Appendix F

Flooding and Drainage Assessment

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MEMORANDUM

TO:	Hannah Darst David J. Powers & Associates	DATE:	March 24, 2020
FROM:	Caitlin Gilmore, PE	JOB#:	DPOW.100.18
SUBJECT:	The San Jose Flea Market Mixed Use Development Flooding and Drainage Evaluation Updated		

INTRODUCTION

This memorandum is an update to the previous analysis completed in September of 2005. David J Powers is preparing an EIR to develop 52 acres of residential units and office space with two new bridge crossings to the south side of the previously analyzed Flea Market site, south of Berryessa Road, east of Coyote Creek and adjacent to the new VTA/BART line. In addition to focusing on the south side of Berryessa Road, this update includes several changes which have occurred in the watershed; namely the completion of the BART/VTA track guideway and Berryessa Station, the improvements to Upper Penitencia Creek with bridge replacements and studies of the watershed completed on behalf of VTA and the Santa Clara Valley Water District. In addition, the phase of the Flea Market development on the north side of Berryessa Road is under construction.

The objective of this study is to describe the existing flood and drainage conditions at the proposed San Jose Flea Market mixed use development project (north and south), the potential project constraints, and potential impacts of the proposed project. The project area includes Upper Penitencia Creek and is adjacent to Coyote Creek. Portions of the project are subject to flooding from Upper Penitencia Creek.

PROJECT DESCRIPTION

The proposed San Jose Flea Market Mixed Use Development is a planned development zoning application for a total of approximately 120 acres located in San Jose, California. The project is proposed on the site of the San Jose Flea Market, which is located on both sides of Berryessa Road, east of Coyote Creek, and north of Mabury Road. The planned development on the 52 acres south of Berryessa Road for which this update is written would include the development of a total of up to 3.4 million square feet of business uses, retail, parking structures, and up to 3,450 residential units.

A 15.5-acre open space buffer would be located along Upper Penitencia Creek and Coyote Creek, forming the northern and western property edges. Approximately 1.4 acres of public park would be located adjacent to the open space buffer. A bridge over Upper Penitencia Creek would provide vehicle access from Berryessa Road, aligning with Sierra Road to the north. A second vehicle bridge would be located to the east of the access bridge, crossing Upper Penitencia. An arterial (80' wide right of way) street would extend south along the Coyote Creek open space buffer and connect to Mabury Road. Local (48' wide) and collector (56' wide) streets would extend along the eastern edge of the site adjacent to the BART station (under construction) and across the site, providing access to residential and offices areas. Residential uses would extend across the west and south ends of the site. A town square is proposed in front of the BART station, and a landscape-divided roadway would separate the residential uses from the

office/commercial uses. A total of seven office buildings are proposed, centered around the BART station. Nine residential structures are proposed. Three parking structures are proposed adjacent to the office uses. Figure 1 shows a project overview.

