# Appendix J

## Utilities Supporting Information

- India Basin Memoranda:
  - Concept Design Technical Memorandum
  - Utility Description
    (Auxiliary Water Supply System)
  - Utility Description
    (Low Pressure Water System)
  - Utility Description
    (Recycled Water Distribution System)
  - 700 Innes & India Basin Open Space -
    Sanitary Sewer Design
  - 700 Innes & India Basin Open Space -
    Storm Drain Design
  - Water Demands Memorandum
  - Preliminary Water Demands
- San Francisco Public Utilities Commission
  Agenda Item: Water Supply Assessment for the
  India Basin Mixed-Use Project

# Memo

MAGNUSSON
KLEMENCIC
ASSOCIATES

**Structural + Civil Engineers**
1301 Fifth Avenue, Suite 3200 Seattle Washington 98101-2699 T: 206 292 1200 F: 206 292 1201 W: www.mka.com

| | | | |
|---|---|---|---|
| **TO** | Ashley Ludwig - GGN | **DATE** | 8/19/2016 |
| **FROM** | Drew Gangnes | **PAGE** | 1 OF 4 |
| **PROJECT** | **India Basin Park** | **PROJECT #** | A2960.50 |
| **SUBJECT** | Concept Design Technical Memorandum | | |

## Introduction

Magnusson Klemencic Associates (MKA) has been assisting Gustafson Guthrie Nichol (GGN) with civil engineering planning level input to their concept design for India Basin Park. MKA's conceptual engineering focus has been on water resource strategies and grading and earthwork analyses. This Technical Memorandum summarizes MKA's input to the conceptual design.

The conceptual design effort for India Basin Park covers two adjacent properties: the existing India Basin Shoreline Park (IBSP) and the 900 Innes site, see Figure 1. While the conceptual design is a holistic, new India Basin Park covering both of these two properties, information in this memo is organized by property to aid environmental permitting processes.

## Existing Conditions

This section describes the existing water resources situation at each property.

IBSP

IBSP is an operating city park.

*Domestic Water*

There is domestic water service on site serving irrigation controllers. There does not appear to be any other existing water demands on the site. A map of the City water system is shown in Figure 2.

*Sanitary Sewer*

There are no sanitary sewer demands on the site. Existing restroom service is via portable toilets. A map of the city wastewater collection system is shown in Figure 3.

*Storm Drainage*

The property is in the City's Separate Sewer Area, see Figure 4.

Figure 5 indicates the existing storm drainage situation at the site. There is one storm drain inlet within the turnaround that is conveyed to an outfall. Some portions of the site overland flow to this inlet while the remainder

of the site sheet flows to the shoreline. A combined sewer overflow pipe runs under Hudson Avenue under the IBSP site but no area of the site is connected to it.

900 Innes

900 Innes is a former boat maintenance and repair facility that is currently out of use and fenced off from public access.

*Domestic Water*

There are no current water demands on the site. However, it is presumed the Shipwrights Cottage (and potentially other buildings) utilized municipal water when they were in service. A map of the City water system is shown in Figure 2.

*Sanitary Sewer*

There are no current sanitary sewer demands on the site. However, it is presumed the Shipwrights Cottage (and potentially other buildings) may have utilized municipal sewer service when they were in service. A city wastewater line runs through a portion of the 900 Innes site which seems to be in a location that could have allowed for gravity collection of the Shipwrights Cottage and some of the other onsite buildings, see Figure 3.

*Storm Drainage*

Figure 5 indicates the existing storm drainage situation at the site. The combined sewer overflow pipe in Hudson Avenue outfalls within the 900 Innes property but none of the property is connected to the pipe. The entire site sheet flows to the shoreline.

While this property is not currently mapped in the City's GIS system as part of the Separated Sewer Area, we have learned from SFPUC that this is because it has no inlet/outlet infrastructure (only sheet flows to the shoreline), see Figure 4.

## Proposed Concepts

This section describes the proposed water resources and earthwork concepts for the new park by property.

IBSP

*Domestic Water*

MKA provided estimated project water demands by property in a memo dated July 12, 2016. This memo is attached in Appendix A.

*Sanitary Sewer*

The sanitary sewer demands from the park can be inferred from the Water Demand Memo in Appendix A. All water demands aside from Irrigation, Water Feature Top-off and Drinking Fountains will become sanitary sewer flows. Another infrequent sanitary sewer demand will be twice yearly draining of the water feature for routine maintenance, this will entail draining down 3,330 cubic feet of water.

*Storm Drainage*

The proposed storm drainage for the project is shown in Figure 6. Storm drainage will be managed per the SFPUC storm drainage code. Swale, bioretention or constructed wetland Best Management Practices (or a combination of these) will be used to manage runoff from new impervious surfaces. The concept design breaks down topographically into two basins within the IBSP property. Figure 6 shows a concept for utilizing constructed wetlands to manage the runoff in each sub-basin. The northern sub-basin will utilize the existing outfall near the turnaround and the southern sub-basin will require a new outfall.

Recycle Water

The project plans to create recycled water for park irrigation and potentially toilet flushing by mining wastewater from the combined sewer pipeline in Hunters Point Blvd and treating it in an onsite wastewater treatment system, see Figure 7.

*Earthwork*

The anticipated earthwork for the project is indicated in Figure 8.

<u>900 Innes</u>

*Domestic Water*

MKA provided estimated project water demands by property in a memo dated July 12, 2016. This memo is attached in Appendix A.

*Sanitary Sewer*

The sanitary sewer demands from the park can be inferred from the Water Demand Memo in Appendix A. All water demands aside from Irrigation, Water Feature Top-off and Drinking Fountains will become sanitary sewer flows. Another infrequent sanitary sewer demand will be twice yearly draining of the water feature for routine maintenance, this will entail draining down 1,770 cubic feet of water.

*Storm Drainage*

The proposed storm drainage for the project is shown in Figure 6. Storm drainage will be managed per the SFPUC storm drainage code. Swale, bioretention or constructed wetland Best Management Practices (or a combination of these) will be used to manage runoff from new impervious surfaces. The concept design breaks down

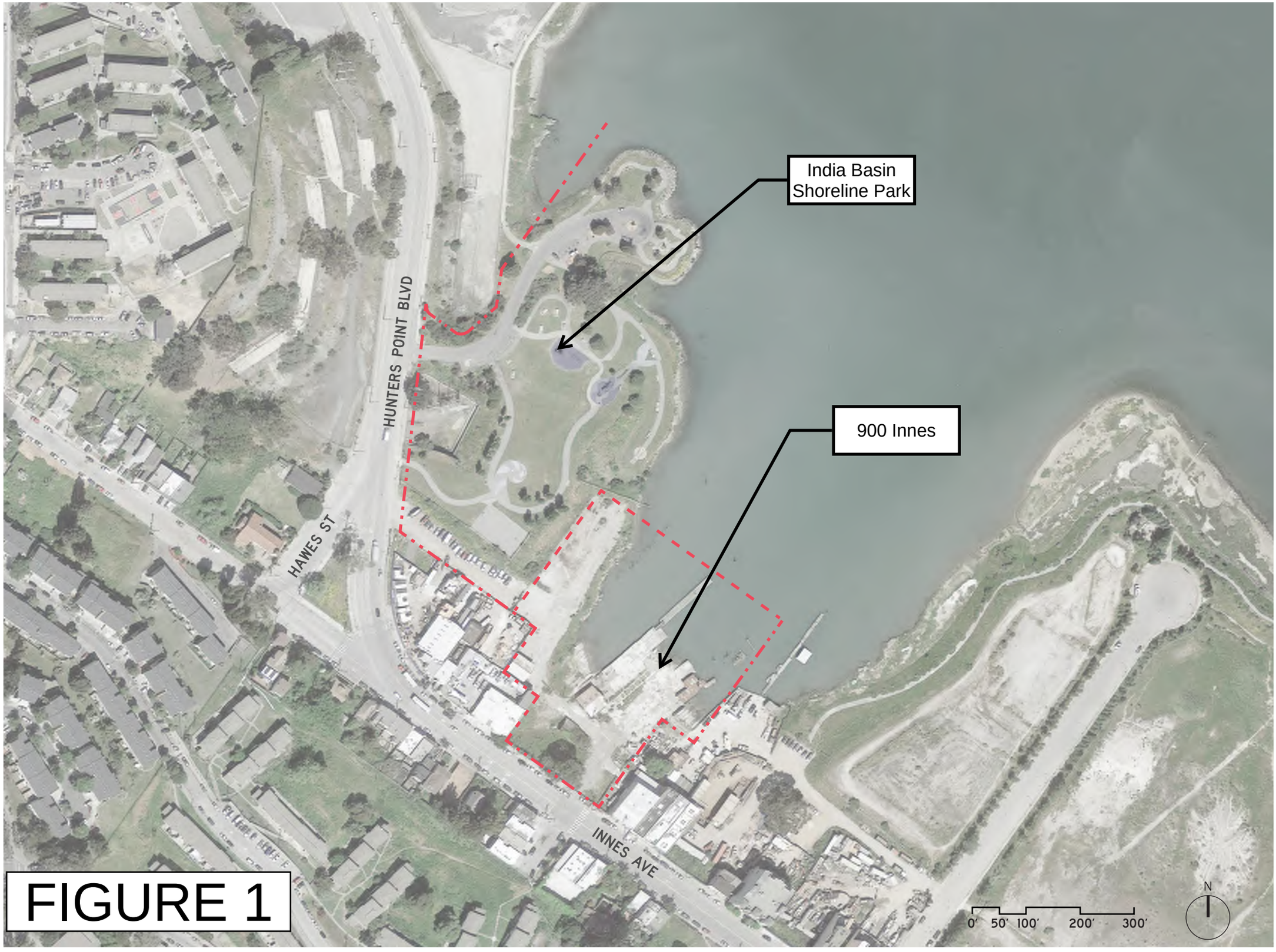
topographically into a single basin within the 900 Innes property. Figure 6 shows a concept for utilizing a constructed wetland to manage the runoff for the property. This property will utilize a new outfall that will be jointly used by 900 Innes and the abutting Build Inc development.

Recycle Water

The project plans to create recycled water for park irrigation and potentially toilet flushing by mining wastewater from the combined sewer pipeline in Hunters Point Blvd and treating it in an onsite wastewater treatment system on the IBSP property, see Figure 7. Recycled water will be piped from that property for use at the 900 Innes property.

*Earthwork*

The anticipated earthwork for the project is indicated in Figure 8.


India Basin
Shoreline Park
900 Innes
HUNTERS POINT BLVD
HAWES ST
INNES AVE
0' 50' 100' 200' 300'
N

# FIGURE 1

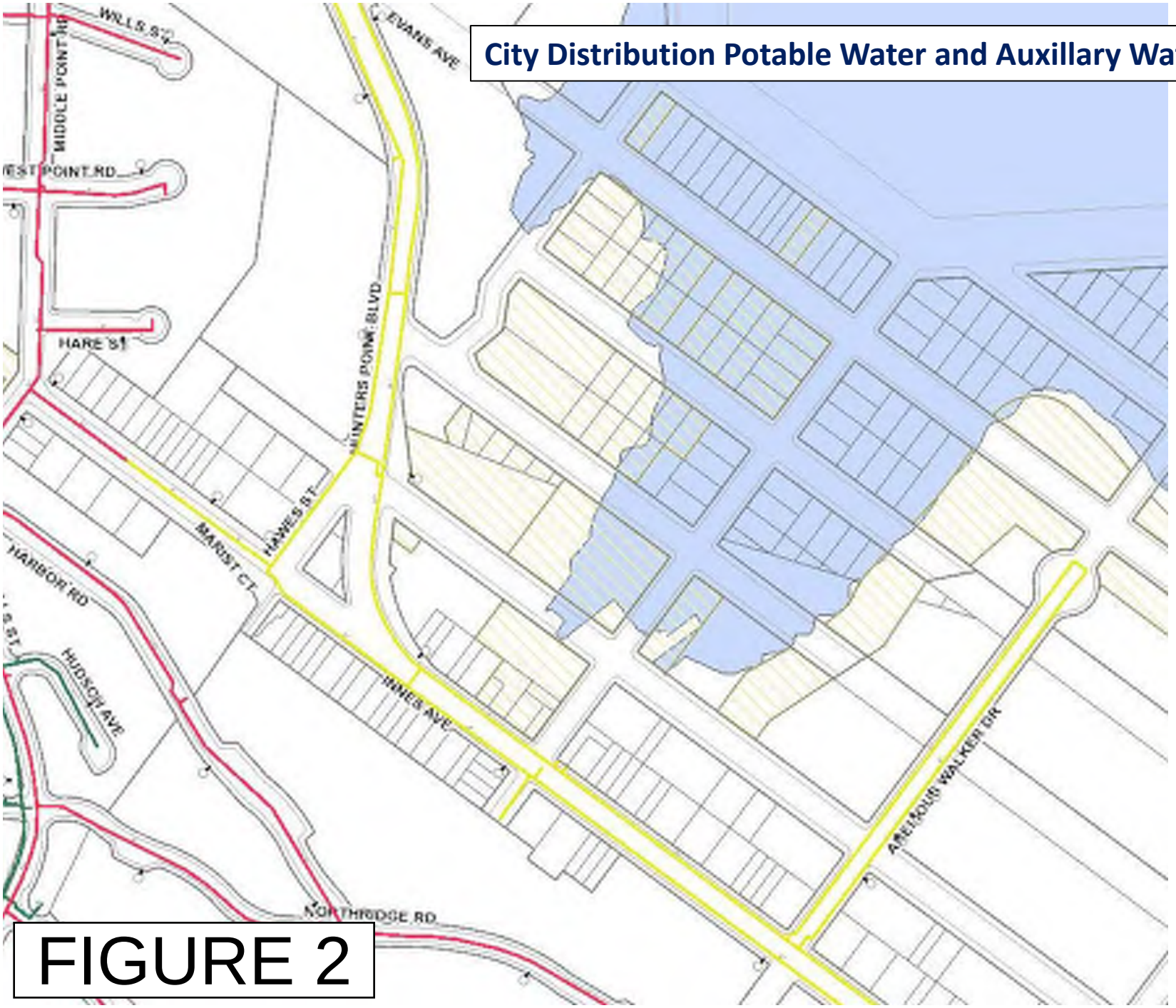

City Distribution Potable Water and Auxillary Water Supply
WILLS ST
MIDDLE POINT RD
EST POINT RD
EVANS AVE
HARE ST
HUNTERS POINT BLVD
HAYES ST
MARIST CT
HARBOR RD
HUDSON AVE
HINES AVE
AMELIA EARHART WALKER DR
NORTHRIDGE RD

FIGURE 2


Wastewater Enterprise, Collection System Division
FIGURE 3

Home ▾ San Francisco Separate Sewer (MS4) Area Map

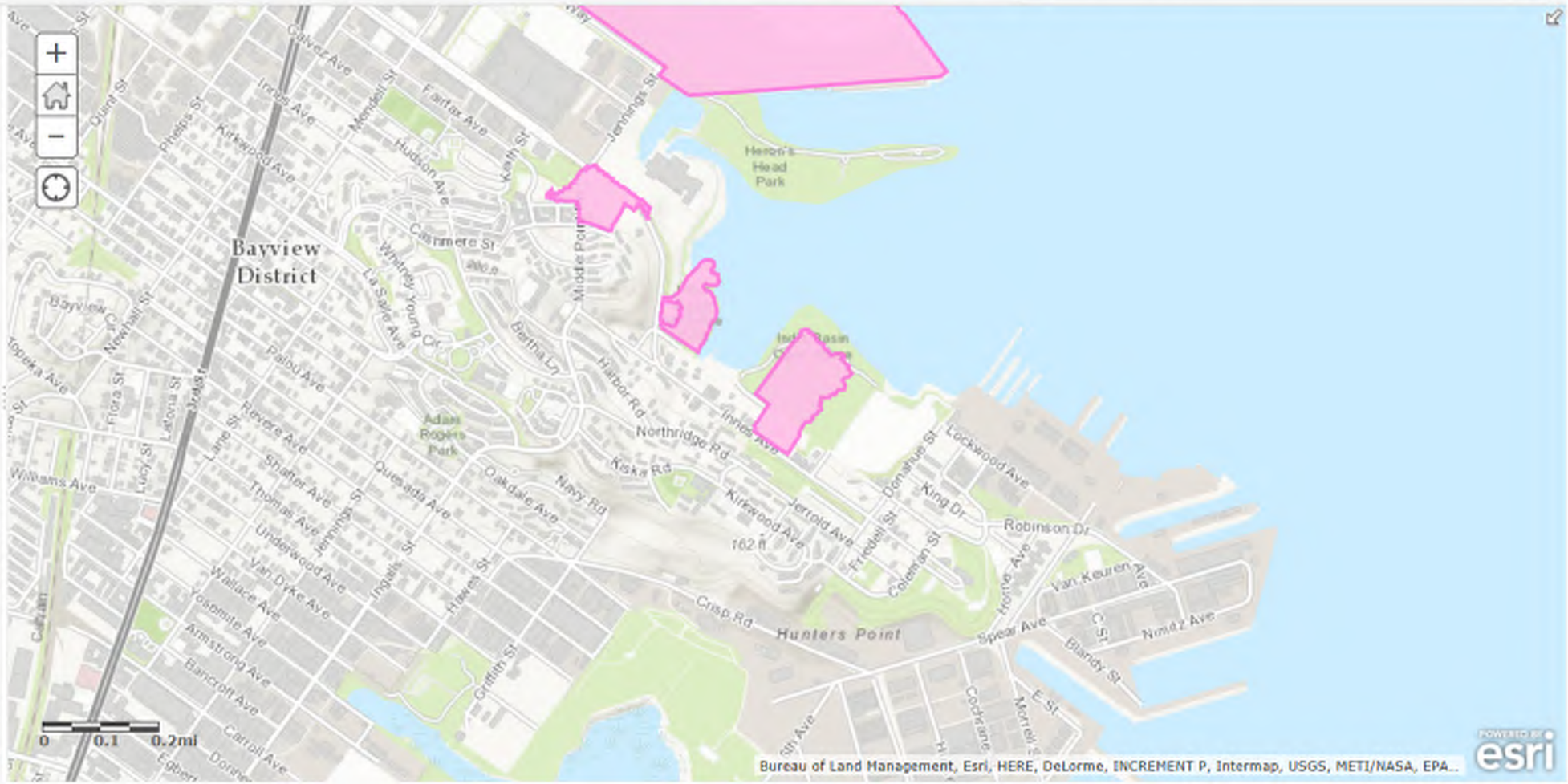
Sign In

Details | Basemap | Share | Print | Measure | Find address or place

About | Content | Legend

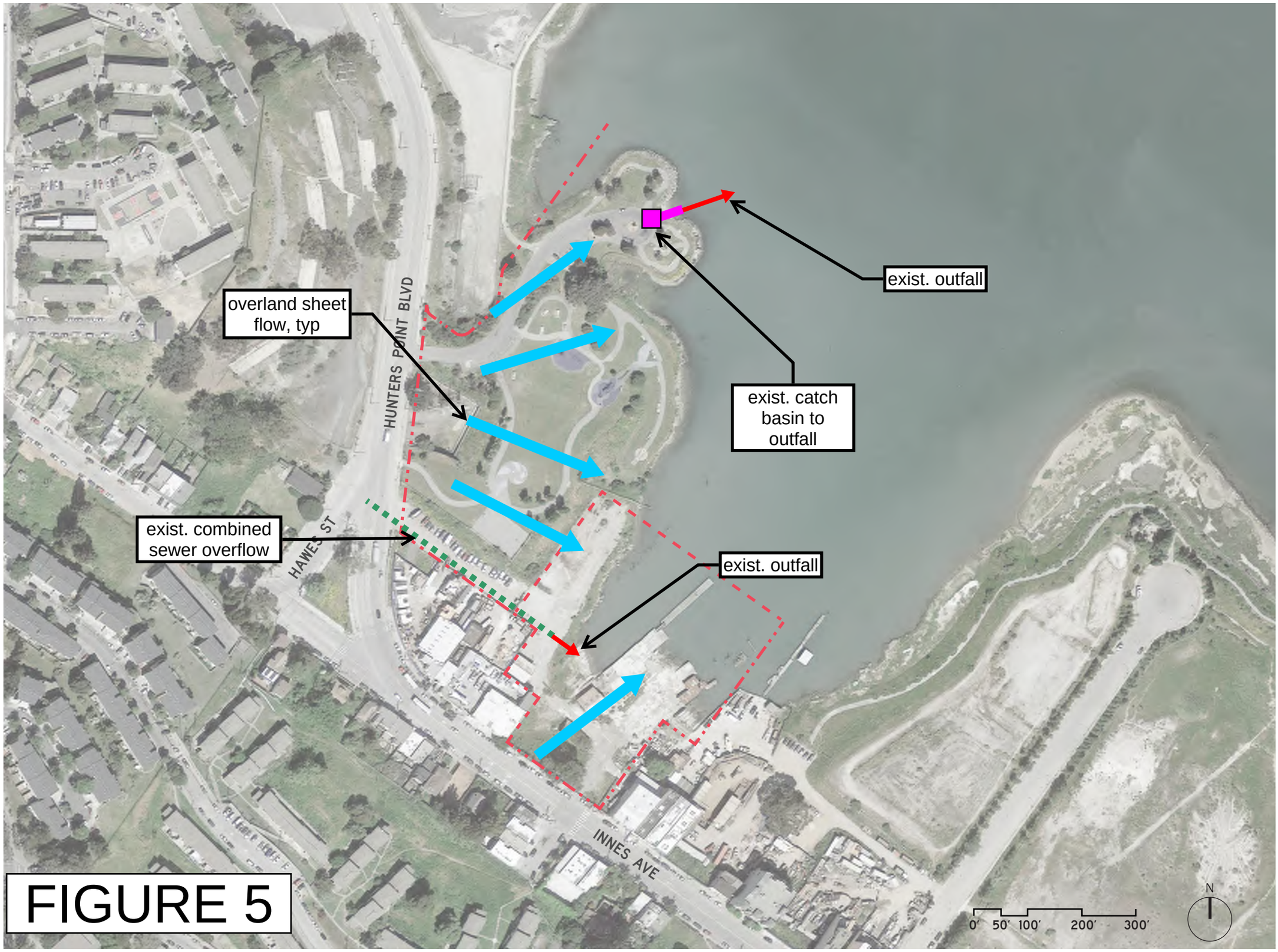
Legend

**Separate Sewer (MS4) Areas**

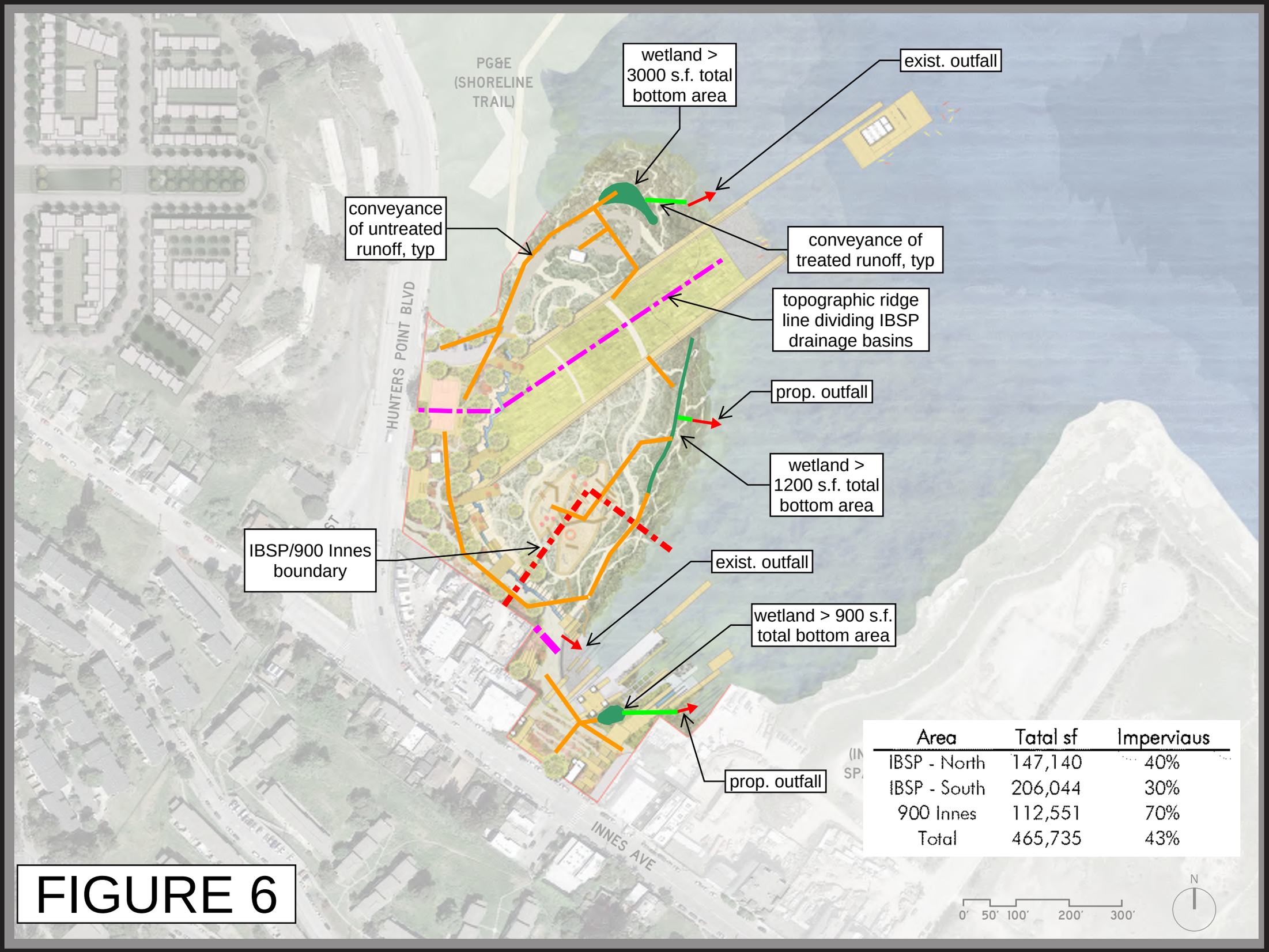



Esri.com . Help . Terms of Use . Privacy . Contact Esri . Report Abuse

FIGURE 4


exist. outfall
overland sheet flow, typ
HUNTERS POINT BLVD
exist. catch basin to outfall
exist. combined sewer overflow
HAWES ST
exist. outfall
INNES AVE
0' 50' 100' 200' 300'
N

# FIGURE 5


PG&E
(SHORELINE
TRAIL)
HUNTERS POINT BLVD
INNES AVE
wetland > 3000 s.f. total bottom area
exist. outfall
conveyance of untreated runoff, typ
conveyance of treated runoff, typ
topographic ridge line dividing IBSP drainage basins
prop. outfall
wetland > 1200 s.f. total bottom area
IBSP/900 Innes boundary
exist. outfall
wetland > 900 s.f. total bottom area
prop. outfall
Area | Tatal sf | Impervious
IBSP - North | 147,140 | 40%
IBSP - South | 206,044 | 30%
900 Innes | 112,551 | 70%
Total | 465,735 | 43%
0' 50' 100' 200' 300'
N

