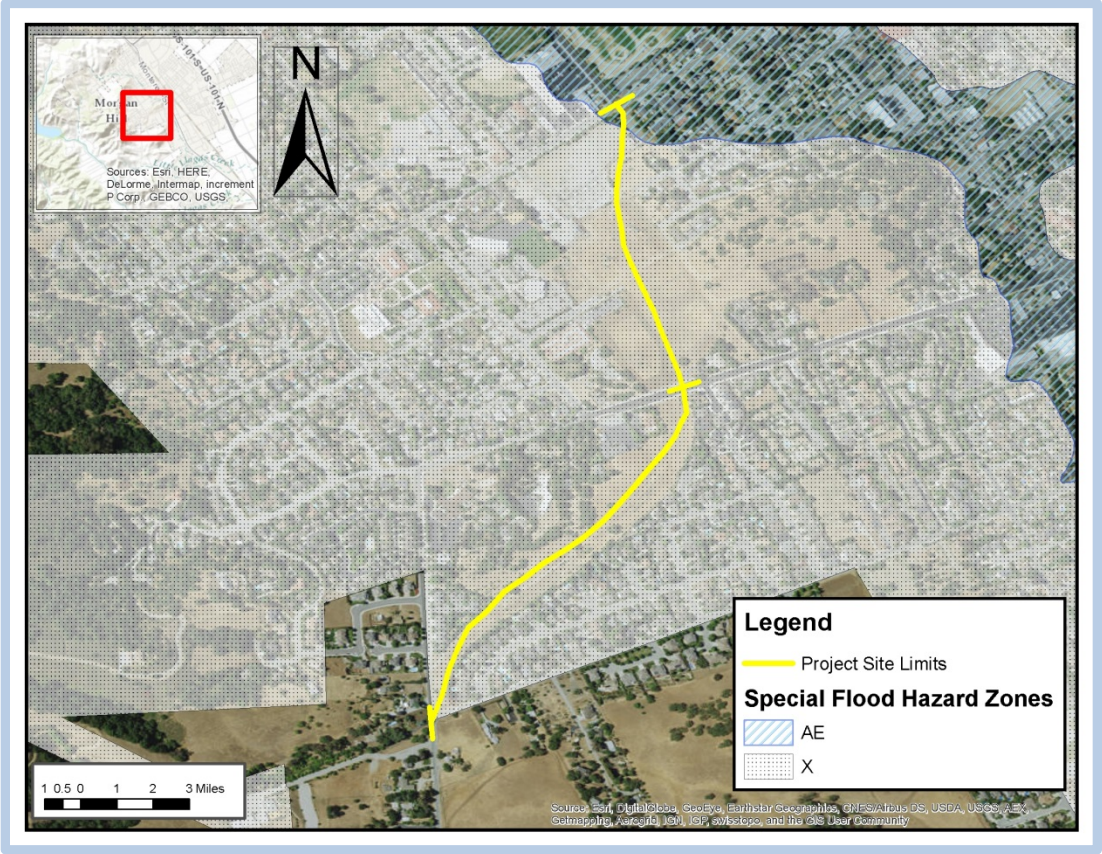

Figure 2: FEMA Flooding Map

Impact HYDRO2: ***Expose people to landslide or mudflow hazards.***

Finding: ***Less than Significant with Mitigation***

According to the U.S. Geological Survey of landslide susceptibility (Figure 3), although the project site is located within an area of moderate incidences of landslides, it is not located in an area that is susceptible to landslides. The project site does not contain steep ground slopes and thus does not pose any threats of mudflow hazards. A geologist should be retained during the detailed design and construction of the project for general soil construction suitability. By incorporating any mitigation recommendations made by the geologist during detailed design, this potential impact would be reduced to ***less than significant***.