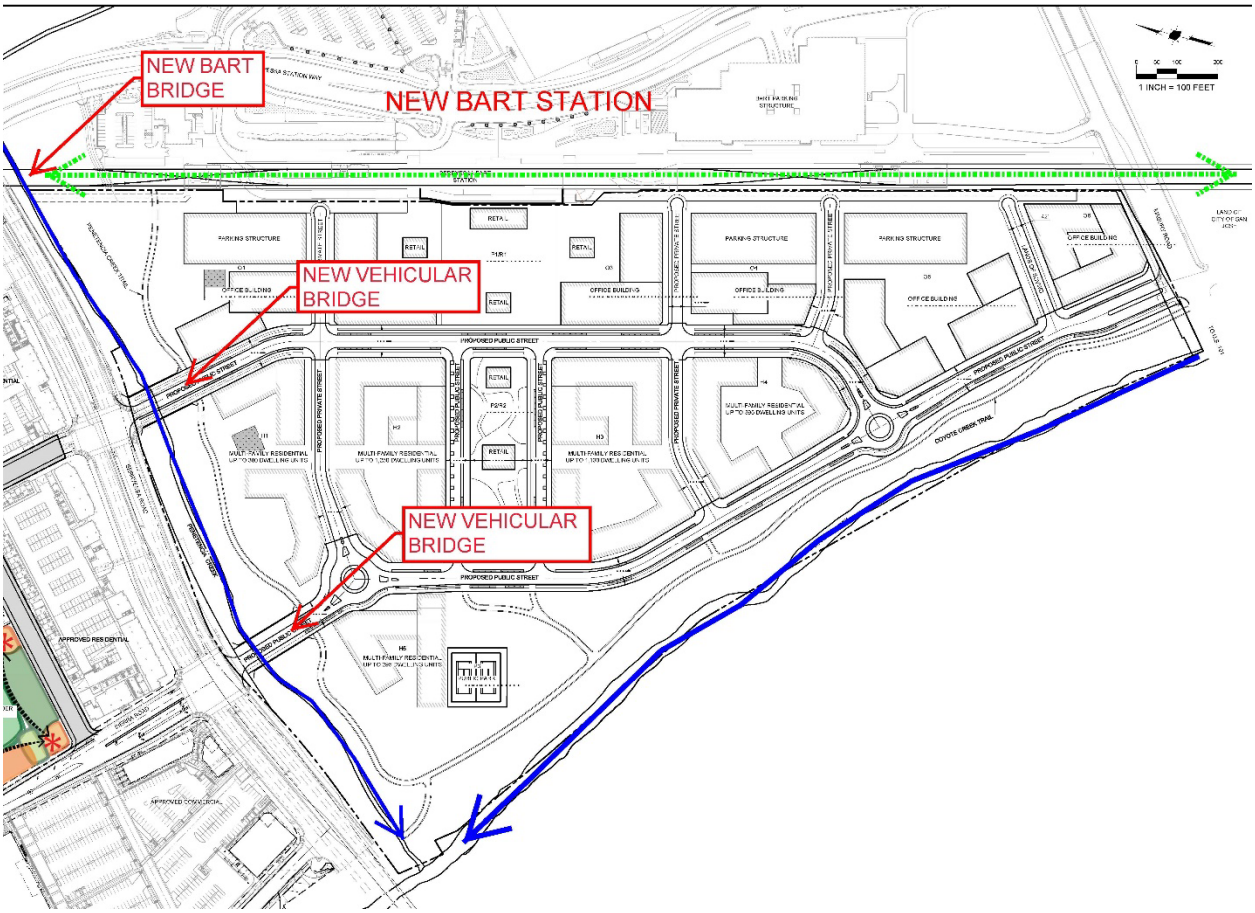

Figure 1: South Flea Market Proposed Project Overview

EXISTING SETTING

The Upper Penitencia Creek watershed is located in the northeast part of Santa Clara County, California, near the southern end of San Francisco Bay. The watershed lies in and adjacent to the eastern part of the city of San Jose and extends northward into the city of Milpitas. The total watershed area is about 24 square miles, or 15,300 acres.

Upper Penitencia Creek is a tributary of Coyote Creek. Coyote Creek originates in the mountains of the Diablo Range northeast of Morgan Hill. After leaving the mountains, it flows northwesterly along the floor of the Santa Clara Valley to San Francisco Bay, a distance of about 42 miles. Upper Penitencia Creek joins it about 10 miles from the bay. Coyote Creek's drainage area, above the point where it enters the bay, is 320 square miles.

The Diablo Range borders the east side of the Santa Clara Valley. The boundary between the mountains and the alluvial plain that forms the valley floor is quite sharply defined. Flows coming out of the

mountains must cross this alluvial plain to reach Coyote Creek. At Upper Penitencia Creek the distance from the mountains to Coyote Creek is about three and a half miles.

Elevations in the Upper Penitencia Creek watershed range from nearly 3,000 feet above mean sea level in the upper watershed, to 280 feet at Dorel Drive near the base of the mountains, to 80 feet at the junction of Upper Penitencia and Coyote Creeks. The upper watershed, upstream of Dorel Drive, occupies about 21 square miles and includes Upper Penitencia Creek and its principal tributary, Arroyo Aguague. The topography is rugged and vigorously youthful. Canyons are deep and narrow, with little or no flat land along their bottoms. Slopes are steep and landslides are numerous.

The bedrock in the hills consists primarily of sandstones, shales, conglomerates, and limestones. Soils are the residual soils toned from these rocks and include the moderately well- drained clay barns of the Altamont-Azule association and the well-drained barns of the Los Gatos-Gaviota-Vallecjtos association.

Vegetative cover includes grassland and brushland on the upper parts of the hills and woodland in the steep valleys. The land use is primarily range and recreation. There is little urban development in the upper watershed.