# FIGURE 6

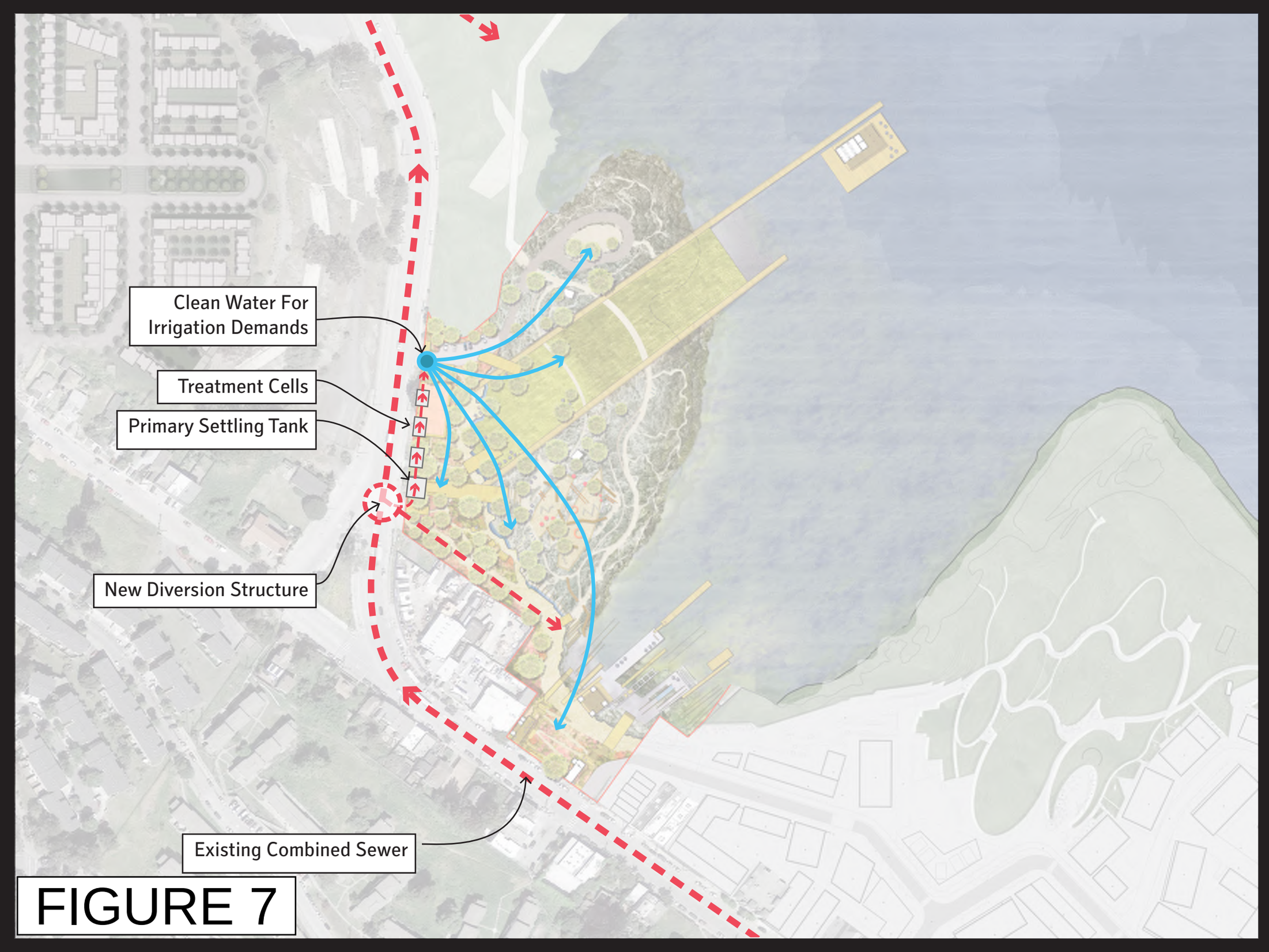
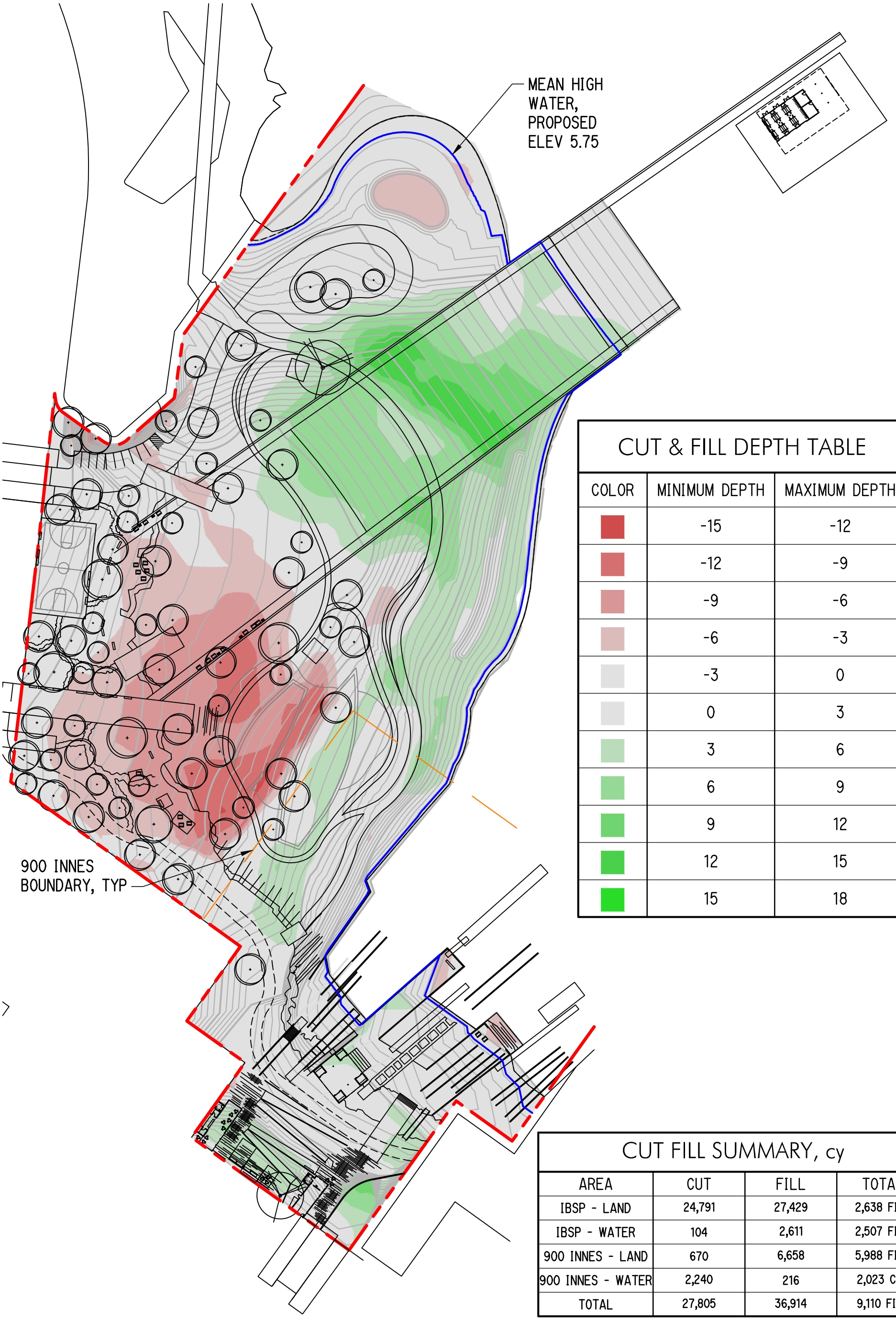

Clean Water For Irrigation Demands
Treatment Cells
Primary Settling Tank
New Diversion Structure
Existing Combined Sewer

FIGURE 7




| CUT & FILL DEPTH TABLE | | |
|---|---|---|
| COLOR | MINIMUM DEPTH | MAXIMUM DEPTH |
| | -15 | -12 |
| | -12 | -9 |
| | -9 | -6 |
| | -6 | -3 |
| | -3 | 0 |
| | 0 | 3 |
| | 3 | 6 |
| | 6 | 9 |
| | 9 | 12 |
| | 12 | 15 |
| | 15 | 18 |

| CUT FILL SUMMARY, cy | | | |
|---|---|---|---|
| AREA | CUT | FILL | TOTAL |
| IBSP - LAND | 24,791 | 27,429 | 2,638 FILL |
| IBSP - WATER | 104 | 2,611 | 2,507 FILL |
| 900 INNES - LAND | 670 | 6,658 | 5,988 FILL |
| 900 INNES - WATER | 2,240 | 216 | 2,023 CUT |
| TOTAL | 27,805 | 36,914 | 9,110 FILL |

# INDIA BASIN PARK: CUT FILL EXHIBIT

8/11/2016

100 50 0 100 200

scale 1" = 100' feet

FIGURE 8

# Appendix A - MKA Water Demand Memo

# Memo

MAGNUSSON
KLEMENCIC
ASSOCIATES

**Structural + Civil Engineers**

1301 Fifth Avenue, Suite 3200 Seattle Washington 98101-2699 T: 206 292 1200 F: 206 292 1201 W: www.mka.com

| | | | |
|---|---|---|---|
| TO | Ashley Ludwig - GGN | DATE | 7/12/2016 |
| FROM | Drew Gangnes | PAGE | 1 OF 1 |
| PROJECT | **India Basin Park Concept Design** | PROJECT # | A2960.50 |
| SUBJECT | Preliminary Water Demands | | |

This memo summarizes MKA's preliminary assessment of water demands for the new India Basin Park project.

## Background

MKA has been providing civil engineering consulting to GGN as they prepare the conceptual design for a new India Basin Park. The new park will encompass the combined land area of the existing India Basin Shoreline Park (IBSP) and the 900 Innes site. The water demands noted in this memo are based on the conceptual park design and program provided by GGN.

## Preliminary Water Demands

Table 1 summarizes the preliminary water demands for the project, with a breakdown by IBSP and 900 Innes sites. The "potable" column is an accounting of which demands must be served by potable, city water vs those that might be served by recycled water in the event that recycled water is available at the site.

Table 1. Preliminary Water Demands

| Park Component | Total *gal/year* | IBSP *gal/year* | 900 INNES *gal/year* | Potable |
|---|---|---|---|---|
| Irrigation | 927,344 | 805,029 | 122,315 | N |
| Water Feature Top-off | 83,516 | 69,117 | 14,399 | Y |
| Restrooms Flow | 19,800 | 13,200 | 6,600 | Y |
| Restrooms Flush | 112,200 | 74,800 | 37,400 | N |
| Concession Stand | 99,000 | 0 | 99,000 | Y |
| Drinking Fountains | 24,000 | 19,200 | 4,800 | Y |
| Kayak Station | 660,000 | 660,000 | 0 | Y |
| Fish Station | 270,000 | 270,000 | 0 | Y |
| Water Play | | 0 | TBD | Y |
| Totals | 2,195,860 | 1,911,346 | 284,514 | |

## Basis of Calculations

Irrigation demands were computed using the SFPUC Water Demand Calculator which takes into account different weather data, the areas of planting and species factors. The water feature top-off was computed based on the

MAGNUSSON
KLEMENCIC
ASSOCIATES

Structural + Civil Engineers
1301 Fifth Avenue, Suite 3200 Seattle Washington 98101-2699 T: 206 292 1200 F: 206 292 1201 W: www.mka.com



water feature area and weather data. Water demands for the other park components were calculated based on the assumptions noted in Table 2.

Table 2. Water Demand Assumptions

| Park Component | count | gpm | hr/day | day/yr | gal/yr | gal/d |
|---|---|---|---|---|---|---|
| Hose Bib - Kayak | 2 | 10 | 2 | 275 | 660,000 | 1,808 |
| Hose Bib - Fish | 1 | 10 | 2 | 300 | 270,000 | 740 |
| Drinking Fountain | | 0.13 | 2 | 300 | 24,000 | 66 |
| | **vis/day** | **gal/vis** | **day/yr** | **gal/yr** | **Flow** | **Flush** |
| Restrooms | 100 | 4 | 330 | 132,000 | 19,800 | 112,200 |
| | **vis/day** | **gal/vis** | **day/yr** | **gal/yr** | | |
| Concession | 100 | 3 | 330 | 99,000 | | |

BkF 100+ YEARS
ENGINEERS . SURVEYORS . PLANNERS *Delivering Inspired Infrastructure*

# MEMORANDUM

Date: July 15, 2016 BKF Job Number: 20140069

To: Courtney Pash, BUILD, INC.
Trafton Bean, BUILD, INC.

From: Tom Morse, BKF
Jenn Chu, BKF

Subject: India Basin – Utility Description (Auxiliary Water Supply System)

## PURPOSE

In the event a supplemental fire water system is required for the India Basin Project ("Project"), this memorandum provides a description of the City of San Francisco's existing auxiliary water supply system (AWSS) and the current status of proposed AWSS infrastructure.

## BACKGROUND

The Project encompasses approximately 23.32 acres in the Bayview Hunters Point neighborhood in San Francisco. The site is bound by the San Francisco Bay to the north, Candlestick-Hunters Point Shipyard Development to the east, Innes Avenue to the south, and 900 Innes to the west.

The Project consists of two properties – 700 Innes and India Basin Open Space. The 700 Innes property and India Basin Open Space would be developed by Build Inc. to include public rights-of-way, residential units, commercial uses, parking, and open space.

## AUXILIARY WATER SUPPLY SYSTEM

### Existing Conditions

The City of San Francisco owns and operates an auxiliary water supply system (AWSS), independent of the City's low pressure water system. The AWSS infrastructure includes a redundant, non-potable, high pressure water system comprised of a network of high pressure mains and fire hydrants built solely for firefighting.

The City also has over 170 underground cisterns strategically located throughout the City. These cisterns have no connection to either the low pressure water system or AWSS. They provide water storage available to the San Francisco Fire Department (SFFD) in the event of major damages to the existing low pressure water system or existing AWSS.

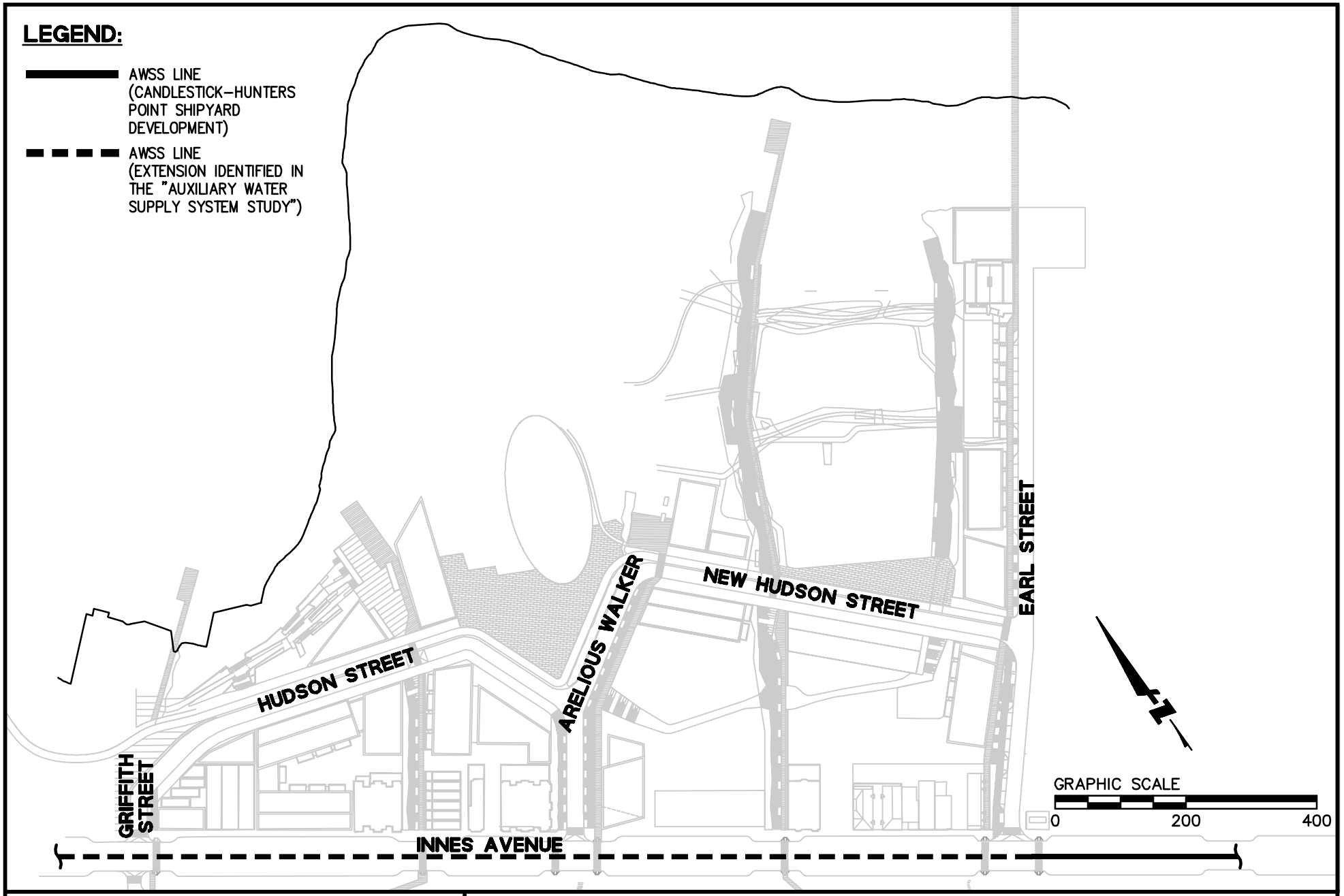
Existing AWSS infrastructure is currently not available along the Project's Innes Avenue frontage. The adjacent Candlestick-Hunters Point Shipyard Development plans to install AWSS infrastructure in Innes Avenue to Earl Street. In the January 23, 2009 report entitled "The Auxiliary Water Supply System Study", prepared by Metcalf & Eddy and AECOM ("Report"), the City has plans to continue the extension of AWSS infrastructure in Innes Avenue from Earl Street to Evans

Avenue.

Proposed Conditions

The proposed AWSS infrastructure for the Project is currently unknown. The AWSS extension identified in the Report would provide AWSS infrastructure along the Project's Innes Avenue frontage. In addition, it is our understanding the SFPUC City Distribution Division (CDD) and SFFD will commission an AWSS study that will make AWSS recommendations and confirm the extension is adequate for the Project.

Exhibit 1 shows the proposed AWSS infrastructure to be installed by the adjacent Candlestick-Hunters Point Shipyard Development and the extension identified in the Report.




BkF
ENGINEERS / SURVEYORS / PLANNERS
255 SHORELINE DRIVE SUITE 200
REDWOOD CITY, CA 94065
650/482-6300
650/482-6399 (FAX)

# INDIA BASIN – EXHIBIT 1
# PROPOSED AUXILIARY WATER SUPPLY SYSTEM

Drawn CHG
Job No. 20140069
Checked JNC/TRM
Date 07/15/16
Approved TRM
Sheet 1 of 1

BkF 100+ YEARS
ENGINEERS . SURVEYORS . PLANNERS *Delivering Inspired Infrastructure*

# MEMORANDUM

Date: July 15, 2016 BKF Job Number: 20140069

To: Courtney Pash, BUILD, INC.
Trafton Bean, BUILD, INC.

From: Tom Morse, BKF
Jenn Chu, BKF

Subject: India Basin – Utility Description (Low Pressure Water System)

## PURPOSE

The purpose of this memorandum is to provide a description of existing and proposed low pressure water system infrastructure associated with the India Basin Project ("Project").

## BACKGROUND

The Project encompasses approximately 23.32 acres in the Bayview Hunters Point neighborhood in San Francisco. The site is bound by the San Francisco Bay to the north, Candlestick-Hunters Point Shipyard Development to the east, Innes Avenue to the south, and the 900 Innes/India Basin Shoreline Park Development to the west.

The Project consists of two properties – 700 Innes and India Basin Open Space. The 700 Innes property and India Basin Open Space would be developed by Build Inc. to include public rights-of-way, residential units, commercial uses, parking, and open space.

## LOW PRESSURE WATER SYSTEM

### Existing Conditions

The City's potable water is supplied through a low pressure distribution system. This system is owned by SFPUC and maintained by DPW. Potable water supply is currently available from a 16-inch main in Innes Avenue. Exhibit 1 shows the existing low pressure water system.

There are two existing fire hydrants along the Innes Avenue frontage – located at the Innes Avenue/Arelious Walker and Innes Avenue/Earl Street intersections. BKF is currently obtaining pressure and flow data for these hydrants from the San Francisco Fire Department. The required fire flow for the project has not yet been determined and is dependent on the proposed building areas and construction types.

### Proposed Conditions

The proposed low pressure water system will serve the potable water demands and fire flow demands for the Project. Exhibit 2 shows the proposed low pressure water system.

In order to maintain connectivity and redundancy, the Project proposes to provide a low pressure

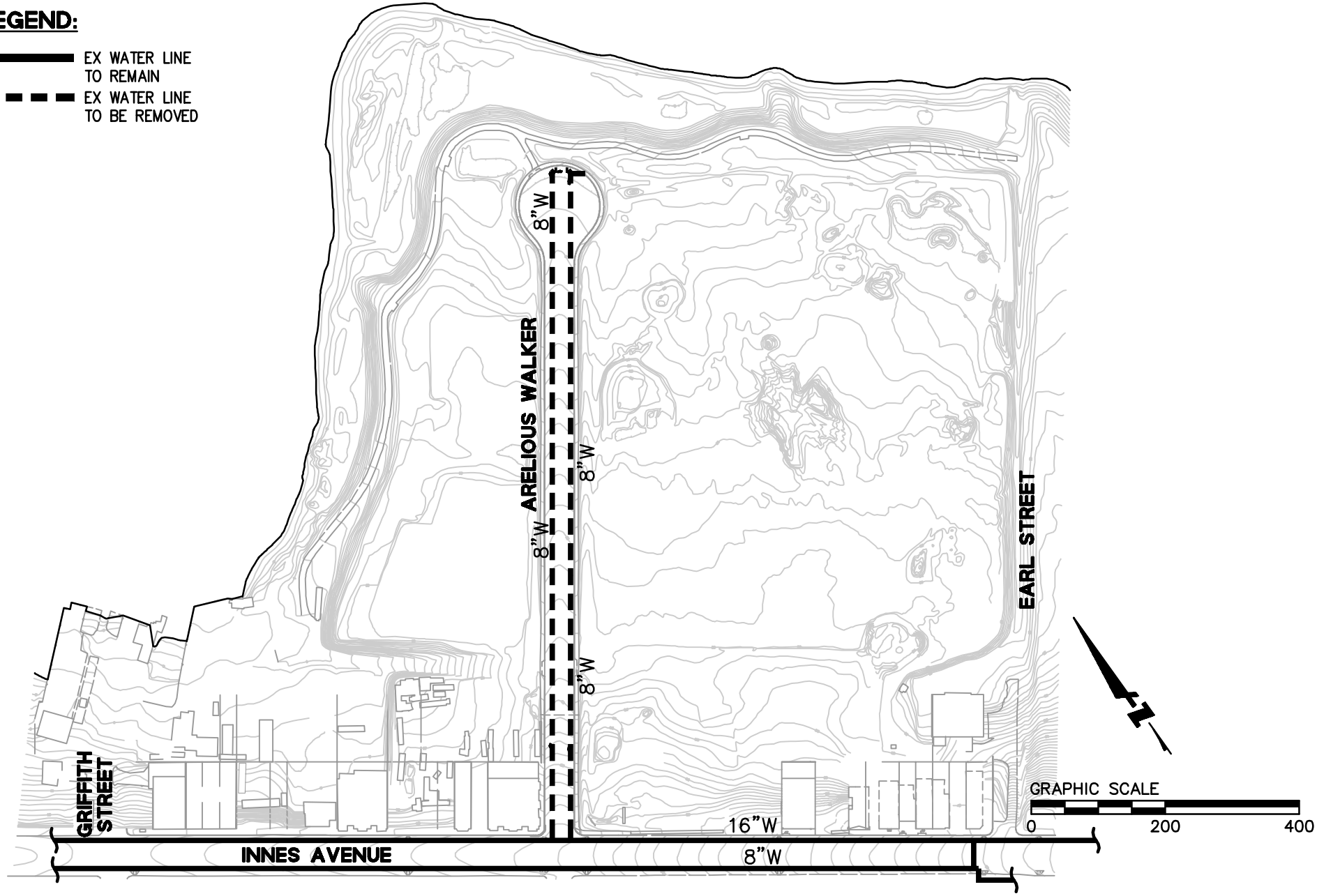
water network within the proposed streets. The proposed low pressure water system will connect to the existing low pressure water system at the following locations:

- Innes Avenue and Earl Street
- Innes Avenue and Arelious Walker
- Innes Avenue and Griffith Street

**LEGEND:**

EX WATER LINE TO REMAIN

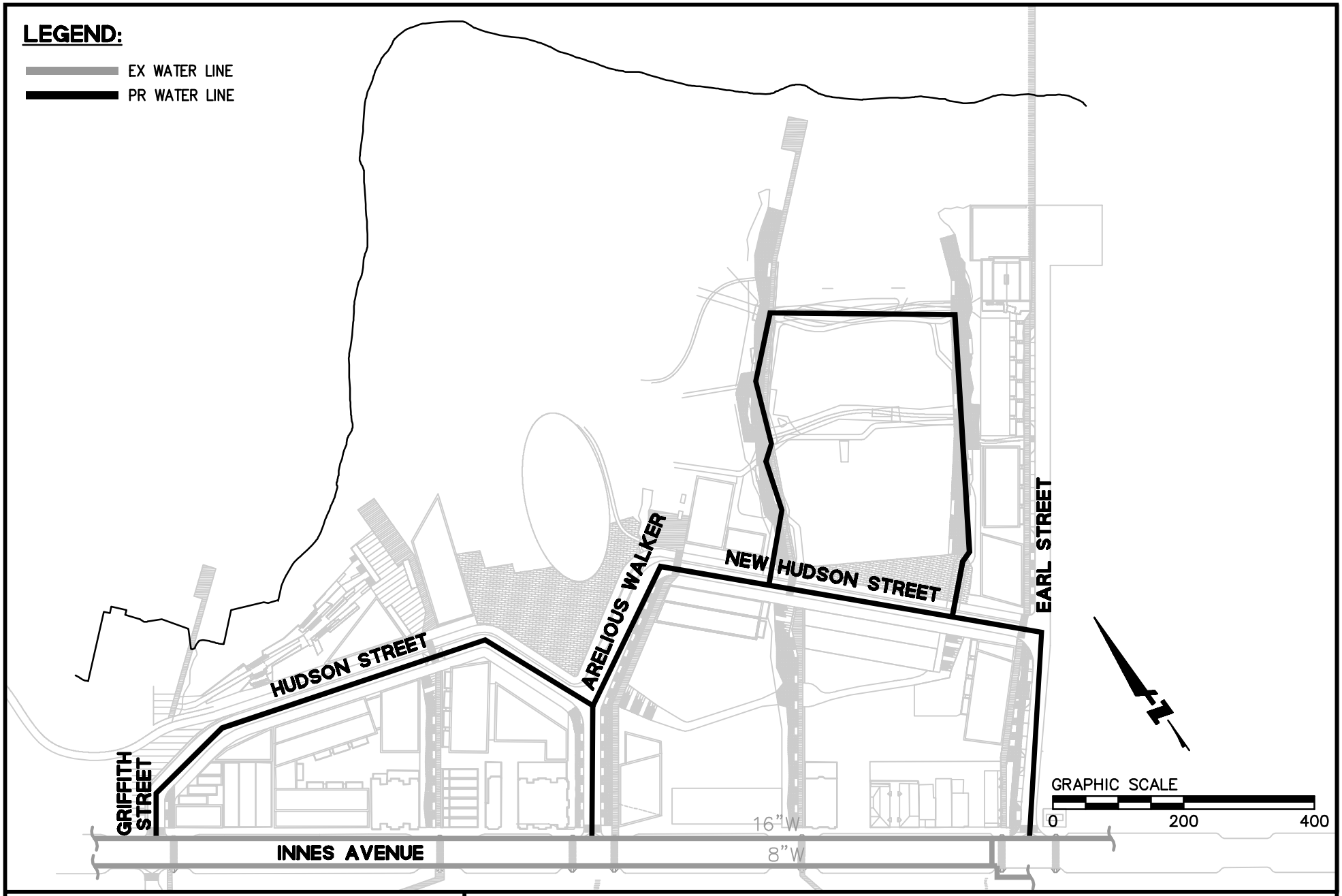
EX WATER LINE TO BE REMOVED




BkF
ENGINEERS / SURVEYORS / PLANNERS
255 SHORELINE DRIVE SUITE 200
REDWOOD CITY, CA 94065
650/482-6300
650/482-6399 (FAX)

# INDIA BASIN - EXHIBIT 1
# EXISTING LOW PRESSURE WATER SYSTEM

Drawn CHG
Job No. 20140069
Checked JNC/TRM
Date 07/15/16
Approved TRM
Sheet 1 of 2




BkF
ENGINEERS / SURVEYORS / PLANNERS
255 SHORELINE DRIVE SUITE 200
REDWOOD CITY, CA 94065
650/482-6300
650/482-6399 (FAX)

# INDIA BASIN - EXHIBIT 2
# PROPOSED LOW PRESSURE WATER SYSTEM

Drawn CHG
Job No. 20140069
Checked JNC/TRM
Date 07/15/16
Approved TRM
Sheet 2 of 2

BkF 100+ YEARS
ENGINEERS . SURVEYORS . PLANNERS *Delivering Inspired Infrastructure*

# MEMORANDUM

Date: August 2, 2016 BKF Job Number: 20140069

To: Courtney Pash, BUILD
Trafton Bean, BUILD

From: Tom Morse, BKF
Jenn Chu, BKF

Subject: India Basin – Utility Description (Recycled Water Distribution System)

## PURPOSE

The purpose of this memorandum is to provide a description of existing and proposed recycled water distribution system infrastructure associated with the India Basin Project ("Project"). Treatment, storage, and pumping will be addressed in a separate memorandum.

## BACKGROUND

The Project encompasses approximately 23.3 acres in the Bayview Hunters Point neighborhood in San Francisco. The site is bound by the San Francisco Bay to the north, Candlestick-Hunters Point Shipyard Development to the east, Innes Avenue to the south, and the 900 Innes/India Basin Shoreline Park Development to the west.

The Project consists of two properties – 700 Innes and India Basin Open Space. The 700 Innes property and India Basin Open Space would be developed by Build Inc. to include public rights-of-way, residential units, commercial uses, parking, and open space.