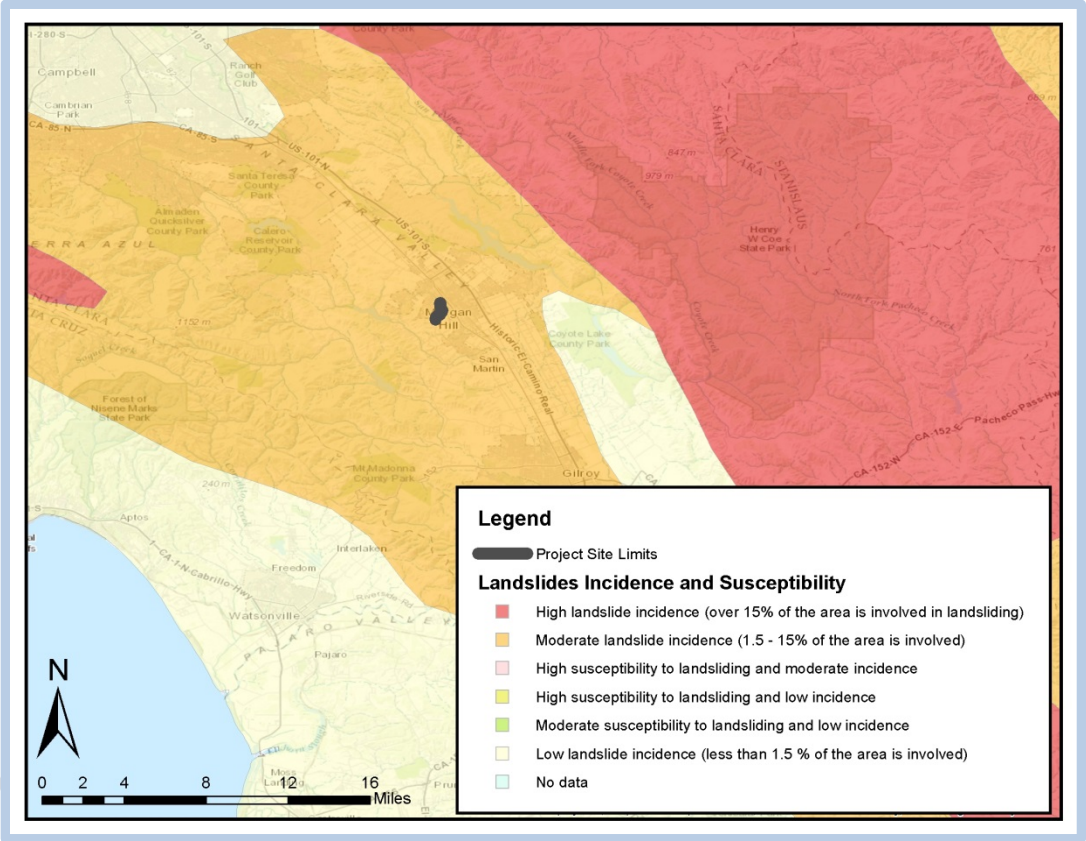

Figure 3: Landslide and Mudflow Hazards

Impact Hydro3: ***Expose people or structures to a significant risk of loss, injury or death involving flooding as a result of the failure of a dam.***

Finding: ***Less than Significant***

The Hale Avenue Extension project is not located in the inundation boundaries of either the Chesbro or Coyote Dams. However, the site is located on the fringe of the Anderson Dam inundation zone as depicted by the Association of Bay Area Governments (ABAG) in Figure 4. The Project does not include the construction of any structures and thus does not expose people or structures to significant risk of loss, injury, or death in the event of the failure of the Anderson Dam. In addition, Anderson dam is currently kept at a maximum depth of about 68 percent full due to a recent SCVWD seismic analysis. Since the Project does not include the construction of any structures, the Anderson Reservoir is managed to prevent significant damage during a maximum credible earthquake, and the probability of such failure is extremely remote, the potential impact is ***less than significant***.