The area below Dorel Drive contrasts sharply with the upper watershed. The creek emerges from the hills at the top of an alluvial fan that merges with other fans to form the plains that border San Francisco Bay. The soils in the lower watershed can be divided into three groups, based primarily on their position on the fan.

On the upper part of the fan one will find Yolo loam and Garretson gravelly loam. The latter is restricted to stream benches along the channel. These soils are well drained and have slopes up to 5 percent. On the lower edges of the fan are Cropley clay and Yolo silty loam, well-drained soils with slopes up to 2 percent. Farther down, in a north-south band along the east side of Coyote Creek, are the Campbell silty clay and silty clay loam. These are somewhat poorly drained soils with slopes of 0 to 2 percent, found on valley bottom areas and alluvial plains.

Most of the lower watershed was once in agricultural uses, particularly orchards, truck drops and cut flowers. This has given way almost entirely to urban uses. Undeveloped land is now limited to a few scattered parcels still used for agriculture, and the corridor along portions of Upper Penitencia Creek.

The climate is one of mild, dry summers and cool, wet winters. Temperature extremes range from about 20 to 100 degrees Fahrenheit. Average winter lows are in the middle 30's, while the summer highs average in the 80's. Average annual rainfall ranges from 14 inches in the lower watershed to 18 inches in the mountains. Ninety percent of the rainfall occurs from November through March.

Flow in Upper Penitencia Creek is classified as intermittent, which means that the creek is normally dry or nearly dry during the summer months. Low flows are partially regulated by Cherry Flat Reservoir, a 500-acre-foot reservoir located about 5 miles upstream of Dorel Drive.

The Santa Clara Valley Water District (SCVWD) operates a number of percolation ponds to recharge the local ground water. Three ponds are located adjacent to the creek downstream of Noble Avenue, and another is between Interstate 680 and King Road. The SCVWD diverts from the creek and imports water

through a pipeline to supply the ponds. The SCVWD also releases water into the creek, to be infiltrated into the streambed. This imported water augments the natural flow in the creek between Noble Avenue and King Road. Farther downstream the creek is usually dry during the summer.

For the most part, the vegetation along the creek has been preserved as development has occurred. Upstream of Dorel Drive there has been little development along the creek. Through the urbanized area, the creek supports an extensive stand of trees and other riparian vegetation along both banks, interrupted in only a few places. The creek is one of the few remaining riparian corridors connecting the mountains of the Diablo Range with Coyote Creek.

The creek is in public ownership for much of its length. In the upper watershed it flows for about three miles through the City of San Jose Alum Rock Park. The reach between Dorel Drive and King Road is commonly known as Penitencia Creek Park. It combines lands owned by the County of Santa Clara, the City of San Jose, the SCVWD, and various school districts. The portion owned by the SCVWD was acquired for a flood control right-of-way. The water district also has a flood control easement on the reach downstream of King Road. However, at the Project Site Upper Penitencia Creek is owned entirely by the Flea Market and Coyote Creek is privately held from at least the centerline to the project side east bank.

FLOOD HISTORY

Perhaps the largest flood of the century on Penitencia Creek occurred in 1911. No stream gauge data exists for that flood and a recurrence interval has therefore never been assigned to it. Estimates of dollar damages are also unavailable. The flood was described in a local newspaper on March 7, 1911:

“Penitencia Creek had evidently overflowed its banks for its entire length between the mouth of Alum Rock Canyon and the Coyote Creek. At Capitol Avenue...water stood three feet...

“Two bridges in the canyon were carried away, a railroad bridge below the tunnel which went out sometime Sunday night and a railroad bridge...was torn loose yesterday.’

More recent floods have occurred in 1955, 1958, 1962, 1963, 1973, 1980, 1982, 1983, 1986, 1995, and 1998. The largest recorded flood occurred in 1958 and had a peak flow of 2,100 cubic feet per second (cfs). This flow approximates a 13-year event. The 1982 flood is the only one of these for which damage estimates are available. The SCVWD reports that it caused between $1 and $2 million in damages. This flood was approximately a 10-year event.

According to the U.S. Army Corps of Engineers’ (Corps) 1995 reconnaissance report, 4,300 buildings are located in the flood-prone area including portions of the cities of San Jose and Milpitas. In the event of a 1 percent or 100-year flood, almost half of the buildings would have water entering the first floor and damages would exceed $121 million.