## RECYCLED WATER SYSTEM

### Existing Conditions

There is currently no existing recycled water infrastructure within or adjacent to the Project.

### Proposed Conditions

The Project is located within the City's designated recycled water use area. As required by the City's Recycled Water Ordinance, the Project will install recycled water infrastructure in the project streets. Proposed non-potable water demands were calculated and summarized in the "India Basin – Water Demand Memorandum", prepared by BKF Engineers, dated July 18, 2016.

Since recycled water infrastructure is not available adjacent to the Project, the following options are being analyzed for providing recycled water to the Project:

*Option 1 – Connect to Existing Low Pressure Water System*

Since a recycled water supply will not be available during the first phases of the project

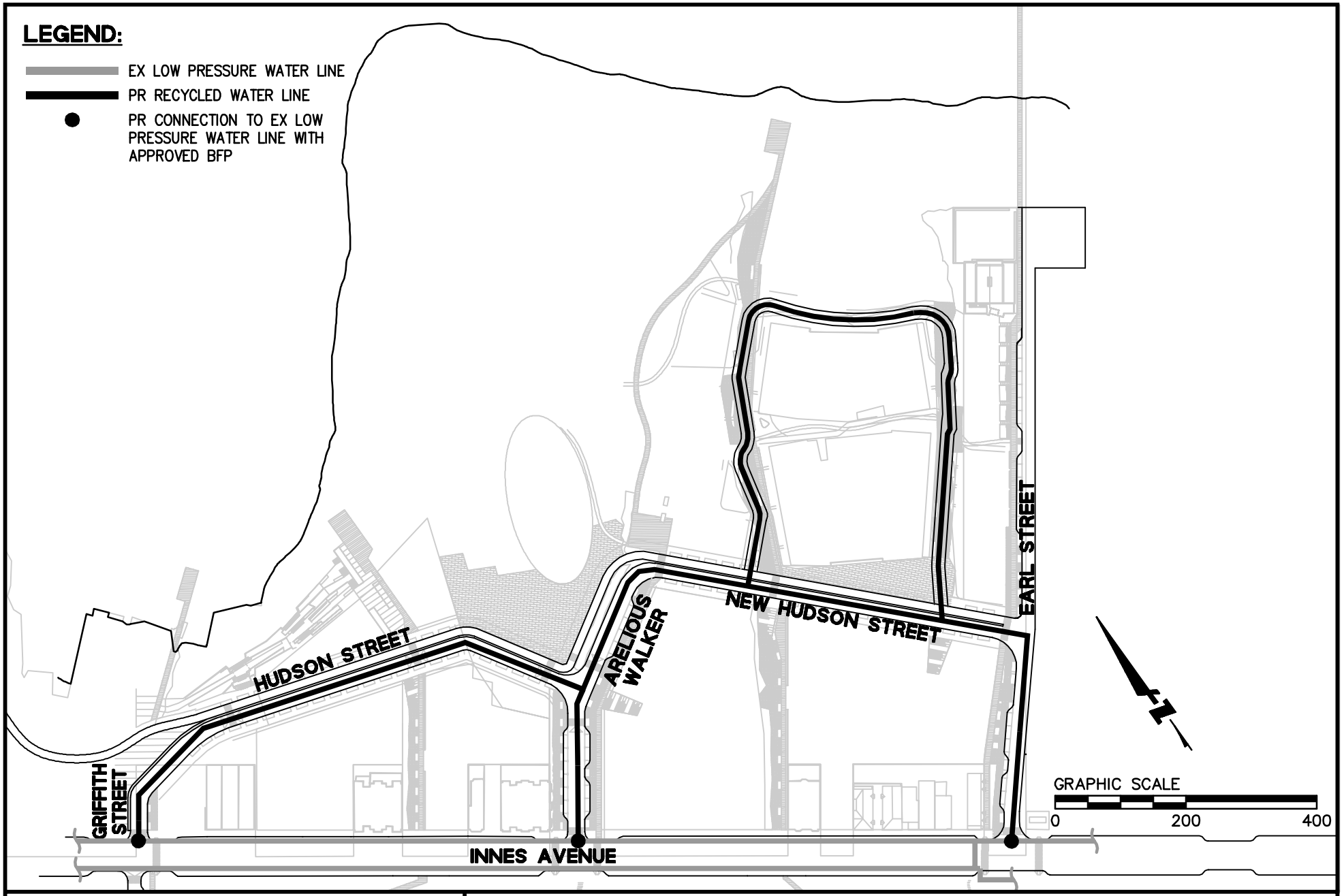
development, the recycled water distribution system could potentially be served from interim connections to the existing low pressure water system in Innes Avenue. Appropriate backflow prevention devices would be installed at each connection point to prevent backflow from the recycled water system to the low pressure water system. The proposed recycled water distribution system would potentially connect to the existing low pressure water system at the following locations:

- Innes Avenue and Griffith Street
- Innes Avenue and Arelious Walker
- Innes Avenue and Earl Street

Exhibit 1 shows the proposed recycled water distribution system under this option.

*Option 2 – Construct Onsite Wastewater Treatment Facility*

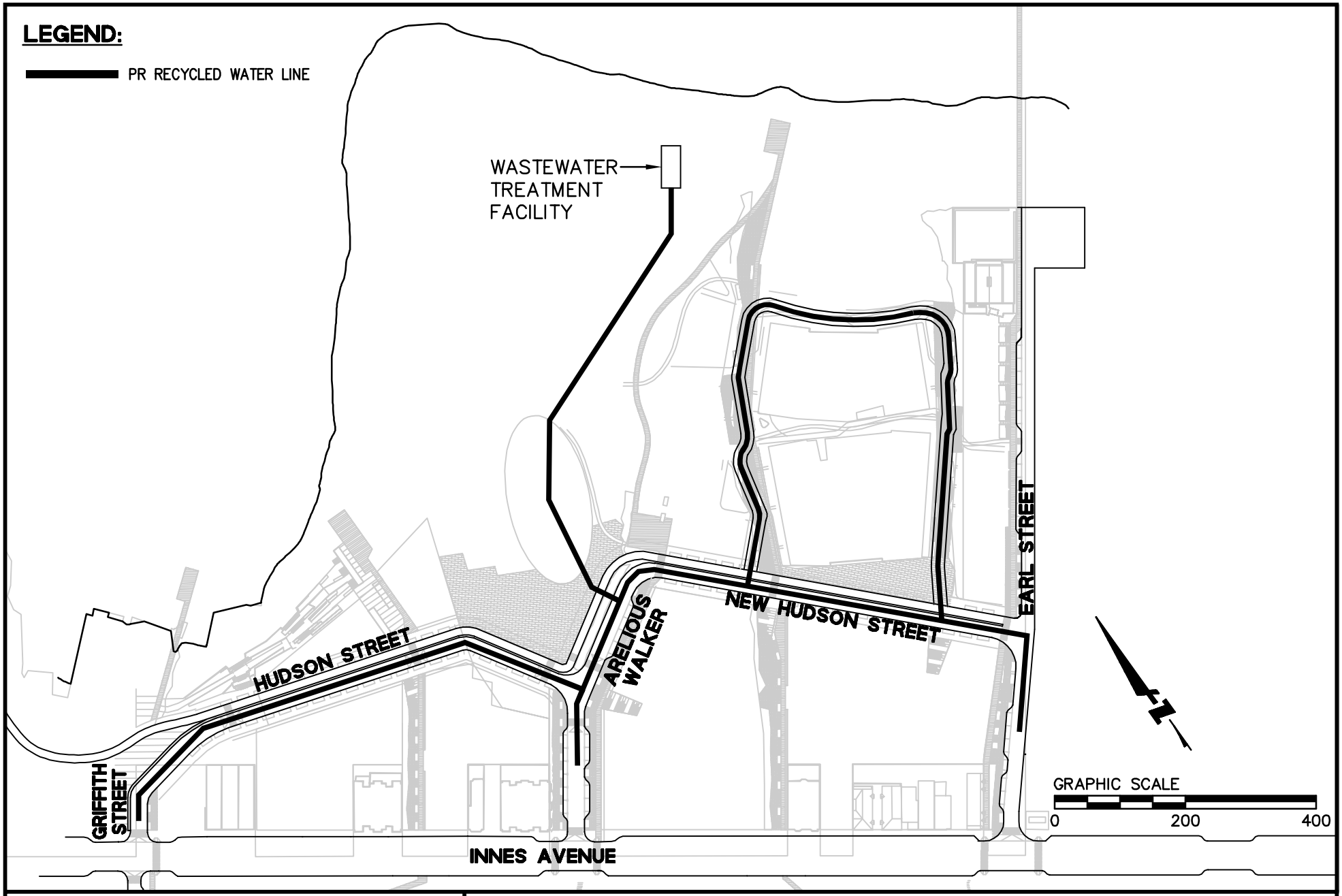
A wastewater treatment facility would be constructed onsite to treat a portion of the wastewater generated by the Project for reuse as recycled water. Exhibit 2 shows the proposed recycled water distribution system under this option.




BkF
ENGINEERS / SURVEYORS / PLANNERS
255 SHORELINE DRIVE SUITE 200
REDWOOD CITY, CA 94065
650/482-6300
650/482-6399 (FAX)

# INDIA BASIN - EXHIBIT 1
# PROPOSED RECYCLED WATER SUPPLY SYSTEM

Drawn EYS
Job No. 20140069
Checked JNC/TRM
Date 08/01/16
Approved TRM
Sheet 1 of 2




BkF
ENGINEERS / SURVEYORS / PLANNERS
255 SHORELINE DRIVE SUITE 200
REDWOOD CITY, CA 94065
650/482-6300
650/482-6399 (FAX)

# INDIA BASIN - EXHIBIT 2
# PROPOSED RECYCLED WATER SUPPLY SYSTEM

Drawn EYS
Job No. 20140069
Checked JNC/TRM
Date 08/01/16
Approved TRM
Sheet 2 of 2

SHERWOOD
DESIGN ENGINEERS

58 MAIDEN LANE, 3RD FLOOR, SAN FRANCISCO, CA 94108
(415) 677-7300 WWW.SHERWOODENGINEERS.COM

# MEMORANDUM

**To:** AECOM
**From:** Sherwood Design Engineers on Behalf of Build SF
**Re:** India Basin 700 Innes & India Basin Open Space - Sanitary Sewer Design
**Date**: September 28, 2016

## 1. Introduction

This memorandum describes existing and future sanitary sewer flow rates and associated infrastructure for the proposed India Basin Development Project (the "Project"). The Project is being developed by Build SF, and it is located on an approximately 23.1 acre site in the Bayview Hunters Point neighborhood of San Francisco. The site is bordered by San Francisco Bay to the north, Candlestick-Hunters Point Shipyard Development to the east, Innes Avenue to the south, and the 900 Innes/India Basin Shoreline Park Development to the west.[1]

The Project site consists of a number of private parcels and platted streets, which will be collectively referred to in this report as 700 Innes (16.9 acres) and India Basin Open Space (6.2 acres). 700 Innes includes all the upland portions of the site, while the India Basin Open Space encompasses an approximately 200 foot wide band along the Project's Bay shoreline. The open space portion consists of approximately 2.5 acres of wetlands that were enhanced as offsite mitigation during the 1997 San Francisco Airport expansion, plus another 3.7 acres that extend landward from the wetlands to the BCDC 100 foot shoreline offset boundary. Current plans call for the development of public roads, residential units, commercial uses, parking, and additional open space on the 700 Innes portion of the site, while the India Basin Open Space is to be dedicated to the San Francisco Recreation and Parks Department (SFRPD). The Project does not include adjacent SFRPD properties totaling approximately 15.5 acres (900 Innes Avenue and India Basin Shoreline Park) that are also being reviewed in the same EIR. Refer to documentation prepared by MKA Engineers for sanitary sewer conditions within these areas. The Project is located within the Jurisdiction of the San Francisco Public Utilities Commission (SFPUC).

## 2. Existing Conditions

Approximately half of the Project site is located within a Separate Sewer (MS4) Area, as defined by the SFPUC, so stormwater is to be discharged directly to San Francisco Bay. The other half is located within the combined sewer area that covers most of the City, so stormwater is to be collected along with wastewater for treatment by the SFPUC prior to discharge. The MS4 portion of the site extends from Innes Avenue to the Bay in a broad band that covers Arelious Walker Drive and varies from approximately 400 feet wide at Innes to 600 feet wide at the Bay.

The existing sewer infrastructure on the site consists of a 12" gravity sewer plus a 6-inch sewer force main in Arelious Walker Drive.. A pump station was built at the end of Arelious Walker to pump wastewater into the force main for discharge into an SFPUC manhole at the intersection with Innes Avenue. These facilities were never conveyed to the SFPUC and are currently unused, because the lots created when Arelious Walker Drive was constructed have never been developed. As a result,

[1] For the purposes of this report, it is assumed Innes Avenue runs in an east-west direction. Its actual orientation is southeast to northwest.

there is no pump within the pump station and the infrastructure has been abandoned for a number of years. The entire system will be demolished as part of the proposed Project.

All existing developed properties are drained by gravity connections to Innes Avenue Sewer. The existing Innes Avenue sewer is part of the PUC's combined sewer/stormwater collection system, and it has a flow direction from east to west. It is 21-inches in diameter between the Project's easterly boundary and Innes Avenue, where it increases to 30-inch diameter and continues west toward the Southeast Wastewater Treatment Plant at Arelious Walker Drive. Laterals of varying size (6"-12") connect to this sewer via manholes from existing improved parcels along the Project's Innes Avenue frontage. All parcels located within the site will be cleared for development, while the few outparcels will remain. Existing wastewater flows generated by these in-Project parcels are presented in the table below. (Refer to Table 1 at the end of this report for more details)

**Existing Conditions**

| | |
|---|---|
| Residential | 5 units |
| Commercial/Retail | 13,310 sf |

| | Sanitary Sewer generation | |
|---|---|---|
| | Average (gpd) | Max (gpm) |
| Existing Conditions | 4,472 | 10 |

## 3. Proposed Conditions

The proposed project has been planned with two variants for the principal development area of 700 Innes; a residential option and a commercial option. The table below describes the program breakdown for these two options, plus the associated development being planned by SFRPD within the India Basin Open Space Area.

**MAXIMUM RESIDENTIAL OPTION**

| Program | Development |
|---|---|
| Residential | 1,240 units |
| Commercial/Retail | 275,330 sf |
| Institutional/Education | 50,000 sf |

**MAXIMUM COMMERCIAL OPTION**

| Program | Development |
|---|---|
| Residential | 500 units |
| Commercial/Retail | 1,000,000 sf |
| Institutional/Education | 50,000 sf |

It is the intent to change the designation of the site to be fully encompassed by the MS4 separate sewer area, so stormwater will be managed separately from wastewater. To serve the proposed development, a sanitary sewer collection system will be constructed throughout the Project and dedicated to the SFPUC for ownership and maintenance. Due to the topography, the Project will be divided into three sewer sheds; one consisting of parcels draining directly via gravity to the Innes



58 MAIDEN LANE, 3RD FLR, SAN FRANCISCO, CA 94108 (415) 677-7300 WWW.SHERWOODENGINEERS.COM

combined sewer main and two gravity collection systems that culminate in low points that require pumping up to the Innes combined sewer main). Most of the Project will drain by gravity to a low point in the northwest corner of the proposed development area, here pump station #1 will lift the wastewater into the existing Innes Avenue combined sewer main. The southwest portion of the site, between New Hudson Street and the Bay, will drain to a separate pump station (pump station #2) that will convey the wastewater to pump station #1, where it will be pumped back up to Innes along with the rest of the site's wastewater. Only the existing out parcels located along Innes Avenue will continue draining directly to the Innes Avenue sewer. Sanitary sewer strategies will remain the same for both the residential and commercial variants. Sanitary sewer generation will be slightly lower for the commercial variant due to lower building water demands. All gravity piping, force mains and pump stations will be sized to match anticipated wastewater flows.

The collection system will be located in proposed public streets in the southerly half of the site, and in dedicated maintenance easements farther north where all road access will be privately owned. In addition, portions of the force mains mentioned above will be routed through easements along the eastern edge of the proposed 700 Innes open space area in the northwest corner of the site.

Total wastewater flows for the proposed Project have been calculated on the basis of the 'India *Basin – Water Demands Memorandum'* prepared by BKF Engineers, dated September 16th 2016. These calculations, which are summarized below, incorporate the two development variants described above. Note they include no allowance for the disposal of groundwater generated by foundation dewatering during both construction and long term project operation. It is expected these flows will be discharged directly to the Innes Avenue sewer. (Refer to Tables 2 and 3 at the end of this report for more details)

**TOTAL WASTEWATER FLOWS** (annual average & peak )

| Program | Wastewater generation | | | | | |
|---|---|---|---|---|---|---|
| | 700 INNES | | INDIA BASIN OPEN SPACE | | TOTAL | |
| | gpd | Max gpm | gpd | Max gpm | gpd | Max gpm |
| Maximum Residential | 155,511 | 317 | 0 | 0 | **155,511** | **317** |
| Maximum Commercial | 128,047 | 292 | 0 | 0 | **128,047** | **292** |

Current plans also call for the construction of an on-site wastewater treatment plant (WWTP) in the northwest corner of the lower development area, adjacent to the previously described pump station #1. Wastewater will be diverted to this plant for treatment and reuse as needed to comply with San Francisco's Non-Potable Water Program. Required uses include toilet flushing and irrigation, but the Project also plans to use recycled water to meet building cooling demands, as well as to irrigate adjacent parklands if an agreement can be reached with the Department of Parks and Recreation. Because both irrigation and cooling needs change significantly throughout the year, it is estimated that total recycled demand will range from a low of approximately 42,000 gpd in December to a high of 92,000 gpd in June under the maximum residential variant. Similarly, total recycled water use will range from approximately 54,000 gpd in December to a high of 106,000 gpd in June under the maximum commercial variant. The remainder of the project's wastewater will be discharged to the City sewer through the previously described pump stations and force main. Note that Tables 2 and 3 do not account for on-site treatment but only show total estimated wastewater flows. Refer to Tables 4 and 5 for a projected monthly breakdown of estimated on-site wastewater treatment and

reuse. Under the commercial variant the on-site WWTP will be nominally larger in footprint with its increase in treatment flow than under the residential variant.

Additional modeling of the sanitary sewer system will be performed as part of detailed technical studies for the *'Infrastructure Master Plan'* that is currently being developed by BKF Engineers. Refer to memoranda prepared by MKA for a description of wastewater issues associated with the planned development of 900 Innes and India Basin shoreline Park.

**TABLE 1: EXISTING WATER DEMAND/WASTEWATER GENERATION**

| DESCRIPTION OF USE | WATER DEMAND[7] | | SANITARY SEWER GENERATION | | |
|---|---|---|---|---|---|
| **Land Use** | **Average Daily Demand (gpd)** | **Average Daily Demand (gpm)** | **Average Daily Generation (gpd)[8]** | **Average Daily Generation (gpm)** | **Peak Daily Generation (gpm)[6]** |
| *RESIDENTIAL*[2] | 750 | 1 | 675 | 1 | 3 |
| *COMMERCIAL/RETAIL*[3] | 1,997 | 2 | 1,797 | 2 | 6 |
| INFLOW & INFILTRATION[4] | --- | --- | 2,000 | 1 | 1 |
| **EXISTING TOTALS** | **2,747** | **3** | **4,472** | **4** | **10** |

**NOTES:**

1) The onsite existing buildings and their uses are based on information documented in the June 1, 2016 Initial Study for the India Basin Mixed-Use Project.

2) Existing residential potable water demand based on 150.0 gpd/du. The approximately 11,600 sf of existing residential use was assumed to be equivalent to 5 dwelling units for this analysis.

3) Existing commercial and retail potable water demand based on 0.15 gpd/sf.

4) Per WCSMP, city wide inflow and infiltration is estimated to be 500gpd for each acre served by a collection system.

5) It is estimated that 10% of potable water is used consumptively or otherwise diverted from the sewer system, so wastewater generation equals 90% of total water demand.

6) A peaking factor of 3 has been applied to peak minute flows.

7) From *'India Basin – Water Demands Memorandum'* prepared by BKF Engineers, dated July 18th Revised September 16th 2016.

8) A peaking factor of 3 has been applied to average daily flows to estimate peak discharge rates.

**TABLE 2: MAXIMUM RESIDENTIAL[1,2] WATER DEMAND/WASTEWATER GENERATION**

**700 INNES**

| DESCRIPTION OF USE | WATER DEMAND (from BKF) | | WASTEWATER GENERATION | | |
|---|---|---|---|---|---|
| **Land Use** | **Average Daily (gpd)** | **Average Daily (gpm)** | **Average Daily (gpd)[10]** | **Average Daily (gpm)** | **Peak Daily (gpm)[11]** |
| *RESIDENTIAL[3]* | 144,460 | 101 | 130,014 | 90 | 271 |
| *COMMERCIAL/RETAIL[4]* | 19,274 | 14 | 17,347 | 12 | 36 |
| *INSTITUTIONAL/EDUCATION[4]* | 3,500 | 3 | 3,150 | 2 | 7 |
| *IRRIGATION[5]* | 20,455 | 14 | n/a | n/a | n/a |
| *COOLING WATER[6]* | 2,699 | 2 | n/a | n/a | n/a |
| *INFLOW & INFILTRATION[8]* | --- | --- | 5000 | 3 | 3 |
| **700 INNES TOTALS** | **190,388** | **134** | **155,511** | **108** | **317** |

**INDIA BASIN OPEN SPACE**

| DESCRIPTION OF USE | WATER DEMAND (from BKF) | | WASTEWATER GENERATION | | |
|---|---|---|---|---|---|
| **Land Use** | **Average Daily (gpd)** | **Average Daily (gpm)** | **Average Daily (gpd)[10]** | **Average Daily (gpm)** | **Peak Daily (gpm)[11]** |
| *RESIDENTIAL[3]* | 0 | 0 | 0 | 0 | 0 |
| *COMMERCIAL/RETAIL[4]* | 0 | 0 | 0 | 0 | 0 |
| *INSTITUTIONAL/EDUCATION[4]* | 0 | 0 | 0 | 0 | 0 |
| *IRRIGATION[5]* | 9,848 | 7 | n/a | n/a | n/a |
| *COOLING WATER[6]* | 0 | 0 | 0 | 0 | 0 |
| *INFLOW & INFILTRATION[8]* | 0 | 0 | 0 | 0 | 0 |
| **INDIA BASIN OPEN SPACE TOTALS** | **9,848** | **7** | **0** | **0** | **0** |

| | | | | | |
|---|---|---|---|---|---|
| **PROJECT TOTALS** | **200,186** | **141** | **155,511** | **108** | **317** |
| Existing Demands[7] | 2,747 | 3 | 4,472 | 4 | 10 |
| **NET INCREASE** | **202,983** | **144** | **158,048** | **111** | **328** |

*See notes on page 7.*



58 MAIDEN LANE, 3RD FLR, SAN FRANCISCO, CA 94108 (415) 677-7300 WWW.SHERWOODENGINEERS.COM

**TABLE 3: MAXIMUM COMMERCIAL[1,2] WATER DEMAND/WASTEWATER GENERATION**

**700 INNES**

| DESCRIPTION OF USE | WATER DEMAND (from BKF) | | WASTEWATER GENERATION | | |
|---|---|---|---|---|---|
| Land Use | Average Daily (gpd) | Average Daily (gpm) | Average Daily (gpd) [10] | Average Daily (gpm) | Peak Daily (gpm) [11] |
| *RESIDENTIAL*[3] | 58,250 | 41 | 52,425 | 41 | 123 |
| *COMMERCIAL/RETAIL*[4] | 70,000 | 49 | 63,000 | 49 | 147 |
| *INSTITUTIONAL/EDUCATION*[4] | 3,500 | 3 | 3,150 | 3 | 9 |
| *IRRIGATION*[5] | 20,455 | 14 | n/a | n/a | n/a |
| *COOLING WATER*[6] | 4,863 | 4 | n/a | n/a | n/a |
| *INFLOW & INFILTRATION*[9] | --- | --- | 5,000 | 3 | 3 |
| **700 INNES DEMAND TOTALS** | **157,068** | **111** | **123,575** | **96** | **282** |

**INDIA BASIN OPEN SPACE**

| DESCRIPTION OF USE | WATER DEMAND (from BKF) | | WASTEWATER GENERATION | | |
|---|---|---|---|---|---|
| Land Use | Average Daily (gpd) | Average Daily (gpm) | Average Daily (gpd) [10] | Average Daily (gpm) | Peak Daily (gpm) [11] |
| *RESIDENTIAL*[3] | 0 | 0 | 0 | 0 | 0 |
| *COMMERCIAL/RETAIL*[4] | 0 | 0 | 0 | 0 | 0 |
| *INSTITUTIONAL/EDUCATION*[4] | 0 | 0 | 0 | 0 | 0 |
| *IRRIGATION*[5] | 9,848 | 7 | n/a | n/a | n/a |
| *COOLING WATER*[6] | 0 | 0 | 0 | 0 | 0 |
| *INFLOW & INFILTRATION*[9] | 0 | 0 | 0 | 0 | 0 |
| **INDIA BASIN OPEN SPACE DEMAND TOTALS** | **9,848** | **7** | **0** | **0** | **0** |

| | | | | | |
|---|---|---|---|---|---|
| **PROJECT TOTALS** | **166,917** | **118** | **123,575** | **96** | **282** |
| Existing Demands[7] | 2,747 | 3 | 4,472 | 4 | 10 |
| **NET INCREASE** | **169,663** | **121** | **128,047** | **100** | **292** |

*See notes on page 7.*



58 MAIDEN LANE, 3RD FLR, SAN FRANCISCO, CA 94108 (415) 677-7300 WWW.SHERWOODENGINEERS.COM

**NOTES (TABLE 2&3):**

1) "Maximum Commercial Without Recycled Water" represents a maximum commercial development with no recycled water available at the start of the project.

2) The Build SF Development and RPD Development program quantities are based on program summaries documented in the June 1, 2016 Initial Study for the India Basin Mixed-Use Project.

3) Residential potable water demand based on 116.5 gpd/du. Assumes 50 gallons per capita per day (gpcd) and 2.33 residents per dwelling unit, based on water demands identified in the CCSF Retail Water Demands and Conservation Potential Report, November 2004.

4) Commercial and retail potable water demand based on 0.07 gpd/sf. Institutional/education also assumes potable water demand based on 0.07 gpd/sf.

5) Average, year-round irrigation water demand for Build SF Development provided by Bionic.

6) Cooling water demand for Build SF Development provided by Glumac.
Cooling water demand for RPD Development is expected to be small compared to the overall project demand and is noted as zero for this analysis.

7) Refer to Table 1 for existing demands calculations.

8) An average, long term inflow and infiltration rate of 500 gpd/acre was applied to the approximately 10 acres of the project site that are currently proposed for development.

9) It is assumed that 10 percent of domestic water demand will be consumed and not discharged to the sewer.

10) A peaking factor of 3 has been applied to average daily flows to estimate peak discharge rates.



