

Appendix E

Infrastructure Analysis for San Pablo Avenue

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INTRODUCTION

MIG, in collaboration with the City of Richmond and City of El Cerrito, is preparing a Specific Plan for a segment of San Pablo Avenue. The Specific Plan corridor encompasses San Pablo Avenue between MacDonald Avenue in the City of Richmond at the north and Central Avenue in the City of El Cerrito at the south end of the project. This reach of San Pablo Avenue east of Interstate 80 (I-80) is also designated as State Route (SR) 123.

The purpose of this report is to: 1) identify the utility providers for this corridor; 2) provide a general review of potential limitations in the currently installed systems; and 3) recommend feasibility-level improvements and associated costs. This review is based on block map information from the various utility companies, discussions with utility provider staff, and available public domain reports and records. A list of references is included at the end of this report.

Capacity for utility systems is determined by the type and density of development within the corridor. In the existing condition, San Pablo Avenue is primarily a business district with medium density development up to two story buildings. As described in the El Cerrito General Plan:

“San Pablo Avenue is a continuous suburban, strip-commercial street. Typical of an older state highway, the strip has a variety of low-scale commercial malls, surface parking, and older one- and two-story commercial and residential buildings in a variety of sizes, characters, ages, and styles.”

It is assumed that the current utility facilities are sized to maintain service and operations at an optimal level.

A limited discussion of the ability of the utility systems to support future opportunities for development within the San Pablo Corridor is provided. The needs for additional information and investigation, to better confirm conclusions, is also discussed.

STORM DRAINAGE SYSTEM

General

The storm drainage system within San Pablo Avenue is owned and maintained by the City of Richmond, the City of El Cerrito, and potentially the California Department of Transportation (Caltrans). Because this roadway is a State Route caltrans may be involve in operation and maintenance of the roadway drainage system. The pipelines collecting runoff from this area discharge to Baxter Creek and Cerrito Creek. Based upon the Caltrans Highway Design Manual, Chapter 830, Table 831.3, the system was most likely designed to handle the design event of the 10-year storm. This assumption is based upon the low roadway speed and the urbanized nature of the roadway. For roadway spread design, local standards were most likely used.

Based upon the review of aerial photography, the existing condition of San Pablo Avenue and the surrounding parcels is highly developed. There is little open, unpaved area. The study area

consists of significant impervious surfaces including buildings, roadways, parking lots, sidewalks, and walkways.

The drainage systems within the area are subject to the standards of the cities, the Contra Costa Clean Water Program (CCCWP), and Caltrans Stormwater Quality requirements.

Supply and Capacity

The ability of the system to handle the 10-year storm event is not clear. However, based upon the El Cerrito General Plan, there are no known areas of flooding or of system failure within the study limits. Therefore, improvements to collect and convey the 10-year event do not appear to be required within the City of El Cerrito. no flooding or drainage issues were reported from the city of Richmond in this area.

Based upon runoff patterns discussed below, the system appears to collect runoff from the residential areas east of San Pablo Avenue. This runoff is then conveyed via pipes to San Francisco Bay. Complete data is not available. However, Baxter Creek crosses San Pablo Avenue just south of MacDonald Avenue. Information concerning pipes collecting runoff within the City of El Cerrito was not available for this study.

Runoff Patterns

The general drainage direction of the watershed is from northeast to southwest. Drainage on San Pablo Avenue is collected in gutters along the face of existing concrete curbs. The gutters convey runoff flow to inlets along the edges of the roadway. The inlets discharge to underground pipes which then flow to Baxter Creek and Cerrito Creek, within the project limits. These underground pipes are assumed to drain to pipes within cross streets to the north and south.

Project limits are located within the Baxter Creek and Cerrito Creek watersheds. Baxter Creek is located near the northerly limits of study, just south of MacDonald Avenue. Within the project limits, Baxter Creek is mainly a constructed earth channel. Downstream of the project, Baxter Creek is almost exclusively underground until discharge to Stege Marsh and the San Francisco Bay. There are no known points of flooding along Baxter Creek within the project study limits.