Upper Penitencia Creek is a well-defined, entrenched channel where it leaves the mountainous area near Dorel Avenue. Between Dorel Avenue and Piedmont Road its capacity is estimated to be approximately 3,000 cfs. From Piedmont Road through the culvert at Penitencia Creek Road the capacity is estimated to be close to 1,400 cfs. As the creek continues down the alluvial fan and across the urbanized valley floor, its capacity decreases to about 800 cfs near King Road.

FLOOD CONDITIONS

FEMA Effective Study

Upper Penitencia Creek was studied in detail for the Flood Insurance Study for the City of San Jose, revised February 19, 2014. The majority of the project site is located within Special Flood Hazard Areas (SFHA) designated by the Federal Emergency Management Agency (FEMA) and shown on the effective Flood Insurance Rate Maps (FIRMs) for the City of San Jose (Community No. 060349, Panels 0232H and 0251J, revised May 18th 2009). The effective FIRMs show water ponded (Zone AH) to an elevation of 82 feet (NAVD88) on the north side of Berryessa Road and to an elevation of 84 feet NAVD on the south side of Berryessa Road. Based on the effective flood insurance study, the water surface elevations within Coyote Creek are below the existing top of bank elevations within the project site and on-site flooding is based on spills from Upper Penitencia Creek alone. Flooding from Lower Silver Creek is contained by the recent Water District flood control project and does not reach the project Site.

Based on the original hydrology and hydraulic information from the flood study analysis, the estimated flood elevations on the project site were based on potential worst case conditions and do not represent the current conditions on the site.

South Side

The ponded one-percent elevation of 84 feet NAVD south of Upper Penitencia Creek on the effective FIRM was based on the maximum water surface elevation in the channel upstream of the existing access road bridge and assumes no flood water could return to the channel downstream of the access road due to buildings and obstructions adjacent to the channel. The analysis which established the FIRM also assumes that no flood water would flow into Coyote Creek along the southeast side (right bank) of the channel although the water level would be three to four feet above the channel bank. In addition, there is an access ramp from the flea market site into the Coyote Creek channel which would allow runoff from the site to return to Coyote Creek.

Based on the FEMA effective study for the 100-year flood condition, approximately 1,100 cfs are contained in the Upper Penitencia Creek channel and approximately 390 cfs would flow through the project site from near the railroad toward Coyote Creek as shallow sheetflow from spills at King Road. Since the map was developed, the BART station has been constructed which blocks a portion of this overflow and the railroad bridge restriction within the channel has been removed. The proposed south flea market project removed a portion of the floodplain designation from the property by applying for a LOMR to reduce the floodplain extent onsite based on better topographic data which allows flow back into the channels. The revised floodplain from this LOMR Case 19-09-1592P is depicted in Figure 2. The LOMR will become effective June 1, 2020. Remaining buildings within the revised floodplain extents will be elevated above the effective base flood elevation and removed from the floodplain through the placement of engineered fill.

North Side

The portion of the project site north of Berryessa Road is subject to shallow 100-year flooding from Upper Penitencia Creek spills that occur upstream of the UPRR. Approximately, 480 cfs was estimated to flow over the UPRR north of Berryessa Road and enter the northern portion of the project site from the existing development area to the east. Approximately half of the northern portion of the site is shown as a shallow ponding area on the effective flood insurance rate maps with an estimated water surface elevation of 82 feet NAVD. Based on the existing elevations on the northern portion of the site, the

maximum depths would be three to four feet along the bank of Coyote Creek to the southwest, decreasing to less than one foot deep at the eastern property line.

The estimated ponding elevation on the site and the limited portion of the site included in the flood plain may have been due to concrete traffic barriers on the site and along Coyote Creek. The portion of the Flea Market development under construction to the north of Berryessa Road received a Letter of Map Revision (LOMR) 16-09-1141P which removed the development area from the SFHA based on the effective floodplain information described herein and placed the site in a Zone X (average depths less than one foot). Figure 2 provides an excerpt from the LOMR effective June 1, 2020.