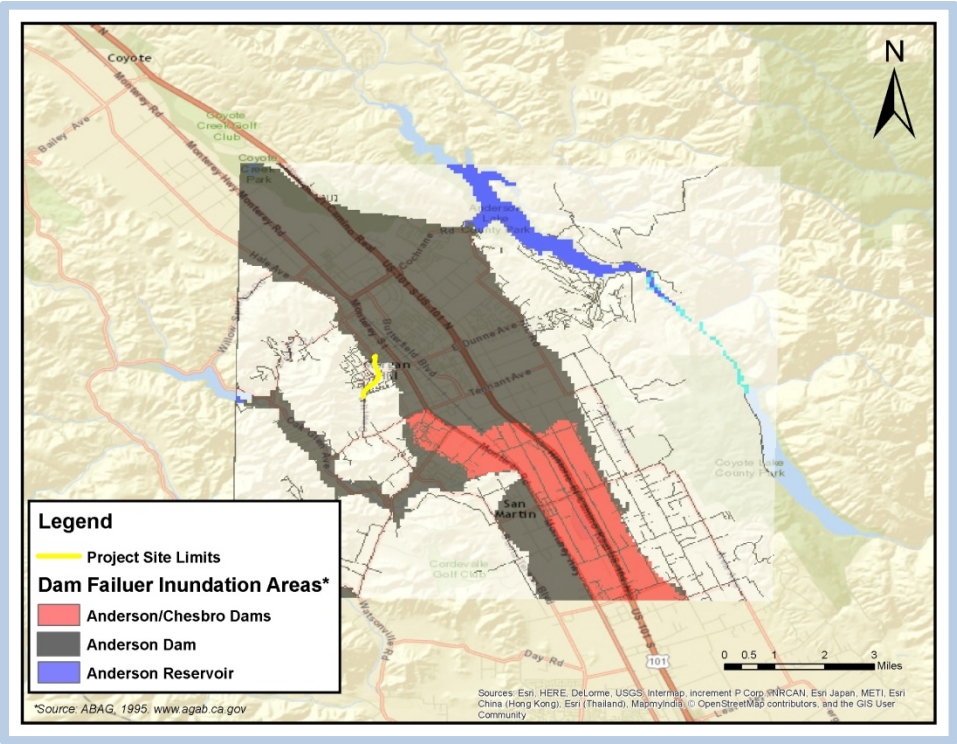

Figure 4: Dam Inundation Boundaries

Impact HYDRO4: ***Substantially alter the existing drainage pattern of the site in a manner which would exceed the capacity of storm water drainage systems, or result in substantial flooding on- or off-site.***

Finding: ***Less than Significant with Mitigation***

Existing Site Drainage Pattern

The existing site is divided into two drainage areas by a ridge between West Dunne Avenue and West Main Avenue, and a low point that is just South of West Dunne Avenue. The Northern portion is designated as Basin I and the Southern portion as Basin II. The entire site is tributary to West Little Llagas Creek. Figure 5 depicts the existing site topography and natural drainage. Table 1 lists the drainage basin areas and watershed to which each drains.

Table 1: Drainage Basins

Basin	Area (acres)	Watershed
I	3.4	Llagas Creek
II	6.9	Llagas Creek

Basin I drains from elevation 395-ft to 340-ft. Basin II drains from elevation 427-ft to 362-ft.