Within the project limits, North Fork Cerrito Creek is underground. Just downstream of the project, North Fork Cerrito Creek discharges to Cerrito Creek, which is almost exclusively a constructed or natural earth channel until discharge to Albany Flats and the San Francisco Bay.

The existence of 100-year floodplains was explored via Federal Emergency Management Agency (FEMA) flood mapping information. Per FEMA FIRM Community Panel Number 0600350020 C, there is not a 100-year floodplain between the northerly limits of the project and the railroad crossing just south of MacDonald Avenue. Per FEMA FIRM Community Panel Number 0650270003B, the remaining study area is not within a 100-year floodplain.

Ratio of Pervious to Impervious Area

The assessment of the amount of impervious surface is based upon review of aerial photography and approximations of this visual assessment.

The study area is highly developed and impervious. The existing condition includes a paved roadway with a minimum of four lanes of traffic. At intersections, the roadway widens to accommodate varying numbers of turning lanes. Additional roadway width also accommodates parallel parking.

The existing medians vary between being raised and at-grade. Raised medians are landscaped with grass and trees and hardscaped with cobbles or asphalt. At-grade medians, such as the medians south of Central Avenue in El Cerrito, tend to be paved similarly to the adjacent roadway.

The parcels surrounding San Pablo Avenue are highly developed. Up to 90 percent of the existing parcels tend to include impervious surfaces such as buildings, parking lots, and sidewalks. Approximately 10 percent of the parcels have a landscape buffer. These buffers tend to be a maximum of 10 feet wide. Along approximately 25 percent of the length of the study, the sidewalks contain street trees. These trees tend to be located within tree well insets in the sidewalk.

Design Considerations

There are three storm drainage requirements with which the project must comply:

1. Collection and conveyance of the 10-year storm event.
2. Compliance with hydromodification management.
3. Compliance with storm water quality regulations.

Currently, the National Pollutant Discharge Elimination System (NPDES) Permit regulates storm water quality for the CCCWP. The upcoming adoption of the Municipal Regional Permit (MRP) and revisions to the 303(d) List of Impacted Water Bodies may also have an impact on the Project.

Another item currently in the adoption cycle is the 2008 version of the 303(d) List of Impacted Water Bodies. This list cites various creeks and water bodies as well as pollutants of concern. The Staff Report prepared by the San Francisco Bay Regional Water Quality Control Board (Regional Board) dated February 2009 was adopted by the Regional Board and will take effect once the State Water Resources Control Board (SWRCB) and the US Environmental Protection Agency (EPA) adopt and approve the list.

During the 10-year storm event, the project must collect roadway runoff efficiently. This collection will prevent impacts to the walking public and provide a safer environment for traffic.

To comply with generally accepted standards as well as City standards, the project may require additional inlets and connecting pipelines at traffic calming bulb-outs and upstream of mid-block crosswalks. Because of the highly-developed nature of the project and the requirement for compliance with hydromodification management within the County, it is assumed that there will be no need for trunk pipe size increases. However, during design it would be cost-effective to rehabilitate or replace existing pipelines in unacceptable condition. Pipelines can be inspected via CCTV to verify condition. Modifications to curbs, gutters, medians, and crossing locations may necessitate the replacement of existing storm drain inlets and connecting pipelines. These modifications may also require the addition of manholes at junction points to facilitate maintenance.

Hydromodification Management (HM) is the management of storm water “such that post-project stormwater discharge rates and durations match pre-project discharge rates and durations from 10% of the pre-project 2-year peak flow up to the pre-project 10-year peak flow.”[2] Typically, if a project creates or replaces more than one acre of impervious surface, it is subject to hydromodification management requirements. However, if the project does not increase the impervious surface to levels greater than the existing condition, hydromodification management is not required. In the case of the Specific Plan, the existing roadway curb-to-curb width is anticipated to be equal to existing conditions.

