
# WEST OAKLAND SPECIFIC PLAN
## Final Plan

# 6. Public Infrastructure

June 2014

# 6: Public Infrastructure

## SECURING THE BASIC INFRASTRUCTURE

***"A contemporary and sufficient infrastructure system comprises the core of every successful built environment. A strong infrastructure system is the backbone of our homes, offices, schools, factories and hospitals, complimenting and supporting elegant design and functional facilities. It is the vehicle for business development and the productive economy; allowing the private sector to stimulate revenue and jobs."***

West Oakland "Industrial District Strategy Support, Public Infrastructure Report", BKF Engineers, March 2011

In March of 2011, the City of Oakland, with engineering support from BKF Engineers, prepared the "Industrial District Strategy Support, Public Infrastructure Report" for the Mandela and 3rd Street Industrial Districts (*West Oakland Infrastructure Report*). That report examined the current state of the transportation network and infrastructure serving the industrial sections of West Oakland.

The *West Oakland Infrastructure Report* forms a critical component of this chapter of the Specific Plan particular to the industrial areas of West Oakland. It is supplemented with additional research and recommendations for West Oakland-wide infrastructure issues from examination of City Public Works Agency documents and from field surveys of the Plan Area. Additionally, Chapter 5 of this Specific Plan includes further recommendations and strategies particular to roadways and transportation infrastructure in West Oakland.

### West Oakland Infrastructure Report

The *West Oakland Infrastructure Report* developed a framework for further necessary infrastructure planning and design efforts in support of the City's overall Industrial District strategy. It included strategies to address safety concerns, improve connectivity, and enhance the function of the multi-modal transportation systems in West Oakland's industrial areas. Roadway and utility infrastructure deficiencies were catalogued, needs were assessed, and improvements with associated costs were recommended and prioritized for future funding procurement.

The *West Oakland Infrastructure Report*'s study area is generally co-terminus with the Mandela/Grand and 3rd Street Opportunity Areas of this Specific Plan. Thus, the recommendations from that Report are equally applicable to this Plan. Although the scope of analysis contained in the *West Oakland Infrastructure Report* was limited to these two primarily industrial areas of West Oakland, the strategies contained in that report are also at least partially applicable to the 7th Street Opportunity Area as well.

Portions of the analysis and many of the individual recommendations of that report have been intentionally and specifically

incorporated into this Specific Plan, for several reasons:

- First, by being incorporated into this Specific Plan, the recommendations of that technical *Report* are now elevated as City policy pertaining to West Oakland.
- Secondly, the recommendations and infrastructure improvements that were recommended in the *West Oakland Infrastructure Report* were never subject to environmental review. As integral components of this Specific Plan, the West Oakland Specific Plan's EIR can provide appropriate environmental analysis of these recommended improvements.
- Third and most importantly, the recommendations of the *West Oakland Infrastructure Report* represent a fundamental and basic need for successful implementation of this Specific Plan.

## *Major Findings and Conclusions: Critical Infrastructure Needs*

The *Report* found that both the Mandela/West Grand and 3rd Street Opportunity Areas have served as important parts of the City of Oakland's industrial base for over a century. Both of these areas are situated near major transportation networks, and are served by, and have direct access to, the Port of Oakland; the BNSF and Union Pacific Railroads; highways 80, 880, and 580; and the West Oakland BART Station. Additionally, the Oakland International Airport is only approximately 10-miles away to the south. Within this context, these Opportunity Areas are ideally located from a regional perspective to promote and enable commercial and industrial activity.

While the existing transportation system network provides an excellent framework for attracting and serving existing and potential future commercial and industrial uses, most of the existing infrastructure components are at or beyond their useful design life. With the exception of the new Mandela Parkway landscaped median which replaced the former 'Cypress' section of Highway 880, many surrounding areas are in critical need of repair and rehabilitation. Significant infrastructure investment is immediately needed to serve the existing community and to attract new businesses.

Consistent with the City's overall Industrial Strategy, the West Oakland Specific Plan also seeks to refine the economic and land use goals for the West Oakland Opportunity Areas. The regional business and real estate market has recognized a shift from traditional industrial uses toward a broader diversity of "new economy uses" such as new digital media, trade and logistics, life science and healthcare, green technology, green design and construction and specialty food production. These types of uses are expected to be the target industries envisioned in this Plan, complimenting existing businesses in these Opportunity Areas. As indicated in the *West Oakland Infrastructure Report*, new and modernized infrastructure is crucial to attract these types of business.

Public infrastructure improvements are not just an end in themselves: but they also support permanent private and public sector jobs and fulfill the larger citywide missions of supporting overall community development and providing the core services necessary to support new residential and commercial development.

## *Prioritizing Needed Improvements*

The surface infrastructure that supports the West Oakland industrial-based Opportunity Areas (Mandela/West Grand and 3rd Street) is comprised of a network of transportation systems. These transportation systems include streets, railroad spurs, bicycle routes and pedestrian paths, and work together to provide access to and through West Oakland to deliver freight and supplies. The local transportation systems connect with a broader network of regional transportation systems with direct access to the Port of Oakland, the railroad corridors, the surrounding freeways and the West Oakland Bay Area Rapid Transit (BART) station. Utility Infrastructure also support these industrialized areas with stormwater and wastewater collection systems, domestic and

fire suppression water networks, and electric, gas and communication networks.

The capacity and capability of each of these infrastructure systems to support current businesses and land use, as well as future development, is vital for the long-term viability of the West Oakland industrial areas.

The West Oakland Infrastructure Report recognizes that while there are many long-term improvements necessary to secure a fully supportive infrastructure system, the funding for such improvements may only become available on an irregular basis. Therefore, the Report provides its recommendations in various priority categories described below.

The implementation order reflects an understanding that funding for the entire program is unlikely to be available in a single phase. A priority-based implementation strategy may provide the best leverage for funding; however, several improvement projects that address multiple priorities simultaneously could be leveraged if sufficient funding is available.

### *Priority 1 – Safety*

The first priority level of needed infrastructure improvements addresses specific traffic safety concerns and deficiencies. Improvements to roadway sight distances and traffic flow can decrease the potential for traffic collisions and are an immediate need for improvement.

### *Priority 2 – State of Good Repair*

Pavement repair throughout West Oakland would address numerous safety issues, would improve the roadway conditions to better support multi-modal uses, and is a cost-effective method of signifying to the all members of the West Oakland community that Oakland is actively and progressively making visible improvements to attract new development. However, given an overall engineer's estimate of over $15 million to implement pavement repairs throughout both the Mandela/West Grand and 3rd Street Opportunity Areas, pavement repairs have also been individually prioritized based on each street's function in context with the overall City street network grid. Streets are designated as Tier 1, 2, or 3, with Tier 1 roadways being of highest priority.

### *Priority 3 – Gateways*

Projects that delineate gateway opportunities are categorized as 'Priority 3'. Gateways could include monuments and/or signage combined with traditional infrastructure elements such as street lighting and street or other right-of-way improvements at strategic locations to advise visitors that they are entering a special "district" within West Oakland.

### *Priority 4 – Intersection Improvements*

Improvements to street intersections include curbs, gutters, sidewalks, accessible curb ramps, pavement rehabilitation, striping, and signage and gateway monuments. Projects within this priority grouping are sub-divided to differentiate the costs associated with reconstructing intersections with upgrades and railroad spur replacement, and without upgrades and railroad spur replacement

### *Priority 5 – Streetscape and Roadway Reconstruction*

Full street reconstruction improvements would replace curbs, gutters, sidewalks, pavement, striping, signage, lighting, underground utilities and landscaping. Full streetscape improvements are assigned a lower priority level due to the high costs associated with these improvements. As with intersection improvements, separate costs are identified for improvements with and without railroad spur replacement.

### *Priority 6 – Circulation*

Larger projects that improve general circulation through the area are assigned a relatively low priority level, partly due to cost and partly due to the level of further study necessary before implementation of these recommendations.