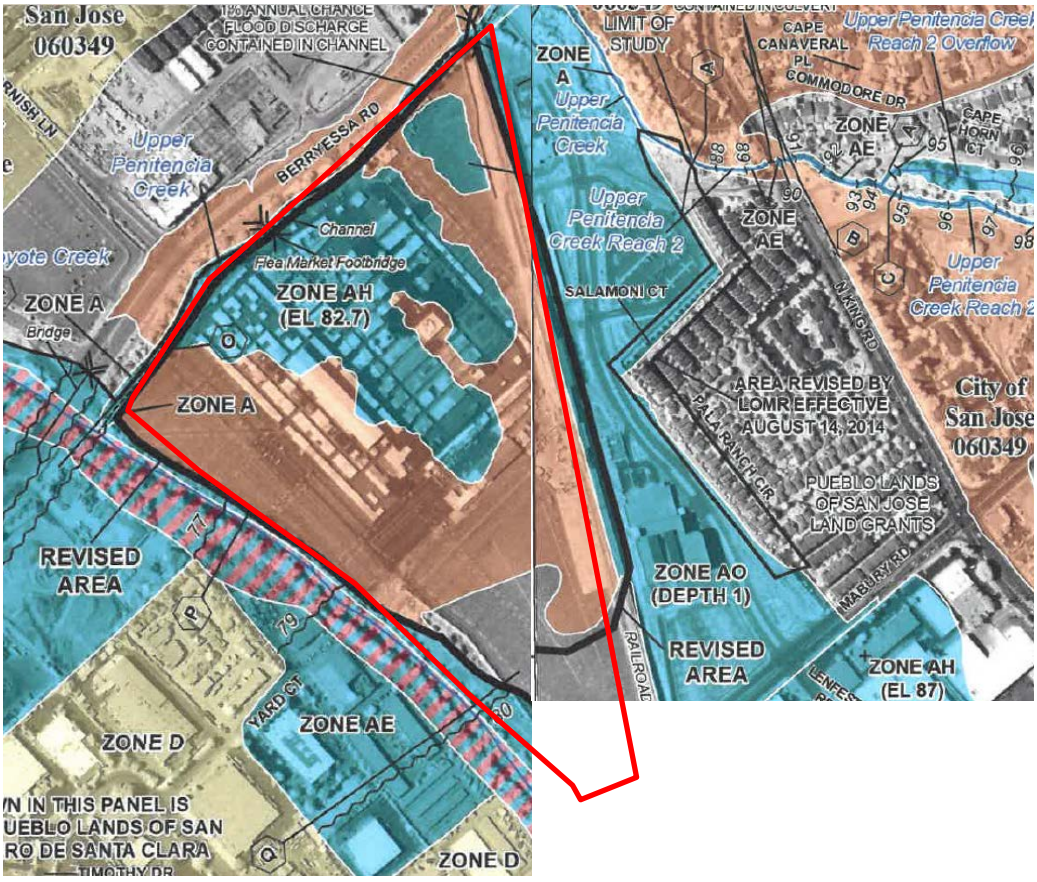

Figure 2: FEMA Effective Floodplain from South Flea Market LOMR

BART/VTA CLOMR

As part of the Silicon Valley Bart Extension Project (SVBX) a new BART/VTA track has been constructed that bisects the Upper Penitencia Watershed to the northeast of the Flea Market. The project included the construction of the above ground Berryessa Station, scheduled to open in 2020. The construction of the track alignment within the existing Union Pacific Railroad right-of-way included replacing the existing railroad bridge over Upper Penitencia. At that time, a flood control channel widening and restoration project was completed on Upper Penitencia between Berryessa Road and King Road which included the construction of an access road over Upper Penitencia to the new BART station.

Due to the changes in the flood control facilities along Upper Penitencia and others occurring within the Berryessa and Lower Penitencia Watershed, the SVBX project was required to complete a CLOMR for the project which included remapping the watershed to account for the new project and significant development which had occurred since the effective FIS. This CLOMR was completed, but never submitted to FEMA for re-mapping. Since that time, the Water District has initiated a Cooperating Technical Partnership with FEMA to remap the watershed again, thus making the SVBX CLOMR outdated.