In addition, the existing area is highly developed with very small amounts of remaining pervious surfaces. The validity of the assumption that the impervious surface will not increase will need to be verified when more defined site plans are developed.

Permanent post-construction Best Management Practices (BMPs) are required when more than 10,000 square feet of impervious surface is created or replaced. Permanent treatment BMPs include:

1. Biofiltration swales.
2. Detention basins.
3. Bioretention areas.
4. Flow-through planter boxes

BMPs must be incorporated to accommodate the runoff from impervious surfaces in compliance with the NPDES Permit. This need can be achieved through the use of low impact development (LID) features as well as various BMPs. LID features reduce the impervious surfaces. These features include pervious pavements, landscape features, and green roofs. Parking stalls and plaza areas along San Pablo Avenue may be able to utilize pervious asphalt, pervious concrete, or permeable pavers. Medians may be landscaped to increase permeability. Landscaped open space will contribute to reductions in impervious surfaces.

Given the existing level of urbanization and the proposed plans for the areas adjacent to San Pablo Avenue, BMPs should fit the project character and account for potential constraints. Bioretention planter areas or tree wells may be used to treat roadway runoff. Flow-through

planter boxes may be used to treat roof runoff. During design, the Stormwater C.3 Guidebook should be referenced for acceptable BMPs, design considerations, design criteria, and operation and maintenance information.

In addition to the C.3 guidebook, the project should also determine if drainage will discharge to a water body impacted by specific pollutants. While not yet approved and adopted by the US EPA, the 2008 303(d) List of Impacted Water Bodies (303(d) List) has been prepared and issued by the Regional Board. The associated staff report currently recommends that Baxter Creek and Cerrito Creek be added to the 303(d) List as impacted by trash. Trash impacts require special care be taken with regards to trash removal from storm water based upon commercial areas and population. Section C.10 of the Municipal Regional Permit, Draft, provides more detailed information concerning this subject.

Proposed Improvements

The proposed improvements cited relate to the right-of-way limits of San Pablo Avenue. The parcels to be developed into mixed use, office, residential, and commercial sites must accommodate their own storm drainage, hydromodification, and storm water quality improvements for each parcel. Regional facilities may be desirable to accommodate some developments or to reduce operation and maintenance responsibilities.

To comply with generally accepted standards as well as City standards, the project may require additional inlets and connecting pipelines at traffic calming bulb-outs and upstream of mid-block crosswalks. Because of the highly-developed nature of the project and the requirement for compliance with hydromodification management within the County, it is assumed that there will be no need for trunk pipe size increases. Modifications to curbs, gutters, medians, and crossing locations may necessitate the replacement of existing storm drain inlets and connecting pipelines. These modifications may also require the addition of manholes at junction points to facilitate maintenance.

Improvements related to 10-year storm event include those items required to provide collection and conveyance for a designated design event. The assumptions for improvements are as follows:

1. Project length is approximately 2.7 miles (14,200 feet).
2. Assume two existing inlets every 500 feet (with 5 feet of pipe replaced per inlet).
 - a. Replacement of 60 inlets
 - b. Replacement of 300 feet of 15-inch pipe
3. Assume addition of two new inlets at each midblock crossing with associated piping and junction structures.
 - a. 13 new manholes
 - b. 26 new inlets
 - c. 650 feet of 15-inch pipe