## *Engineer's Cost Estimates*

Rough, order of magnitude construction cost estimates have been developed for each priority level improvement. Improvement costs

within the Mandela/West Grand Opportunity Area are shown below in **Table 6-1.**

**Table 6-1: Mandela/West Grand Opportunity Area, Infrastructure Improvement Costs($million)**

| | NE Area | NW Area | SE Area | SW Area | Total |
|---|---|---|---|---|---|
| Priority 1 - Safety | $0.1 | | $0.1 | | $0.2 |
| Priority 2- Maint. & Repair | $1.8 | $4.9 | $3.5 | $2.0 | $12.2 |
| Priority 3 - Gateways | $0.2 | 0.1 | $0.1 | | $0.4 |
| Priority 4 -Intersection Improvements | | | | | |
| With Rail | $2.0 | $5.0 | $4.5 | $3.4 | $14.9 |
| Without Rail | $1.6 | $4.2 | $3.9 | $2.8 | $12.5 |
| Priority 5 –Streetscape Improvements | | | | | |
| With Rail | $14.0 | $33.0 | $26.0 | $18.0 | $91.0 |
| Without Rail | $11.0 | $29.0 | $22.0 | $13.0 | $75.0 |
| Priority 6- Circulation Imprvmts. | $4.7 | | | | $4.7 |
| **TOTAL (with rail replace.)** | **$22.4** | **$42.2** | **$33.6** | **$22.8** | **$121** |

In the 3rd Street Opportunity Area, full intersection and streetscape replacements do not appear to be currently necessary. Priorities for safety, maintenance and repair are similar, but the next priority level improvements in this Opportunity Area includes upgrades to the sewer and storm drain systems as well as upgrades to the water delivery systems. The next priority level includes upgrades to streetlights, followed by miscellaneous projects that improve circulation in the area. Rough, order of magnitude construction costs have been estimated for recommended improvements at each priority level for the 3rd Street Opportunity Area, as presented in **Table 6-2**.

**Table 6-2: 3rd Street Opportunity Area, Infrastructure Improvement Costs ($million)**

| | |
|---|---|
| Priority 1 Maintenance and Repair | $ 2.6 |
| Priority 2 Gateways | $ 0.4 |
| Priority 3 Utility Upgrades | $ 7.4 |
| Priority 4 Streetlights | $ 1.4 |
| Priority 5 Traffic Circulation | $ 0.7 |
| **TOTAL** | **$ 12.5** |

This general order of implementation priorities reflects an understanding that, although full streetscape and roadway improvements throughout each Opportunity Area are the ultimate goal, funding for full improvements is unlikely to be available in a single phase.

## BASIC INFRASTRUCTURE STRATEGIES

A preliminary survey of various infrastructure conditions revealed that the Plan Area suffers from the following infrastructure issues:

- missing or inadequate curbs and/or gutters
- missing or deficient sidewalks that may be uneven and need attention
- street pavement that should be repaved or sealed
- handicap curb ramps that do not meet current ADA standards and should be replaced
- inactive rail road tracks in streets often exposed to an extent that hinders vehicular passage on the affected streets

- inadequate street lighting, particularly on streets adjacent to underground freeway storage uses

These conditions are indicated on **Figure 6.1.1** which represents an illustrative sample of the type of problems characteristic of the entire Plan Area. The survey will be augmented as time and resources permit. In the interim, City actions should focus on addressing these known deficiencies.

Basic infrastructure improvement strategies, derived from the *West Oakland Infrastructure Report* and supplemented by additional field surveys and area-wide research are recommended to provide the basic infrastructure needs required to support economic redevelopment and to provide the core services supportive of new residential and commercial development within the Plan Area.

The strategies address traffic safety, pavement maintenance and repair, rail lines in the street right of way, street sections, gateways, water, wastewater and storm drainage systems overhead utilities (such as electricity, telecommunications and broadband networks), and circulation system improvements (such as street networks, bicycle facilities, and pedestrian connections).

## Traffic Safety

### *Existing Traffic Safety Issues*

The first set of recommendations from the *West Oakland Infrastructure Report* consists of measures that address specific traffic safety issues, where current roadway configurations present a dangerous condition. The Report identifies two such conditions:

The Campbell Street and West Grand Avenue intersection does not provide adequate site distances for autos attempting to enter or cross West Grand Avenue from Campbell Street, heading north. A fence between the ramp descending from the upper portion of West Grand and the at-grade side streets impedes the ability of drivers to see cars traveling eastbound down the ramp. Eastbound traffic tends to maintain a high rate of speed down the ramp from the west. Cars attempting to turn left from Campbell Street to go westbound on West Grand Avenue do not have adequate site distance to safely make the turn.

Wood Street north of West Grand Avenue is in various stages of disrepair, with pavement deterioration so bad that most northbound traffic uses the southbound lanes to avoid the rough ride. This hazardous condition is exacerbated by a curve in the road near 32nd Street which limits sight distance, and a poorly marked utility pole that sits in traffic near the middle of the 32nd Street / Wood Street intersection.

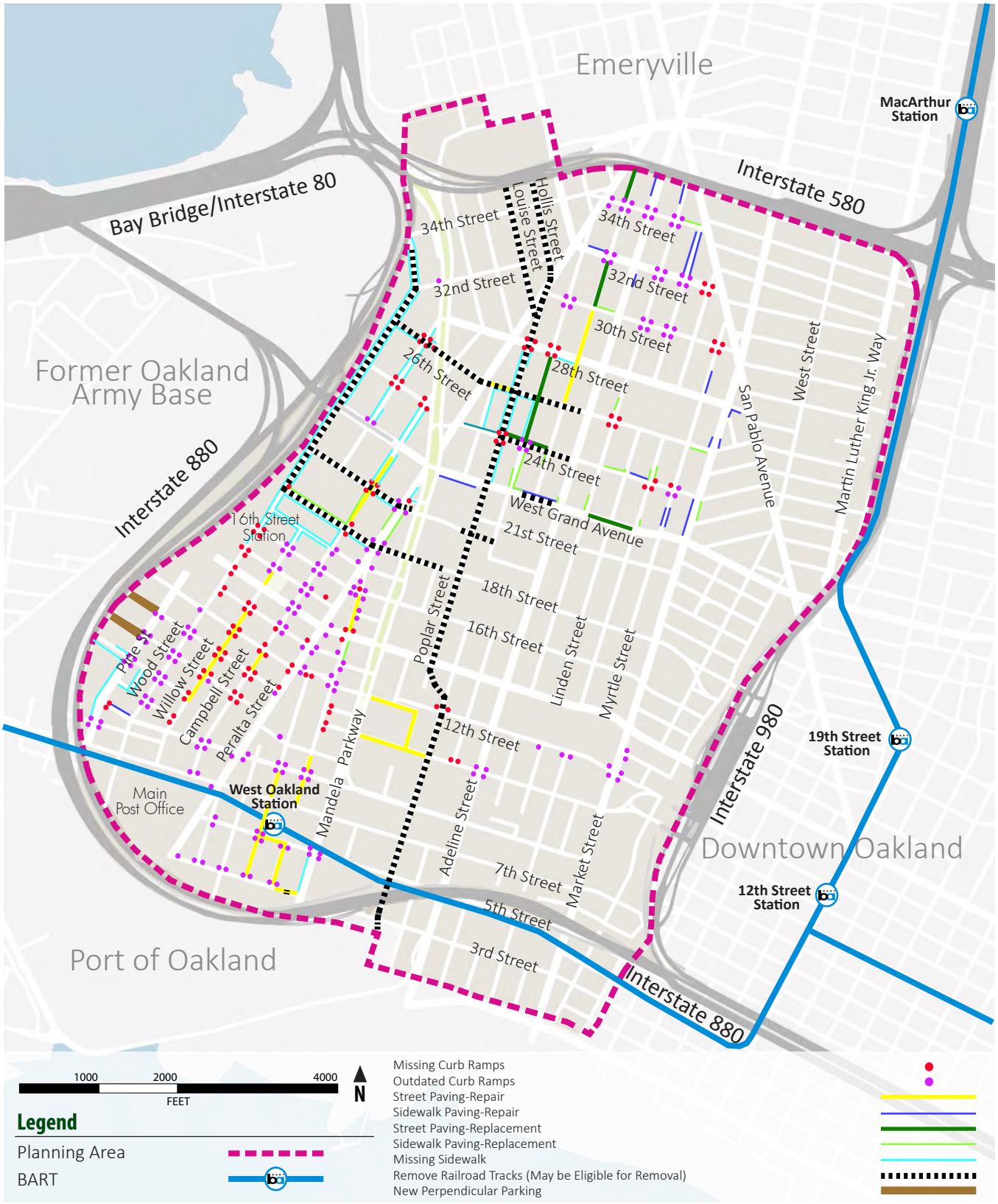
### *Recommended Strategies*

**Intent: Implement specific traffic safety improvements at selected roadway locations to improve sight distance and traffic flow, thereby decreasing the potential for traffic collisions. These improvements should be addressed promptly.**

Traffic Safety-1: Campbell Street, between West Grand Avenue and 20th Street, should be converted into a one-way, southbound street. Automobile traffic would no longer be allowed to make the unsafe left-hand turn to westbound West Grand Avenue.