SCVWD CTP Project

As part of the Cooperating Technical Partnership program, the Water District along with FEMA are undergoing a study of the Upper Penitencia and Lower Penitencia – Berryessa Creek watershed which encompasses the Flea Market project site. The study includes developing new calibrated hydrology and system hydraulics as well as modeling the overland two dimensional floodplain. The new FEMA Levee Analysis and Mapping Procedures (LAMP) are being employed whereas levee analysis was not included in the effective FIS. If the City of San Jose elects to submit the resultant study as a LOMR, the effective map and FIS will be updated. Until the maps are updated or adopted by the City of San Jose, the effective FEMA FIRM and FIS will govern the flood design and elevations of the Flea Market project.

This model incorporates the BART/VTA station, tracks, new bridge crossings and channel modifications described previously. The placement of fill for the station and upsizing of the railroad bridge have significantly decreased the 100-year floodplain on the Site compared to the effective FEMA FIRM. However, the draft updated mapping still depicts a 100-year floodplain on the Flea Market south site from a spill upstream of the existing pedestrian bridge over Upper Penitencia. The Flea Market project will elevate the site or remove the channel restriction (existing pedestrian bridge) to remove the draft mapped flood risk from the site and maintain flows in Upper Penitencia Creek.

FLOOD PROTECTION PROJECT

The U.S. Army Corps of Engineers (Corps), in conjunction with the Santa Clara Valley Water District (SCVWD) was working to develop a flood management plan for Upper Penitencia Creek. As of 2017 Federal funding for the project was not provided; therefore the District is pursuing local-only options.

The Water District is currently developing a Planning Study Report for flood control conceptual alternatives between Dorel Drive and the Coyote Creek confluence. A combination of modified floodplains, levees, flood walls, bypass channels and fish passage improvements are being considered. In previous studies completed by the District and the Corps in 2006, the Staff preferred alternative included widening the channel by 200 feet between the railroad bridge and the confluence with Coyote Creek adjacent to the flea market. No construction dates for the project have been identified at this time.

EXISTING DRAINAGE CONDITIONS

The project area is served by underground storm drain systems which discharge to both Coyote Creek and Upper Penitencia Creek. The existing land use on the site includes extensive buildings, pavement and parking lots. The existing site is estimated to be more than 95 percent pavement draining to the stream channels.

POTENTIAL PROJECT IMPACTS

The proposed Flea Market Mixed Use Development update would increase the density of development in portions of the project area. This may have effects on both flooding and drainage conditions. The

increased density of development may affect flooding by reducing the area available for flood flows to flow over land through the area as sheetflow. The installation of up to two new bridges across Upper Penitencia Creek has the potential to impact the carrying capacity of the Creek. The project would also replace the existing storm drain facilities on the site and modify existing drainage patterns. These potential effects are described below.

Flooding

The evaluation of increased development density on flooding in the project area is complicated by the fact that the effective FEMA flood plain maps are inaccurate due to changes in the existing conditions on the project site since the last map revision for Upper Penitencia Creek in 1988. It appears that the parking area north of Berryessa Road had been expanded, and concrete traffic barriers on the site had been relocated. In the area south of Berryessa Road there have also been changes to traffic barriers, walls and buildings. The construction of the BART station, tracks and bridges has caused a blockage in the overland floodplain from the spill at King Road, reducing the extent and depth of flooding on the flea market south site. However, the general flood conditions on the site with overflows from Upper Penitencia Creek have not changed. There would continue to be shallow flooding on the site with ponding and flows from east to west toward Coyote Creek.

North of Berryessa Road, the proposed land use plan under construction includes large blocks of residential and industrial/commercial development. The north site applied for and received a Letter of Map Revision which designated the southern portion adjacent to the Creek as an X Zone with average flood depths less than one foot. The base flood elevation was removed from the Site and the project is under construction. The blockages due to structures will concentrate the shallow (less than 1' deep) sheet flow into the multiple east west roadways for conveyance to Coyote Creek. Design of the project to allow for sheetflow through the site is common for floodplain areas in the City of San Jose. The potential changes to the site flooding conditions would be a less than significant impact.

South of Upper Penitencia Creek, the project may place fill or remove the channel obstruction causing the spill in order to keep 100-year flows in the channel; or, the project may place fill to elevate the proposed structures above the base flood elevation. In the first scenario the flood would be retained in the channel, the site would be outside of the 100-year floodplain and placed into Zone X and onsite development would not impact flooding. For the second option, the proposed land use would result in 100-year sheetflow travelling from east to west parallel to the creek in the open space adjacent to the existing creek channel and in parallel streets. The extent and depth of flow may depend on the property interface at the UPRR and the location of the spill. In addition, the construction of the new access roads and bridges across the creek may affect the amount of flow in the channel versus the sheetflow on the site. Preliminary hydraulic analysis suggests that larger span bridges over the existing channel could contain the existing creek flow within the existing channel. As with the northern portion of the site, for either option, the project would require a FEMA letter of map revision to define the new flood plain areas and flood elevations. The potential changes to the site flooding conditions would be a less than significant impact.

