WATER SUPPLY

General Information

The City of Sacramento provides domestic water to the Downtown Infrastructure Study project area. The City utilizes both surface water and groundwater to meet the water demands. The City treats surface water diverted from the Sacramento and American Rivers through the Sacramento River Water Treatment Plant (SRWTP) and the E.A. Fairbairn Water Treatment Plant (FWTP), respectively. Additionally the City extracts groundwater from both the North Sacramento and Central Sacramento basins. The current reliable water production capacity is approximately 280 mgd.

Sacramento River Water Treatment Plant: The SRWTP began operation in 1924 with an initial capacity of 32 million gallons per day (mgd), and treats water diverted from the Sacramento River approximately one-half mile downstream of the confluence of the American River. A new water intake structure, located approximately 700 feet downstream of the old intake structure, was completed in 2003. Other expansions and modifications completed by the City since the 1920s have increased the treatment plant's design capacity to 160 mgd. Currently, due to the conditions of the existing facilities and hydraulic constraints, the SRWTP's reliable capacity is limited to 135 mgd. Design is underway for a project to rehabilitate the older facilities at the SRWTP to bring the capacity back to 160 mgd.

E.A. Fairbairn Water Treatment Plant: The FWTP is located adjacent the American River approximately seven miles upstream with the Sacramento River. The FWTP began operation in 1964 and has a current capacity of 200 mgd following an expansion completed in 2005. Currently, the California Department of Public Health (CDPH) has permitted a capacity of 160 mgd. However, the amount of water diverted is further limited by the so-called Hodge Flow Criteria. Generally, during the time of peak demand, most often in June, July, or August, the Hodge Flow Criteria could limit the diversion rate at the FWTP to 100 mgd.

Groundwater Wells: The City currently operates 27 municipal groundwater supply wells; 25 wells are located in the northern portion of the City, north of the American River, while the remaining 2 are located south of the American River. The total pumping capacity of the City's municipal supply wells is approximately 20.7 mgd, assuming 90 percent of the production capacity is available.

The City maintains eleven enclosed distributed water storage reservoirs with a total capacity of 45 million gallons. This water is used to meet the water demand for fire flows, emergencies, and peak hours where they exceed the maximum day supply rates. In addition to the reservoirs, the SRWTP & FWTP together maintain a combined on-site storage of over 43 million gallons.

The City operates pumping facilities throughout the area. There are 18 high lift service pumps at the SRWTP and FWTP. The City also maintains pumping facilities at ten of the City's storage reservoirs. These pump stations are of varying sizes and capacities.

The City differentiates the water mains into two distinct categories: water distribution mains and water transmission mains. Water distribution mains are smaller pipelines located in the streets and alleys utilized for water services. Water transmission mains are larger pipelines utilized to convey water to the distribution mains.

It is the City's policy to utilize the water distribution mains only for water services, fire services and fire hydrants. These pipes are typically 4 inches to 12 inches in diameter. If no smaller pipe is available, existing water mains 14 inches and 16 inches in diameter may be considered distribution mains. These pipes may be tapped only with the approval of the City of Sacramento Department of Utilities.

Transmission mains are 18 inches and larger in diameter. They are used to convey large volumes of water from the treatment plants to selected points throughout the distribution system. They are also utilized to transfer water to and from the storage reservoirs to meet fluctuating daily and seasonal demands. These mains cannot be tapped for water services, fire services or fire hydrants Considering each service tap is a potential weakening of the water main, the City currently has the policy to restrict the installation of service taps until

after a project has been reviewed and approved by the City. This is to restrict the number of taps to the mains to those that are in the ultimate location per an approved development plan. This reduces the number of service taps that are abandoned due to changes in the development plans.