Traffic Safety-2: At the intersection of Wood Street and 32nd Street, the existing utility pole should be to be moved out of the traveled way. Pacific Gas &Electric Company should be contacted to discuss potential solutions. Additional self-supported steel poles may need to be utilized, as there appear to be very few options for guying new poles.

## Fig. 6.1.1: Infrastructure Improvements*




*Map for illustrative purposes only. Indicates the type and general locations of infrastructure improvements identified to date. Other improvements may be identified in future surveys.

## Pavement Maintenance & Repair

### *Pavement Conditions*

Based on field review and confirmed by records kept as part of the Metropolitan Transportation Commission's (MTC's) Pavement Management System, roadways throughout West Oakland are generally in poor condition and in dire need of repair and long-term rehabilitation.

With the exception of Mandela Parkway and those short segments of roadways that were rehabilitated with the Mandela Parkway project, most of the roadways in the Mandela/West Grand Opportunity Area are in very poor condition. Many streets are flat and are missing appropriate drainage facilities, resulting in standing water that expands and contracts the soil, leading to the loss of structural integrity and the deterioration of the pavement. Of particular concern, many of the streets in the Mandela/West Grand Opportunity Area share alignments with rail lines. Streets in the worst condition tend to be the streets that share alignments with rail.

The streets in the 3rd Street Opportunity Area are generally in better condition. There are fewer instances where rail lines coexist with the streets, and there is curb and gutter in more of the street sections. However, there are several streets where significant damage has been identified.

### *Recommended Strategies*

**Intent: Most of the streets serving West Oakland provide an excellent framework for serving transportation needs but are in critical need of repair and rehabilitation. Significant investment in street repair and maintenance is needed to serve the existing community and to attract new businesses.**

Pavement Repair-1: Potholes are evident throughout West Oakland, particularly in the Mandela/West grand Opportunity Area. Patching potholes will provide a short-term and inexpensive solution, but only until more extensive pavement rehabilitation can be conducted.

Pavement Repair-2: Pavement repair throughout West Oakland, but in particular throughout virtually the entire Mandela/West Grand Opportunity Area, is needed to improve the roadways to accommodate multimodal uses and safely convey all forms of transportation associated with existing and new development. Options of repair, dependent upon location, range from slurry seals to pavement overlays, to removal and replacement of the entire pavement section.

- The highest priority street repairs recommended in the Mandela/West Grand Opportunity Area are on West Grand Avenue from Wood Street to Adeline Street, on Adeline Street from 19th to 30th Street, and on Peralta Street from Mandela Parkway to 28th Street.
- The highest priority street repairs recommended in the 3rd Street Opportunity Area are on Adeline Street from I-880 to 3rd Street, and on 3rd Street from Union Street to Martin Luther King Jr. (MLK) Way.

Pavement Repair-3: Roadways that share alignments with rail spurs should be given high priority in the City of Oakland's pavement management program, and should be resurfaced with a temporary improvement to bring them to a serviceable condition until a long-term rail repair or removal strategy can be implemented.

Pavement Repair-4: For work within what would typically be the railroads' responsibility for maintenance, the City should explore all possible avenues to ensure the railroads live up to their obligations to remove those rail lines not identified for reuse. However, where the interface between street pavement surface and the rails is in poor condition, critical repair work may need to be performed independent from the railroads.

Pavement Repair-5: As funding options are researched for improvements to rail, recognize that street pavement repairs and rail improvements will be necessarily linked.

This nexus may expand the possibilities for funding sources.

## Rail Lines

### *Current Conditions*

Much of West Oakland's industrial areas were originally developed as manufacturing and warehousing hubs that benefitted from proximity to the Port and from access to its backbone rail infrastructure. Over time, many of the older manufacturing and warehousing industries have moved from West Oakland, or evolved with less dependency on rail. Many of the benefits once offered by rail access have now declined, and many businesses still dependent on rail have found other suitable locations in East Oakland or further into the San Joaquin Valley.

The older rail spurs in West Oakland's industrial areas that are no longer in active use still share their alignments with City streets.

- Within the Mandela/West Grand Opportunity Area, these shared streets include Wood, 18th, 20th and 26th Streets from the west, and Poplar Street from the south.
- Within the 3rd Street Opportunity Area, existing rail lines define the entire south edge of 3rd Street. Magnolia, Chestnut, Linden, Filbert, Myrtle and Brush Streets all terminate on the north side of the rail right-of-way. Market Street and MLK Jr. Way cross the rail lines at grade, and Adeline Street is elevated to cross above the rail lines.
- In addition to these "main" spurs, smaller rail spurs directly feed various parcels, often times by splitting from the "main" line in the street and traversing onto the sidewalk to access loading areas that front the public right-of-way.

In their current condition, these inactive rail spurs can cause tripping hazards for pedestrians, and complicate implementation of accessibility and ADA compliance programs. Additionally, the interface between the street pavement surface and the rails is often in very poor condition with resulting potholes and cracks. Throughout the industrial portions of West Oakland, there are numerous locations where these rail spurs and their shared streets have not been adequately maintained.

### *Recommended Strategies*

**Intent: A comprehensive strategy is needed for both the near-term and the longer-term future to address the disposition and condition of rail lines that share alignments with City streets.**

Rail Lines-1: In the near term, the at-grade rail crossings at Market Street and at Martin Luther King Jr. Way are in poor condition and should be repaired.

Rail Lines-2: For the long term, decisions need to be made by stakeholders, including the City, the railroad companies and property owners about which rail lines should be removed and which will remain in perpetuity, in what streets, and to serve which parcels.

Rail Lines-3: Those spur lines designated to stay should be brought up to appropriate current standards of construction and safety by the applicable railroad company. The streets that the rail spurs share an alignment with should be reconstructed with appropriate, modern features such as proper sub-drainage and adequate rail crossing panels throughout their length.

Rail Lines-4: Since the rail spur that serves the block surrounded by Linden, Filbert and 3rd Streets does not align with the street system, it creates a viable long term rail service corridor that could be retained with the existing land uses.

Rail Lines-5: Those rail lines not identified for reuse should be removed by the applicable railroad company, and the roadways reconstructed in accordance with appropriate construction standards and environmental practices.

Rail Lines-6: In general, all rail lines east of Mandela Parkway should ultimately be removed by the applicable railroad

company, as they do not appear to be in current use, as evidenced by existing paving patterns (i.e., in many cases the rails have been paved over).

### Standardized Street Sections

#### *Current Conditions*

The analysis and recommendations identified below should be considered supplementary to the "Complete Streets' recommendations applicable throughout all of West Oakland, as contained in Chapter 5 of this Specific Plan.

Full street improvements should include curbs, gutters, drainage, sidewalks, adequate pavement widths, striping (potentially to include bike lanes or paths and parking), signage, lighting, underground utilities and landscaping or street trees.