58 MAIDEN LANE, 3RD FLR, SAN FRANCISCO, CA 94108 (415) 677-7300 WWW.SHERWOODENGINEERS.COM

**TABLE 4:**
**MONTHLY WATER DEMANDS AND SEWER GENERATION - MAXIMUM RESIDENTIAL VARIANT**

| | WATER DEMANDS | | | | | WASTEWATER GENERATION | | |
|---|---|---|---|---|---|---|---|---|
| | Indoor Potable[1] (gpd) | Indoor Non-Potable[1] (gpd) | Irrigation[2] (gpd) | Cooling[3] (gpd) | Total Non-Potable (gpd) | I&I[4] (gpd) | Wastewater Generation[5] (gpd) | Discharge to City Sewer[6] (gpd) |
| Jan | 132,733 | 34,501 | 8,325 | 124 | 42,950 | 5,000 | 158,961 | 116,010 |
| Feb | 132,733 | 34,501 | 11,714 | 687 | 46,903 | 5,000 | 158,961 | 112,058 |
| Mar | 132,733 | 34,501 | 23,622 | 1,303 | 59,427 | 5,000 | 158,961 | 99,534 |
| Apr | 132,733 | 34,501 | 35,131 | 1,924 | 71,556 | 5,000 | 158,961 | 87,404 |
| May | 132,733 | 34,501 | 44,281 | 2,979 | 81,762 | 5,000 | 158,961 | 77,199 |
| Jun | 132,733 | 34,501 | 53,057 | 4,041 | 91,599 | 5,000 | 158,961 | 67,362 |
| Jul | 132,733 | 34,501 | 50,751 | 4,717 | 89,969 | 5,000 | 158,961 | 68,992 |
| Aug | 132,733 | 34,501 | 47,408 | 6,021 | 87,930 | 5,000 | 158,961 | 71,031 |
| Sep | 132,733 | 34,501 | 40,630 | 6,221 | 81,352 | 5,000 | 158,961 | 77,609 |
| Oct | 132,733 | 34,501 | 25,878 | 3,103 | 63,482 | 5,000 | 158,961 | 95,479 |
| Nov | 132,733 | 34,501 | 14,811 | 834 | 50,146 | 5,000 | 158,961 | 108,815 |
| Dec | 132,733 | 34,501 | 6,951 | 310 | 41,763 | 5,000 | 158,961 | 117,198 |

**TABLE 5:**
**MONTHLY WATER DEMANDS AND SEWER GENERATION - MAXIMUM COMMERCIAL VARIANT**

| | WATER DEMANDS | | | | | WASTEWATER GENERATION | | |
|---|---|---|---|---|---|---|---|---|
| | Indoor Potable[7] (gpd) | Indoor Non-Potable[7] (gpd) | Irrigation[2] (gpd) | Cooling[3] (gpd) | Total Non-Potable (gpd) | I&I[4] (gpd) | Wastewater Generation[5] (gpd) | Discharge to City Sewer[6] (gpd) |
| Jan | 85,680 | 46,070 | 8,325 | 731 | 55,126 | 5,000 | 128,182 | 73,056 |
| Feb | 85,680 | 46,070 | 11,714 | 1,715 | 59,499 | 5,000 | 128,182 | 68,683 |
| Mar | 85,680 | 46,070 | 23,622 | 3,312 | 73,005 | 5,000 | 128,182 | 55,177 |
| Apr | 85,680 | 46,070 | 35,131 | 4,090 | 85,291 | 5,000 | 128,182 | 42,891 |
| May | 85,680 | 46,070 | 44,281 | 6,754 | 97,105 | 5,000 | 128,182 | 31,077 |
| Jun | 85,680 | 46,070 | 53,057 | 6,846 | 105,973 | 5,000 | 128,182 | 22,209 |
| Jul | 85,680 | 46,070 | 50,751 | 7,399 | 104,220 | 5,000 | 128,182 | 23,962 |
| Aug | 85,680 | 46,070 | 47,408 | 9,249 | 102,727 | 5,000 | 128,182 | 25,455 |
| Sep | 85,680 | 46,070 | 40,630 | 8,979 | 95,679 | 5,000 | 128,182 | 32,503 |
| Oct | 85,680 | 46,070 | 25,878 | 5,248 | 77,196 | 5,000 | 128,182 | 50,986 |
| Nov | 85,680 | 46,070 | 14,811 | 2,623 | 63,504 | 5,000 | 128,182 | 64,678 |
| Dec | 85,680 | 46,070 | 6,951 | 1,205 | 54,226 | 5,000 | 128,182 | 73,956 |

*See notes on page 9.*



58 MAIDEN LANE, 3RD FLR, SAN FRANCISCO, CA 94108 (415) 677-7300 WWW.SHERWOODENGINEERS.COM

**NOTES (TABLE 4&5):**

1) "Indoor Non-Potable" and “Indoor Potable” demands are from the Tables 4 of the BKF Water Demands Memorandum 09.16.16.

2) Annual “Irrigation” water demand for Build Development provided by Bionic. Monthly breakdown has been applied to the total using standard percentages from the SFPUC District Scale Non-Potable Water Calculator V5.3.

3) “Cooling” demands are also from Tables 4 and 5 of the BKF Memorandum, but distributed over the year through application of seasonal demand adjustments per Glumac.

4) An average, long term inflow and infiltration rate of 500 gpd/acre was applied to the approximately 10 acres of the project site that are currently proposed for development.

5) “Total Wastewater Generation” is the sum of “Indoor Non-Potable Demand” and 90 percent of “Indoor Potable Demand,” to account for an assumed 10 percent consumptive use.

6) “Total Discharge to City Sewer” equals “Total Wastewater Generation” plus “I&I” less “Total Non-Potable Demand”.

7) "Indoor Non-Potable" and “Indoor Potable” demands are from the Tables 5 of the BKF Water Demands Memorandum 09.16.16.

SHERWOOD
DESIGN ENGINEERS

58 MAIDEN LANE, 3RD FLOOR, SAN FRANCISCO, CA 94108
(415) 677-7300 WWW.SHERWOODENGINEERS.COM

# MEMORANDUM

**To:** AECOM
**From:** Sherwood Design Engineers on Behalf of Build SF
**Re:** India Basin 700 Innes & India Basin Open Space - Storm Drain Design
**Date**: September 28, 2016

## 1. Introduction

This memorandum describes existing and future stormwater conditions for Build SF's proposed India Basin Development (the "Project). The Project is s located on an approximately 23.1 acre site in the Bayview Hunters Point neighborhood of San Francisco. The site is bordered by San Francisco Bay to the north and northwest, Candlestick-Hunters Point Shipyard Development to the east, Innes Avenue to the south, and the 900 Innes/India Basin Shoreline Park Development to the west.[1]

The Project site consists of a number of private parcels and platted streets, which will be collectively referred to in this report as 700 Innes (16.9 acres) and India Basin Open Space (6.2 acres). 700 Innes includes all the upland portions of the site, while the India Basin Open Space encompasses an approximately 200 foot wide band along the Project's Bay shoreline. The open space portion consists of approximately 2.5 acres of wetlands that were enhanced as offsite mitigation during the 1997 San Francisco Airport expansion, plus another 3.7 acres that extend landward from the wetlands to the BCDC 100 foot shoreline offset boundary. Current plans call for the development of public roads, residential units, commercial uses, parking, and additional open space on the 700 Innes portion of the site, while the India Basin Open Space is to be dedicated to the San Francisco Recreation and Parks Department (SFRPD). The Project does not include adjacent SFRPD properties totaling approximately 15.5 acres (900 Innes Avenue and India Basin Shoreline Park) that are also being reviewed in the same EIR. Refer to documentation prepared by MKA Engineers for stormwater conditions within these areas.

## 2. Existing Conditions

The Project site is primarily undeveloped. Existing improvements are limited to a few residential and commercial buildings along Innes Avenue and a single developed public street, Arelious Walker Drive, which runs north from Innes to a cul-de-sac a short distance before the Bay. All existing buildings will be demolished, except for a single family residence that will be relocated on the site. A short section of the Arelious Walker Drive right of way will be retained north of Innes, but the entire street and its improvements will be demolished in accordance with the proposed site plan. Total impervious cover on the existing site (roofs plus pavement) is estimated to be 10 percent, with sparse vegetative cover on the remaining pervious areas.

The entire site slopes north from Innes Avenue toward the Bay. This slope varies from five to ten percent between Innes and the currently vacant right of way of Hudson Avenue, where it then flattens to between one and two percent. The dry land portions of the site end at an eight to ten

[1] For the purposes of this report, it is assumed Innes Avenue runs in an east-west direction. Its actual orientation is southeast to northwest.

foot high embankment at the edge of the Bay. Within the flatter area below Hudson, there are several small mounds of dumped fill that rise between 15 and 20 feet above the surrounding terrain, all located on the east side of Arelious Walker Drive.

According to the Project's geotechnical report, the lower portions of the site, which have all been filled, are likely susceptible to liquefaction and lateral spreading. As a result, it is being conservatively assumed that concentrated infiltration of stormwater or other water sources could worsen these conditions, so all water quality treatment ponds (as described in a following Section) will be lined. Water that percolates through the upper soil layers in these ponds will be collected in underdrains and discharged to the Bay.

Approximately half of the Project site, including all of Arelious Walker Drive, is located within a Separate Sewer (MS4) Area, as designated by the SFPUC. The only storm drain improvements on the site are a series of catch basins and 12-inch storm drain line in Arelious Walker Drive. This line flows downhill to an assumed pump station inside a locked utility fence adjacent to the Bay, from which the project survey indicates a 14-inch force main conveys stormwater up to the Innes Avenue sewer at the intersection with Arelious Walker Drive. The existence of the pump station could not be confirmed, but a large, concrete overflow structure is visible inside the fence. It is expected stormwater flows the pump station cannot accommodate exit this structure and spill down the nearby shoreline embankment into the Bay. Because a pumped stormwater connection to the City sewer is not consistent with the SFPUC Separate Sewer (MS4) Area designation that covers nearly half of the Project site, including all of Arelious Walker Drive, it is assumed the designation was made since these improvements were constructed. The new designation would apply to all new development within the portions of the site that it covers.

The Arelious Walker storm drain system is the only existing facility on the undeveloped portions of the site, so the majority of rainfall is either absorbed into the ground or runs off as overland sheetflow to the Bay shoreline. There are no records of storm drain connections for the existing improved properties, but it is assumed the runoff from building roofs and front yard areas is discharged through lateral connections to the Innes Avenue sewer. Because the terrain drops away sharply from Innes, the rear portions of these lots most likely drain north to the vacant part of the site and the Bay.

## 3. Proposed Conditions

The proposed project consists of multiple blocks of mixed use development, with residential and commercial buildings surrounding courtyards built on podia. These improvements, which include new public roadways on both existing and reconfigured rights of way, will be spread along the entire Innes Avenue frontage and extend almost to the Bay along the site's easterly boundary. The remainder of the Project will be a combination of public and privately owned open space covering a total of about 11.8 acres along the Bay shoreline and in the northwestern part of the site. Because the planned courtyard landscaping will be over structures, only the open spaces and unpaved portions of the public roadways can be considered as pervious for the estimation of stormwater runoff. The following table summarizes these planned changes in land use and infiltration conditions.

**Land Cover in acres – Residential and Commercial Variant**

| | | Pervious Area | | Impervious Area | | Total Area | |
|---|---|---|---|---|---|---|---|
| | | acres | % | acres | % | acres | % |
| **700 Innes** | Existing | 15.4 | 91% | 1.7 | 10% | 16.9 | 100% |
| | Proposed | 1.2 | 7% | 15.9 | 94% | 16.9 | 100% |
| **India Basin Open Space** | Existing | 5.9 | 95% | 0.3 | 5% | 6.2 | 100% |
| | Proposed | 5.9 | 95% | 0.3 | 5% | 6.2 | 100% |

**Notes:**
Existing areas per ALTA/ACSM Land Title Survey prepared by Martin Ron & Associates, March 2014
Proposed areas per site plan by Bionic Landscape August 2016

The areas and percentages listed in the table apply equally to both the residential and the commercial project variants as currently proposed. Building sizes and locations will be slightly modified, but there will be no significant changes in roadway layout, area to be constructed over podium or total building footprint.

The Project plans to collect all stormwater runoff in a publicly owned storm drain network for discharge to the Bay, which will require a modification of the site's existing MS4 boundary. Stormwater will be treated prior to discharge, primarily through biofiltration, in accordance with SFPUC and Regional Water Quality Control Board requirements. Because of the previously described concerns related to concentrated infiltration, the biofiltration areas will be lined with underdrains that will discharge all runoff to the Bay after treatment. These treatment facilities, which will also treat runoff from the proposed public streets, will be owned and maintained by a future property owners' association. Treatment areas for the development block located north of the proposed New Hudson Street will be scattered throughout internal courtyards, while treatment for the public streets and for the areas between Innes Avenue and New Hudson Street will be located within the private open space in the northwest quadrant of the site. Per the SFPUC guidelines, it is expected the total area needed for biofiltration will be between four and five percent of the total Project site, or between 1 and 1.2 acres.

Each treatment cell will be designed to capture and treat the first 0.75 inches of rainfall from its contributing watershed, as required by the SFPUC. Higher flows will bypass the treatment and be discharged directly to the Bay. The San Francisco Department of Public Works (SFDPW) typically requires public storm drain improvements to be designed with capacity for a 5-year recurrence interval storm, with flows generated by higher intensity storms carried within overland flow routes on the surface. The peak projected discharge rate under these pipe sizing criteria, for both existing and proposed conditions, is estimated as follows using the Rational Method:

**Site Peak Runoff Rates**

| | | Total Area<br>acres | Weighted Runoff Coefficient<br>C | Rainfall Intensity (5yr 10min storm)<br>in / hr | Peak runoff Rate (5yr 10min storm)<br>cfs | Peak runoff Rate Increase<br>% |
|---|---|---|---|---|---|---|
| **Total site: 700 Innes & India Basin Open Space** | Existing | 23.3 | 0.44 | 2.32 | 23.94 | 69% |
| | Proposed | 23.3 | 0.75 | 2.32 | 40.41 | |

**Notes:**
Areas per table above
Runoff coefficients; pervious = 0.4, impervious = 0.9
Estimated Time of Concentration = 10 minutes
Rainfall intensity from SFDPW
Rational Formula: Peak Runoff (cfs) = Coefficient x Intensity x Area

The location of catch basins and drainage inlets within public streets, as well as minimum pipe sizes, will be in accordance with SFDPW requirements. Overland flow routes will be designed to carry the 100-year storm away from all buildings and improvements, for discharge to the Bay.

Refer to memorandum presented by MKA for information on storm drain design for 900 Innes and India Basin Shoreline Park.

BKF 100+ YEARS
ENGINEERS . SURVEYORS . PLANNERS *Delivering Inspired Infrastructure*

# MEMORANDUM

Date: July 18, 2016 BKF Job Number: 20140069

To: Courtney Pash, BUILD, INC.
Trafton Bean, BUILD, INC.

From: Tom Morse, BKF
Jenn Chu, BKF

Subject: India Basin – Water Demands Memorandum

## PURPOSE

The purpose of this memorandum is to provide a summary of proposed potable and non-potable water demands associated with the India Basin Project ("Project").

## BACKGROUND

The Project encompasses approximately 38.84 acres in the Bayview Hunters Point neighborhood in San Francisco. The site is bound by the San Francisco Bay to the north, Candlestick-Hunters Point Shipyard Development to the east, Innes Avenue to the south, and Hunters Point Boulevard and Hawes Street to the west.

The Project consists of four properties – 700 Innes, 900 Innes, India Basin Shoreline Park, and India Basin Open Space. The 700 Innes property and India Basin Open Space would be developed by Build Inc. to include public rights-of-way, residential units, commercial uses, parking, and open space ("Build Inc. Development"). The 900 Innes property and India Basin Shoreline Park are publicly owned by the San Francisco Recreation and Parks Department (RPD) and would be developed to create a publicly accessible network of new and/or improved parkland and open space ("RPD Development").

The Project is flexibly zoned either commercial or residential, meaning that either use could be constructed. For that reason, the India Basin EIR is studying both maximum residential and maximum commercial program options for the project. The program options propose to include the following:

*Maximum Residential Option*

| | Build Inc. Development | RPD Development |
|---|---|---|
| Residential | 1,240 units | - |
| Commercial/Retail | 275,330 sf | 14,500 sf |
| Institutional/Education | 50,000 sf | - |

*Maximum Commercial Option*

| | Build Inc. Development | RPD Development |
|---|---|---|
| Residential | 500 units | - |
| Commercial/Retail | 1,000,000 sf | 14,500 sf |
| Institutional/Education | 50,000 sf | - |

Potable water supply is currently available from a domestic water main in Innes Avenue. The project site is within the City's designated recycled water use area. A non-potable water system is not currently available within the project limits. As required by the City's Recycled Water Ordinance, the project will install a non-potable water system and connect to the potable water system in the interim condition with approved backflow devices. In order to provide a conservative estimate of future water demands for the Project, this memorandum does not assume compliance with the Non-Potable Water Ordinance (Ordinance 109-15). However, the Project is subject to the requirements of the Non-Potable Water Ordinance and will comply.

## EXISTING POTABLE AND NON-POTABLE WATER DEMAND

Table 1 shows the existing potable water demands for the Project based on the onsite existing buildings and their approximate square footages. There is no existing non-potable water demand since the site is not currently served by a non-potable water system.

## PROPOSED POTABLE AND NON-POTABLE WATER DEMAND

Potable and non-potable water demand calculations are included as attachments to this memorandum.

Table 2 and Table 3 calculate demands for the maximum residential and maximum commercial options with no recycled water available at the start of the project. Potable water demand is based on demands for residential, commercial/retail, institutional/education, landscape irrigation and cooling water uses.

Table 4 and Table 5 calculate demands for the maximum residential and maximum commercial options with recycled water available for the project. Potable water demand is based on demands for residential, commercial/retail, and institutional/education uses. Non-potable water demand is based on toilet flushing, landscape irrigation and cooling water uses.

Residential potable water unit demand was based on 116.5 gallons per day per dwelling unit. This unit demand assumes 50 gallons per capita per day and 2.33 residents per dwelling unit. These unit demands are consistent with the November 2004 "City and County of San Francisco Retail Water Demands and Conservation Potential" report ("Demands Report"), prepared by Hydroconsult, Inc. The Demands Report provides projections of potable water demand for the years through 2030 and projects that, through normal replacement of plumbing fixtures and

appliances, most or all residences will have plumbing fixtures and appliances that meet the current plumbing code by that time. Table ES-1 of the Demands Report identifies a citywide multifamily water demand of 26.5 million gallons per day for the year 2015. Table 2 of the Demands Report identifies 239,883 multifamily dwelling units for 2015. Table 3 of the Demands Report identifies an average of 2.29 people per dwelling unit for 2015. This provides a unit demand of approximately 48 gallons per capita day. Similar information for the year 2030 provides approximately 45 gallons per capita day. This memorandum uses 50 gallons per capita day, which is slightly conservative. Residential recycled water unit demand for toilet flushing was based on 8 gallons per capita day (assumed 5 flushes per day per person at 1.6 gallons per flush) and 2.33 residents per dwelling unit.

Commercial and retail potable water unit demand was based on 0.07 gallons per day per square foot. This demand rate was calculated by the following methodology. Prior to 2008 and adoption of the California Green Building Standards ("Code"), 0.10 gallons per day per square foot was a generally accepted water demand used for office/commercial space. Currently, the Code requires calculation of a baseline demand and then requires a 25% reduction from baseline. In order to account for conservation and implementation of the Code, we applied the 25% reduction to 0.10 gallons per day per square foot, resulting in a unit demand of 0.075 gallons per day per square foot. Additionally, the November 2004 Demands Report provides an estimated historical demand of 18.3 gallons per employee per day (Appendix B). Using an assumption of 200 square feet per employee for retail and commercial uses results in a unit demand of 0.92 gallons per day per square foot. This is similar to the 0.10 gallons per day per square foot noted above and with the 25% reduction applied yields 0.07 gallons per square foot. Commercial and retail recycled water unit demand for toilet flushing was assumed to be 50 percent of the total water demand; 0.035 gallons per day per square foot is used for this analysis.

Institutional/education potable water unit demand is 0.07 gallons per square foot and is assumed to be consistent with commercial and retail potable water unit demand. Similar to the commercial and retail recycled water unit demand, institutional/education recycled water unit demand for toilet flushing was assumed to be 50 percent of the total water demand; 0.035 gallons per day per square foot is used for this analysis.

Irrigation demands for the Build Inc. Development were provided by Bionic. The demand includes irrigation for the development parcels, public streets and open space. Irrigation demands for the RPD Development were provided by MKA.

Cooling demands for the Build Inc. Development were provided by Glumac. Cooling demands for the RPD Development are expected to be small compared to the overall project demand and was noted as zero for this analysis.

## CONCLUSION

Below are summary tables for proposed average daily water demands, with and without recycled

water uses, which are required by the Project. These demands are broken down by the year 2015, 2020, and 2025 to match the time divisions used in the City's Urban Water Management Plan. The Project is expected to achieve full build out by the year 2025.

*Cumulative Potable Water Demand without Recycled Water*

| Program | Average Daily Water Demand (gpd) | | |
|---|---|---|---|
| | 2015 | 2020 | 2025 |
| Maximum Residential | 0 | 163,728 | 243,217 |
| Maximum Commercial | 0 | 128,976 | 209,897 |

*Cumulative Recycled Water Demand without Recycled Water*

| Program | Average Daily Water Demand (gpd) | | |
|---|---|---|---|
| | 2015 | 2020 | 2025 |
| Maximum Residential | 0 | 0 | 0 |
| Maximum Commercial | 0 | 0 | 0 |

*Cumulative Potable Water Demand with Recycled Water*

| Program | Average Daily Water Demand (gpd) | | |
|---|---|---|---|
| | 2015 | 2020 | 2025 |
| Maximum Residential | 0 | 79,891 | 133,353 |
| Maximum Commercial | 0 | 33,745 | 86,300 |

*Cumulative Recycled Water Demand with Recycled Water*

| Program | Average Daily Water Demand (gpd) | | |
|---|---|---|---|
| | 2015 | 2020 | 2025 |
| Maximum Residential | 0 | 83,837 | 109,864 |
| Maximum Commercial | 0 | 95,231 | 123,597 |

ATTACHMENTS

- Table 1 – Existing Potable Water Demand
- Table 2 – Maximum Residential Without Recycled Water
- Table 3 – Maximum Commercial Without Recycled Water
- Table 4 – Maximum Residential With Recycled Water
- Table 5 – Maximum Commercial With Recycled Water
- India Basin Park Concept Design Preliminary Water Demands Memo, prepared by MKA, dated July 6, 2016

**TABLE 1: EXISTING WATER DEMAND[1]**

| DESCRIPTION OF USE | | | POTABLE WATER DEMAND | | RECYCLED WATER DEMAND | |
|---|---|---|---|---|---|---|
| **Land Use** | **Unit** | **Unit Demand** | **Average Daily Demand (gpd)** | **Average Daily Demand (gpm)** | **Average Daily Demand (gpd)** | **Average Daily Demand (gpm)** |
| RESIDENTIAL[2] | 5 du | 150.0 gpd/du | 750 | 1 | 0 | 0 |
| COMMERCIAL/RETAIL[3] | 13,310 sf | 0.15 gpd/sf | 1,997 | 2 | 0 | 0 |
| **EXISTING WATER DEMAND TOTALS** | | | **2,747** | **3** | **0** | **0** |

| | | | | |
|---|---|---|---|---|
| **TOTAL DEMANDS** | **2,747** | **3** | **0** | **0** |

Notes:

1 The onsite existing buildings and their uses are based on information documented in the June 1, 2016 Initial Study for the India Basin Mixed-Use Project.

2 Existing residential potable water demand based on 150.0 gpd/du. The approximately 11,600 sf of existing residential use was assumed to be equivalent to 5 dwelling units for this analysis.

3 Existing commerical and retail potable water demand based on 0.15 gpd/sf.

**TABLE 2: MAXIMUM RESIDENTIAL WITHOUT RECYCLED WATER[1,2]**

**BUILD INC. DEVELOPMENT**

| DESCRIPTION OF USE | | | POTABLE WATER DEMAND | | RECYCLED WATER DEMAND | |
|---|---|---|---|---|---|---|
| **Land Use** | **Unit** | **Unit Demand** | **Average Daily Demand (gpd)** | **Average Daily Demand (gpm)** | **Average Daily Demand (gpd)** | **Average Daily Demand (gpm)** |
| RESIDENTIAL[3] | 1,240 du | 116.5 gpd/du | 144,460 | 101 | 0 | 0 |
| COMMERCIAL/RETAIL[4] | 275,330 sf | 0.07 gpd/sf | 19,274 | 14 | 0 | 0 |
| INSTITUTIONAL/EDUCATION[4] | 50,000 sf | 0.07 gpd/sf | 3,500 | 3 | 0 | 0 |
| IRRIGATION[5] | --- sf | --- gpd/sf | 67,268 | 47 | 0 | 0 |
| COOLING WATER[6] | --- sf | --- gpd/sf | 2,699 | 2 | 0 | 0 |
| **BUILD INC. DEVELOPMENT DEMAND TOTALS** | | | **237,201** | **167** | **0** | **0** |

**RPD DEVELOPMENT**

| DESCRIPTION OF USE | | | POTABLE WATER DEMAND | | RECYCLED WATER DEMAND | |
|---|---|---|---|---|---|---|
| **Land Use** | **Unit** | **Unit Demand** | **Average Daily Demand (gpd)** | **Average Daily Demand (gpm)** | **Average Daily Demand (gpd)** | **Average Daily Demand (gpm)** |
| IRRIGATION[8] | --- sf | --- gpd/sf | 2,541 | 2 | 0 | 0 |
| WATER FEATURE[8] | --- sf | --- gpd/sf | 229 | 1 | 0 | 0 |
| RESTROOMS FLOW[8] | --- sf | --- gpd/sf | 54 | 1 | 0 | 0 |
| RESTROOMS FLUSH[8] | --- sf | --- gpd/sf | 307 | 1 | 0 | 0 |
| CONCESSION[8] | --- sf | --- gpd/sf | 271 | 1 | 0 | 0 |
| DRINKING FOUNTAIN[8] | --- sf | --- gpd/sf | 66 | 1 | 0 | 0 |
| KAYAK STATION[8] | --- sf | --- gpd/sf | 1,808 | 2 | 0 | 0 |
| FISH STATION[8] | --- sf | --- gpd/sf | 740 | 1 | 0 | 0 |
| **RPD DEVELOPMENT DEMAND TOTALS** | | | **6,016** | **10** | **0** | **0** |

| | | | | |
|---|---|---|---|---|
| **TOTAL DEMANDS** | **243,217** | **177** | **0** | **0** |
| Existing Demands[7] | 2,747 | 3 | 0 | 0 |
| **NET INCREASE** | **240,470** | **174** | **0** | **0** |

Notes:

1 "Maximum Residential Without Recycled Water" represents a maximum residential development with no recycled water available at the start of the project.

2 The Build Inc. Development and RPD Development program quantities are based on program summaries documented in the June 1, 2016 Initial Study for the India Basin Mixed-Use Project.

3 Residential potable water demand based on 116.5 gpd/du. Assumes 50 gallons per capita per day (gpcd) and 2.33 residents per dwelling unit, based on water demands identified in the CCSF Retail Water Demands and Conservation Potential Report, November 2004.

4 Commerical and retail potable water demand based on 0.07 gpd/sf.
Institutional/education also assumes potable water demand based on 0.07 gpd/sf.

5 Irrigation water demand for Build Inc. Development provided by Bionic.

6 Cooling water demand for Build Inc. Development provided by Glumac.
Cooling water demand for RPD Development is expected to be small compared to the overall project demand and is noted as zero for this analysis.

7 Refer to Table 1 for existing demands calculations.

8 Water demand for RPD Development provided by MKA.

## TABLE 3: MAXIMUM COMMERCIAL WITHOUT RECYCLED WATER[1,2]

**BUILD INC. DEVELOPMENT**

| DESCRIPTION OF USE | | | POTABLE WATER DEMAND | | RECYCLED WATER DEMAND | |
|---|---|---|---|---|---|---|
| **Land Use** | **Unit** | **Unit Demand** | **Average Daily Demand (gpd)** | **Average Daily Demand (gpm)** | **Average Daily Demand (gpd)** | **Average Daily Demand (gpm)** |
| RESIDENTIAL[3] | 500 du | 116.5 gpd/du | 58,250 | 41 | 0 | 0 |
| COMMERCIAL/RETAIL[4] | 1,000,000 sf | 0.07 gpd/sf | 70,000 | 49 | 0 | 0 |
| INSTITUTIONAL/EDUCATION[4] | 50,000 sf | 0.07 gpd/sf | 3,500 | 3 | 0 | 0 |
| IRRIGATION[5] | --- sf | --- gpd/sf | 67,268 | 47 | 0 | 0 |
| COOLING WATER[6] | --- sf | --- gpd/sf | 4,863 | 4 | 0 | 0 |
| **BUILD INC. DEVELOPMENT DEMAND TOTALS** | | | **203,881** | **144** | **0** | **0** |

**RPD DEVELOPMENT**

| DESCRIPTION OF USE | | | POTABLE WATER DEMAND | | RECYCLED WATER DEMAND | |
|---|---|---|---|---|---|---|
| **Land Use** | **Unit** | **Unit Demand** | **Average Daily Demand (gpd)** | **Average Daily Demand (gpm)** | **Average Daily Demand (gpd)** | **Average Daily Demand (gpm)** |
| IRRIGATION[8] | --- sf | --- gpd/sf | 2,541 | 2 | 0 | 0 |
| WATER FEATURE[8] | --- sf | --- gpd/sf | 229 | 1 | 0 | 0 |
| RESTROOMS FLOW[8] | --- sf | --- gpd/sf | 54 | 1 | 0 | 0 |
| RESTROOMS FLUSH[8] | --- sf | --- gpd/sf | 307 | 1 | 0 | 0 |
| CONCESSION[8] | --- sf | --- gpd/sf | 271 | 1 | 0 | 0 |
| DRINKING FOUNTAIN[8] | --- sf | --- gpd/sf | 66 | 1 | 0 | 0 |
| KAYAK STATION[8] | --- sf | --- gpd/sf | 1,808 | 2 | 0 | 0 |
| FISH STATION[8] | --- sf | --- gpd/sf | 740 | 1 | 0 | 0 |
| **RPD DEVELOPMENT DEMAND TOTALS** | | | **6,016** | **10** | **0** | **0** |

| | | | | |
|---|---|---|---|---|
| **TOTAL DEMANDS** | **209,897** | **154** | **0** | **0** |
| Existing Demands[7] | 2,747 | 3 | 0 | 0 |
| **NET INCREASE** | **207,150** | **151** | **0** | **0** |

Notes:

1 "Maximum Commercial Without Recycled Water" represents a maximum commercial development with no recycled water available at the start of the project.

2 The Build Inc. Development and RPD Development program quantities are based on program summaries documented in the June 1, 2016 Initial Study for the India Basin Mixed-Use Project.