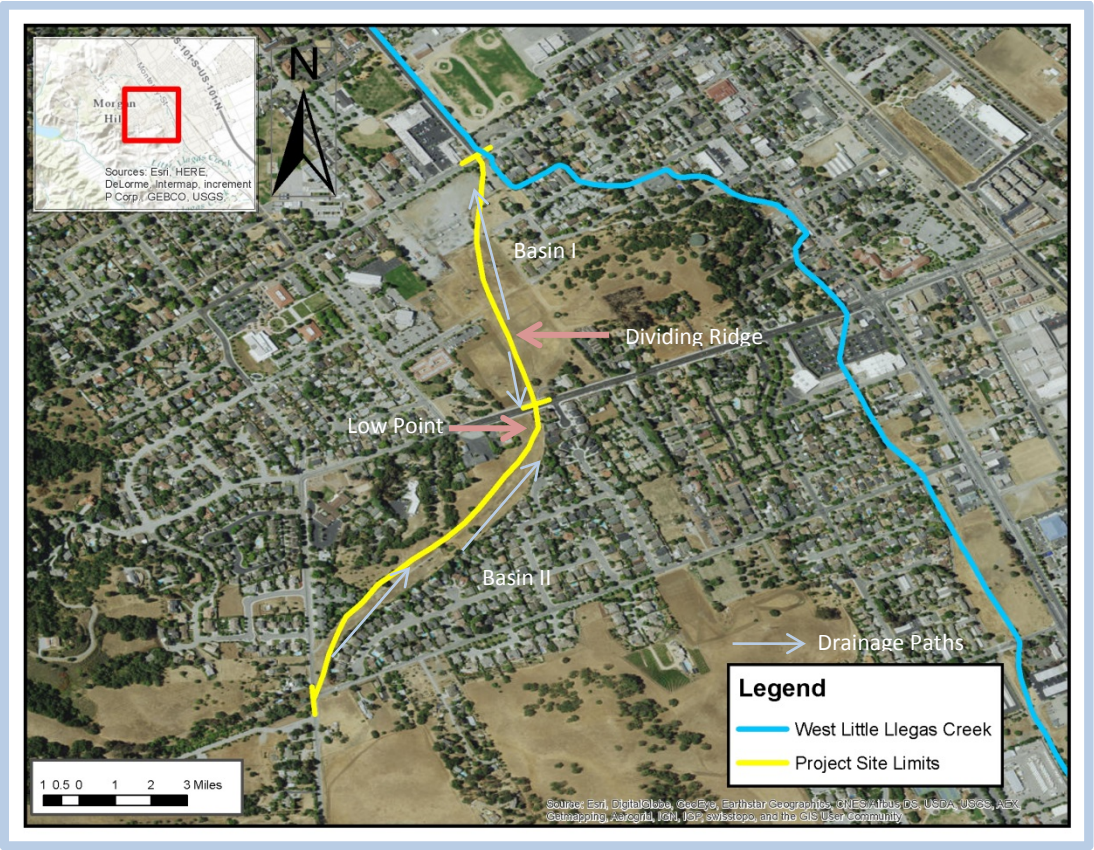

Figure 5: Existing Site Drainage

To estimate peak storm water runoff from the site before and after development, the Rational Method is employed per the City's Storm Drain Design Standards. The Rational Method analyzes land use, soil type, project size, and rainfall rates for a particular project location to estimate a peak flow from each drainage basin for the 5, 10, and 100-year storm events for the time of concentration intensity (T_c) and the 24-hour durations. Land use for the site will change with the proposed development from open space to roadway.

Existing soils underlying the site are Natural Resources Conservation Service Hydrologic Soil Groups B and D.[1] Hydrologic Soil Group B encompasses soils with moderate to low runoff potential and moderate infiltration rates; this includes onsite loam and gravelly loam. Hydrologic Soil Group D encompasses soils with very slow infiltration rates due to high consistency of clay soils. The areas with group D soil experience greater peak runoff values and faster times of concentration (i.e. quicker peak runoff) than those areas characterized by group B soils.

The Rational Method incorporates soil type when determining the runoff coefficient (C). Rainfall intensity rates for the project site are based on the table provided in the City's Storm Drain Design Standards. The project site is analyzed for the 5-year, 10-year and 100-year design storms as those are reported in the City's Storm Drain Design Standards. The pre-project peak flows are listed below in Table 2.

[1] *Soil Map – Eastern Santa Clara Area, California*. Web Soil Survey - National Cooperative Soil Survey, Natural Resources Conservation Service. July 27, 2010. Website: http://websoilsurvey.nrcs.usda.gov.

Table 2: Existing Peak Flows - TBD

Design Storm		Basin I C - 0.1 Area - 3.4 acre Tc - 17 min		Basin II C - 0.2 Area - 6.9 acre Tc - 33 min	
Return Period	**Duration**	**Intensity (in/hr)**	**Peak Flow Q (cfs)**	**Intensity (in/hr)**	**Peak Flow Q (cfs)**
5 year	Tc	0.897	0.30	0.764	1.05
10 year	Tc	1.244	0.42	1.064	1.47
100 year	Tc	1.897	0.64	1.642	2.27
5 year	24-hour	0.171	0.06	0.171	0.24
10 year	24-hour	0.247	0.08	0.247	0.34
100 year	24-hour	0.427	0.15	0.427	0.59

Proposed Site Drainage Pattern

The proposed site drainage intends to treat runoff through bioretention areas lining the street and detain runoff in two retention basins that will be sited at the low points of the project so that stormwater is drained via gravity to the retention basins.