Pedestrian connectivity along streets is important to provide access for residents and employees who may travel from downtown, from the bus and BART and from the surrounding West Oakland residential neighborhoods, to existing and new employment centers. Bicycle routes are important connections from the West Oakland Opportunity Areas to the surrounding community as an integral part of the overall transportation network. An increased emphasis on pedestrian and cycling opportunities is also an important component of decreasing congestion and reducing the carbon footprint of new development. Appropriate and complete street sections are also vital in accommodating on-street parking and to improve stormwater runoff through curbs and gutters and needed storm drain connections.

For the most part, the existing street grid provides for continuous streets and sidewalks that connect through West Oakland's residential neighborhoods. However, within the industrial portions of West Oakland's Opportunity Areas, particular within the Mandela/West Grand and portions of the 3rd Street Opportunity Areas, there are numerous examples of incomplete, substandard and deteriorated street sections. These incomplete street sections are both functional and aesthetic obstacles toward realizing a new economic development potential for the surrounding area.

#### *Recommended Strategies*

**Intent: Incomplete street sections are both functional and aesthetic obstacles toward realizing the economic development potential of the surrounding area, and should be improved to current City standards, tailored to meet site-specific needs.**

Street Sections-1: Pedestrian zones should be delineated throughout the Mandela/West Grand Opportunity Area, and currently missing or deteriorated sections of sidewalks and trails should be connected (i.e., "gaps" closed).

Street Sections-2: Intersections currently lacking accessible curb ramps or that have ramps that do not meet current ADA accessibility standards must be improved to City current standards as a part of any streetscape or paving project.

Street Sections-3: Both interim and permanent bicycle routes and lanes should be established throughout West Oakland. Improvements to the street surfaces as described under Pavement Repair Strategies will benefit bicycle circulation.

Street Sections-4: Currently designated bicycle routes should be connected and signed to further promote bicycle use in and through West Oakland.

Street Sections-5: Curbs and gutters, and striping for parallel parking should be installed throughout West Oakland where these street sections do not exist (i.e., "gaps" closed).

Street Sections-6: As an interim measure, street lights should be maintained and fixtures replaced to increase lighting and therefore increase public safety. Ultimately, street lights should be replaced as part of intersection and streetscape improvements, utilizing appropriate City lighting standards

and fixtures from the city's lighting standards.

Street Sections-7: Those streets that currently do not accommodate on-street parking should be improved with new street sections that designate on-street parking areas, and that also provide for improved stormwater runoff and pedestrian circulation.

Street Sections-8: For those blocks where cars are currently parking perpendicular to the street, and there is sufficient right-of-way to accommodate both angled parking and any missing sidewalk sections, perpendicular parking sections should be installed on the edge of the road. The perpendicular parking section permits cars to safely park, maximizes the number of parking stalls, appropriately directs stormwater runoff, and provides pedestrians with a clear path of travel.

Street Sections-9: New street standards specific to the needs of existing and future uses in West Oakland, should be considered in particular locations. New street sections are suggested at the following locations:

- Along 10th Street, just west of Pine Street, the road section should accommodate perpendicular parking on one side and parallel parking on the other side to provide sufficient parking to match existing uses if possible. At least 6 foot clear sidewalks should be provided to improve pedestrian circulation and safety, while new curb and gutters should be installed to alleviate stormwater runoff ponding and help to prevent future damage to the pavement.
- Along 11th Street, just West of Pine Street, the road section should be similar to the proposed 10th Street section. However, because 11th Street has only a 59' right-of-way, a 7' compact parallel parking stall should be utilized on the parallel parking side. The existing buildings on the north side provide bays for truck loading, so perpendicular parking is recommended.
- Wood Street has an irregular existing street section along its length, reflecting completed sections of new construction and other areas of very poor condition, with no sidewalk, curb or gutter at all. Installation of curb, gutter, and sidewalks, with perpendicular parking in certain sections is recommended. The curb and gutter would allow conveyance of stormwater runoff while at the same time allowing vehicle traffic to park and/or load at the edge of the road without causing damage.
- 17th Street currently lacks a clear pedestrian path of travel between Wood Street and Campbell Street. The north side of 17th Street has no clear, safe pedestrian path of travel and the south side provides a broken path. New curb, gutter and sidewalk should be installed along the south side of 17$^{th}$ Street between Wood and Willow Streets, with clear signage at the intersections of Wood and17th Streets and at Campbell and 17$^{th}$Streets, indicating that to pedestrians should use crosswalks and continue along the south side of 17th Street.
- 18th Street between Wood Street and Campbell Street is a block in which cars park perpendicularly and there is no sidewalk for pedestrian travel. The south side of the street does not provide curb, gutter or sidewalk, and cars currently park on the asphalt at the edge of the road. New curb, gutter, sidewalk and a perpendicular parking section should be installed along this road. This will permit pedestrian travel along both sides of the street, will maintain the existing perpendicular parking, and would allow stormwater runoff to be properly conveyed.
- On 3rd Street, the northerly sidewalk between Brush Street and Castro Street ends halfway through the block, where perpendicular parking stalls begin. The sidewalk should be continued the full length of the street, and the existing perpendicular parking stalls removed.

While there will be a net loss in parking spaces along the block, the lengthened sidewalk will improve pedestrian safety and will also improve vehicular traffic safety by providing a uniform parking situation throughout the entire block.

- The current parking stall configuration on Linden Street within the 3rd Street Opportunity Area should be reviewed with the Oakland Fire Department. Upon review, the curb on the west side of the street may need to be painted red, effectively eliminating 10- parallel parking spaces.

### Gateways

#### *Recommended Strategies*

**Intent: In order to signify the entry into each commercial- or industrial-oriented Opportunity Area (Opportunity Areas 1 and 3), gateway features should be installed at strategic locations to help identify the particular Opportunity Area as a "place", that is specifically recognized by the City and the public (see Figure 6.1.2).**

Gateways-1: Gateway monuments could be located at the following locations:

- along Mandela Parkway north of 32nd Street,
- at Mandela Parkway south of 12th Street,
- at Mandela Parkway and 7th Street,
- at West Grand Avenue east of Chestnut Street, and
- at West Grand Avenue between Frontage Road and Mandela Parkway.