3 Residential potable water demand based on 116.5 gpd/du. Assumes 50 gallons per capita per day (gpcd) and 2.33 residents per dwelling unit, based on water demands identified in the CCSF Retail Water Demands and Conservation Potential Report, November 2004.

4 Commerical and retail potable water demand based on 0.07 gpd/sf.
Institutional/education also assumes potable water demand based on 0.07 gpd/sf.

5 Irrigation water demand for Build Inc. Development provided by Bionic.

6 Cooling water demand for Build Inc. Development provided by Glumac.
Cooling water demand for RPD Development is expected to be small compared to the overall project demand and is noted as zero for this analysis.

7 Refer to Table 1 for existing demands calculations.

8 Water demand for RPD Development provided by MKA.

**TABLE 4: MAXIMUM RESIDENTIAL WITH RECYCLED WATER[1,2]**

**BUILD INC. DEVELOPMENT**

| DESCRIPTION OF USE | | | | POTABLE WATER DEMAND[9] | | RECYCLED WATER DEMAND | |
|---|---|---|---|---|---|---|---|
| **Land Use** | **Unit** | **Unit Demand** | | **Average Daily Demand (gpd)** | **Average Daily Demand (gpm)** | **Average Daily Demand (gpd)** | **Average Daily Demand (gpm)** |
| RESIDENTIAL[3, 7] | 1,240 du | 116.5 | gpd/du | 121,346 | 85 | 23,114 | 17 |
| COMMERCIAL/RETAIL[4, 7] | 275,330 sf | 0.07 | gpd/sf | 9,637 | 7 | 9,637 | 7 |
| INSTITUTIONAL/EDUCATION[4, 7] | 50,000 sf | 0.07 | gpd/sf | 1,750 | 2 | 1,750 | 2 |
| IRRIGATION[5] | --- sf | --- | gpd/sf | 0 | 0 | 67,268 | 47 |
| COOLING WATER[6] | --- sf | --- | gpd/sf | 0 | 0 | 2,699 | 2 |
| **BUILD INC. DEVELOPMENT DEMAND TOTALS** | | | | **132,733** | **94** | **104,468** | **75** |

**RPD DEVELOPMENT**

| DESCRIPTION OF USE | | | | POTABLE WATER DEMAND | | RECYCLED WATER DEMAND | |
|---|---|---|---|---|---|---|---|
| **Land Use** | **Unit** | **Unit Demand** | | **Average Daily Demand (gpd)** | **Average Daily Demand (gpm)** | **Average Daily Demand (gpd)** | **Average Daily Demand (gpm)** |
| IRRIGATION[10] | --- sf | --- | gpd/sf | 0 | 0 | 2,541 | 2 |
| WATER FEATURE[10] | --- sf | --- | gpd/sf | 229 | 1 | 0 | 0 |
| RESTROOMS FLOW[10] | --- sf | --- | gpd/sf | 54 | 1 | 0 | 0 |
| RESTROOMS FLUSH[10] | --- sf | --- | gpd/sf | 0 | 0 | 307 | 0 |
| CONCESSION[10] | --- sf | --- | gpd/sf | 271 | 1 | 0 | 0 |
| DRINKING FOUNTAIN[10] | --- sf | --- | gpd/sf | 66 | 1 | 0 | 0 |
| KAYAK STATION[10] | --- sf | --- | gpd/sf | 0 | 0 | 1,808 | 1 |
| FISH STATION[10] | --- sf | --- | gpd/sf | 0 | 0 | 740 | 1 |
| **RPD DEVELOPMENT DEMAND TOTALS** | | | | **620** | **4** | **5,396** | **4** |

| | | | | |
|---|---|---|---|---|
| **TOTAL DEMANDS** | **133,353** | **98** | **109,864** | **79** |
| Existing Demands[8] | 2,747 | 3 | 0 | 0 |
| **NET INCREASE** | **130,606** | **95** | **109,864** | **79** |

Notes:

1 "Maximum Residential With Recycled Water" represents a maximum residential development with recycled water available for the project. Recycled water uses include toilet flushing, landscape irrigation, and cooling water.

2 The Build Inc. Development and RPD Development program quantities are based on program summaries documented in the June 1, 2016 Initial Study for the India Basin Mixed-Use Project.

3 Residential potable water demand based on 116.5 gpd/du. Assumes 50 gallons per capita per day (gpcd) and 2.33 residents per dwelling unit, based on water demands identified in the CCSF Retail Water Demands and Conservation Potential Report, November 2004.

4 Commerical and retail potable water demand based on 0.035 gpd/sf.
Institutional/education also assumes potable water demand based on 0.07 gpd/sf.

5 Irrigation water demand for Build Inc. Development provided by Bionic.

6 Cooling water demand for Build Inc. Development provided by Glumac.
Cooling water demand for RPD Development is expected to be small compared to the overall project demand and is noted as zero for this analysis.

7 Recycled water demand for residential toilet flushing based on 2.33 residents per dwelling unit and 8 gpd for recycled water toilets, based on water conserving projections for 2030. Recycled water demand for commercial and retail toilet flushing based on 0.035 gpd/sf. Institutional/education also assumes toilet flusing based on 0.035 gpd/sf.

8 Refer to Table 1 for existing demands calculations.

9 Since recycled water will be used to supplement the potable water supply, the recycled water demand was subtracted from the total potable water demands shown in Table 1.

10 Water demand for RPD Development provided by MKA.

## TABLE 5: MAXIMUM COMMERCIAL WITH RECYCLED WATER[1,2]

**BUILD INC. DEVELOPMENT**

| DESCRIPTION OF USE | | | POTABLE WATER DEMAND[9] | | RECYCLED WATER DEMAND | |
|---|---|---|---|---|---|---|
| **Land Use** | **Unit** | **Unit Demand** | **Average Daily Demand (gpd)** | **Average Daily Demand (gpm)** | **Average Daily Demand (gpd)** | **Average Daily Demand (gpm)** |
| RESIDENTIAL[3, 7] | 500 du | 116.5 gpd/du | 48,930 | 34 | 9,320 | 7 |
| COMMERCIAL/RETAIL[4, 7] | 1,000,000 sf | 0.07 gpd/sf | 35,000 | 25 | 35,000 | 25 |
| INSTITUTIONAL/EDUCATION[4, 7] | 50,000 sf | 0.07 gpd/sf | 1,750 | 2 | 1,750 | 2 |
| IRRIGATION[5] | --- sf | --- gpd/sf | 0 | 0 | 67,268 | 47 |
| COOLING WATER[6] | --- sf | --- gpd/sf | 0 | 0 | 4,863 | 4 |
| **BUILD INC. DEVELOPMENT DEMAND TOTALS** | | | **85,680** | **61** | **118,201** | **85** |

**RPD DEVELOPMENT**

| DESCRIPTION OF USE | | | POTABLE WATER DEMAND | | RECYCLED WATER DEMAND | |
|---|---|---|---|---|---|---|
| **Land Use** | **Unit** | **Unit Demand** | **Average Daily Demand (gpd)** | **Average Daily Demand (gpm)** | **Average Daily Demand (gpd)** | **Average Daily Demand (gpm)** |
| IRRIGATION[10] | --- sf | --- gpd/sf | 0 | 0 | 2,541 | 2 |
| WATER FEATURE[10] | --- sf | --- gpd/sf | 229 | 1 | 0 | 0 |
| RESTROOMS FLOW[10] | --- sf | --- gpd/sf | 54 | 1 | 0 | 0 |
| RESTROOMS FLUSH[10] | --- sf | --- gpd/sf | 0 | 0 | 307 | 0 |
| CONCESSION[10] | --- sf | --- gpd/sf | 271 | 1 | 0 | 0 |
| DRINKING FOUNTAIN[10] | --- sf | --- gpd/sf | 66 | 1 | 0 | 0 |
| KAYAK STATION[10] | --- sf | --- gpd/sf | 0 | 0 | 1,808 | 1 |
| FISH STATION[10] | --- sf | --- gpd/sf | 0 | 0 | 740 | 1 |
| **RPD DEVELOPMENT DEMAND TOTALS** | | | **620** | **4** | **5,396** | **4** |

| | | | | |
|---|---|---|---|---|
| **TOTAL DEMANDS** | **86,300** | **65** | **123,597** | **89** |
| Existing Demands[8] | 2,747 | 3 | 0 | 0 |
| **NET INCREASE** | **83,553** | **62** | **123,597** | **89** |

Notes:

1 "Maximum Commercial With Recycled Water" represents a maximum commercial development with recycled water available for the project. Recycled water uses include toilet flushing, landscape irrigation, and cooling water.

2 The Build Inc. Development and RPD Development program quantities are based on program summaries documented in the June 1, 2016 Initial Study for the India Basin Mixed-Use Project.

3 Residential potable water demand based on 116.5 gpd/du. Assumes 50 gallons per capita per day (gpcd) and 2.33 residents per dwelling unit, based on water demands identified in the CCSF Retail Water Demands and Conservation Potential Report, November 2004.

4 Commerical and retail potable water demand based on 0.035 gpd/sf.
Institutional/education also assumes potable water demand based on 0.07 gpd/sf.

5 Irrigation water demand for Build Inc. Development provided by Bionic.

6 Cooling water demand for Build Inc. Development provided by Glumac.
Cooling water demand for RPD Development is expected to be small compared to the overall project demand and is noted as zero for this analysis.

7 Recycled water demand for residential toilet flushing based on 2.33 residents per dwelling unit and 8 gpd for recycled water toilets, based on water conserving projections for 2030. Recycled water demand for commercial and retail toilet flushing based on 0.035 gpd/sf.
Institutional/education also assumes toilet flusing based on 0.035 gpd/sf.

8 Refer to Table 1 for existing demands calculations.

9 Since recycled water will be used to supplement the potable water supply, the recycled water demand was subtracted from the total potable water demands shown in Table 1.

10 Water demand for RPD Development provided by MKA.

# Memo

MAGNUSSON
KLEMENCIC
ASSOCIATES

**Structural + Civil Engineers**

1301 Fifth Avenue, Suite 3200 Seattle Washington 98101-2699 T: 206 292 1200 F: 206 292 1201 W: www.mka.com

| | | | |
|---|---|---|---|
| TO | Ashley Ludwig - GGN | DATE | 7/12/2016 |
| FROM | Drew Gangnes | PAGE | 1 OF 1 |
| PROJECT | **India Basin Park Concept Design** | PROJECT # | A2960.50 |
| SUBJECT | Preliminary Water Demands | | |

This memo summarizes MKA's preliminary assessment of water demands for the new India Basin Park project.

## Background

MKA has been providing civil engineering consulting to GGN as they prepare the conceptual design for a new India Basin Park. The new park will encompass the combined land area of the existing India Basin Shoreline Park (IBSP) and the 900 Innes site. The water demands noted in this memo are based on the conceptual park design and program provided by GGN.

## Preliminary Water Demands

Table 1 summarizes the preliminary water demands for the project, with a breakdown by IBSP and 900 Innes sites. The "potable" column is an accounting of which demands must be served by potable, city water vs those that might be served by recycled water in the event that recycled water is available at the site.

Table 1. Preliminary Water Demands

| Park Component | Total *gal/year* | IBSP *gal/year* | 900 INNES *gal/year* | Potable |
|---|---|---|---|---|
| Irrigation | 927,344 | 805,029 | 122,315 | N |
| Water Feature Top-off | 83,516 | 69,117 | 14,399 | Y |
| Restrooms Flow | 19,800 | 13,200 | 6,600 | Y |
| Restrooms Flush | 112,200 | 74,800 | 37,400 | N |
| Concession Stand | 99,000 | 0 | 99,000 | Y |
| Drinking Fountains | 24,000 | 19,200 | 4,800 | Y |
| Kayak Station | 660,000 | 660,000 | 0 | Y |
| Fish Station | 270,000 | 270,000 | 0 | Y |
| Water Play | | 0 | TBD | Y |
| Totals | 2,195,860 | 1,911,346 | 284,514 | |

## Basis of Calculations

Irrigation demands were computed using the SFPUC Water Demand Calculator which takes into account different weather data, the areas of planting and species factors. The water feature top-off was computed based on the

MAGNUSSON
KLEMENCIC
ASSOCIATES

Structural + Civil Engineers
1301 Fifth Avenue, Suite 3200 Seattle Washington 98101-2699 T: 206 292 1200 F: 206 292 1201 W: www.mka.com



water feature area and weather data. Water demands for the other park components were calculated based on the assumptions noted in Table 2.

Table 2. Water Demand Assumptions

| Park Component | count | gpm | hr/day | day/yr | gal/yr | gal/d |
|---|---|---|---|---|---|---|
| Hose Bib - Kayak | 2 | 10 | 2 | 275 | 660,000 | 1,808 |
| Hose Bib - Fish | 1 | 10 | 2 | 300 | 270,000 | 740 |
| Drinking Fountain | | 0.13 | 2 | 300 | 24,000 | 66 |
| | **vis/day** | **gal/vis** | **day/yr** | **gal/yr** | **Flow** | **Flush** |
| Restrooms | 100 | 4 | 330 | 132,000 | 19,800 | 112,200 |
| | **vis/day** | **gal/vis** | **day/yr** | **gal/yr** | | |
| Concession | 100 | 3 | 330 | 99,000 | | |

# AGENDA ITEM
# Public Utilities Commission
***City and County of San Francisco***

DEPARTMENT Water Enterprise AGENDA NO. **10a**

MEETING DATE December 13, 2016

**Approve Water Supply Assessment:** Consent Calendar
**Project Manager:** Paula Kehoe

**Approve Water Supply Assessment for the India Basin Mixed-Use Project**

| | |
|---|---|
| **Summary of Proposed Commission Action:** | **Approve** the Water Supply Assessment (WSA) for the proposed India Basin Mixed-Use Project, pursuant to the State of California Water Code Section 10910 *et seq.;* California Environmental Quality Act (CEQA) Section 21151.9; and CEQA Guidelines Section 15155. |
| | |
| **Background:** | Water Code Sections 10910-10915 provide a nexus between the regional land use planning process and the environmental review process. The law also reflects the growing awareness of the need to incorporate water supply and demand analysis at the earliest possible stage in the land use planning process. The core of this law is the requirement for a public water system to prepare a water supply assessment (WSA) of whether available water supplies are sufficient to serve the demand generated by projects of a specified size ("water demand projects"), as well as the reasonably foreseeable cumulative demand in the region over the next 20 years under a range of hydrologic conditions. The WSA is required within 90 days of the time the public water system receives a request for such assessment from the lead agency preparing an environmental impact report (EIR) or negative declaration under CEQA. The Planning Department, which carries out the City's lead agency responsibilities under CEQA, is preparing an EIR for the proposed project and has identified the proposed project as a water demand project.<br><br>The content of a WSA is specified by the Water Code and includes identification of any existing water supply entitlements or contracts, and detailed information about groundwater supplies. It assesses the adequacy of water supplies to serve the proposed project and cumulative demand.<br><br>The WSA must be completed by the public water supplier that would serve the project and be approved by its governing body at a public meeting. Approval of a WSA is not approval of the development |

**APPROVAL:** _____

COMMISSION SECRETARY Donna Hood

| | |
|---|---|
| | project for which the WSA is prepared. A WSA is an informational document required to be prepared for use in the City's environmental review of a project under CEQA.<br><br>The attached WSA prepared by San Francisco Public Utilities Commission (SFPUC) staff analyzes the sufficiency of long-term water supplies to serve the proposed project and cumulative development and concludes that there are adequate short-term and long-term water supplies to provide water service to the Project in compliance with the State Water Code requirements. |
| | |
| **Result of Inaction:** | A delay in approving this agenda item will result in the inability of the San Francisco Planning Department to complete the environmental review for the proposed India Basin Mixed-Use Project. Under CEQA Guidelines Section 15155, the SFPUC may, within 90 days of the request for the WSA from Planning, request a reasonable extension of time to complete the WSA. |
| | |
| **Description of Action:** | Approve the WSA for the proposed India Basin Mixed-Use Project**,** pursuant to the State of California Water Code 10910. |
| | |
| **Environmental Review:** | Approval of the WSA is not a project under CEQA as the WSA is an informational document prepared for the CEQA process and is not an approval of the Project. |
| | |
| **Recommendation:** | SFPUC staff recommends that the Commission adopt the attached resolution. |
| | |
| **Attachment:** | 1. Water Supply Assessment for the India Basin Mixed-Use Project |

# PUBLIC UTILITIES COMMISSION

City and County of San Francisco

RESOLUTION NO. _____

WHEREAS**,** Under the California Environmental Quality Act (CEQA) and State Water Code (Section 10910(g)(1)), the San Francisco Public Utilities Commission (SFPUC) is required to prepare and approve a Water Supply Assessment (WSA) for the India Basin Mixed-Use Project's cumulative water demands; and

WHEREAS, A WSA is an informational document that assesses the adequacy of water supplies to serve a project and is required to be prepared as part of the CEQA environmental review process; and

WHEREAS, As an informational document, approval of the WSA is not a project under CEQA and is not an approval of the India Basin Mixed-Use Project; and

WHEREAS, A WSA must be approved at a public meeting by the governing body of the public water supplier that would serve the project; and

WHEREAS; The SFPUC staff prepared a WSA for the India Basin Mixed-Use Project, which concluded that the SFPUC has adequate water supplies to meet the Project's water demands through 2040; now, therefore, be it

RESOLVED, This Commission approves the Water Supply Assessment for the India Basin Mixed-Use Project, pursuant to the State of California Water Code 10910(g).

*I hereby certify that the foregoing resolution was adopted by the Public Utilities Commission at its meeting of December 13, 2016.*

_____

*Secretary, Public Utilities Commission*

San Francisco
Water Power Sewer
Services of the San Francisco Public Utilities Commission

525 Golden Gate Avenue, 13th Floor
San Francisco, CA 94102
T 415.554.3155
F 415.554.3161
TTY 415.554.3488

November 17, 2016

TO: Commissioner Anson Moran, President
Commissioner Ike Kwon, Vice President
Commissioner Ann Moller Caen
Commissioner Francesca Vietor
Commissioner Vince Courtney

THROUGH: Harlan L. Kelly, Jr., General Manager

FROM: Steven R. Ritchie, Assistant General Manager, Water

RE: Water Supply Assessment for the India Basin Mixed-Use Project

---

# 1.0 Summary

## *1.1 Introduction*

Under the Water Supply Assessment law (Sections 10910 through 10915 of the California Water Code), urban water suppliers like the San Francisco Public Utilities Commission (SFPUC) must furnish a Water Supply Assessment (WSA) to the city or county that has jurisdiction to approve the environmental documentation for certain qualifying projects (as defined in Water Code Section 10912 (a)) subject to the California Environmental Quality Act (CEQA). The WSA process typically relies on information contained in a water supplier's Urban Water Management Plan (UWMP), and involves answering specific questions related to the estimated water demand of the proposed project. This memo serves as the WSA for the proposed India Basin Mixed-Use Project ("proposed project"), for use in the preparation of an Environmental Impact Report (EIR) by the City and County of San Francisco Planning Department (case no. 2014-002541ENV, San Francisco Planning Department).

### 1.1.1 2015 Urban Water Management Plan

The SFPUC's most current UWMP is the UWMP update for 2015, which was adopted in June 2016. The water demand projections in the UWMP incorporated 2012 Land Use Allocation (LUA 2012) housing and employment growth projections from the San Francisco Planning Department.

The WSA for a qualifying project within the SFPUC's retail service area may use information from the UWMP. Therefore, ***the 2015 UWMP is incorporated via references throughout this WSA shown in bold, italicized text.*** The UWMP may be accessed at www.sfwater.org/uwmp.

#### 1.1.2 Basis for Requiring a WSA for the Proposed Project

The proposed project has not been the subject of a previous WSA, nor has it been part of a larger project for which a WSA was completed. The proposed project qualifies for preparation of a WSA under Water Code Section 10912(a) because it is a mixed-use development that, under the Maximum Residential Option, would include more than 500 dwelling units; and under the Maximum Commercial Option, would include more than 250,000 square feet (sf) of commercial office space. The proposed project is characterized further in Section 1.2.

#### 1.1.3 Conclusion of this WSA

In this WSA, the SFPUC concludes that there are adequate water supplies to serve the proposed project and cumulative retail water demands during normal years, single dry years, and multiple dry years over a 20-year planning horizon from 2020 through 2040. Additional information on supply sufficiency is provided in Section 4.2, Findings.

### *1.2 Proposed Project Description*

The proposed project encompasses approximately 38.84 acres in the Bayview Hunters Point neighborhood in San Francisco. The site is bound by the San Francisco Bay to the north, Earl Street to the east, Innes Avenue to the south, and Hunters Point Boulevard and Hawes Street to the west.

The proposed project consists of four properties – 700 Innes, 900 Innes, India Basin Shoreline Park, and India Basin Open Space. The 700 Innes property and India Basin Open Space would be developed by BUILD Inc. to include public rights-of-way, residential units, commercial uses, parking, and open space. The 900 Innes property and India Basin Shoreline Park are publicly owned by the San Francisco Recreation and Parks Department and would be developed to create a publicly accessible network of new and/or improved parkland and open space.

The proposed project is flexibly zoned either commercial or residential, meaning that either use could be constructed. For that reason, the EIR for the proposed project is studying both Maximum Residential and Maximum Commercial program options. The Maximum Residential Option would include 1,240 residential dwelling units and 275,330 sf of commercial/retail use within the BUILD development, while the Maximum Commercial Option would include 500 residential dwelling units and 1,000,000 sf of commercial/retail use within the BUILD development. Both options would include 50,000 sf of institutional/education use within the BUILD development, and 14,500 sf of commercial/retail use within the Recreation and Parks Department development.

Further details on both the Maximum Residential and Maximum Commercial options are provided in Attachment B. However, for the purpose of the WSA, only the Maximum Residential Option is assessed for water supply as it would result in the most conservative water demand estimate and would encompass the demands estimated for the Maximum Commercial Option.

## 2.0 Water Supply

This section reviews San Francisco's existing and planned water supplies.

### *2.1 Regional Water System*

See ***Section 3.1 of the UWMP*** for descriptions of the Regional Water System (RWS) and ***Section 6.1 of the UWMP*** for water rights held by City and County of San Francisco and the SFPUC Water System Improvement Program (WSIP).

### *2.2 Existing Retail Supplies*

Retail water supplies from the RWS are described in ***Section 6.1 of the UWMP***.

Local groundwater supplies, including the Westside Groundwater Basin, Central Groundwater Sub Basin, and Sunol Filter Gallery Subsurface Diversions, are described in ***Section 6.2.1 of the UWMP***.

Local recycled water supplies, including the Harding Park Recycled Water Project and Pacifica Recycled Water Project, are described in ***Section 6.2.1 of the UWMP***.

### *2.3 Planned Retail Water Supply Sources*

The San Francisco Groundwater Supply Project is described in ***Section 6.2.2 of the UWMP***.

The proposed Westside and Eastside Recycled Water Projects, as well as non-potable water supplies associated with onsite water systems implemented in compliance with San Francisco's Non-potable Water Ordinance (Health Code Chapter 12C), are also described in ***Section 6.2.2 of the UWMP***.

### *2.4 Summary of Current and Future Retail Water Supplies*

A breakdown of water supply sources for meeting SFPUC retail water demand through 2040 in normal years is provided in ***Section 6.2.5 of the UWMP***.

### *2.5 Dry-Year Water Supplies*

A description of dry-year supplies developed under WSIP is provided in ***Section 7.2 of the UWMP***. Other water supply reliability projects and efforts that are currently underway or completed are described in ***Section 7.4 of the UWMP***. A breakdown of water supply sources for meeting SFPUC retail water demand through 2040 in multiple dry years are provided in ***Section 7.5 of the UWMP***. For a single dry year, the retail RWS allocation and, thus, the breakdown of water supply sources would be the same as those in a normal year.

## 3.0 Water Demand

This section reviews the climatic and demographic factors that may affect San Francisco's water use, projected retail water demands, and the demand associated with the proposed project.

### *3.1 Climate*

San Francisco has a Mediterranean climate. Summers are cool and winters are mild with infrequent rainfall. Temperatures in the San Francisco area average 57 degrees Fahrenheit annually, ranging from the mid-40s in winter to the upper 60s in late summer. Strong onshore flow of wind in summer keeps the air cool, generating fog through September. The warmest temperatures generally occur in September and October. Rainfall in the San Francisco area averages about 22 inches per year and is generally confined to the "wet" season from late October to early May. Except for occasional light drizzles from thick marine stratus clouds, summers are nearly completely dry. A summary of the temperature and rainfall data for the City of San Francisco is included in Table 1.

**Table 1: San Francisco Climate Summary**

| Month | Average Maximum Temperature (°F) | Average Minimum Temperature (°F) | Average Monthly Rainfall (inches) |
|---|---|---|---|
| January | 58.0 | 45.7 | 4.36 |
| February | 60.3 | 47.3 | 4.41 |
| March | 61.4 | 48.1 | 2.98 |
| April | 62.3 | 49.1 | 1.38 |
| May | 63.2 | 50.9 | 0.68 |
| June | 64.8 | 52.7 | 0.18 |
| July | 65.6 | 54.3 | 0.02 |
| August | 66.6 | 55.3 | 0.06 |
| September | 68.1 | 55.0 | 0.19 |
| October | 67.8 | 53.3 | 1.04 |
| November | 61.2 | 48.1 | 2.85 |
| December | 58.3 | 45.9 | 4.33 |
| **Annual Average** | **63.3** | **50.6** | **22.45** |

Source: Western Regional Climate Center (www.wrcc.dri.edu), 1981-2010 data from two San Francisco monitoring stations (Mission Dolores/SF#047772 and Richmond/SF#047767).

## *3.2 Projected Growth*

Projections of population growth in the retail service area through 2040 are presented in ***Section 3.2.2 of the UWMP***. The corresponding LUA 2012 projections for housing and employment in San Francisco, which are incorporated into the projected retail water demands, are provided in ***Appendix E of the UWMP***.

## *3.3 Projected Retail Water Demands*

For the 2015 UWMP, the SFPUC developed a new set of models that incorporate socioeconomic factors to project retail demands through 2040. These models incorporate the latest housing and employment projections from LUA 2012. ***See Section 4.1 of the UWMP*** for tabulated retail water demand projections through 2040 and a description of the model methodology.

## *3.4 Proposed Project Water Demand*

BUILD Inc.'s water resource consultants provided a memo describing the methods and assumptions used to estimate the water demand of the proposed project, along with the resulting demand (Attachment B). The SFPUC reviewed the memo to ensure that the methodology is appropriate for the types of proposed water uses, the assumptions are valid and thoroughly documented along with verifiable data sources, and a professional standard of care was used. The SFPUC concluded that the demand estimates provided by BUILD Inc.'s consultants are reasonable. Water demand associated with the proposed project over the 20-year planning horizon is shown in the following table.

**Table 2: Water Demand Based on Project Phasing**

| Demand of Proposed Project (mgd) | 2020 | 2025 | 2030 | 2035 | 2040 |
|---|---|---|---|---|---|
| Potable Demand | 0.068 | 0.110 | 0.110 | 0.110 | 0.110 |
| Non-potable Demand | 0.049 | 0.063 | 0.063 | 0.063 | 0.063 |
| Total Demand | 0.117 | 0.173 | 0.173 | 0.173 | 0.173 |

mgd = million gallons per day

Notes:
The BUILD development portion of the proposed project would be constructed in two phases, with Phase 1 completed by 2020 and Phase 2 completed by 2025. The Recreation and Parks Department development portion would be constructed in one phase and completed by 2020.

The San Francisco Planning Department has determined that the proposed project is encompassed within the projections presented in LUA 2012 as indicated in the letter from the Planning Department to the SFPUC (Attachment A). Therefore, the demand of the proposed project is also encompassed within the San Francisco retail water demands that are presented in ***Section 4.1 of the UWMP***, which considers retail water demand based on the LUA 2012 projections. The following table shows the demand of the proposed project relative to total retail demand.

**Table 3: Proposed Project Demand Relative to Total Retail Demand**

| | 2020 | 2025 | 2030 | 2035 | 2040 |
|---|---|---|---|---|---|
| Total Retail Demand (mgd)[1] | 77.5 | 79.0 | 82.3 | 85.9 | 89.9 |
| Total Demand of Proposed Project (mgd) | 0.117 | 0.173 | 0.173 | 0.173 | 0.173 |
| Portion of Total Retail Demand[2] | 0.15% | 0.22% | 0.21% | 0.20% | 0.19% |

Notes:
1. Retail water demands per ***Table 4-1 of the UWMP***.
2. The proposed project is accounted for in the LUA 2012 projections and subsequent retail water demand projections.

# 4.0 Conclusion

## *4.1 Comparison of Projected Supply and Demand*

***Section 7.5 of the UWMP*** compares the SFPUC's retail water supplies and demands through 2040 during normal year, single dry-, and multiple dry-year periods. See Table 4, below, which is adapted from the UWMP (Table 7-4). As explained previously in Section 3.4, water demands associated with the proposed project are already captured in the retail demand projections presented in the UWMP. The proposed project is expected to represent up to 0.22 percent of the total retail water demand.