Mitigation

The project will result in increased runoff from the site due to the increased impervious surfaces. The retention basins should be sized to meet HMP requirements and include sufficient storage volume to mitigate the increased peak runoff rate up to the 25-year event if there is an outlet to the retention basin or designed to the 100-year if there is no outlet structure on the retention basin.

The project will treat stormwater through bioretention areas that are designed to meet the requirements set forth in the *Post-Construction Stormwater Management Requirements for Development Projects in the Central Coast Region.*

The project will also be required to retain runoff onsite through the use of infiltration, evaporation, or rainwater harvesting. If this is deemed infeasible due to poorly draining soils, the project shall set aside 10% of the equivalent impervious surface for stormwater management controls as described in the *Post-Construction Stormwater Management Requirements for Development Projects in the Central Coast Region.* This will be incorporated into the two retention basins.

With these mitigations, impacts to flood risk and storm drain systems as a result of the project will be reduced to **less than significant**.

Impact HYDRO5: ***Substantially alter the existing drainage pattern of the site in a manner which would result in substantial erosion or siltation on- or off-site.***

Finding: ***Less than Significant with Mitigation***

As described above, the project will be required to install drainage pipes to convey to the 10-year storm event and the street shall be designed to convey the 100-year storm event without impact to surrounded properties. The retention basins that will be sized to limit the rate and volume of runoff to existing conditions, which will avoid erosion or siltation. With the mitigation measures described under HYDRO-4, impacts to erosion or siltation on or off site due to the project will be reduced to less than significant. At later stages of planning, a Stormwater Pollution Prevention Plan (SWPPP) and a Stormwater Control Plan (SWCP) will be prepared to avoid on-site erosion and water quality impairment during and post construction. These requirements, and other impacts and mitigation measures specific to sediment as a water quality concern, are discussed in Mitigation Measure HYDRO-7.

With these mitigation measures, the runoff generated by the project will not result in erosion on- or off-site, and the project impact will be ***less than significant***.

Impact HYDRO6: ***Substantially deplete groundwater supplies or interfere with groundwater recharge.***

Finding: ***Less than Significant***

The project site is located in the Llagas Creek watershed, meaning that the site is entirely underlain by the Llagas groundwater basin. Recharge of the Llagas groundwater basin is achieved through an equal combination of natural recharge and recharge activities of the SCVWD (23,000 afy each) through percolation ponds. The project site is not located on or near any of the SCVWD percolation ponds as depicted in Figure 6.The Llagas basin is estimated to have an operation storage capacity between 150,000 and 165,000 af, and basin pumping between 2001 and 2009 ranges from 44,000 acre-feet to 50,000 acre-feet. The proposed project has no impact to the SCVWD recharge activities for the Llagas groundwater basin.

The surface area of the Llagas groundwater basin is 56,000 acres. Although infiltration varies over the basin, this creates an average annual infiltration volume of 0.4 acre-feet per acre (af/acre) of surface area. The total impervious surface of the proposed development is about 6.2 acres (4,500 feet of approximately 60-ft wide roadway and bike lane). Applying the average annual infiltration volume (0.4 af/acre) and the most conservative assumption, that no rainfall onto post-project impervious surfaces is able to percolate into the groundwater basin, this results in a decrease of about 2.4 acre-feet/year of infiltration, around one tenth of a percent decrease from existing conditions, and less than 0.01% of the historic groundwater withdrawals. This does not represent a substantial interference with groundwater recharge. Furthermore, these calculations assume zero infiltration of rainfall onto impervious areas, but in fact the project proposes to utilize drainage swales and basins which will promote infiltration of runoff from impervious surfaces. The impact of the project to groundwater recharge is ***less than significant***.