### Potable Water Delivery System

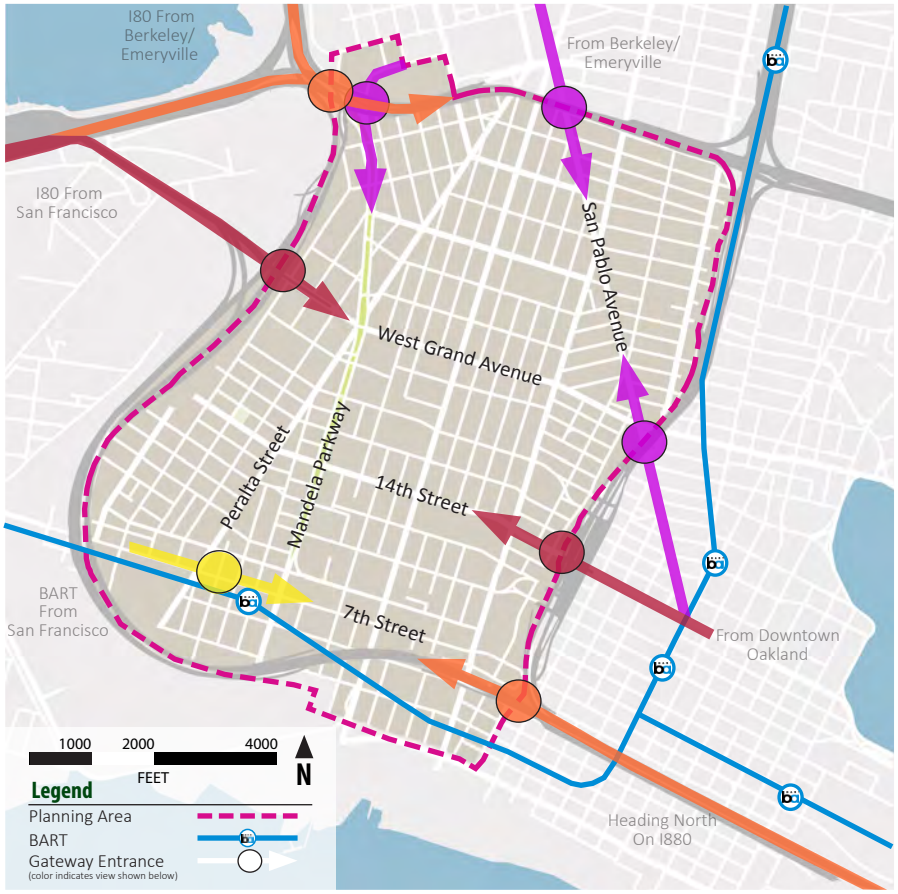
#### *Current Conditions*

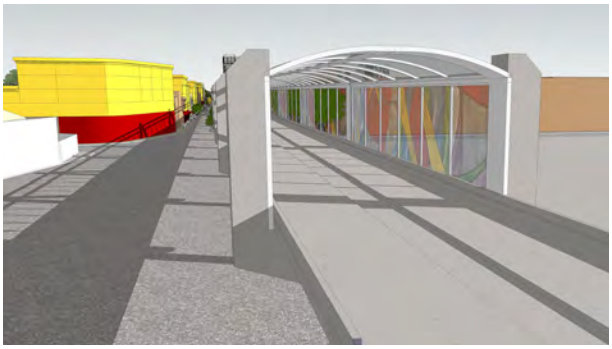
West Oakland is serviced by a network of water transmission and distribution lines ranging from 2 inches to 36 inches in diameter (see **Figure 6.1.3.** There are two transmission lines with diameters of 36 inches. One transmission main traverses north on West Street, turning west on 34th Street, and diverting north again on both Market Street and Hollis Street (two separate mains). The other large 36" transmission line traverses west on 9th Street, north one block on Market Street, west on 10th Street and finally north on Adeline Street before terminating and branching into several smaller transmission lines. Three 24-inch pipes (34th Street, 14th Street, and 5th Street) are also found within West Oakland, all terminating into the adjacent former Oakland Army Base and the Port of Oakland.

Distribution mains are located on every street throughout West Oakland. Most neighborhood distribution mains are typically 6- and 8-inches, although some as small as 2-inches are also present. Per the East Bay Municipal Utility District's (EBMUD) latest programs, most of these smaller pipes are being replaced with 6-inch pipes.

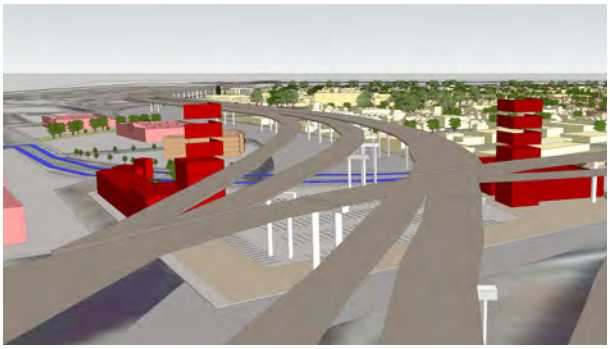
West Oakland's industrial areas have historically demanded high water usage. These industries included heavy industrial and manufacturing such as food canning, ship building, and iron works. Water supply pipes in West Oakland were sized accordingly to accommodate the higher water usage. Although many of these former customers have relocated, the main water supply pipes have remained in place and are active, and have more than enough capacity to handle planned mixed-use development.

## Fig. 6.1.2: Gateways



BART Gateway

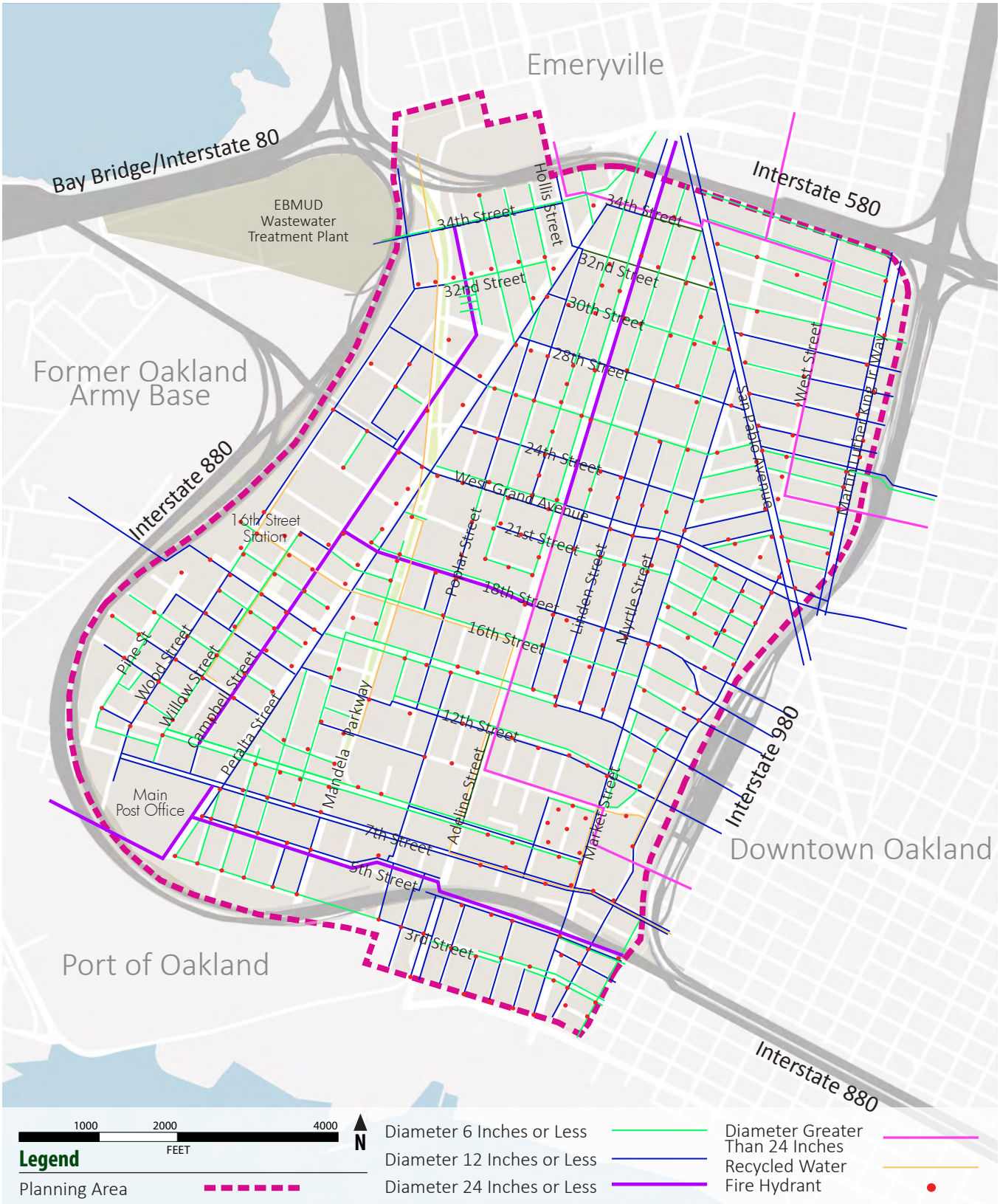


Freeway Gateway

Arterial Gateway: San Pablo Underpass


Arterial Gateway: West Grand Viaduct

**Fig. 6.1.3: Potable and Recycled Water**



### *Opportunity Area Water Systems*

Within each Opportunity Area, there are smaller conveyance lines that are interconnected to form multiple redundant loops, and individual parcels have service lines connected to the conveyance lines that deliver metered water flow to each parcel.

- Water is primarily delivered to the Mandela/West Grand Opportunity Area through transmission mains under Adeline, 18th, Campbell, Ettie and 34th Streets. Because many of the parcels within the Mandela/West Grand Opportunity Area are very large, there are several smaller internal streets that have no public water main. Many of the conveyance lines are old and are likely to be in poor condition, and may be undersized to meet current fire flow requirements.
- Water is primarily delivered to the 3rd Street Opportunity Area through a transmission main under 4th Street.