**Table 4: Projected Supply and Demand Comparison (mgd)**

| | | Normal Year | Single Dry Year[1] | Multiple Dry Years | | |
|---|---|---|---|---|---|---|
| | | | | Year 1[1] | Year 2[2] | Year 3[2] |
| 2020 | Total Retail Demand[3] | 77.5 | 77.5 | 77.5 | 77.5 | 77.5 |
| | Total Retail Supply[4] | 77.5 | 77.5 | 77.5 | 77.5 | 77.5 |
| | Surplus/(Deficit) | 0 | 0 | 0 | 0 | 0 |
| 2025 | Total Retail Demand[3] | 79.0 | 79.0 | 79.0 | 79.0 | 79.0 |
| | Total Retail Supply[4] | 79.0 | 79.0 | 79.0 | 79.0 | 79.0 |
| | Surplus/(Deficit) | 0 | 0 | 0 | 0 | 0 |
| 2030 | Total Retail Demand[3] | 82.3 | 82.3 | 82.3 | 82.3 | 82.3 |
| | Total Retail Supply[4] | 82.3 | 82.3 | 82.3 | 82.3 | 82.3 |
| | Surplus/(Deficit) | 0 | 0 | 0 | 0 | 0 |
| 2035 | Total Retail Demand[3] | 85.9 | 85.9 | 85.9 | 85.9 | 85.9 |
| | Total Retail Supply[4] | 85.9 | 85.9 | 85.9 | 85.9 | 85.9 |
| | Surplus/(Deficit) | 0 | 0 | 0 | 0 | 0 |
| 2040 | Total Retail Demand[3] | 89.9 | 89.9 | 89.9 | 89.9 | 89.9 |
| | Total Retail Supply[4] | 89.9 | 89.9 | 89.9 | 88.8 | 88.8 |
| | Surplus/(Deficit) | 0 | 0 | 0 | (1.1) | (1.1) |

Notes:
1. During a single dry year and multiple dry year 1, a system-wide shortage of 10% is in effect. Under the Water Shortage Allocation Plan (WSAP), the retail supply allocation at this stage of shortage is 36.0% of available RWS supply, or 85.9 mgd. However, due to the Phased WSIP Variant, only 81 mgd of RWS supply can be delivered. RWS supply is capped at this amount.
2. During multiple dry years 2 and 3, a system-wide shortage of 20% is in effect. Under the WSAP, the retail supply allocation at this stage of shortage is 37.5% of available RWS supply, or 79.5 mgd. RWS supply is capped at this amount.
3. Total retail demands correspond to those in ***Table 4-1 of the UWMP***, and reflect both passive and active conservation, as well as water loss.
4. Total retail supplies correspond to those in ***Table 6-7 of the UWMP***. Procedures for RWS allocations and the WSAP are described in ***Section 8.3 of the UWMP***. Groundwater and recycled water are assumed to be used before RWS supplies to meet retail demand. However, if groundwater and recycled water supplies are not available, up to 81 mgd, or the corresponding capped amount in dry years, of RWS supply could be used.

The LUA 2012 projections result in a retail demand in 2035 of 85.9 mgd, which represents a 5.0 mgd, or 6 percent, increase over the 2035 demand projected in the 2010 UWMP. The ability to meet the demand of the retail customers is in large part due to development of 10 mgd of local WSIP supplies, including conservation, groundwater, and recycled water. These supplies are anticipated to be fully implemented over the next 10 to 15 years.

If planned future water supply projects (i.e., San Francisco Groundwater Supply Project, Westside Recycled Water Project, Eastside Recycled Water Project, and onsite non-potable supplies) are not implemented, normal-year supplies may not be enough to meet projected retail demands. To balance any water supply deficits during normal years, the SFPUC may import additional water from the RWS beyond the retail allocation of 81 mgd, with mitigation implemented by the SFPUC and potential environmental surcharges if RWS deliveries exceed the 265 mgd interim supply limitation.

If dry-year supply projects (i.e., Calaveras Dam Replacement Project, Lower Crystal Springs Dam Improvements Project, Alameda Creek Recapture, Regional

Groundwater Storage and Recovery Project, and water transfers) are not implemented, existing dry year supplies may not be enough to meet projected retail demands. To balance any water supply deficits during dry years, the SFPUC may reduce system deliveries and impose customer rationing.

The SFPUC remains committed to meeting the level of service goals and objectives outlined under WSIP. In addition, the SFPUC continues to explore other future supplies, including:

- Development of additional conservation and recycling.
- Development of additional groundwater supplies.
- Securing of additional water transfer volumes.
- Increasing Tuolumne River supply.

## *4.2 Findings*

Regarding the availability of water supplies to serve the proposed project beginning in 2020, the SFPUC finds, based on the entire record before it, as follows:

- During normal years, single dry years, and multiple dry years, the SFPUC has sufficient water supplies to serve the proposed project.
- With the addition of planned retail supplies, the SFPUC has sufficient water supplies available to serve its retail customers, including the demands of the proposed project, existing customers, and foreseeable future development.

Approval of this WSA by the Commission is not equivalent to approval of the development project for which the WSA is prepared. A WSA is an informational document required to be prepared for use in the City's environmental review of a project under CEQA. It assesses the adequacy of water supplies to serve the proposed project and cumulative demand.

Furthermore, this WSA is not a "will serve" letter and does not verify the adequacy of existing distribution system capacity to serve the proposed project. A "will serve" letter and/or hydraulic analysis must be requested separately from the SFPUC City Distribution Division to verify hydraulic capacity.

If there are any questions or concerns, please contact Steve Ritchie at (415) 934-5736 or SRitchie@sfwater.org.

# Attachment A –

## Communications from San Francisco Planning Department

SAN FRANCISCO
**PLANNING DEPARTMENT**

**MEMO**

1650 Mission St.
Suite 400
San Francisco,
CA 94103-2479

Reception:
415.558.6378

Fax:
415.558.6409

Planning
Information:
415.558.6377

**DATE:** **June 13, 2013**

**TO:** **SF Planning EP Planners & SFPUC Planners**

**FROM:** **Scott T. Edmondson, AICP; Aksel Olsen**

**RE:** **Project Types Represented in the Land Use Allocation**

This Memorandum explains the Planning Department's Land Use Allocation (LUA) and the types of projects included in the LUA. The 2012 LUA is the most recent update and uses the Association of Bay Area Governments' (ABAG) May 2012 Jobs-Housing Connection Scenario. As this memorandum explains, the Planning Department expects that the LUA will encompass the vast majority of development proposals that project sponsors will present to the Planning Department. This memorandum also identifies possible unusual circumstances under which EP Planners and the SF PUC Planners may want to consult further with the Planning Department's Information and Analysis Group to determine whether a project is encompassed within the LUA.

**ABAG's Projections of San Francisco's Economic Growth and the LUA**

The LUA takes ABAG's 30-year projections of citywide household and job growth and allocates them to smaller geographic units, in this case, the traffic analysis zones of the SF Transportation Authority's Countywide Transportation Model. Thus, the LUA does not project growth but simply allocates ABAG's growth projections to subarea locations within the city. The current 2012 LUA uses ABAG's Jobs-Housing Connection Scenario projections for San Francisco and covers the period from 2010 to 2040; these projections were released in May 2012 and are represented in five-year increments.

ABAG derives its demographic and economic growth projections from assumptions about long-term demographic and economic growth.[1] ABAG maintains its own set of regional models and develops each forecast with its in-house experts and private economic consultants.[2] The forecasting is informed by the best information and assumptions available through federal and State agencies, such as the State Department of Finance, and private sources. However, ABAG develops its forecast based on local knowledge from over 50 years of forecasting and develops the forecast to reflect local conditions in contrast to more general forecasting assumptions of State or federal sources. ABAG's estimate of total citywide growth for the 30-year period is expected to best represent actual growth at the end of the 30-year period. However, projected growth for any portion of the projection period, such as growth in a one-year or a five-year period, would be expected to vary from actual growth in such periods. Within the 30-year growth projection period, higher than average growth periods could be followed by lower than average growth periods such that growth over the period would ultimately equal the projected 30-year

total. All projection methodologies make assumptions based on the best available information at the time. To minimize the effects of imprecision intrinsic to any projections methodology when used in for planning decisions, ABAG follows professional best practices and updates its projections every two years. Accordingly, the Planning Department updates its LUA every two years. The planning practice of frequently updating projections and plans allows the incorporation of new information over time to provide for the most up-to-date projections.

The SFPUC updates its Urban Water Management Plan (UWMP) every five years. The UWMP typically relies on LUA projections or similar information. But, because the LUA is updated every two years, the SFPUC may want to review the LUA issued within SFPUC's 5-year UWMP cycle; and if it varies in a significant way from the SFPUC's projections used in its UWMP, discuss with Planning whether it should make any changes in its own water supply needs assessment during an UWMP cycle.

**Types of Projects Included in the LUA**

The LUA translates ABAG's projected household and job growth into total expected development in San Francisco over a 30-year period. The LUA translates ABAG's household growth into residential housing units and ABAG's job growth into commercial space.[3] Thus, the LUA projections of housing units and commercial space include all project types expected from San Francisco growth, such as housing, office, retail, production-distribution-repair (PDR), visitor, and cultural-institutional-educational (CIE). The LUA does not exclude any project type or potential growth. As such, the LUA and the ABAG economic projections upon which it is based contain the best estimates available of reasonably foreseeable growth and development in San Francisco over a 30-year period.

**Unusual Circumstances**

The LUA can be considered to include all reasonably expected growth and development and it is frequently updated to correct for expected variations. Nevertheless, there are possible unusual circumstances under which the EP Planners or SFPUC Planners may want to request further Planning Department consultation with the Information and Analysis Group to determine if a particular project falls within the LUA. ABAG's projections and the Department's LUA take into account urban economic trends and based on that information capture all reasonably foreseeable growth in San Francisco. Limited capital and aggregate demand of any urban economy constrains growth. However, occasionally the reality or perception may arise that a project lies outside the normal growth constraints of the San Francisco economy for some reason, and therefore lies outside ABAG's projection's and the Department's current spatial allocation in its LUA.

One can envision the rare case of a project arising outside the City's economy (demand and capital) from an organization not located in San Francisco using nonprofit foundation funds or private donations to construct a large institutional project in San Francisco, such as a major hospital, a university, or an office complex. These projects would represent spending and demand beyond that normally active in the San Francisco economy, and therefore represent net additions to projected growth beyond that captured by ABAG's projections and reflected in the Department's LUA. Indicative characteristics of such projects

would include those with non-local sponsors, of large size, and for an institutional land use. Alternatively, very large project proposals from local project sponsors active in the SF economy involving a large site, land assembly, a planned unit development (PUDs), master plans, or area plan and rezoning proposals may warrant individual assessment for a range of reasons even though they are likely captured in ABAG's projections and the LUA. Such projects would be similar to recent projects such as Hunters Point/Candlestick, Park Merced, Treasure Island, Pier 70 Master Plan, Eastern Neighborhoods, or the Transit Center District Plan.

The bi-annual update of ABAG's projections and the LUA would be able to capture development associated with such projects. However, should such a project be proposed between updates, the EP Planners and SFPUC could treat its appearance as sufficient cause to request the Planning Department's assistance in determining whether to consider the project outside the latest LUA projections.

---

[1] Please see ABAG's summary of its research and forecasting on its website: http://www.abag.ca.gov/planning/research/index.html

[2] ABAG describes its current Jobs-Housing Scenario policy-based forecast here: http://onebayarea.org/pdf/JHCS/May_2012_Jobs_Housing_Connection_Strategy_Appendices_Low_Res.pdf.

[3] The LUA citywide totals only differ slightly, up to within one percent of ABAG totals (+/-). The difference is produced by LUA's complex method of translating ABAG projections into development (residential units and commercial space) and allocating total citywide growth to subarea locations. The minor difference between the LUA and ABAG citywide totals is real in absolute terms, but not in the sense that they are different projections. The one percent difference does not constitute a difference of projections. ABAG and MTC consider variation of one percent in citywide totals, plus or minus, as sufficiently representing ABAG's projections for consistency with the MTC regional projections and modeling purposes (congestion management, etc.). Even if a few versions of the LUA must be done to make minor subarea spatial allocation corrections, as long as the LUA's citywide totals are within one percent of ABAG's projections, and ABAG's projections have not changed, the LUA citywide totals have not effectively changed either. Any of those LUA versions' citywide totals fully represent the same unchanged ABAG projection totals.

# Attachment B –

## India Basin Mixed-Use Project Demand Memo

SAN FRANCISCO
**PLANNING DEPARTMENT**

**MEMO**

1650 Mission St.
Suite 400
San Francisco,
CA 94103-2479

Reception:
**415.558.6378**

Fax:
**415.558.6409**

Planning
Information:
**415.558.6377**

**DATE:** August 22, 2016

**TO:** Fan Lau, SFPUC

**FROM:** Chris Thomas, Environmental Planning

**CC:** Bret Bollinger, Environmental Planning

**RE:** India Basin Project Water Supply Assessment Request
(Planning Department Case No. 2014-002541ENV)

The purpose of this memorandum is to request that the San Francisco Public Utilities Commission (SFPUC) prepare a Water Supply Assessment (WSA) for the proposed India Basin project, in compliance with CEQA Guidelines Section 15155 and Sections 10910 through 10915 of the California Water Code. The project sponsor has provided project information intended to meet the requirements outlined in the SFPUC guidance memo dated July 13, 2015. A summary of the project description, proposed average daily water demands for 2015, 2020 and 2025, and supporting tables prepared by the project sponsor's consultant, are attached.

Should you have questions or need additional information from the Planning Department or the project sponsor, please contact me at 415-575-9036 or christopher.thomas@sfgov.org.

BkF 100+ YEARS
ENGINEERS . SURVEYORS . PLANNERS *Delivering Inspired Infrastructure*

# MEMORANDUM

Date: July 18, 2016
*Revised September 16, 2016*
*Revised October 10, 2016*
*Revised November 2, 2016*

BKF Job Number: 20140069

To: Courtney Pash, BUILD
Victoria Lehman, BUILD

From: Tom Morse, BKF
Jenn Chu, BKF

Subject: India Basin – Water Demands Memorandum

## PURPOSE

The purpose of this memorandum is to provide a summary of proposed potable and non-potable water demands associated with the India Basin Project ("Project").

## BACKGROUND

The Project encompasses approximately 38.84 acres in the Bayview Hunters Point neighborhood in San Francisco. The site is bound by the San Francisco Bay to the north, Earl Street to the east, Innes Avenue to the south, and Hunters Point Boulevard and Hawes Street to the west.

The Project consists of four properties – 700 Innes, 900 Innes, India Basin Shoreline Park, and India Basin Open Space. The 700 Innes property and India Basin Open Space would be developed by BUILD to include public rights-of-way, residential units, commercial uses, a school, parking, and open space ("Build Development"). The 900 Innes property and India Basin Shoreline Park are publicly owned by the San Francisco Recreation and Parks Department (RPD) and would be developed to create a publicly accessible network of new and/or improved parkland and open space ("RPD Development").

The Project is flexibly zoned either commercial or residential, meaning that either use could be constructed. For that reason, the India Basin EIR is studying both maximum residential and maximum commercial program options for the project. The program options propose to include the following:

*Maximum Residential Option*

| | Build Development | RPD Development |
|---|---|---|
| Residential | 1,240 units | - |
| Commercial/Retail | 275,330 sf | 14,500 sf |
| Institutional/Education | 50,000 sf | - |

*Maximum Commercial Option*

| | Build Development | RPD Development |
|---|---|---|
| Residential | 500 units | - |
| Commercial/Retail | 1,000,000 sf | 14,500 sf |
| Institutional/Education | 50,000 sf | - |

Potable water supply is currently available from a domestic water main in Innes Avenue. The project site is within the City's designated recycled water use area. A non-potable water system is not currently available within the project limits. As required by the City's Recycled Water Ordinance, the project will install a non-potable water system and connect to the potable water system in the interim condition with approved backflow devices. In order to provide a conservative estimate of future water demands for the Project, this memorandum does not assume compliance with the Non-Potable Water Ordinance (Ordinance 109-15). However, the Project is subject to the requirements of the Non-Potable Water Ordinance and will comply.

## EXISTING POTABLE AND NON-POTABLE WATER DEMAND

Table 1 shows the existing potable water demands for the Project based on the onsite existing buildings and their approximate square footages. Since existing billing data was not available to compute the existing potable water demands, higher unit demands were used to account for older, less efficient fixtures in the existing condition. This memorandum uses a residential potable water unit demand of 150 gallons per day per dwelling unit and a commercial/retail potable water unit demand of 0.15 gallons per day per square foot. There is no existing non-potable water demand since the site is not currently served by a non-potable water system.

## PROPOSED POTABLE AND NON-POTABLE WATER DEMAND

Potable and non-potable water demand calculations are included as attachments to this memorandum.

Table 2 and Table 3 calculate demands for the maximum residential and maximum commercial options with no recycled water available at the start of the project. Potable water demand is based on demands for residential, commercial/retail, institutional/education, landscape irrigation and cooling water uses.

Table 4 and Table 5 calculate demands for the maximum residential and maximum commercial options with recycled water available for the project. Potable water demand is based on demands for residential, commercial/retail, and institutional/education uses. Non-potable water demand is based on toilet flushing, landscape irrigation and cooling water uses.

Residential potable water unit demand was based on 90 gallons per day per dwelling unit. This unit demand assumes 45 gallons per capita per day and 2.0 residents per dwelling unit.

Residential recycled water unit demand for toilet flushing was based on 6.4 gallons per capita day (assumed 5 flushes per day per person at 1.28 gallons per flush) and 2.0 residents per dwelling unit. These unit demands are consistent with the "San Francisco Public Utilities Commission Water Enterprise 2015 Retail Water Conservation Plan" report ("Water Report"), prepared by RMC. The Water Report provides projections of potable water demand for the years through 2040 and projects that, through normal replacement of plumbing fixtures and appliances, most or all residences will have plumbing fixtures and appliances that meet the current plumbing code by that time. Table 1 of the Water Report identifies a unit demand of 43 to 45 gallons per capita day through the year 2040. This memorandum uses 45 gallons per capita day, which is slightly conservative. Appendix B, Pages 21-23, of the Water Report identifies a unit demand of 2.0 residents per dwelling unit for multifamily units.

Commercial and retail potable water unit demand was based on 0.07 gallons per day per square foot. Commercial and retail recycled water unit demand for toilet flushing was assumed to be 50 percent of the total water demand; 0.035 gallons per day per square foot is used for this analysis. This demand rate was calculated by the following methodology. Prior to 2008 and adoption of the California Green Building Standards ("Code"), 0.10 gallons per day per square foot was a generally accepted water demand used for office/commercial space. Currently, the Code requires calculation of a baseline demand and then requires a 25% reduction from baseline. In order to account for conservation and implementation of the Code, we applied the 25% reduction to 0.10 gallons per day per square foot, resulting in a unit demand of 0.075 gallons per day per square foot.

Institutional/education potable water unit demand is 0.07 gallons per square foot and is assumed to be consistent with commercial and retail potable water unit demand. Similar to the commercial and retail recycled water unit demand, institutional/education recycled water unit demand for toilet flushing was assumed to be 50 percent of the total water demand; 0.035 gallons per day per square foot is used for this analysis.

Irrigation demands for the Build Development were provided by Bionic (attached, Appendix A). The demand includes irrigation for the development parcels, public streets and open space. Since Bionic's calculations considered a 7-month irrigation period, the total annual irrigation demand was divided by 365 days in order to consider a year-round irrigation period. Irrigation demands for the RPD Development were provided by MKA (attached, Appendix B).

Cooling demands for the Build Development were provided by Glumac and were calculated from a site mass model using eQuest, an energy simulation program. A nominal unit demand of 1.37 gallons per ton-hour was used to convert the ton-hour output from the model. Cooling demands for the RPD Development are expected to be small compared to the overall project demand and was noted as zero for this analysis.

## CONCLUSION

Below are summary tables for proposed average daily water demands, with and without recycled water uses, which are required by the Project. These demands are broken down by the year 2015, 2020, and 2025 to match the time divisions used in the City's Urban Water Management Plan. The Build Development is expected to be constructed in two phases, with Phase 1 completed by 2020 and Phase 2 completed by 2025. The RPD Development is expected to be completed in one phase (2020). Appendix C illustrates the proposed phasing plan for the Build Development.

*Cumulative Potable Water Demand without Recycled Water*

| Program | Average Daily Water Demand (gpd) | | |
|---|---|---|---|
| | 2015 | 2020 | 2025 |
| Maximum Residential | 0 | 116,777 | 173,392 |
| Maximum Commercial | 0 | 100,548 | 159,682 |

*Cumulative Recycled Water Demand without Recycled Water*

| Program | Average Daily Water Demand (gpd) | | |
|---|---|---|---|
| | 2015 | 2020 | 2025 |
| Maximum Residential | 0 | 0 | 0 |
| Maximum Commercial | 0 | 0 | 0 |

*Cumulative Potable Water Demand with Recycled Water*

| Program | Average Daily Water Demand (gpd) | | |
|---|---|---|---|
| | 2015 | 2020 | 2025 |
| Maximum Residential | 0 | 67,792 | 110,283 |
| Maximum Commercial | 0 | 36,086 | 78,518 |

*Cumulative Recycled Water Demand with Recycled Water*

| Program | Average Daily Water Demand (gpd) | | |
|---|---|---|---|
| | 2015 | 2020 | 2025 |
| Maximum Residential | 0 | 48,985 | 63,109 |
| Maximum Commercial | 0 | 67,068 | 81,164 |

ATTACHMENTS

- Table 1 – Existing Potable Water Demand
- Table 2 – Maximum Residential Without Recycled Water
- Table 3 – Maximum Commercial Without Recycled Water
- Table 4 – Maximum Residential With Recycled Water
- Table 5 – Maximum Commercial With Recycled Water
- Appendix A – India Basin Landscape Water Demand Calculations, prepared by Bionic, dated September 27, 2016
- Appendix B – India Basin Park Concept Design Preliminary Water Demands Memo, prepared by MKA, dated July 6, 2016
- Appendix C – Phasing Plan

**TABLE 1: EXISTING WATER DEMAND[1]**

| DESCRIPTION OF USE | | | POTABLE WATER DEMAND | | RECYCLED WATER DEMAND | |
|---|---|---|---|---|---|---|
| **Land Use** | **Unit** | **Unit Demand** | **Average Daily Demand (gpd)** | **Average Daily Demand (gpm)** | **Average Daily Demand (gpd)** | **Average Daily Demand (gpm)** |
| RESIDENTIAL[2] | 5 du | 150.0 gpd/du | 750 | 1 | 0 | 0 |
| COMMERCIAL/RETAIL[3] | 13,310 sf | 0.15 gpd/sf | 1,997 | 2 | 0 | 0 |
| **EXISTING WATER DEMAND TOTALS** | | | **2,747** | **3** | **0** | **0** |

| | | | | |
|---|---|---|---|---|
| **TOTAL DEMANDS** | **2,747** | **3** | **0** | **0** |

Notes:

1 The onsite existing buildings and their uses are based on information documented in the June 1, 2016 Initial Study for the India Basin Mixed-Use Project.

2 Existing residential potable water demand based on 150.0 gpd/du. The approximately 11,600 sf of existing residential use was assumed to be equivalent to 5 dwelling units for this analysis.

3 Existing commerical and retail potable water demand based on 0.15 gpd/sf.

**TABLE 2: MAXIMUM RESIDENTIAL WITHOUT RECYCLED WATER[1,2]**

**700 INNES (BUILD DEVELOPMENT)**

| DESCRIPTION OF USE | | | POTABLE WATER DEMAND | | RECYCLED WATER DEMAND | |
|---|---|---|---|---|---|---|
| **Land Use** | **Unit** | **Unit Demand** | **Average Daily Demand (gpd)** | **Average Daily Demand (gpm)[9]** | **Average Daily Demand (gpd)** | **Average Daily Demand (gpm)[9]** |
| RESIDENTIAL[3] | 1,240 du | 90.0 gpd/du | 111,600 | 78 | 0 | 0 |
| COMMERCIAL/RETAIL[4] | 275,330 sf | 0.07 gpd/sf | 19,274 | 14 | 0 | 0 |
| INSTITUTIONAL/EDUCATION[4] | 50,000 sf | 0.07 gpd/sf | 3,500 | 3 | 0 | 0 |
| IRRIGATION[5] | --- sf | --- gpd/sf | 20,455 | 14 | 0 | 0 |
| COOLING WATER[6] | --- sf | --- gpd/sf | 2,699 | 2 | 0 | 0 |
| **700 INNES DEMAND TOTALS** | | | **157,528** | **111** | **0** | **0** |

**INDIA BASIN OPEN SPACE (BUILD DEVELOPMENT)**

| DESCRIPTION OF USE | | | POTABLE WATER DEMAND | | RECYCLED WATER DEMAND | |
|---|---|---|---|---|---|---|
| **Land Use** | **Unit** | **Unit Demand** | **Average Daily Demand (gpd)** | **Average Daily Demand (gpm)[9]** | **Average Daily Demand (gpd)** | **Average Daily Demand (gpm)[9]** |
| RESIDENTIAL[3] | 0 du | 90.0 gpd/du | 0 | 0 | 0 | 0 |
| COMMERCIAL/RETAIL[4] | 0 sf | 0.07 gpd/sf | 0 | 0 | 0 | 0 |
| INSTITUTIONAL/EDUCATION[4] | 0 sf | 0.07 gpd/sf | 0 | 0 | 0 | 0 |
| IRRIGATION[5] | --- sf | --- gpd/sf | 9,848 | 7 | 0 | 0 |
| COOLING WATER[6] | --- sf | --- gpd/sf | 0 | 0 | 0 | 0 |
| **INDIA BASIN OPEN SPACE DEMAND TOTALS** | | | **9,848** | **7** | **0** | **0** |

| | | | | |
|---|---|---|---|---|
| **BUILD DEVELOPMENT DEMANDS** | **167,376** | **118** | **0** | **0** |

**TABLE 2: MAXIMUM RESIDENTIAL WITHOUT RECYCLED WATER[1,2] (CONTINUED)**

**900 INNES (RPD DEVELOPMENT)**

| DESCRIPTION OF USE | | | POTABLE WATER DEMAND | | RECYCLED WATER DEMAND | |
|---|---|---|---|---|---|---|
| Land Use | Unit | Unit Demand | Average Daily Demand (gpd) | Average Daily Demand (gpm)[9] | Average Daily Demand (gpd) | Average Daily Demand (gpm)[9] |
| IRRIGATION[8] | --- sf | --- gpd/sf | 335 | 0 | 0 | 0 |
| WATER FEATURE[8] | --- sf | --- gpd/sf | 39 | 0 | 0 | 0 |
| RESTROOMS FLOW[8] | --- sf | --- gpd/sf | 18 | 0 | 0 | 0 |
| RESTROOMS FLUSH[8] | --- sf | --- gpd/sf | 102 | 0 | 0 | 0 |
| CONCESSION[8] | --- sf | --- gpd/sf | 271 | 0 | 0 | 0 |
| DRINKING FOUNTAIN[8] | --- sf | --- gpd/sf | 13 | 0 | 0 | 0 |
| KAYAK STATION[8] | --- sf | --- gpd/sf | 0 | 0 | 0 | 0 |
| FISH STATION[8] | --- sf | --- gpd/sf | 0 | 0 | 0 | 0 |
| **900 INNES DEMAND TOTALS** | | | **779** | **1** | **0** | **0** |

**INDIA BASIN SHORELINE PARK (RPD DEVELOPMENT)**

| DESCRIPTION OF USE | | | POTABLE WATER DEMAND | | RECYCLED WATER DEMAND | |
|---|---|---|---|---|---|---|
| Land Use | Unit | Unit Demand | Average Daily Demand (gpd) | Average Daily Demand (gpm)[9] | Average Daily Demand (gpd) | Average Daily Demand (gpm)[9] |
| IRRIGATION[8] | --- sf | --- gpd/sf | 2,206 | 2 | 0 | 0 |
| WATER FEATURE[8] | --- sf | --- gpd/sf | 189 | 0 | 0 | 0 |
| RESTROOMS FLOW[8] | --- sf | --- gpd/sf | 36 | 0 | 0 | 0 |
| RESTROOMS FLUSH[8] | --- sf | --- gpd/sf | 205 | 0 | 0 | 0 |
| CONCESSION[8] | --- sf | --- gpd/sf | 0 | 0 | 0 | 0 |
| DRINKING FOUNTAIN[8] | --- sf | --- gpd/sf | 53 | 0 | 0 | 0 |
| KAYAK STATION[8] | --- sf | --- gpd/sf | 1,808 | 1 | 0 | 0 |
| FISH STATION[8] | --- sf | --- gpd/sf | 740 | 1 | 0 | 0 |
| **INDIA BASIN SHORELINE PARK DEMAND TOTALS** | | | **5,237** | **4** | **0** | **0** |

| | | | | |
|---|---|---|---|---|
| **RPD DEVELOPMENT DEMANDS** | **6,016** | **4** | **0** | **0** |

| | | | | |
|---|---|---|---|---|
| **TOTAL DEMANDS** | **173,392** | **122** | **0** | **0** |
| Existing Demands[7] | 2,747 | 3 | 0 | 0 |
| **NET INCREASE** | **170,645** | **119** | **0** | **0** |

Notes:

1 "Maximum Residential Without Recycled Water" represents a maximum residential development with no recycled water available at the start of the project.