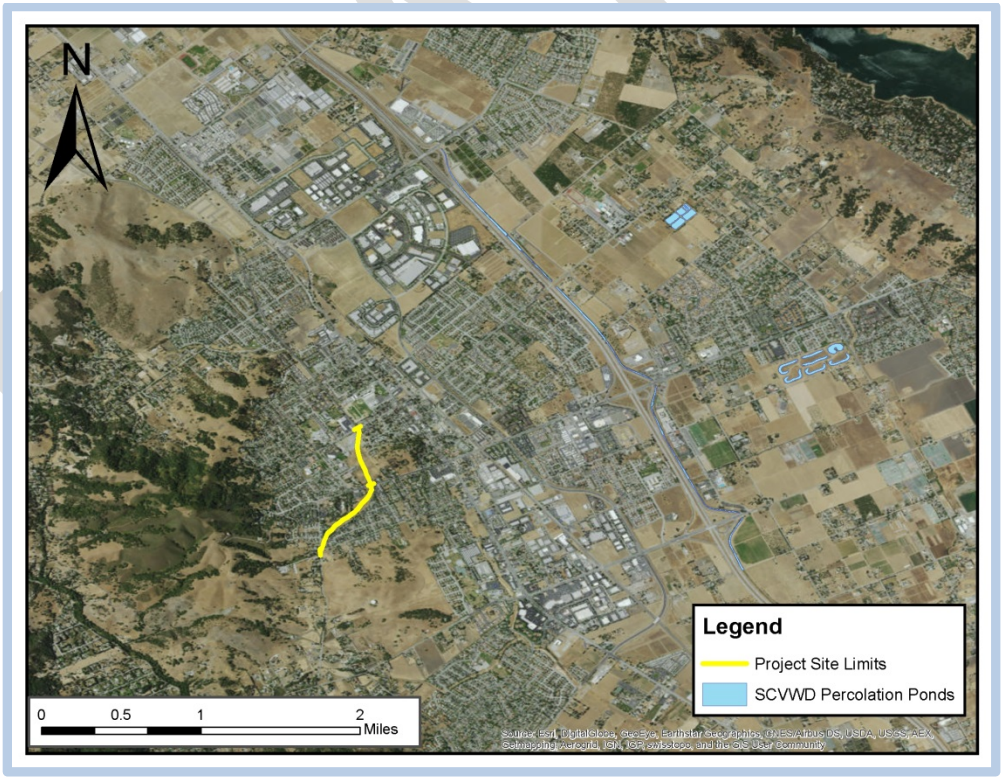

Figure6: SCVWD Percolation Ponds for Groundwater Recharge

Impact Hydro7: ***Violate any water quality standards or otherwise substantially degrade water quality.***

Finding: ***Less than Significant with Mitigation***

The RWQCB lists water bodies that are impaired for water quality. Llagas Creek is listed as an impaired 303(d) water body for pH, chloride, low dissolved oxygen, sodium and total dissolved solids. The City of Morgan Hill has set TDMLs for sediment, fecal coliform and nitrate in their Storm Water Management Plan.[2]

Surface Water Quality

The proposed project could generate significant adversely impacted water quality. Pollutants and chemicals associated with roadways and other impervious surfaces could runoff the project site. The pollutants could then flow into the storm drain system and eventually to the tributary creeks described herein. These pollutants could include, but may not be limited to, heavy metals from automobile emissions, oil, grease, debris, and air pollution residue. Contaminated roadway runoff that remains relatively untreated could result in incremental long-term degradation of water quality.

Short-term adverse impacts to water quality may also occur during construction of the project when areas of disturbed soils become susceptible to water erosion and downstream sedimentation. Grading and vegetation removal in proximity to drainage features could result in an increase in bank erosion, affecting both water quality and slope stability along the drainage feature.

Site Design

Site design to reduce impervious area coverage, limited grading and fitting of structures to the existing topography, and use of swales rather than storm drain pipes to convey runoff are favored approaches to managing urban runoff. Current agency guidance also recommends that, where soils and geotechnical conditions allow, runoff be infiltrated using a combination of treatment BMPs, such as bioretention areas and infiltration trenches, to reduce peak flows and enhance water quality.