With recent development and maintenance programs, EBMUD has emphasized that it has enough capacity in its current water distributions system now to meet projected population growth up to the year 2040.

## *Recommended Strategies*

***Intent**: Implement those overall water delivery system improvements needed to fully serve the economic development potential of West Oakland and to meet current City standards.*

Water-1: Support EBMUD's ongoing program to upgrade their older, smaller distribution lines to 6-inches, and to 8-inches where necessary to comply with current California Fire Code where laterals for fire hydrants are located.

- Many of the conveyance lines within the industrial portions of West Oakland's Opportunity Areas are not large enough to meet current fire flow requirements. New development located on parcels not fronted by a water line of at least 8-inches in diameter will require a new water line upsizing of the water main to meet current codes (see detailed descriptions in the *West Oakland Infrastructure Report*).

Water-2: Continue to require that maintenance, capital repairs and upgrades to water distributions systems be financed by connection fees charged to new development, and through on-going customer service charges.

- EBMUD block maps indicate that many of the water lines throughout West Oakland are cast iron and were installed in the 1930's. These pipes have likely experienced significant corrosion and should be replaced (see detailed descriptions in the *West Oakland Infrastructure Report*).

Water-3: Coordinate with EBMUD to reassess its water distribution system to determine whether upsizing of its pipes for increased flow and/or pressure may be required. If upsizing is required and is deemed necessary for the viability of new development, the cost will likely be borne by the developer.

Water-4: For projects that create new parcels which front a street that does not have a water main, a new public water main will be required, to be constructed at the developers' expense.

## Recycled Water

### *Current Conditions*

Recycled water use that meets a portion of water supply demands increases the availability and reliability of the potable water supply and lessens the effect of extreme rationing induced by a prolonged severe drought. EBMUD has been recycling water for landscape irrigation and in-plant processes at its Main Wastewater Treatment Plant since 1971. EBMUD's goal is to recycle 14 MGD (15,680 acre-feet per year (AFY)) by year 2020 and 20 MGD by year 2040, bringing the total recycled water use to nearly 5.1 billion gallons annually. That amount equates to a 7% reduction in potable water, and would save enough water to supply the

indoor and outdoor water needs of an estimated 130,000 residents per day, based on current consumption data.

EBMUD recently completed a large multi-phased water recycling project which has begun supplying recycled water. The East Bayshore Recycled Water Project (EBRWP) will supply an annual average of 2.2 million gallons per day (MGD) of recycled water to portions of Alameda, Albany, Berkeley, Emeryville and Oakland. The recycled water will be used in place of drinking water to irrigate landscapes, flush toilets, to restore wetlands and for industrial purposes. Most of the 4.4-mile long recycled transmission pipeline is in place, along with more than 2 miles of transmission pipeline in Oakland, and up to 24 miles of distribution pipelines being constructed throughout the EBRWP.

Within West Oakland, the primary recycled water transmission main is found traversing west from 7th Street then north on Mandela Parkway into Emeryville (and other cities to the north). Smaller distribution pipelines are found mainly on 16th Street and Willow Street (refer to Figure 6-3).

Industrial and landscape irrigation applications will be the primary uses for recycled water, and it is anticipated that there will be some use for commercial applications.

### *Recommended Strategies*

**Intent: Work with EBMUD to continue to implement its Water Recycling Program in the most cost-effective manner to meet the 20 MGD goal by the year 2040.**

Recycled-1: Encourage EBMUD to continue its effective incentive program to use recycled water rather than mandating its use.

Recycled-2: Consider re-use of existing pipelines, reservoirs, and other facilities which are no longer needed by other utilities for distributing recycled water to customers.

Recycled-3: Encourage installation of separate plumbing system for new projects during initial construction rather than retrofitting the project.

Recycled-4: Include installation of new recycled water distribution mains when roads are being reconstructed, even if it is to place an empty conduit for future connection.

Recycled-5: Focus the use of recycled water within the Mandela/Grand Opportunity Area, as the primary recycled water transmission main is found traversing west from 7th Street then north on Mandela Parkway into Emeryville. Smaller distribution pipelines are also located in 16th Street and Willow Street.

## Sanitary Sewer

### *Current Conditions*

The City of Oakland owns and maintains the sanitary sewer system throughout the City (see **Figure 6.1.4)**. This system consists of smaller collection lines connected to individual properties, which are then connected to larger sewer mains within the street right-of-way. The City's system is ultimately connected to the major sewer trunk main lines (interceptors) that are owned by EBMUD. The EBMUD interceptor system consists of a main line that runs west under 3rd Street, turns north at Wood Street, and then turns into the EBMUD Wastewater Treatment Plant near the point where Wood Street terminates and becomes Beach Street.

### *City of Oakland Collection System*

The City of Oakland owns, operates, and maintains the local sanitary sewer collection system covering approximately 48 square miles, and includes over 1,000 miles of sanitary sewer lines, 31,000 structures and 7 pump stations, serving a population of about 400,000 people throughout the City.

**Fig. 6.1.4: Sanitary Sewer**

Most of the City's sewer system is over 50 years old, some as old as 100 years. Most of the sewer pipes are in poor condition, and many are plugged or abandoned. Much of the City's antiquated sewer system is constructed of vitrified clay pipe, making it susceptible to cracking and vulnerable to failure. Many pipes do not have any associated data, such as diameter, flow direction, material, etc.

Because of the dilapidated condition of underground conduits, groundwater infiltration and inflow ("I & I") remains the biggest challenge that the City faces, as this contributes to roughly 80% of peak wet weather flow, and only 20% of the flow actually consists of sewage.

A twenty-five year capital improvement program was initiated in 1987, intended to rehabilitate up to 30% of the City's sewer system to eliminate wet weather overflows. This program is mandated under the City's sanitary sewer discharge permit with the Regional Water Quality Control Board, and is due to complete in 2014.

In an attempt to meet additional projected maintenance costs to its antiquated sanitary sewer system, recent City ordinances require homeowners to repair or replace their private sewer laterals prior to the sale of their homes. In addition, all streetscape projects are required to have the sewer main scoped to ascertain the integrity of the sewer main prior to paving work. If the pipe is shown to be in poor condition, the project must incorporate new (or rehabilitated) pipes into its scope of work.

### *EBMUD Interceptor and Treatment System*

The City's sewer system conveys wastewater to the EBMUD interceptor system. The interceptor system consists of 29 miles of reinforced concrete pipes ranging from 12 inches to 9 feet in diameter. Fifteen pumping stations lift wastewater throughout the collection system as it travels to the Main Wastewater Treatment Plant (MWWTP).

EBMUD has two interceptor systems within West Oakland:

- The South Interceptor system traverses east-west on 3rd Street.
- The North Interceptor system runs along Wood Street and terminates within the MWWTP. The North Interceptor System also conveys raw sewage from the South Interceptor, as well as from Pump Station "K" on 7th Street (serving portions of the Port of Oakland).

The MWWTP is located in Oakland near the entrance of the San Francisco-Oakland Bay Bridge. At the plant, primary treatment removes floating materials, oils and greases, sand and silt and organic solids heavy enough to settle in water. Secondary treatment biologically removes most of the suspended and dissolved organic and chemical impurities that would rob life-giving oxygen from the waters of the Bay if allowed to decompose naturally.

### *Major Issues*

The existing sewer system throughout West Oakland is in need of repair. The current capital improvement program due to be completed in 2014 will have rehabilitated only up to 30% of the City's sewer system to eliminate wet weather overflows, but will not address the nearly 700 miles of remaining sewer system that continues to deteriorate with age. Only a small fraction of this remaining portion is rehabilitated on an as-needed basis each year.

However, with completion of the current program, the City's sanitary sewer system should have sufficient capacity to accommodate a projected 20% growth rate. Capacity to handle additional development from full build-out of the Plan is unknown, and further engineering analysis will be needed. Based on the general understanding of the existing condition of the collection pipe system, replacement of existing pipes will be required. The capacity of replacement pipes is typically sized to handle future demands.