2 The Build Development and RPD Development program quantities are based on program summaries documented in the June 1, 2016 Initial Study for the India Basin Mixed-Use Project.

3 Residential potable water demand based on 90 gpd/du. Assumes 45 gallons per capita per day (gpcd) and 2.0 residents per dwelling unit, based on water demands identified in the SFPUC Water Enterprise 2015 Retail Water Conservation Plan.

4 Commerical and retail potable water demand based on 0.07 gpd/sf.
Institutional/education also assumes potable water demand based on 0.07 gpd/sf.

5 Irrigation water demand for Build Development provided by Bionic.

6 Cooling water demand for Build Development provided by Glumac.
Cooling water demand for RPD Development is expected to be small compared to the overall project demand and is noted as zero for this analysis.

7 Refer to Table 1 for existing demands calculations.

8 Water demand for RPD Development provided by MKA.

9 Gallons per minute value is rounded to the nearest whole number. Numerical differences between tables is due to rounding.

**TABLE 3: MAXIMUM COMMERCIAL WITHOUT RECYCLED WATER[1,2]**

**700 INNES (BUILD DEVELOPMENT)**

| DESCRIPTION OF USE | | | POTABLE WATER DEMAND | | RECYCLED WATER DEMAND | |
|---|---|---|---|---|---|---|
| **Land Use** | **Unit** | **Unit Demand** | **Average Daily Demand (gpd)** | **Average Daily Demand (gpm)[9]** | **Average Daily Demand (gpd)** | **Average Daily Demand (gpm)[9]** |
| RESIDENTIAL[3] | 500 du | 90.0 gpd/du | 45,000 | 32 | 0 | 0 |
| COMMERCIAL/RETAIL[4] | 1,000,000 sf | 0.07 gpd/sf | 70,000 | 49 | 0 | 0 |
| INSTITUTIONAL/EDUCATION[4] | 50,000 sf | 0.07 gpd/sf | 3,500 | 3 | 0 | 0 |
| IRRIGATION[5] | --- sf | --- gpd/sf | 20,455 | 14 | 0 | 0 |
| COOLING WATER[6] | --- sf | --- gpd/sf | 4,863 | 4 | 0 | 0 |
| **700 INNES DEMAND TOTALS** | | | **143,818** | **102** | **0** | **0** |

**INDIA BASIN OPEN SPACE (BUILD DEVELOPMENT)**

| DESCRIPTION OF USE | | | POTABLE WATER DEMAND | | RECYCLED WATER DEMAND | |
|---|---|---|---|---|---|---|
| **Land Use** | **Unit** | **Unit Demand** | **Average Daily Demand (gpd)** | **Average Daily Demand (gpm)[9]** | **Average Daily Demand (gpd)** | **Average Daily Demand (gpm)[9]** |
| RESIDENTIAL[3] | 0 du | 90.0 gpd/du | 0 | 0 | 0 | 0 |
| COMMERCIAL/RETAIL[4] | 0 sf | 0.07 gpd/sf | 0 | 0 | 0 | 0 |
| INSTITUTIONAL/EDUCATION[4] | 0 sf | 0.07 gpd/sf | 0 | 0 | 0 | 0 |
| IRRIGATION[5] | --- sf | --- gpd/sf | 9,848 | 7 | 0 | 0 |
| COOLING WATER[6] | --- sf | --- gpd/sf | 0 | 0 | 0 | 0 |
| **INDIA BASIN OPEN SPACE DEMAND TOTALS** | | | **9,848** | **7** | **0** | **0** |

| | | | | |
|---|---|---|---|---|
| **BUILD DEVELOPMENT DEMANDS** | **153,666** | **109** | **0** | **0** |

**TABLE 3: MAXIMUM COMMERCIAL WITHOUT RECYCLED WATER[1,2] (CONTINUED)**

**900 INNES (RPD DEVELOPMENT)**

| DESCRIPTION OF USE | | | POTABLE WATER DEMAND | | RECYCLED WATER DEMAND | |
|---|---|---|---|---|---|---|
| Land Use | Unit | Unit Demand | Average Daily Demand (gpd) | Average Daily Demand (gpm)[9] | Average Daily Demand (gpd) | Average Daily Demand (gpm)[9] |
| IRRIGATION[8] | --- sf | --- gpd/sf | 335 | 0 | 0 | 0 |
| WATER FEATURE[8] | --- sf | --- gpd/sf | 39 | 0 | 0 | 0 |
| RESTROOMS FLOW[8] | --- sf | --- gpd/sf | 18 | 0 | 0 | 0 |
| RESTROOMS FLUSH[8] | --- sf | --- gpd/sf | 102 | 0 | 0 | 0 |
| CONCESSION[8] | --- sf | --- gpd/sf | 271 | 0 | 0 | 0 |
| DRINKING FOUNTAIN[8] | --- sf | --- gpd/sf | 13 | 0 | 0 | 0 |
| KAYAK STATION[8] | --- sf | --- gpd/sf | 0 | 0 | 0 | 0 |
| FISH STATION[8] | --- sf | --- gpd/sf | 0 | 0 | 0 | 0 |
| **900 INNES DEMAND TOTALS** | | | **779** | **1** | **0** | **0** |

**INDIA BASIN SHORELINE PARK (RPD DEVELOPMENT)**

| DESCRIPTION OF USE | | | POTABLE WATER DEMAND | | RECYCLED WATER DEMAND | |
|---|---|---|---|---|---|---|
| Land Use | Unit | Unit Demand | Average Daily Demand (gpd) | Average Daily Demand (gpm)[9] | Average Daily Demand (gpd) | Average Daily Demand (gpm)[9] |
| IRRIGATION[8] | --- sf | --- gpd/sf | 2,206 | 2 | 0 | 0 |
| WATER FEATURE[8] | --- sf | --- gpd/sf | 189 | 0 | 0 | 0 |
| RESTROOMS FLOW[8] | --- sf | --- gpd/sf | 36 | 0 | 0 | 0 |
| RESTROOMS FLUSH[8] | --- sf | --- gpd/sf | 205 | 0 | 0 | 0 |
| CONCESSION[8] | --- sf | --- gpd/sf | 0 | 0 | 0 | 0 |
| DRINKING FOUNTAIN[8] | --- sf | --- gpd/sf | 53 | 0 | 0 | 0 |
| KAYAK STATION[8] | --- sf | --- gpd/sf | 1,808 | 1 | 0 | 0 |
| FISH STATION[8] | --- sf | --- gpd/sf | 740 | 1 | 0 | 0 |
| **INDIA BASIN SHORELINE PARK DEMAND TOTALS** | | | **5,237** | **4** | **0** | **0** |

| | | | | |
|---|---|---|---|---|
| **RPD DEVELOPMENT DEMANDS** | **6,016** | **4** | **0** | **0** |

| | | | | |
|---|---|---|---|---|
| **TOTAL DEMANDS** | **159,682** | **113** | **0** | **0** |
| Existing Demands[7] | 2,747 | 3 | 0 | 0 |
| **NET INCREASE** | **156,935** | **110** | **0** | **0** |

Notes:

1 "Maximum Commercial Without Recycled Water" represents a maximum commercial development with no recycled water available at the start of the project.

2 The Build Development and RPD Development program quantities are based on program summaries documented in the June 1, 2016 Initial Study for the India Basin Mixed-Use Project.

3 Residential potable water demand based on 90 gpd/du. Assumes 45 gallons per capita per day (gpcd) and 2.0 residents per dwelling unit, based on water demands identified in the SFPUC Water Enterprise 2015 Retail Water Conservation Plan.

4 Commerical and retail potable water demand based on 0.07 gpd/sf.
Institutional/education also assumes potable water demand based on 0.07 gpd/sf.

5 Irrigation water demand for Build Development provided by Bionic.

6 Cooling water demand for Build Development provided by Glumac.
Cooling water demand for RPD Development is expected to be small compared to the overall project demand and is noted as zero for this analysis.

7 Refer to Table 1 for existing demands calculations.

8 Water demand for RPD Development provided by MKA.

9 Gallons per minute value is rounded to the nearest whole number. Numerical differences between tables is due to rounding.

**TABLE 4: MAXIMUM RESIDENTIAL WITH RECYCLED WATER[1,2]**

**700 INNES (BUILD DEVELOPMENT)**

| DESCRIPTION OF USE | | | | POTABLE WATER DEMAND[9] | | RECYCLED WATER DEMAND | |
|---|---|---|---|---|---|---|---|
| **Land Use** | **Unit** | **Unit Demand** | | **Average Daily Demand (gpd)** | **Average Daily Demand (gpm)[11]** | **Average Daily Demand (gpd)** | **Average Daily Demand (gpm)[11]** |
| RESIDENTIAL[3, 7] | 1,240 du | 90.0 | gpd/du | 95,728 | 67 | 15,872 | 12 |
| COMMERCIAL/RETAIL[4, 7] | 275,330 sf | 0.07 | gpd/sf | 9,637 | 7 | 9,637 | 7 |
| INSTITUTIONAL/EDUCATION[4, 7] | 50,000 sf | 0.07 | gpd/sf | 1,750 | 2 | 1,750 | 2 |
| IRRIGATION[5] | --- sf | --- | gpd/sf | 0 | 0 | 20,455 | 14 |
| COOLING WATER[6] | --- sf | --- | gpd/sf | 0 | 0 | 2,699 | 2 |
| **700 INNES DEMAND TOTALS** | | | | **107,115** | **76** | **50,413** | **37** |

**INDIA BASIN OPEN SPACE (BUILD DEVELOPMENT)**

| DESCRIPTION OF USE | | | | POTABLE WATER DEMAND[9] | | RECYCLED WATER DEMAND | |
|---|---|---|---|---|---|---|---|
| **Land Use** | **Unit** | **Unit Demand** | | **Average Daily Demand (gpd)** | **Average Daily Demand (gpm)[11]** | **Average Daily Demand (gpd)** | **Average Daily Demand (gpm)[11]** |
| RESIDENTIAL[3, 7] | 0 du | 90.0 | gpd/du | 0 | 0 | 0 | 0 |
| COMMERCIAL/RETAIL[4, 7] | 0 sf | 0.07 | gpd/sf | 0 | 0 | 0 | 0 |
| INSTITUTIONAL/EDUCATION[4, 7] | 0 sf | 0.07 | gpd/sf | 0 | 0 | 0 | 0 |
| IRRIGATION[5] | --- sf | --- | gpd/sf | 0 | 0 | 9,848 | 7 |
| COOLING WATER[6] | --- sf | --- | gpd/sf | 0 | 0 | 0 | 0 |
| **INDIA BASIN OPEN SPACE DEMAND TOTALS** | | | | **0** | **0** | **9,848** | **7** |

| | | | | |
|---|---|---|---|---|
| **BUILD DEVELOPMENT DEMANDS** | **107,115** | **76** | **60,261** | **44** |

**TABLE 4: MAXIMUM RESIDENTIAL WITH RECYCLED WATER[1,2] (CONTINUED)**

**900 INNES (RPD DEVELOPMENT)**

| DESCRIPTION OF USE | | | POTABLE WATER DEMAND | | RECYCLED WATER DEMAND | |
|---|---|---|---|---|---|---|
| Land Use | Unit | Unit Demand | Average Daily Demand (gpd) | Average Daily Demand (gpm)[11] | Average Daily Demand (gpd) | Average Daily Demand (gpm)[11] |
| IRRIGATION[10] | --- sf | --- gpd/sf | 0 | 0 | 335 | 0 |
| WATER FEATURE[10] | --- sf | --- gpd/sf | 39 | 0 | 0 | 0 |
| RESTROOMS FLOW[10] | --- sf | --- gpd/sf | 18 | 0 | 0 | 0 |
| RESTROOMS FLUSH[10] | --- sf | --- gpd/sf | 0 | 0 | 102 | 0 |
| CONCESSION[10] | --- sf | --- gpd/sf | 271 | 0 | 0 | 0 |
| DRINKING FOUNTAIN[10] | --- sf | --- gpd/sf | 13 | 0 | 0 | 0 |
| KAYAK STATION[10] | --- sf | --- gpd/sf | 0 | 0 | 0 | 0 |
| FISH STATION[10] | --- sf | --- gpd/sf | 0 | 0 | 0 | 0 |
| **900 INNES DEMAND TOTALS** | | | **342** | **0** | **437** | **0** |

**INDIA BASIN SHORELINE PARK (RPD DEVELOPMENT)**

| DESCRIPTION OF USE | | | POTABLE WATER DEMAND | | RECYCLED WATER DEMAND | |
|---|---|---|---|---|---|---|
| Land Use | Unit | Unit Demand | Average Daily Demand (gpd) | Average Daily Demand (gpm)[11] | Average Daily Demand (gpd) | Average Daily Demand (gpm)[11] |
| IRRIGATION[10] | --- sf | --- gpd/sf | 0 | 0 | 2,206 | 2 |
| WATER FEATURE[10] | --- sf | --- gpd/sf | 189 | 0 | 0 | 0 |
| RESTROOMS FLOW[10] | --- sf | --- gpd/sf | 36 | 0 | 0 | 0 |
| RESTROOMS FLUSH[10] | --- sf | --- gpd/sf | 0 | 0 | 205 | 0 |
| CONCESSION[10] | --- sf | --- gpd/sf | 0 | 0 | 0 | 0 |
| DRINKING FOUNTAIN[10] | --- sf | --- gpd/sf | 53 | 0 | 0 | 0 |
| KAYAK STATION[10] | --- sf | --- gpd/sf | 1,808 | 1 | 0 | 0 |
| FISH STATION[10] | --- sf | --- gpd/sf | 740 | 1 | 0 | 0 |
| **INDIA BASIN SHORELINE PARK DEMAND TOTALS** | | | **2,826** | **2** | **2,411** | **2** |

| | | | | |
|---|---|---|---|---|
| **RPD DEVELOPMENT DEMANDS** | **3,168** | **2** | **2,848** | **2** |

| | | | | |
|---|---|---|---|---|
| **TOTAL DEMANDS** | **110,283** | **78** | **63,109** | **46** |
| Existing Demands[8] | 2,747 | 3 | 0 | 0 |
| **NET INCREASE** | **107,536** | **75** | **63,109** | **46** |

Notes:

1 "Maximum Residential With Recycled Water" represents a maximum residential development with recycled water available for the project. Recycled water uses include toilet flushing, landscape irrigation, and cooling water.

2 The Build Development and RPD Development program quantities are based on program summaries documented in the June 1, 2016 Initial Study for the India Basin Mixed-Use Project.

3 Residential potable water demand based on 90 gpd/du. Assumes 45 gallons per capita per day (gpcd) and 2.0 residents per dwelling unit, based on water demands identified in the SFPUC Water Enterprise 2015 Retail Water Conservation Plan.

4 Commerical and retail potable water demand based on 0.035 gpd/sf.
Institutional/education also assumes potable water demand based on 0.035 gpd/sf.

5 Irrigation water demand for Build Development provided by Bionic.

6 Cooling water demand for Build Development provided by Glumac.
Cooling water demand for RPD Development is expected to be small compared to the overall project demand and is noted as zero for this analysis.

7 Recycled water demand for residential toilet flushing based on 2.0 residents per dwelling unit and 6.4 gpcd for recycled water toilets, based on water demands identified in the SFPUC Water Enterprise 2015 Retail Water Conservation Plan.
Recycled water demand for commercial and retail toilet flushing based on 0.035 gpd/sf.
Institutional/education also assumes toilet flushing based on 0.035 gpd/sf.

8 Refer to Table 1 for existing demands calculations.

9 Since recycled water will be used to supplement the potable water supply, the recycled water demand was subtracted from the total potable water demands shown in Table 1.

10 Water demand for RPD Development provided by MKA.

11 Gallons per minute value is rounded to the nearest whole number. Numerical differences between tables is due to rounding.

**TABLE 5: MAXIMUM COMMERCIAL WITH RECYCLED WATER[1,2]**

**700 INNES (BUILD DEVELOPMENT)**

| DESCRIPTION OF USE | | | | POTABLE WATER DEMAND[9] | | RECYCLED WATER DEMAND | |
|---|---|---|---|---|---|---|---|
| **Land Use** | **Unit** | **Unit Demand** | | **Average Daily Demand (gpd)** | **Average Daily Demand (gpm)[11]** | **Average Daily Demand (gpd)** | **Average Daily Demand (gpm)[11]** |
| RESIDENTIAL[3, 7] | 500 du | 90.0 | gpd/du | 38,600 | 27 | 6,400 | 5 |
| COMMERCIAL/RETAIL[4, 7] | 1,000,000 sf | 0.07 | gpd/sf | 35,000 | 25 | 35,000 | 25 |
| INSTITUTIONAL/EDUCATION[4, 7] | 50,000 sf | 0.07 | gpd/sf | 1,750 | 2 | 1,750 | 2 |
| IRRIGATION[5] | --- sf | --- | gpd/sf | 0 | 0 | 20,455 | 14 |
| COOLING WATER[6] | --- sf | --- | gpd/sf | 0 | 0 | 4,863 | 4 |
| **700 INNES DEMAND TOTALS** | | | | **75,350** | **54** | **68,468** | **50** |

**INDIA BASIN OPEN SPACE (BUILD DEVELOPMENT)**

| DESCRIPTION OF USE | | | | POTABLE WATER DEMAND[9] | | RECYCLED WATER DEMAND | |
|---|---|---|---|---|---|---|---|
| **Land Use** | **Unit** | **Unit Demand** | | **Average Daily Demand (gpd)** | **Average Daily Demand (gpm)[11]** | **Average Daily Demand (gpd)** | **Average Daily Demand (gpm)[11]** |
| RESIDENTIAL[3, 7] | 0 du | 90.0 | gpd/du | 0 | 0 | 0 | 0 |
| COMMERCIAL/RETAIL[4, 7] | 0 sf | 0.07 | gpd/sf | 0 | 0 | 0 | 0 |
| INSTITUTIONAL/EDUCATION[4, 7] | 0 sf | 0.07 | gpd/sf | 0 | 0 | 0 | 0 |
| IRRIGATION[5] | --- sf | --- | gpd/sf | 0 | 0 | 9,848 | 7 |
| COOLING WATER[6] | --- sf | --- | gpd/sf | 0 | 0 | 0 | 0 |
| **INDIA BASIN OPEN SPACE DEMAND TOTALS** | | | | **0** | **0** | **9,848** | **7** |

| | | | | |
|---|---|---|---|---|
| **BUILD DEVELOPMENT DEMANDS** | **75,350** | **54** | **78,316** | **57** |

**TABLE 5: MAXIMUM COMMERCIAL WITH RECYCLED WATER[1,2] (CONTINUED)**

**900 INNES (RPD DEVELOPMENT)**

| DESCRIPTION OF USE | | | POTABLE WATER DEMAND | | RECYCLED WATER DEMAND | |
|---|---|---|---|---|---|---|
| Land Use | Unit | Unit Demand | Average Daily Demand (gpd) | Average Daily Demand (gpm)[11] | Average Daily Demand (gpd) | Average Daily Demand (gpm)[11] |
| IRRIGATION[10] | --- sf | --- gpd/sf | 0 | 0 | 335 | 0 |
| WATER FEATURE[10] | --- sf | --- gpd/sf | 39 | 0 | 0 | 0 |
| RESTROOMS FLOW[10] | --- sf | --- gpd/sf | 18 | 0 | 0 | 0 |
| RESTROOMS FLUSH[10] | --- sf | --- gpd/sf | 0 | 0 | 102 | 0 |
| CONCESSION[10] | --- sf | --- gpd/sf | 271 | 0 | 0 | 0 |
| DRINKING FOUNTAIN[10] | --- sf | --- gpd/sf | 13 | 0 | 0 | 0 |
| KAYAK STATION[10] | --- sf | --- gpd/sf | 0 | 0 | 0 | 0 |
| FISH STATION[10] | --- sf | --- gpd/sf | 0 | 0 | 0 | 0 |
| **900 INNES DEMAND TOTALS** | | | **342** | **0** | **437** | **0** |

**INDIA BASIN SHORELINE PARK (RPD DEVELOPMENT)**

| DESCRIPTION OF USE | | | POTABLE WATER DEMAND | | RECYCLED WATER DEMAND | |
|---|---|---|---|---|---|---|
| Land Use | Unit | Unit Demand | Average Daily Demand (gpd) | Average Daily Demand (gpm)[11] | Average Daily Demand (gpd) | Average Daily Demand (gpm)[11] |
| IRRIGATION[10] | --- sf | --- gpd/sf | 0 | 0 | 2,206 | 2 |
| WATER FEATURE[10] | --- sf | --- gpd/sf | 189 | 0 | 0 | 0 |
| RESTROOMS FLOW[10] | --- sf | --- gpd/sf | 36 | 0 | 0 | 0 |
| RESTROOMS FLUSH[10] | --- sf | --- gpd/sf | 0 | 0 | 205 | 0 |
| CONCESSION[10] | --- sf | --- gpd/sf | 0 | 0 | 0 | 0 |
| DRINKING FOUNTAIN[10] | --- sf | --- gpd/sf | 53 | 0 | 0 | 0 |
| KAYAK STATION[10] | --- sf | --- gpd/sf | 1,808 | 1 | 0 | 0 |
| FISH STATION[10] | --- sf | --- gpd/sf | 740 | 1 | 0 | 0 |
| **INDIA BASIN SHORELINE PARK DEMAND TOTALS** | | | **2,826** | **2** | **2,411** | **2** |

| | | | | |
|---|---|---|---|---|
| **RPD DEVELOPMENT DEMANDS** | **3,168** | **2** | **2,848** | **2** |

| | | | | |
|---|---|---|---|---|
| **TOTAL DEMANDS** | **78,518** | **56** | **81,164** | **59** |
| Existing Demands[8] | 2,747 | 3 | 0 | 0 |
| **NET INCREASE** | **75,771** | **53** | **81,164** | **59** |

Notes:

1 "Maximum Commercial With Recycled Water" represents a maximum commercial development with recycled water available for the project. Recycled water uses include toilet flushing, landscape irrigation, and cooling water.

2 The Build Development and RPD Development program quantities are based on program summaries documented in the June 1, 2016 Initial Study for the India Basin Mixed-Use Project.

3 Residential potable water demand based on 90 gpd/du. Assumes 45 gallons per capita per day (gpcd) and 2.0 residents per dwelling unit, based on water demands identified in the SFPUC Water Enterprise 2015 Retail Water Conservation Plan.

4 Commerical and retail potable water demand based on 0.035 gpd/sf.
Institutional/education also assumes potable water demand based on 0.035 gpd/sf.

5 Irrigation water demand for Build Development provided by Bionic.

6 Cooling water demand for Build Development provided by Glumac.
Cooling water demand for RPD Development is expected to be small compared to the overall project demand and is noted as zero for this analysis.

7 Recycled water demand for residential toilet flushing based on 2.0 residents per dwelling unit and 6.4 gpcd for recycled water toilets, based on water demands identified in the SFPUC Water Enterprise 2015 Retail Water Conservation Plan.
Recycled water demand for commercial and retail toilet flushing based on 0.035 gpd/sf.
Institutional/education also assumes toilet flushing based on 0.035 gpd/sf.

8 Refer to Table 1 for existing demands calculations.

9 Since recycled water will be used to supplement the potable water supply, the recycled water demand was subtracted from the total potable water demands shown in Table 1.

10 Water demand for RPD Development provided by MKA.

11 Gallons per minute value is rounded to the nearest whole number. Numerical differences between tables is due to rounding.

# APPENDIX A

India Basin Landscape Water Demand Calculations 9.27.2016
OVERALL BIONIC

Wetland Planting areas

| ZONE | AREA (SF) | IRR RATE (IN/WK) | IRR DEMAND (CU FT/DAY) | IRR DEMAND (GAL/DAY) |
|---|---|---|---|---|
| - | 178,893 | 0.5 | 1,065 | 7,965 |
| TOTAL | 178,893 | | | 7,965 |

Upland Planting Areas

| ZONE | AREA (SF) | IRR RATE (IN/WK) | IRR DEMAND (CU FT/DAY) | IRR DEMAND (GAL/DAY) |
|---|---|---|---|---|
| - | 323,693 | 1.0 | 3,853 | 28,824 |
| TOTAL | 323,693 | | | 28,824 |

Streetscape Planting Areas

| ZONE | AREA (SF) | IRR RATE (IN/WK) | IRR DEMAND (CU FT/DAY) | IRR DEMAND (GAL/DAY) |
|---|---|---|---|---|
| - | 1,823 | 0.5 | 11 | 81 |
| TOTAL | 1,823 | | | 81 |

Green Roof Planting Areas

| ZONE | AREA (SF) | IRR RATE (IN/WK) | IRR DEMAND (CU FT/DAY) | IRR DEMAND (GAL/DAY) |
|---|---|---|---|---|
| - | 125,479 | 0.5 | 747 | 5,587 |
| TOTAL | 125,479 | | | 5,587 |

On-Structure Planting Areas

| ZONE | AREA (SF) | IRR RATE (IN/WK) | IRR DEMAND (CU FT/DAY) | IRR DEMAND (GAL/DAY) |
|---|---|---|---|---|
| - | 37,930 | 0.5 | 226 | 1,689 |
| TOTAL | 37,930 | | | 1,689 |

Trees*

| ZONE | TOTAL TREES | IRR RATE (IN/WK/TREE) | IRR RATE (GAL/DAY/TREE) | IRR DEMAND (GAL/DAY) |
|---|---|---|---|---|
| PARK | 106 | 0.71 | 25.53 | 2,706 |
| STREETS | 487 | 0.32 | 10.46 | 5,094 |
| TOTAL | 593 | | | 7,800 |

| | |
|---|---|
| **DAILY IRRIGATION DEMAND (GAL/DAY)** | **51,946** |
| **ANNUAL IRRIGATION DEMAND (GAL/YR)** | **11,060,179** |

*Tree calculation assumes 30' dia. canopy for park trees, 20' dia. canopy for street trees, using CIMIS water calculator tool
*Annual irrigation demand assumes typical daily irrigation 7 months/year during dry season, no irrigation 5 months/year during wet season

India Basin Landscape Water Demand Calculations 9.27.2016

IBOS OVERALL BIONIC

Wetland Planting areas

| ZONE | AREA (SF) | IRR RATE (IN/WK) | IRR DEMAND (CU FT/DAY) | IRR DEMAND (GAL/DAY) |
|---|---|---|---|---|
| - | 164,195 | 0.5 | 977 | 7,311 |
| TOTAL | 164,195 | | | 7,311 |

Upland Planting Areas

| ZONE | AREA (SF) | IRR RATE (IN/WK) | IRR DEMAND (CU FT/DAY) | IRR DEMAND (GAL/DAY) |
|---|---|---|---|---|
| - | 105,021 | 1.0 | 1,250 | 9,352 |
| TOTAL | 105,021 | | | 9,352 |

Streetscape Planting Areas

| ZONE | AREA (SF) | IRR RATE (IN/WK) | IRR DEMAND (CU FT/DAY) | IRR DEMAND (GAL/DAY) |
|---|---|---|---|---|
| - | 0 | 0.5 | 0 | 0 |
| TOTAL | 0 | | | 0 |

Green Roof Planting Areas

| ZONE | AREA (SF) | IRR RATE (IN/WK) | IRR DEMAND (CU FT/DAY) | IRR DEMAND (GAL/DAY) |
|---|---|---|---|---|
| - | 2,048 | 0.5 | 12 | 91 |
| TOTAL | 2,048 | | | 91 |

On-Structure Planting Areas

| ZONE | AREA (SF) | IRR RATE (IN/WK) | IRR DEMAND (CU FT/DAY) | IRR DEMAND (GAL/DAY) |
|---|---|---|---|---|
| - | 0 | 0.5 | 0 | 0 |
| TOTAL | 0 | | | 0 |

Trees*

| ZONE | TOTAL TREES | IRR RATE (IN/WK/TREE) | IRR RATE (GAL/DAY/TREE) | IRR DEMAND (GAL/DAY) |
|---|---|---|---|---|
| PARK | 5 | 0.71 | 25.53 | 128 |
| STREETS | 0 | 0.32 | 10.46 | 0 |
| TOTAL | 5 | | | 128 |

| | |
|---|---|
| **TOTAL IRRIGATION DEMAND - GALLONS/DAY** | **16,881** |
| **ANNUAL IRRIGATION DEMAND (GAL/YR)** | **3,594,308** |

*Tree calculation assumes 30' dia. canopy for park trees, 20' dia. canopy for street trees, using CIMIS water calculator tool

*Annual irrigation demand assumes typical daily irrigation 7 months/year during dry season, no irrigation 5 months/year during wet season

India Basin Landscape Water Demand Calculations 9.27.2016

700 INNES OVERALL BIONIC

Wetland Planting areas

| ZONE | AREA (SF) | IRR RATE (IN/WK) | IRR DEMAND (CU FT/DAY) | IRR DEMAND (GAL/DAY) |
|---|---|---|---|---|
| - | 14698 | 0.5 | 87 | 654 |
| TOTAL | 14,698 | | | 654 |

Upland Planting Areas

| ZONE | AREA (SF) | IRR RATE (IN/WK) | IRR DEMAND (CU FT/DAY) | IRR DEMAND (GAL/DAY) |
|---|---|---|---|---|
| - | 218672 | 1.0 | 2,603 | 19,472 |
| TOTAL | 218,672 | | | 19,472 |

Streetscape Planting Areas

| ZONE | AREA (SF) | IRR RATE (IN/WK) | IRR DEMAND (CU FT/DAY) | IRR DEMAND (GAL/DAY) |
|---|---|---|---|---|
| - | 1,823 | 0.5 | 11 | 81 |
| TOTAL | 1,823 | | | 81 |

Green Roof Planting Areas

| ZONE | AREA (SF) | IRR RATE (IN/WK) | IRR DEMAND (CU FT/DAY) | IRR DEMAND (GAL/DAY) |
|---|---|---|---|---|
| - | 123432 | 0.5 | 735 | 5,496 |
| TOTAL | 123,432 | | | 5,496 |

On-Structure Planting Areas

| ZONE | AREA (SF) | IRR RATE (IN/WK) | IRR DEMAND (CU FT/DAY) | IRR DEMAND (GAL/DAY) |
|---|---|---|---|---|
| - | 37,930 | 0.5 | 226 | 1,689 |
| TOTAL | 37,930 | | | 1,689 |

Trees*

| ZONE | TOTAL TREES | IRR RATE (IN/WK/TREE) | IRR RATE (GAL/DAY/TREE) | IRR DEMAND (GAL/DAY) |
|---|---|---|---|---|
| PARK | 101 | 0.71 | 25.53 | 2,579 |
| STREETS | 487 | 0.32 | 10.46 | 5,094 |
| TOTAL | 588 | | | 7,673 |

**TOTAL IRRIGATION DEMAND - GALLONS/DAY** **35,065**

**ANNUAL IRRIGATION DEMAND (GAL/YR)** **7,465,880**

*Tree calculation assumes 30' dia. canopy for park trees, 20' dia. canopy for street trees, using CIMIS water calculator tool

*Annual irrigation demand assumes typical daily irrigation 7 months/year during dry season, no irrigation 5 months/year during wet season

# APPENDIX B

## Memo

MAGNUSSON
KLEMENCIC
ASSOCIATES

**Structural + Civil Engineers**

1301 Fifth Avenue, Suite 3200 Seattle Washington 98101-2699 T: 206 292 1200 F: 206 292 1201 W: www.mka.com

| | | | |
|---|---|---|---|
| TO | Ashley Ludwig - GGN | DATE | 7/12/2016 |
| FROM | Drew Gangnes | PAGE | 1 OF 1 |
| PROJECT | **India Basin Park Concept Design** | PROJECT # | A2960.50 |
| SUBJECT | Preliminary Water Demands | | |

This memo summarizes MKA's preliminary assessment of water demands for the new India Basin Park project.