Under existing conditions, the site is open space and undeveloped land with limited pollutants of concern. The project development could contribute pollutants to the surface water, including sediment and typical roadway pollutants. In contrast to other potential pollutants, sediment is typically of greatest potential concern during the construction-phase of development. After a project has been constructed and the landscaping has been installed, erosion and sedimentation from roadways are usually minimal. Pollutants other than sediment which might typically degrade surface-water quality during project construction include petroleum products (gasoline, diesel, kerosene, oil, and grease), hydrocarbons from asphalt paving, paints, and solvents, detergents, nutrients (fertilizers), pesticides (insecticides, fungicides, herbicides, rodenticides), and litter. Once the roadway has been constructed, typical roadway runoff contaminants might include all of the above constituents, as well as trace metals from pavement runoff, and landscape maintenance debris.

All of the project runoff will be diverted into detention basins prior to release into the City's storm drain system. This will limit the release of pollutants that could affect aquatic and wetland habitats and sensitive species.

The following mitigation measures are recommended to reduce the effects on surface quality to a ***less than significant level***:

Mitigation

Potential construction-phase and post-construction pollutant impacts from the development of the Site can be controlled below the level of significance through preparation and implementation of an erosion control plan, a storm water pollution prevention plan (SWPPP) and a storm water control plan (SWCP) consistent with recommended design criteria, in accordance with the NPDES permitting requirements enforced by the Regional Board. The erosion control plan forms a significant portion of the construction-phase controls required in a SWPPP, which also details the construction-phase housekeeping measures

[2] *Storm Water Management Plan*. City of Gilroy, City of Morgan Hill and County of Santa Clara. February 22, 2010.

for control of contaminants other than sediment. The SWCP implements treatment measures and best management practices (BMPs) to be implemented for control of pollutants once the project has been constructed. Both the SWPPP and the SWCP set forth the BMP monitoring and maintenance schedule and identifies the responsible entities during the construction and post-construction phases for the proposed site development.

The applicant's SWPPP shall prescribe construction-phase BMPs to adequately contain sediment on-site and prevent construction activities from degrading surface runoff. The erosion control plan in the SWPPP would include components for erosion control, such as phasing of grading, limiting areas of disturbance, designation of restricted-entry zones, diversion of runoff away from disturbed areas, protective measures for sensitive areas, outlet protection, and provision for re-vegetation or mulching. The plan would also prescribe treatment measures to trap sediment once it has been mobilized, at a scale and density appropriate to the size and slope of the catchment. These measures typically include inlet protection, straw bale barriers, straw mulching, straw wattles, silt fencing, check dams, terracing, and siltation or sediment ponds. BMPs shall be implemented in accordance with criteria in the California Stormwater BMP Handbook for Construction or other accepted guidance and shall be reviewed and approved by the City prior to issuance of grading or building permits. The applicant shall identify the SWPPP Manager who will be the responsible party during the construction phase to ensure proper implementation, maintenance and performance of the BMPs.

The applicant's SWCP shall implement post-construction water quality BMPs that control pollutant levels to pre-development levels, or to the maximum extent practicable (MEP) for the site development project. For the roadway itself, BMPs to promote infiltration or "green" treatment of storm runoff shall be emphasized, consistent with Regional Board guidance for NPDES Phase 2 permit compliance. These types of BMPs include infiltration basins and trenches, constructed wetlands, rain gardens, grassy swales, media filters, and biofiltration features. BMPs shall be designed in accordance with engineering criteria in the California Stormwater BMP Handbook for New and Redevelopment or other accepted guidance, and designs shall be reviewed and approved by the City prior to issuance of grading or building permits for the roadway or driveways. These types of structural BMPs are intended to supplement other storm water management program measures, such as street sweeping and litter control, outreach regarding appropriate fertilizer and pesticide use practices, and managed disposal of hazardous wastes. The applicant shall prepare a clearly defined operations and maintenance plan for water quality and quality control measures. The design and maintenance documents shall include measures to limit vector concerns, especially with respect to control of mosquitoes. The applicant shall identify the responsible parties and provide adequate funding to operate and maintain storm water improvements.

REFERENCES

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