4. Assume 10 percent of existing pipe is in poor condition (offset joints, broken pipe, etc).
 - a. Rehabilitate or replace 1,400 feet of 36-inch pipe
 - b. Rehabilitate or replace ten manholes
5. Improvements related to HM program include those items required to comply with the program by the CCCWP. It does not appear that the project will increase impervious surface or discharge. Therefore, no HM improvements are anticipated at this time. The existing system is a paved area discharging to inlets, which discharge to pipelines.
6. Improvements related to storm water quality are those items required to comply with Section C.3 of the NPDES Permit. For the purposes of this Study, storm water quality compliance is limited to those improvements related to San Pablo Avenue not the adjacent parcels, which are required to treat storm water runoff on a project by project basis. Given the highly-developed character of the Specific Plan, it is unlikely that BMPs within San Pablo Avenue or other adjacent streets will be able to accept and treat storm water runoff. For the purposes of this Study, assume half of the roadway and the entire sidewalk are replaced. If the equivalent of three lanes of traffic and two 6-foot wide sidewalks are replaced, approximately 16 acres of impervious surface would require treatment. If, for example, biofiltration tree wells were utilized and each could handle 0.5 acres of impervious surface, 32 units would be required for the pavement replaced along San Pablo Avenue. The incorporation of LID features is recommended to reduce this requirement. While LID features may be more costly than conventional features, the use of LID features will reduce the need for facilities specific to storm water treatment.

WATER SYSTEM

Existing Conditions

Water service to San Pablo Avenue is supplied by the East Bay Municipal District (EBMUD). The Pardee Reservoir (supplied by the Mokelumne River Basin system) is the main source of water for EBMUD.

Based upon utility block maps obtained from EBMUD, the general pipe size within San Pablo Avenue (from north to south) ranges from 12-inch on the left side of the street (from MacDonald Avenue to Potrero Avenue) to 8-inch on the left side of the street (from Potrero Avenue to Fairmount Avenue). Similarly, on the right side of the street, pipe sizes range between 4-inch and 6-inch (from MacDonald Avenue to Cutting Boulevard) to 8-inch (from Cutting Boulevard to Fairmount Avenue).

The San Pablo Avenue corridor is served by two separate pressure zones: 1) GIAa (elevation 355) at the north from Nevin Avenue to Ohio Street, and 2) GOA (elevation 202) from Ohio Street in the north to the boundary of the City of Albany. San Pablo Avenue elevation ranges from 50 ft in the north to 40 ft in the south.

Current work planned for San Pablo Avenue, based on the EBMUD FY08 Pipeline Master Plan, identifies 655 ft of 8-inch water pipeline for replacement between Rose Street and Wall Street.

Recommended Improvements

The following water design criteria are used to develop conceptual improvements. At this stage, demands are developed based upon the proposed development area by block (MIG Development Program – 2030(4-14-09)).

1. For residential areas, a demand factor of 80 gallons per day per person and a factor of three persons per unit are assumed.
2. For commercial areas, a usage factor of 0.13 gallons per day per sq ft has been used.
3. For the pipe sizing, an assumed maximum day factor of 2 is used; a peak hour factor of 3 is also assumed.
4. Fire flows are based on maximum building area, type of building, and if a sprinkler system is required.
5. Per Uniform Fire Code Appendix IIIA, assumed type V building construction, maximum fire area is 55,000 sq ft (based on MIG Development Program - 2030) reduced by 50% under the assumption that the building is provided with an approved automatic fire sprinkler system. An additional 500 gallons per minute (gpm) will be used for fire sprinkler for a total maximum fire demand of 3,625 gpm.
6. Total water demand will include the maximum daily usage demand in addition to the fire flow required.
7. Proposed development is expected to consist of buildings ranging in height from 55 to 65 feet. To support the plumbing of these buildings and to provide the required fire flows, the water system with the higher pressure (GIAa, elevation 355) will need to be used.
8. For the purposes of the Specific Plan, the assumption that the existing high pressure 36-inch pipeline along Key Boulevard, Liberty Street, and Elm Street (four blocks north of San Pablo Avenue) will be adequate. It is assumed that this high pressure pipeline will be used to supply the additional demands and will feed the development with new mains to San Pablo Ave through a looped system.
9. The water system is a looped system.

Table 1 presents the proposed area, water demands, improvements required, and the costs associated with these improvements. The costs include pipe construction only. Pump stations and general system upgrades are excluded from this cost.