Treatment plant capacity is not likely to be an issue, as the buildout will be phased and is within the expected capacity of the treatment plant.

## *Recommended Strategies*

**Intent: New development throughout West Oakland will present an opportunity to replace the City's older, cracked and leaking sewer system pipes.**

All new development throughout West Oakland will be assessed a mitigation fee. The fee is the development's buy-in for the cost of the City's improvements, and represents the development's proportional share of growth-induced improvement costs related to its additional wastewater demand. The City of Oakland Master Fee Schedule summarizes the assessment of the Sewer Mitigation Fees. It is site-specific to the development and is based on an engineering analysis.

Sewer-1: The City's Right-of-Way Management Division implements a City-wide I & I Improvement Program to reduce infiltration and inflow into the sewer system by replacing conduits and structures with new facilities that are less susceptible to leakage. The City of Oakland should assess the relative priority of implementing I & I improvements within the West Oakland Opportunity Areas as a means of increasing sewer capacity such that all envisioned new development can be accommodated within the City's system.

Sewer-2: New development and/or reuse projects should replace existing sewer laterals with new laterals and verify that there are no cross-connections from building downspouts to the sewer. This would result in much lower I/I flow into the main lines.

Sewer-3: Within the Mandela/West Grand Opportunity Area, there are several blocks between West Grand, 18th Street, Wood Street and Peralta Street that contain very large parcels. Public sewer lines were not installed under Campbell Street, 20th Street or Willow Street in this area. New development within these blocks will require new sewers in this small area (see detailed descriptions in the West Oakland Infrastructure Report).

## Storm Drains

### *Current Conditions*

The City of Oakland is responsible for the construction and maintenance of the local storm drainage system within Oakland's public areas and roads, while the Alameda County Flood Control and Water Control District (ACFCWCD) constructs, operates, and maintains major trunk lines and flood control facilities in Oakland.

The City's storm drain system consists of about 370 miles of drainage culvert, 16,000 structures (mostly inlets, manholes, and catch basins), 40 miles of creeks and five pump stations. Like the sewer system, much of the system is old and approaching the end of its intended design life. Storm drain pipes in the City are not connected as one system, but rather scattered through the entire City as small networks of private or public systems (see **Figure 6.1.5**).

Stormwater runoff is collected from within West Oakland through drain inlets and catch basins and conveyed through a series of drain culverts and conduits. The larger pipes serve as connectors in the east-west direction, primarily along 34th, 28th, 24th and 18th Streets, as well as two north-south connectors (Wood Street and Cypress Street). These larger connectors terminate at the Ettie Street Pump Station, where stormwater is lifted up and conveyed to the San Francisco Bay. The flow in the majority of the storm drains follows the natural drainage patterns of the terrain. Pipes generally flow from east to west and from south to north.

The City makes structural improvements as necessary to ensure that the system is able to reasonably handle stormwater flow. However, in the Storm Drainage Master Plan completed by CH2MHill in 2006, the City estimated that over 30% of the existing storm drains are in need of repair. It is generally assumed that the storm drain system in any development area is aged and would not be able to handle increased surface runoff. New development would likely need to be reviewed for pipe upsizing and/or rehabilitation. The costs would likely be borne upon the developer.

**Fig. 6.1.5: Storm Drainage**

### *Major Issues*

According to the City of Oakland Storm Drainage Master Plan (CH2MHILL, 2006), storm drainage collection system improvements are needed throughout the City. That Master Plan estimated that 30% of the existing storm drainage conduits and virtually all of the storm drainage structures in Oakland, including West Oakland, are in need of rehabilitation.

Many of the streets in West Oakland are fairly flat and experience extensive ponding of stormwater runoff. With increased development, ponding of stormwater could become more problematic. Additionally, many individual streets within the West Oakland Opportunity Areas are lacking a dedicated storm drainage system line. Most street sections are too long and flat for run-off to reasonably be conveyed to inlets at either end of the street.

In recent years, standards on stormwater quality and volume control have become increasingly stringent. The City of Oakland is one of fourteen cities in Alameda County that must adhere to the latest C.3 Stormwater Technical Guidance published by the Alameda Countywide Clean Water Program (ACCWP). The ultimate goal of the program is to reduce the amount of impervious areas, thereby increasing groundwater percolation and reducing runoff. Generally, any new development is subject to the provisions of the National Pollutant Discharge Elimination System (NPDES) permit with the State of California. The C.3 handbook provides guidelines and best management practices (BMPs) to decrease surface runoffs by reducing the amount of impervious surface. Over time, this will lower the aggregate runoff coefficient in the planning area, and will minimize the impact the existing storm drain system.

## *Recommended Strategies*

**Intent: New development throughout West Oakland will present an opportunity to improve the City's storm drain system, and to reduce overall runoff.**

Storm Drain-1: As the West Oakland area improves, storm drain lines and structures should be added and or replaced to serve the Industrial Zones.

Storm Drain-2: New development that impacts an established minimum area (the current standard is greater than 2,500 square feet) is subject to provision C.3 of the City's National Pollutant Discharge Elimination System (NPDES) permit with the State of California. Pursuant to these regulations, such new development would be required to implement stormwater treatment measures to clean and filter stormwater prior to its entering the storm drain system. These improvements will serve to improve water quality and lower the overall volume of run-off.

Storm Drain-3: As the West Oakland area improves, underground storm drain lines should be added to several street sections (see detailed descriptions in the West Oakland Infrastructure Report).

## Overhead Utilities

### *Current Conditions*

The Mandela/West Grand and 3rd Street Opportunity Areas contain overhead facilities carrying electrical cable, television and telephone service. The overhead utility poles are jointly owned by Pacific Gas and Electric (PG&E), Comcast, and AT&T. Electricity is delivered by PG&E through a system of 12-kilovolt supply lines. The supply lines feed most, but not all of the street segments within West Oakland, carried on aerial poles that are often also carrying overhead telecommunication and cable television facilities (see **Figure 6.1.6**).

**Fig. 6.1.6: Dry Utilities**

### *Street Lighting*

Lighting is an important factor in a complete and safe-feeling commercial corridor. Based on a lighting assessment performed by BKF Engineers in 2010, multiple streets within the Mandela/West Grand Opportunity Area currently fail to meet the minimum street lighting standards set by the City (see the *West Oakland Infrastructure Report* for details). Several lights were observed to be non-operational at the time of the site visit, and several blocks were observed to be in need of additional lighting. Street lighting within the 3rd Street Opportunity Area was also evaluated against the City's standards. The area appears to be generally well lit, with some areas of exception where existing lighting does not meet the City requirements.

Throughout West Oakland, streetlights are placed on utility poles, and many of these poles are at the end of their useful life. Repairs are inherently difficult to implement because they must be coordinated with PG&E and often other telecommunication companies and cable television providers. Additionally, many streetlights have been damaged by truck traffic, where the mast arms do not accommodate either the height or width of trucks.

### *Electricity & Telecommunications*

As new development occurs in the West Oakland Opportunity Areas, the demands for electricity may exceed the capacity of the existing infrastructure. PG&E evaluates on an area-wide basis and on a case-by-case basis how and where they will need to expand capacity for delivery and distribution of electrical power.

### *Broadband Network*

Access to high-speed broadband networks is critical to many modern businesses. Both AT&T and Comcast provide broadband network services throughout the city of Oakland, and numerous competitive local exchange carriers operate broadband fiber optic-based networks whose backbone facilities for transmission were constructed through Oakland in the late 1990's. The extent of broadband services available to end users in any specific location requires integrated distribution systems that are fed from a larger backbone facility, and is typically dependent upon demand. Given current activities and land uses within the industrial portions of the Mandela/West Grand and 3rd Street Opportunity Areas, the integrated distribution facilities do not exist and bandwidth offerings are likely limited. However, because of the backbone infrastructure in the area, there is potential for extensive broadband connectivity.