The proposed project is generally consistent with a potential District flood protection project with a widened channel for Upper Penitencia Creek. The project includes a minimum 100-foot setback from the existing channel on the south side. This may allow for the construction of a modified version of the

preferred project alternative through the area, which was previously described by the Army Corps as a 200-foot right of way.

Bridge Crossings

The project intends to install up to two new structures on Upper Penitencia: an access road from Berryessa Road that aligns with the new Sierra Road to the north, and a second access road from Berryessa Road east of Sierra Road. These bridges have the potential to impact the floodplain by causing a restriction of flow within the channel or an obstruction to overland flow outside of the channel due to elevated bridge approaches. The bridge designs, including approaches, will have to adhere to Santa Clara Valley Water District standards and prevent an increase in base flood elevation. Bridge designs will also have to account for any future flood control project between the BART tracks and the confluence with Coyote Creek.

The project intends to remove two existing bridges on Upper Penitencia Creek; the Flea Market access bridge and pedestrian bridge. Removing the structures have the potential to increase the flow in Upper Penitencia Creek by maintaining the flow in channel. The existing creek has a capacity of approximately 1600 cfs. Due to restrictions upstream, removing these two structures will not cause in increase in flow greater than the existing creek capacity.

Drainage

The proposed project would redevelop the entire project site with the exception of the Coyote Creek and Upper Penitencia Creek riparian areas. The site is approximately 95 percent pavement and buildings for the existing condition. The site drains to Coyote Creek and Upper Penitencia Creek through existing storm drain systems. The proposed project would increase the open space and riparian areas, and therefore, would reduce the potential runoff compared to existing conditions. The existing storm drain systems would be replaced to conform to the new land plan. The existing outfalls to the stream channels may be modified or replaced. Because the proposed project would reduce the estimated runoff from the site, the project would not increase drainage or flood flows in the stream channels. Therefore, the project would have no significant change in the site runoff or stream flows.

Water Quality

Because the project would remove and replace the existing pavement areas on the site, the project would be required to conform to the current stormwater quality requirements in the City of San Jose. The project would be required to include best management practices to reduce potential pollutants in the runoff from the site. This may include site design, source control and treatment best management practices for both the construction phase and for long-term post-construction.

During construction the project will need to conform to the latest State Water Resources Control Board Construction General Permit. This includes developing a Stormwater Pollution Prevention Plan (SWPPP), registering the project with the State through a Notice of Intent (NOI) and implementing best management practices onsite during construction.

To comply with local regulations for post-construction stormwater controls the project will need to comply with the Regional Water Quality Control Board Regional Municipal Stormwater NPDES Permit (MRP). The MRP requires the implementation of source control, site design, and low impact development (LID)

treatment measures to limit the discharge of pollutants from the Site. The project will install stormwater treatment devices to treat all stormwater from impervious surfaces for the design storm event.

Through compliance with the Construction General Permit and the Regional Municipal Permit there is no significant impact to storm water quality.

REFERENCES

- Federal Emergency Management Agency, Flood Insurance Study, City of San Jose, California, August 17, 1998.
- Santa Clara Valley Water District, Upper Penitencia Creek Watershed Project, August 1988.
- Santa Clara Valley Water District, Upper Penitencia Creek Flood Protection Project Summary, 2001.
- Santa Clara Valley Water District, Project Updates, Upper Penitencia Creek Flood Protection, https://www.valleywater.org/project-updates/creek-river-projects/upper-penitencia-creek-flood-protection, updated January 2018
- Draft Lower Penitencia-Berryessa and Upper Penitencia Watershed Flood Study, March 2018
- Santa Clara Valley Transportation Authority, Silicon Valley Berryessa Extension, Conditional LOMR Submittal, November 2003.
- US Department of Agriculture, Soil Conservation Service, Upper Penitencia Creek FPM Calculations, January 1985.