Table 1

Additional Water Demands and Associated Distribution System Improvements

All pipes are new and will be connected to the high pressure zone.

| Development Area | Proposed Commercial (Sq Ft) | Potential Units | Total Water Demand, Max Day (gpm) | Fire (gpm) | Total Water Demand, Max Day + Fire (gpm) | Pipe Size (in) | Length (ft) | Cost (\$) |
|-----------------------------|------------------------------------|------------------------|--|-------------------|---|-----------------------|--------------------|------------------|
| Macdonald Gateway | 20,453 | 141 | 51 | 3,625 | 3,676 | 10 | 2,000 | 1,000,000 |
| Del Norte BART Station Area | 112,955 | 728 | 162 | 3,625 | 3,787 | 12 | 4,000 | 2,200,000 |
| Civic Center Plaza | 20,480 | 132 | 95 | 3,625 | 3,720 | 10 | 4,000 | 2,000,000 |
| | 35,686 | 230 | 165 | 3,625 | 3,790 | 12 | 2,500 | <u>1,375,000</u> |
| Total | | | | | | | | 6,575,000 |

SANITARY SEWER SYSTEM

Existing Conditions

Sewage within in the San Pablo Avenue corridor is managed by the Stege Sanitary District (SSD). SSD provides sewer service to businesses along San Pablo Avenue between the City of Richmond and the City of El Cerrito and has over 40,000 customers

SSD operates and maintains 150 miles of sanitary sewer in a total area of 5.3 square miles. SSD also operates two pumping stations. Wastewater collected in the SSD system flows to the Special District #1 Interceptor Sewer. Sewage is then conveyed to the EBMUD Wastewater Treatment Facility in Oakland.

Based upon utility block maps obtained from SSD, pipelines are located on the left and right side of San Pablo Avenue. From north to south, the general pipeline sizes are:

1. Left side of San Pablo:
 - a. 8-inch pipeline from Ohio Street to Knott Avenue,
 - b. 8-inch pipeline from Hill to Schmidt
 - c. 10-inch pipeline from Schmidt to Waldo Avenue
 - d. 12-inch pipeline from Waldo Avenue to Fairmount Avenue.

2. Right hand side of San Pablo Avenue
 - a. 6-inch pipeline from Ohio to Knott Avenue
 - b. 10-inch pipeline from Hill to Potrero Avenue
 - c. 8-inch pipeline from Potrero Avenue to Bayview Avenue

From Bayview Avenue to Fairmount Avenue (right side), the size of the line is not given but is shown to be associated with the city of Richmond line (6"-8"). From the given block maps, the

6-inch pipeline between Knott Avenue and Cutting Boulevard appears to be plugged. It is assumed that this portion of the line is abandoned.

At the following locations, larger diameter sewer lines cross San Pablo. These lines could potentially be main service lines, and care must be taken to note their location.

1. Knott Avenue: 18-inch, 15-inch, and 10-inch pipelines.
2. Cutting Boulevard: 1-inch pipeline.
3. Potrero Avenue: 18-inch pipeline.
4. Waldo Avenue through Huntington Avenue: 12-inch pipeline to 18-inch pipeline at center line of San Pablo.
5. Columbia Avenue to Eureka Avenue: 24-inch pipeline.
6. Central Avenue: 36-inch pipeline.

Recommended Improvements

Design criteria are summarized below.

1. Sewer generation at the build out phase is based on 95 percent of indoor water demand projection.
2. Infiltration rates will be based on an allowance of 500 gallons per day per diameter inch per mile.
3. Collection system improvements will parallel the existing backbone network. Connection to off-site trunk sewers at Knott Ave, Cutting Blvd, Potrero Ave, Columbia Ave and Central Ave are assumed.

Table 2 presents the additional sewer flows that will be generated by the additional commercial and residential areas. The pipes shown in the table are sized to serve only the additional area.