The City Department of Utilities has an active Capital Improvement Program (CIP) for maintaining and upgrading the water supply system. The implementation of the water improvements to necessary to serve a specific project site is typically the responsibility of future developers. The City's policy is to require the developer to construct any infrastructure necessary to support the project in question. To determine if water needs for a project can be met a water supply test is performed on the existing system. If the existing water system is sufficient to meet the needs, no infrastructure upgrades are necessary. If the existing infrastructure is found to be insufficient for the project's needs, the developer is required to construct necessary infrastructure improvements.

The current City policy could prove burdensome to a small developer whose project exceeds the capacity of the water system. One project could, under this approach, be held responsible for major infrastructure improvements, creating the possibility of a financial responsibility making the project no longer viable. One possible mitigation for this problem could include the developer entering into agreements with adjacent developers to construct the required facilities as a small assessment district. This process: however, would be complex, expensive, and could be infeasible due to intractable owners.

The infrastructure improvements required for all new development will need to meet current City standards. Looped water main systems are typically required due to the unreliability of dead end mains, and the potential for water quality problems as a result of stagnant water. Additional water main installation may also be required depending on the existing system layout. The City's meter program will require all new water services to be metered.

Temporary source of water for construction is easily acquired two different ways. First, the contractor can purchase a construction service. This utilizes the ultimate water service tap. Secondly, the contractor can purchase rights to use water from an adjacent fire hydrant.

For additional information, the document titled "Department of Utilities Water Distribution System – Commonly Used Criteria", which summarizes the City's planning and design criteria is located in the Appendix C.

Existing Conditions

The Downtown Infrastructure Study project area is generally served by several major transmission mains ranging in size from 14-inch to 42-inch in diameter together with an extensive system of service mains ranging in size from 6-inch to 12-inch diameter.

A major transmission main serving the greater Downtown Sacramento area from the SRWTP enters the area at the west end of I Street through a set of dual 30/36 inch diameter pipelines that converge to a single 42-inch diameter pipeline at the 5th & I Street intersection. This 42-inch pipeline continues easterly through the Study area along I Street decreasing in size to a 36-inch and then to a 16-inch as it branches north and south to serve the greater Downtown area. At 6th Street it branches northerly to an 8-inch service main, southerly to a 24-inch transmission main, and continues easterly as a 36-inch transmission main. At 9th Street it branches northerly to a 14-inch transmission main, southerly to an 18-inch transmission main, and continues easterly as a 36-inch transmission main. At 11th Street the 36-inch transmission main turns northerly outside the Study area to H Street then easterly following H Street beyond the limits of the Study area. A 16-inch transmission main continues easterly on I Street to 12th Street where it branches northerly and southerly to a 20-inch transmission main. At 14th Street it branches again to a 16-inch transmission main both northerly & southerly, and continues easterly as a 16-inch transmission main until it leaves the Study area at 17th Street.

The 24 inch transmission main in 6th Street jogs easterly at J Street to 7th Street around the Westfield Downtown Plaza Mall Shopping Mall, then back to 6th Street at L Street, and continues southerly through the Study area. The 9th Street transmission main is an 18-inch transmission main from I Street to the K/L

Alley where it reduces to a 16-inch transmission main to Capitol Mall where it reduces again to a 14-inch transmission main south of the Study area. A 24-inch transmission main is located in 12th Street through the Study area. The 16-inch transmission main at 14th Street continues south to J Street where it jogs east to 15th Street around the Sacramento Convention Center Complex to K Street, back to 14th Street, and then southerly to L Street where it joins a 16-inch transmission main connected to the 20-inch transmission main in 12th Street. The I Street, 6th Street, and 12th Street transmission mains are identified as a Critical Water Main by the City Utilities Department.

There are no wells or reservoirs within the limits of the Study area. The nearest reservoir outside of the SRWTP is the Alhambra Reservoir located to the east of the Study area Alhambra Boulevard on the block bounded by Alhambra Boulevard, J Street, 33rd Street, & L Street. This reservoir together with the SRWTP are identified by the City as a Critical Infrastructure items.