## *Recommended Strategies*

**Intent: Access to adequate electrical service, modern telecommunications, and high-speed broadband networks is critical to many modern businesses. Improvements to these systems are needed to attract and retain such businesses in West Oakland.**

Lighting-1: As an interim measure, street lights should be maintained and fixtures replaced with Light Emitting Diode (LED) lighting to increase lighting and public safety. Ultimately, street lights should be replaced as part of intersection and streetscape improvements, utilizing appropriate City lighting standards and fixtures, and incorporating Crime Prevention Through Environmental Design (CPTED) principles (see Section 7.2 for more details).

Lighting-2: Based on the BKF survey, a total of approximately 258 street lights should be added within the Mandela/West Grand Opportunity Area, and 40 non-operational streets lights should be replaced or repaired.

Lighting-3: Based on the BKF survey, a total of 82 additional street light poles appear to be needed with the 3rd Opportunity Area to meet the City's lighting standard.

Lighting-4: All upgrades to the street lighting system should take truck height and turning movements into account.

Lighting-5: Existing street light fixtures should be evaluated in specific areas for replacement with LED lighting. Whereas LED lighting offers several benefits over

conventional street lighting in some applications, it is not likely to be practical in some industrial areas because of the street widths, the absence of residences, and the high concentration of lights that would be required to meet the City's standards.

Electricity-1: The City should determine its available balance of undergrounding credits with PG&E, and incorporate specific portions of West Oakland into the city-wide prioritization plan for relocating overhead utility lines underground.

Broadband-1: The City should coordinate a Broadband Network master plan with current network operators to program and plan the facilities.

## Circulation System

### *Street Network & Circulation*

The street network within and through West Oakland provides an important framework for existing and expanded industrial, commercial and residential use. The street network is near major regional transportation networks and it provides good local connectivity and access.

However, there are a number of street system improvements that could substantially benefit the surrounding area. These improvement projects would be an important first step toward an overall street-system wide improvement strategy.

### *Bicycle Facilities*

Bicycle routes that run through each Opportunity Area and which connect the West Oakland Opportunity Areas to the surrounding community are an integral part of the overall transportation network. Major bicycle routes that run through West Oakland, such as the Bay Trail, provide cycling opportunities for residents, commuters and employees, and are an important component of decreasing congestion and reducing the carbon footprint of the business districts in Oakland.

### *Pedestrian Connections*

Pedestrian connectivity within each of the Opportunity Areas is important as a means of enhancing access to employment centers from Downtown, from BART and from the surrounding residential neighborhoods. Pedestrian connections must be an integral part of the circulation system.

### *Recommended Strategies*

**Intent: Both interim and permanent circulation system routes, including streets, bike routes, lanes and pedestrian paths of travel, should be well-established throughout West Oakland. Gaps within currently designated segments should be connected, circulation problems addressed, and non-auto modes promoted within and through West Oakland's Opportunity Areas.**

Circulation-1: The City and the Port of Oakland should coordinate to enact a reasonable resolution to the current circulation problems associated with truck parking on Adeline Street, especially in the mornings. This appears to be a signage and enforcement issue, as there currently appears to be parking area available outside the gates on Port property, on the south side of the Middle Harbor Drive bridge, to accommodate truck parking. A truck parking program with appropriate time limits and enforcement should be implemented.

Circulation-2: An existing barricade was installed at 10th Street between Pine Street and the I-880 frontage in an effort to restrict truck traffic through the adjacent residential neighborhood. However, this solution isolates the residential neighborhood and forces longer trips to circumvent the blockade. It is recommended that another solution, such as replacement of the barricade with signage and enforcement to restrict through truck traffic, be considered.

Circulation-3: Campbell Street between 26th and 28th Streets should be improved to current City of Oakland street standards to improve access and public parking within the Study Area.

Bike Routes-1: Both interim and permanent bicycle routes and lanes should be established throughout West Oakland.

Bike Routes-2: Currently designated bicycle routes should be connected ("gaps" closed) and signed to further promote bicycle use in and connecting through West Oakland.

Bike Routes-3: Signs should be installed identifying Bay Trail routes, particularly as the Bay Trail is meant to navigate Brush and 2nd Streets. Planned bicycle routes as indicated on the City Bicycle Master Plan map should be linked and connected to the bicycle grid.

Bike Routes-4: An alternative, much safer bicycle route to Middle Harbor Shoreline Park for bicycles lies on a walkway/path adjacent to the 7th Street entrance to the Port. The 7th Street route is also connected to the Bay Trail at Mandela Parkway. Middle Harbor Shoreline Park is roughly the same distance from the intersection of 3rd and Adeline using either route.

Bike Lanes and Pedestrian-5: Ensure that a bike lane/pedestrian bridge or other facility is designed and constructed on and from Mandela Parkway near the West Grand area into and through the Army Base development to Gateway Park. Another facility should be developed along 40th Street, through Emeryville, and into Oakland that will provide trail access underneath I-80 to Gateway Park.

Pedestrian Connections-1: While the pedestrian connection from Mandela Parkway to the West Oakland BART Station is new and in good condition, additional street lighting and sidewalk improvements as recommended elsewhere in this chapter of the Plan will provide more safe pedestrian circulation.

Pedestrian Connections-2: ADA ramps between all major transportation hubs in West Oakland should be installed with any new development or streetscape improvement to make the area accessible to pedestrians with disabilities.

Pedestrian Connections-3: Provide safe, secure and well lighted pedestrian corridors, especially surrounding the West Oakland BART Station where pedestrians must pass under I-880 and the elevated BART tracks to access the station and nearby parking lots and housing.

### Industrial Area Infrastructure Costs

The 2011 *Industrial District Strategy Support, Public Infrastructure Report* provides a detailed examination of the current state of the transportation network and infrastructure serving the industrial sections of West Oakland, including strategies to address safety concerns, improve connectivity, and enhance the function of the multi-modal transportation systems. Specific improvements are recommended and associated costs identified, with suggested priorities for future funding. These recommendations represent a fundamental and basic need for successful implementation of this Specific Plan, but the associated costs are substantial – in excess of $132 million for all identified infrastructure improvements.

Recognizing that funding for such improvements may only become available on an irregular basis, this Plan furthers the West Oakland Infrastructure Report's recommendations to establish priorities among these improvements. Highest priority improvements are those that will minimize existing safety concerns and that will address deferent maintenance issues. These first tier improvements are estimated to cost approximately $15 million alone. Next, improvements that have a high level of visibility relative to their costs of implementation are recommended. Third are projects that, piece by piece, bring the infrastructure in the area up to or near current citywide standards. Last, improvement projects that improve overall circulation and infrastructure are recommended.

## RECOMMENDATIONS FOR FURTHER STUDIES

### Engineer's Study - Residential Enhancement Area

The West Oakland Infrastructure Report is a detailed engineering report specifically focused on the industrial sections of West Oakland, overlapping well with the Opportunity Areas as identified in this Specific Plan. However, the 2011 report does not examine the extent to which detailed infrastructure deficiencies may existing outside of these industrial areas, in those West Oakland residential neighborhoods identified as Residential Enhancement Areas in this Plan. While many of the infrastructure deficiencies in West Oakland are located within the industrial areas, a similar detailed engineering and cost estimating effort addressing the residential neighborhoods of West Oakland should be conducted. Such an engineering study should focus on the need for individual street segment pavement repairs, the closing of gaps in the existing sidewalk system, addressing the adequacy of street lighting for public safety, and needed maintenance and improvements to the water, sewer and storm drain systems.

### Other Agency Coordination

Certain infrastructure improvements identified in the West Oakland Infrastructure Report affect areas under the freeways (both under the West Grand viaduct, and in areas bordering on Emeryville and immediately adjacent to Port of Oakland operations. In these areas, the City may not always be the lead or responsible agency for implementing all of the identified improvements, and coordination with Caltrans, the Port of Oakland and Emeryville will be necessary for fully implementing West Oakland-based improvements.

#### *Coordinated Improvement Plans*

As individual development projects pursuant to this Specific Plan come forward, the City should seek to establish public/private partnerships with the developers of those projects. Under such partnerships, the financial resources of the City and the private development community can best be leveraged, at the locations of each new development, to maximize the infrastructure and street system improvements needed to not only serve the new development project, but also to incrementally make improvements that serve the overall community.