Table 2

Projected additional Sanitary Sewer Flows and Collection System Improvements

Based on the proposed additional development areas (2030) as an addition to the existing sanitary sewer system.

| Development Area | Proposed Commercial (sq ft) | Potential Units | Total Sewer Demand (gpm) | Total Sewer Demand per System (gpm) | Pipe size (in) | Length (ft) | Cost (\$) |
|-----------------------------|------------------------------------|------------------------|---------------------------------|--|-----------------------|--------------------|------------------|
| Macdonald Gateway | 20,453 | 141 | 49.0 | 49.0 | 8 | 2,500 | 875,000 |
| Del Norte BART Station Area | 112,955 | 728 | 250 | 250.0 | 8 | 2,200 | 770,000 |
| Civic Center Plaza | 20,480 | 132 | 46.0 | 46.0 | 8 | 2,000 | 700,000 |
| | 35,686 | 230 | 80.0 | 126.0 | 8 | 2,500 | 875,000 |
| Total | | | | | | | 3,220,000 |

DRY UTILITIES

Dry utilities within the San Pablo Specific Plan corridor include Pacific Gas and Electric (PG&E) as well as Comcast (cable and communication lines).

PG&E Gas Line Location

Upon examination of utility block maps obtained from PG&E, the general gas pipeline size within San Pablo (from north to south) is as follows:

1. Left side of the street:
 - a. 3-inches to 2-inches from Ohio Street to Knott Avenue
 - b. 8-inches from Cutting Avenue to Manila and from Schmidt to Fairmount
 - c. 10-inches from Manila to Schmidt Avenue

2. Right side of the street:
 - a. 8-inches from MacDonald Avenue to Cutting Avenue
 - b. 2-inches from Hill to Potrero Avenue and from Madison to Moeser
 - c. 3-inches from Potrero Avenue to Madison Avenue and from Moeser to Huntington
 - d. From Huntington through Central Avenue, the lines vary between 2-inch and 3-inch

There appear to be no large diameter gas pipelines crossing San Pablo Avenue. Per the mapping information, all crossing gas pipelines are either 2-inch or 3-inch lines.

PG&E Electric Line Location

In general, it appears from the PG&E electric block maps that electric service is underground through the limits of the San Pablo Specific Plan area (from MacDonald Ave to Central Ave).

There are locations where underground and overhead lines cross San Pablo Avenue. These locations are as follows:

1. 4-inch underground electric at Conlon Avenue.
2. 4-inch underground electric at Knott Boulevard.
3. 115KV UG crossing at Cutting Boulevard.
4. 6-inch underground electric at Hill Avenue.
5. Two 6-inch underground electric and one 4-inch underground electric at Alameda.
6. One 6-inch vacant underground electric and one 4-inch vacant underground electric at Manila.
7. A three-wire overhead line at Manila.
8. Two 6-inch underground electric lines at Portola.
9. Six-wire and four-wire overhead lines at Columbia to Eureka Avenue.
10. 4-inch underground electric at Central Avenue.

Cable, Internet, and Telecom Access

Access to cable, internet, and telecom service lines are within the adjacent streets/properties along San Pablo Avenue. There are no major service lines locations within the Specific Plan Area.

REFERENCES

1. El Cerrito General Plan, August 1999.
2. Aerial Mapping, Google Maps, 2009.
3. Specific Plan Mapping, San Pablo Avenue Specific Plan Draft, MIG, February 2009.
4. Contra Costa County Watershed Atlas, Contra Costa County Community Development Department, January 2004.
5. Flood Insurance Rate Map, Community Panel 0600350020 C, City of Richmond, CA Federal Emergency Management Agency (FEMA), September 7, 2001.
6. Flood Insurance Rate Map, Community Panel 0650270003B C, City of El Cerrito, CA Federal Emergency Management Agency (FEMA), June 1, 1977.

7. San Pablo Avenue Specific Plan Existing Conditions Analysis, MIG, October 2007.
8. EBMUD block maps
9. Stege Sanitary District sewer map (PDF)
10. City of Richmond GIS data for sewer and storm systems.
11. 1997 Uniform Fire Code Volume 1
12. PG&E block maps
13. Comcast Block maps
14. El Cerrito SWMP 1999