The existing Downtown Study area is generally well served by an extensive system of service mains ranging in size from 6-inch to 12-inch diameters. Upsizing of the existing mains has been performed over the years as development of the Downtown Study area has occurred. However, some of the system mains are cast iron pipelines which have demonstrated a history of problems associated with mains reaching the end of their useful life. Hydraulic testing of these mains has determined a severe reduction in capacity. Continued replacement/upsizing of the cast iron mains, and the smaller 6-inch and 8-inch mains is envisioned in order to provide adequate domestic and fire suppression needs.

Proposed Conditions

Water Demands: The types of development envisioned with the Proposed Projects and Opportunity Sites are high density urban infill type projects. Housing units in these projects typically are smaller units (700-1000 square feet) with a smaller per capita occupancy rate per unit than single-family or multi-family units in suburban areas. The domestic water demands for these high density residential units is anticipated to be significantly reduced from the City's typical single family or multi-family water usage criteria.

The City's water demand criteria for an Equivalent Single Family Dwelling (ESD) unit is 400 gallons per day (gpd) per unit. A reduced water demand rate of 310 gpd has been used in recent planning efforts, and should be used for projects in the Downtown Infrastructure Study area. The City's criteria allows a reduction for multi-family units by applying a factor of 0.75 ESD. For the type of high-density residential urban infill development with smaller unit sizes and fewer people per unit, a factor of 0.55 ESD per unit should be used for the proposed project domestic water demands within the Study Area. This yields a generation rate of 170 gpd per unit. This is similar to the factors used for the Railyards and Richards Boulevard Specific Plan areas.

For the non-residential land uses, the City's standards recommend 0.2 ESDs per 1000 square feet for office/commercial buildings for general planning purposes. This generation rate is generally applied to both the Office and Commercial/Retail land uses, and yields a rate of 62 gpd per 1000 square feet. Factors for specific land uses such as restaurants, bars, dry cleaners, etc. with anticipated higher usage vary from 0.2 to 2.0 ESD per 1000 square feet.

The recent adoption by the State of California of SB7 – "20x2020" Water Conservation Standards requiring a 20% reduction in urban water usage by the year 2020 and the CalGreen Building Code will require reductions in overall water usage through stricter indoor and outdoor usage. These requirements mandating water conservation will further justify the use of the reduced water rates for the Study Area development.

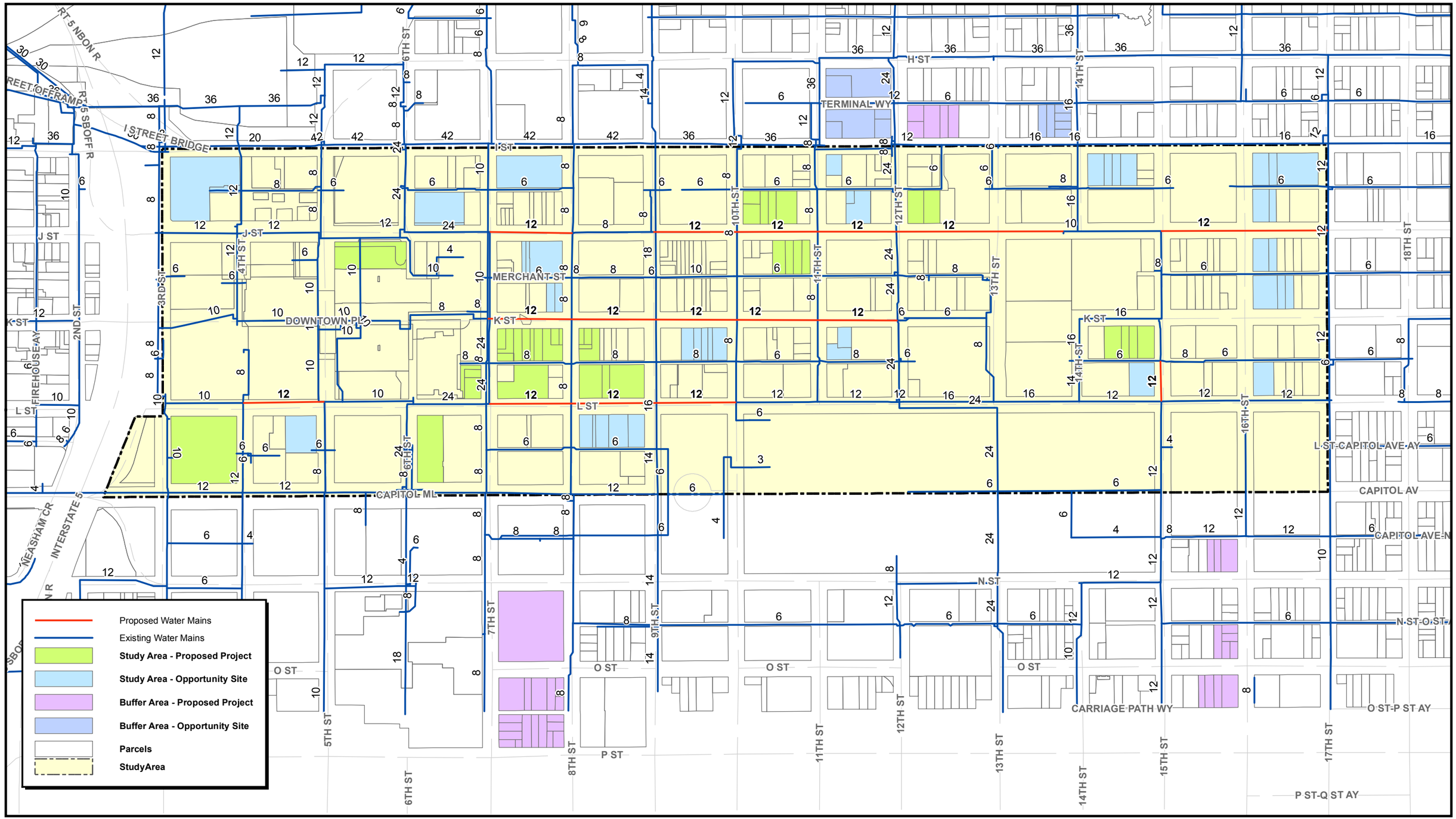
Infrastructure: The plan for the Downtown Infrastructure Study project area is to upgrade the existing water system supply grid to provide the Proposed Projects and Opportunity Sites with adequate water for both domestic and fire suppression needs. The existing water system in generally adequate, but will require strategic upgrades to serve the proposed projects.

The existing transmission mains are not anticipated to be a requirement for development within the limits of the Study Area. The development of the Sacramento Railyards area just north of the Study Area will require

relocation/replacement of the 30 & 36-inch transmission mains located near the northwest corner of the Study Area. These mains will be the responsibility of the City and the Railyards developer.

Extensions of the existing service main system is envisioned to provide adequate service to the developments with the Study Area. The proposed extensions of the existing service main system will be accomplished using new 12-inch watermains. The existing system of 8, 10, & 12-inch service mains will be retained provided they adequately serve future development with sufficient hydraulic capacity. The proposed 12-inch watermain along the K Street Mall (7th to 12th Streets) corridor may prove difficult and expensive to install due to the conflicting presence of the existing Light Rail system. The proposed water system improvements are depicted on Figure V-1.

The existing 6-inch and 8-inch mains located within the alleys can be retained to provide fire and domestic water service to the adjacent existing buildings. The alleyway mains will be retained as installation and maintenance of new services are more easily performed from the alleys. If alley improvements/activation projects occur, it is recommended older pipelines be replaced concurrent with other surface improvements.



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Downtown Infrastructure Study - Water Plan

FIGURE V-1

NOLTE BEYOND ENGINEERING