### Background

MKA has been providing civil engineering consulting to GGN as they prepare the conceptual design for a new India Basin Park. The new park will encompass the combined land area of the existing India Basin Shoreline Park (IBSP) and the 900 Innes site. The water demands noted in this memo are based on the conceptual park design and program provided by GGN.

### Preliminary Water Demands

Table 1 summarizes the preliminary water demands for the project, with a breakdown by IBSP and 900 Innes sites. The "potable" column is an accounting of which demands must be served by potable, city water vs those that might be served by recycled water in the event that recycled water is available at the site.

Table 1. Preliminary Water Demands

| Park Component | Total *gal/year* | IBSP *gal/year* | 900 INNES *gal/year* | Potable |
|---|---|---|---|---|
| Irrigation | 927,344 | 805,029 | 122,315 | N |
| Water Feature Top-off | 83,516 | 69,117 | 14,399 | Y |
| Restrooms Flow | 19,800 | 13,200 | 6,600 | Y |
| Restrooms Flush | 112,200 | 74,800 | 37,400 | N |
| Concession Stand | 99,000 | 0 | 99,000 | Y |
| Drinking Fountains | 24,000 | 19,200 | 4,800 | Y |
| Kayak Station | 660,000 | 660,000 | 0 | Y |
| Fish Station | 270,000 | 270,000 | 0 | Y |
| Water Play | | 0 | TBD | Y |
| Totals | 2,195,860 | 1,911,346 | 284,514 | |

### Basis of Calculations

Irrigation demands were computed using the SFPUC Water Demand Calculator which takes into account different weather data, the areas of planting and species factors. The water feature top-off was computed based on the

MAGNUSSON
KLEMENCIC
ASSOCIATES

Structural + Civil Engineers
1301 Fifth Avenue, Suite 3200 Seattle Washington 98101-2699 T: 206 292 1200 F: 206 292 1201 W: www.mka.com



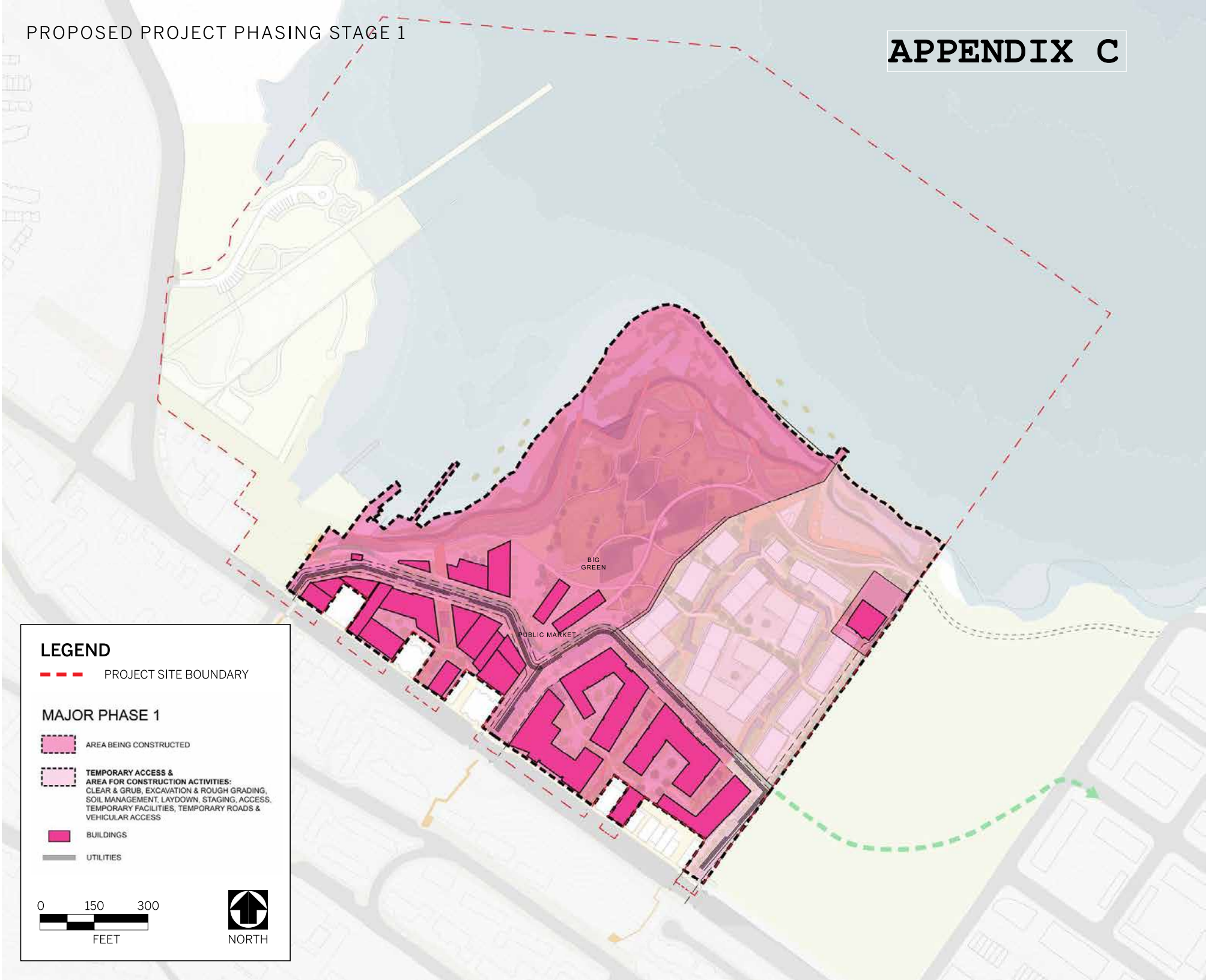
water feature area and weather data. Water demands for the other park components were calculated based on the assumptions noted in Table 2.

Table 2. Water Demand Assumptions

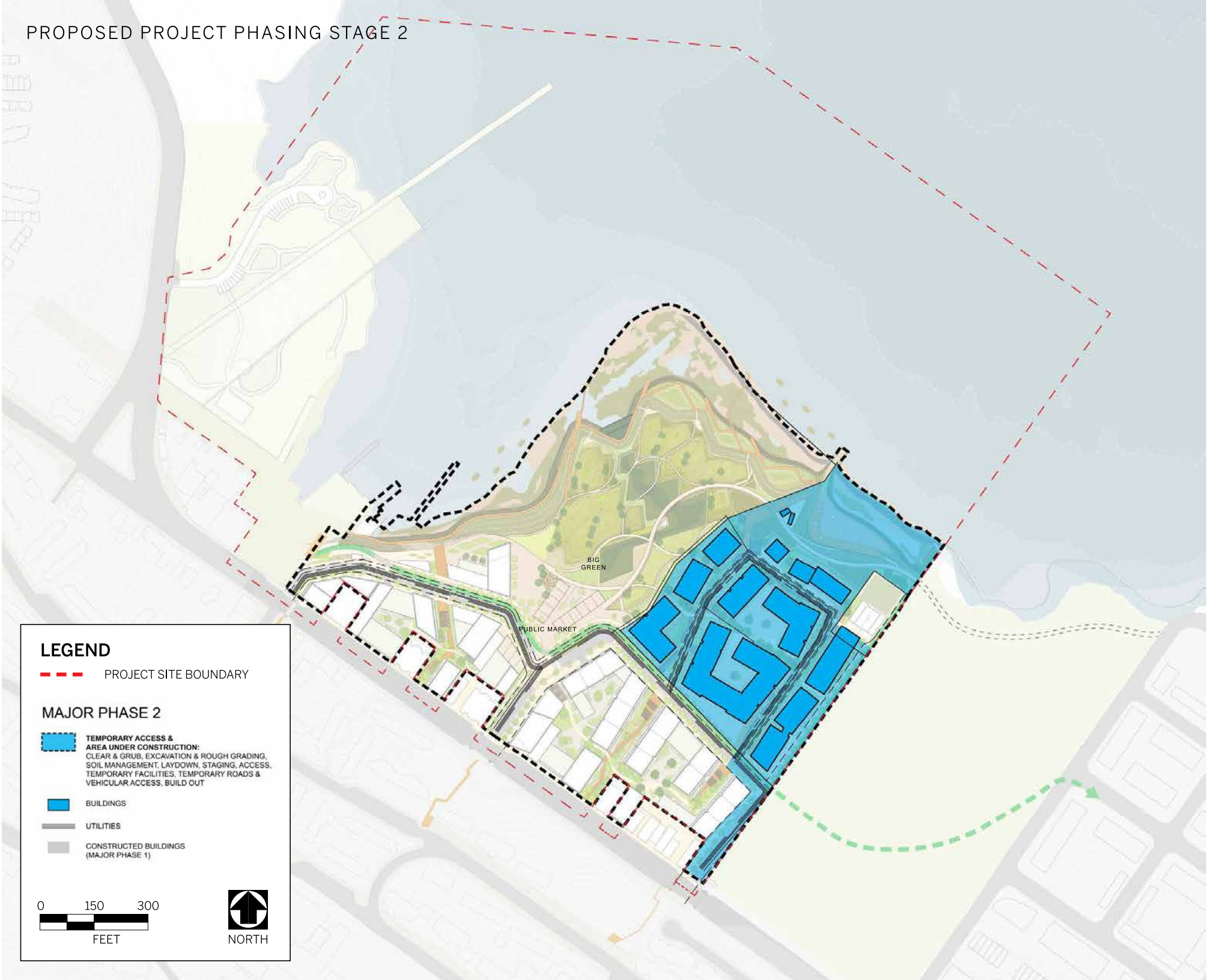
| Park Component | count | gpm | hr/day | day/yr | gal/yr | gal/d |
|---|---|---|---|---|---|---|
| Hose Bib - Kayak | 2 | 10 | 2 | 275 | 660,000 | 1,808 |
| Hose Bib - Fish | 1 | 10 | 2 | 300 | 270,000 | 740 |
| Drinking Fountain | | 0.13 | 2 | 300 | 24,000 | 66 |
| | **vis/day** | **gal/vis** | **day/yr** | **gal/yr** | **Flow** | **Flush** |
| Restrooms | 100 | 4 | 330 | 132,000 | 19,800 | 112,200 |
| | **vis/day** | **gal/vis** | **day/yr** | **gal/yr** | | |
| Concession | 100 | 3 | 330 | 99,000 | | |

PROPOSED PROJECT PHASING STAGE 1

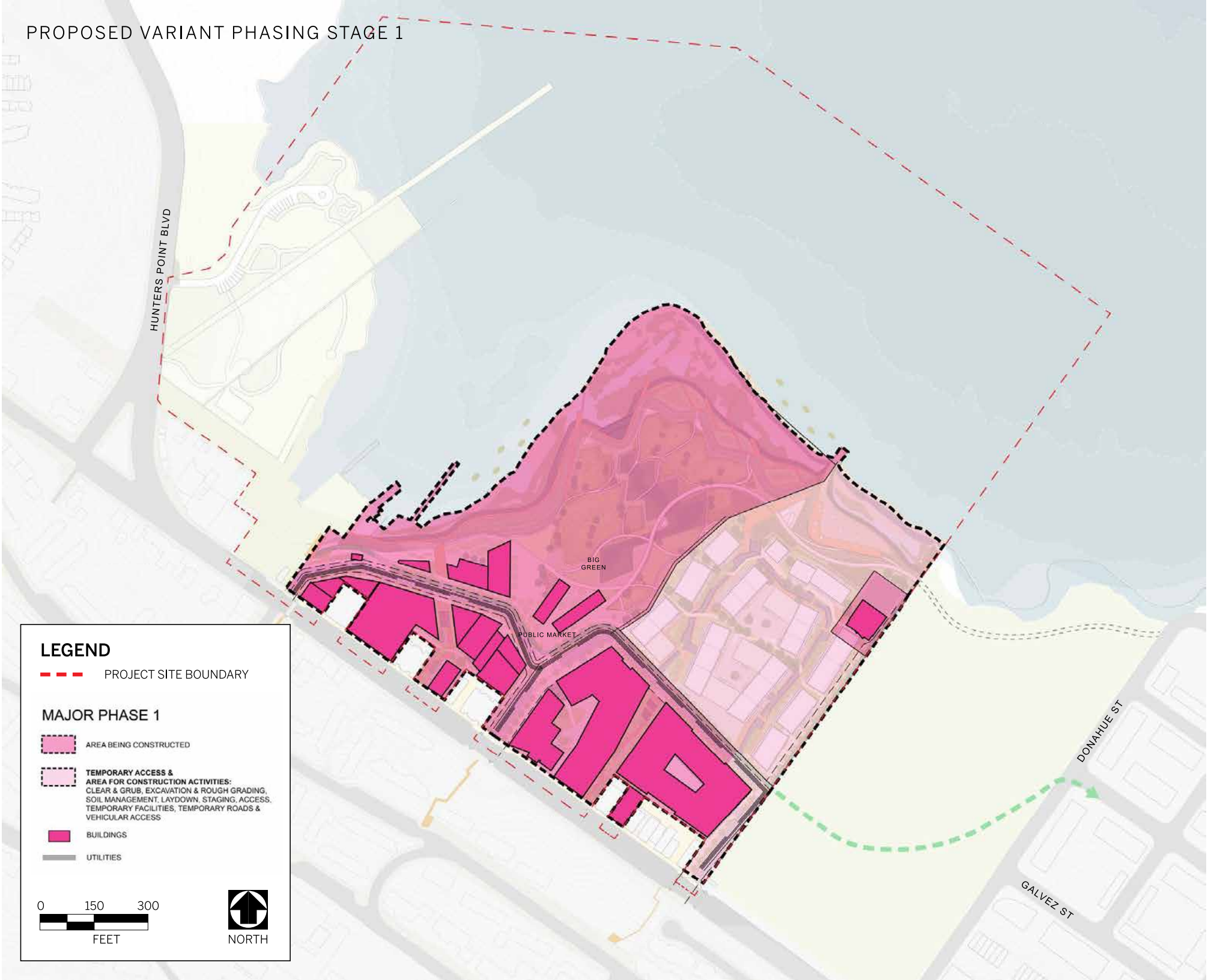
# APPENDIX C



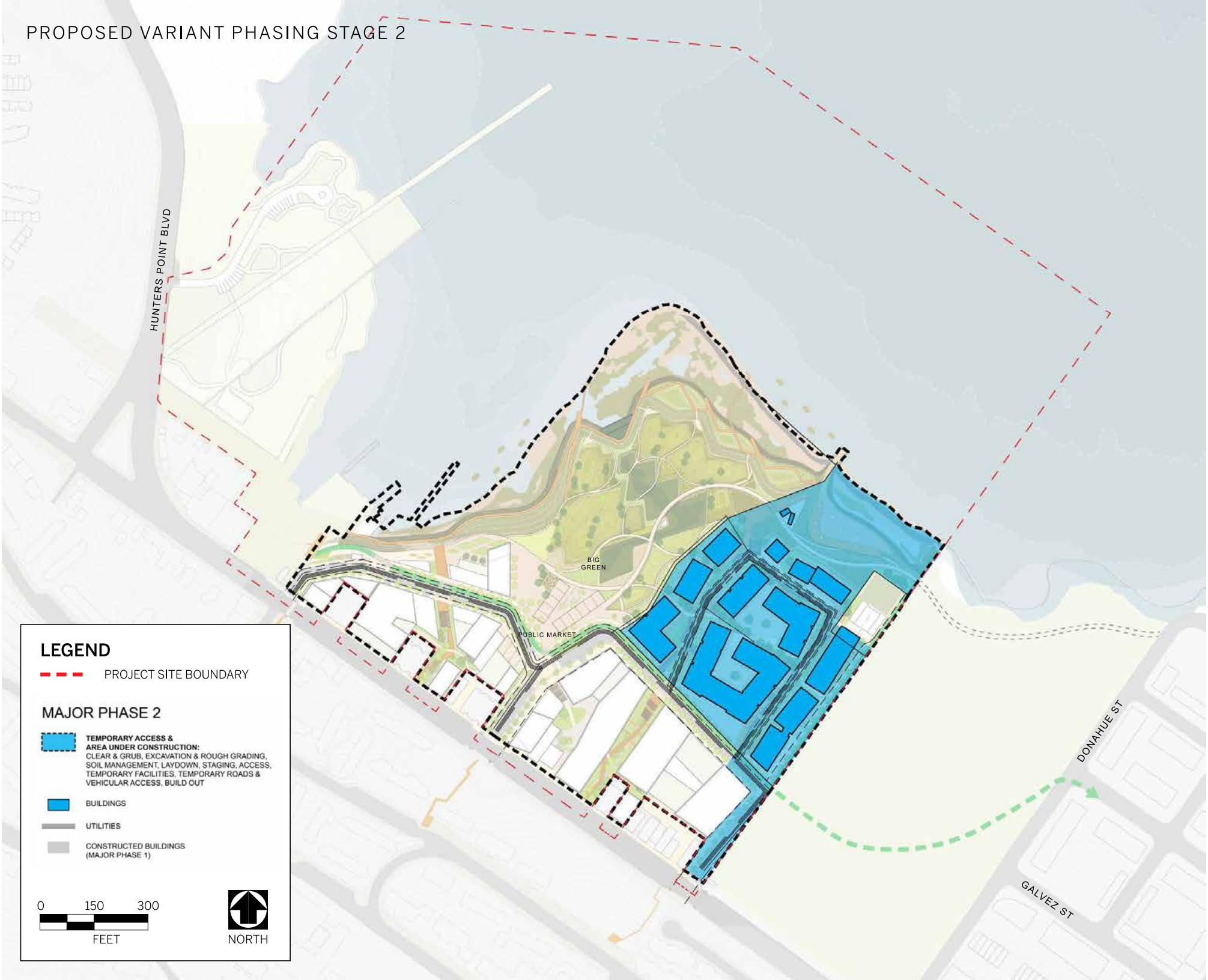
# PROPOSED PROJECT PHASING STAGE 2



# PROPOSED VARIANT PHASING STAGE 1



# PROPOSED VARIANT PHASING STAGE 2



SHERWOOD
DESIGN ENGINEERS

58 MAIDEN LANE, 3RD FLOOR, SAN FRANCISCO, CA 94108
(415) 677-7300 WWW.SHERWOODENGINEERS.COM

# MEMORANDUM

**To:** AECOM
**From:** Sherwood Design Engineers on Behalf of Build SF
**Re:** India Basin 700 Innes & India Basin Open Space - Sanitary Sewer Design
**Date**: October 13, 2016

## 1. Introduction

This memorandum describes existing and future sanitary sewer flow rates and associated infrastructure for the proposed India Basin Development Project (the "Project"). The Project is being developed by Build SF, and it is located on an approximately 23.1 acre site in the Bayview Hunters Point neighborhood of San Francisco. The site is bordered by San Francisco Bay to the north, Candlestick-Hunters Point Shipyard Development to the east, Innes Avenue to the south, and the 900 Innes/India Basin Shoreline Park Development to the west.[1]

The Project site consists of a number of private parcels and platted streets, which will be collectively referred to in this report as 700 Innes (16.9 acres) and India Basin Open Space (6.2 acres). 700 Innes includes all the upland portions of the site, while the India Basin Open Space encompasses an approximately 200 foot wide band along the Project's Bay shoreline. The open space portion consists of approximately 2.5 acres of wetlands that were enhanced as offsite mitigation during the 1997 San Francisco Airport expansion, plus another 3.7 acres that extend landward from the wetlands to the BCDC 100 foot shoreline offset boundary. Current plans call for the development of public roads, residential units, commercial uses, parking, and additional open space on the 700 Innes portion of the site, while the India Basin Open Space is to be dedicated to the San Francisco Recreation and Parks Department (SFRPD). The Project does not include adjacent SFRPD properties totaling approximately 15.5 acres (900 Innes Avenue and India Basin Shoreline Park) that are also being reviewed in the same EIR. Refer to documentation prepared by MKA Engineers for sanitary sewer conditions within these areas. The Project is located within the Jurisdiction of the San Francisco Public Utilities Commission (SFPUC).

## 2. Existing Conditions

Approximately half of the Project site is located within a Separate Sewer (MS4) Area, as defined by the SFPUC, so stormwater is to be discharged directly to San Francisco Bay. The other half is located within the combined sewer area that covers most of the City, so stormwater is to be collected along with wastewater for treatment by the SFPUC prior to discharge. The MS4 portion of the site extends from Innes Avenue to the Bay in a broad band that covers Arelious Walker Drive and varies from approximately 400 feet wide at Innes to 600 feet wide at the Bay.

The existing sewer infrastructure on the site consists of a 12" gravity sewer plus a 6-inch sewer force main in Arelious Walker Drive.. A pump station was built at the end of Arelious Walker to pump wastewater into the force main for discharge into an SFPUC manhole at the intersection with Innes Avenue. These facilities were never conveyed to the SFPUC and are currently unused, because the lots created when Arelious Walker Drive was constructed have never been developed. As a result,

[1] For the purposes of this report, it is assumed Innes Avenue runs in an east-west direction. Its actual orientation is southeast to northwest.

there is no pump within the pump station and the infrastructure has been abandoned for a number of years. The entire system will be demolished as part of the proposed Project.

All existing developed properties are drained by gravity connections to Innes Avenue Sewer. The existing Innes Avenue sewer is part of the PUC's combined sewer/stormwater collection system, and it has a flow direction from east to west. It is 21-inches in diameter between the Project's easterly boundary and Innes Avenue, where it increases to 30-inch diameter and continues west toward the Southeast Wastewater Treatment Plant at Arelious Walker Drive. Laterals of varying size (6"-12") connect to this sewer via manholes from existing improved parcels along the Project's Innes Avenue frontage. All parcels located within the site will be cleared for development, while the few outparcels will remain. Existing wastewater flows generated by these in-Project parcels are presented in the table below. (Refer to Table 1 at the end of this report for more details)

**Existing Conditions**

| | |
|---|---|
| Residential | 5 units |
| Commercial/Retail | 13,310 sf |

| | Sanitary Sewer generation | |
|---|---|---|
| | Average (gpd) | Max (gpm) |
| Existing Conditions | 4,472 | 10 |

## 3. Proposed Conditions

The proposed project has been planned with two variants for the principal development area of 700 Innes; a residential option and a commercial option. The table below describes the program breakdown for these two options, plus the associated development being planned by SFRPD within the India Basin Open Space Area.

**MAXIMUM RESIDENTIAL OPTION**

| Program | Development |
|---|---|
| Residential | 1,240 units |
| Commercial/Retail | 275,330 sf |
| Institutional/Education | 50,000 sf |

**MAXIMUM COMMERCIAL OPTION**

| Program | Development |
|---|---|
| Residential | 500 units |
| Commercial/Retail | 1,000,000 sf |
| Institutional/Education | 50,000 sf |

It is the intent to change the designation of the site to be fully encompassed by the MS4 separate sewer area, so stormwater will be managed separately from wastewater. To serve the proposed development, a sanitary sewer collection system will be constructed throughout the Project and dedicated to the SFPUC for ownership and maintenance. Due to the topography, the Project will be divided into three sewer sheds; one consisting of parcels draining directly via gravity to the Innes



58 MAIDEN LANE, 3RD FLR, SAN FRANCISCO, CA 94108 (415) 677-7300 WWW.SHERWOODENGINEERS.COM

combined sewer main and two gravity collection systems that culminate in low points that require pumping up to the Innes combined sewer main). Most of the Project will drain by gravity to a low point in the northwest corner of the proposed development area, here pump station #1 will lift the wastewater into the existing Innes Avenue combined sewer main. The southwest portion of the site, between New Hudson Street and the Bay, will drain to a separate pump station (pump station #2) that will convey the wastewater to pump station #1, where it will be pumped back up to Innes along with the rest of the site's wastewater. Only the existing out parcels located along Innes Avenue will continue draining directly to the Innes Avenue sewer. Sanitary sewer strategies will remain the same for both the residential and commercial variants. Sanitary sewer generation will be slightly lower for the commercial variant due to lower building water demands. All gravity piping, force mains and pump stations will be sized to match anticipated wastewater flows.

The collection system will be located in proposed public streets in the southerly half of the site, and in dedicated maintenance easements farther north where all road access will be privately owned. In addition, portions of the force mains mentioned above will be routed through easements along the eastern edge of the proposed 700 Innes open space area in the northwest corner of the site.

Total wastewater flows for the proposed Project have been calculated on the basis of the 'India *Basin – Water Demands Memorandum'* prepared by BKF Engineers, dated September 18th 2016 revised October 10th 2016. These calculations, which are summarized below, incorporate the two development variants described above. Note they include no allowance for the disposal of groundwater generated by foundation dewatering during both construction and long term project operation. It is expected these flows will be discharged directly to the Innes Avenue sewer. (Refer to Tables 2 and 3 at the end of this report for more details)

**TOTAL WASTEWATER FLOWS** (annual average & peak )

| Program | Wastewater generation | | | | | |
|---|---|---|---|---|---|---|
| | 700 INNES | | INDIA BASIN OPEN SPACE | | TOTAL | |
| | gpd | Max gpm | gpd | Max gpm | gpd | Max gpm |
| Maximum Residential | 155,511 | 317 | 0 | 0 | **155,511** | **317** |
| Maximum Commercial | 128,047 | 292 | 0 | 0 | **128,047** | **292** |

Current plans also call for the construction of an on-site wastewater treatment plant (WWTP) in the northwest corner of the lower development area, adjacent to the previously described pump station #1. Wastewater will be diverted to this plant for treatment and reuse as needed to comply with San Francisco's Non-Potable Water Program. Required uses include toilet flushing and irrigation, but the Project also plans to use recycled water to meet building cooling demands, as well as to irrigate adjacent parklands if an agreement can be reached with the Department of Parks and Recreation. Because both irrigation and cooling needs change significantly throughout the year, it is estimated that total recycled demand will range from a low of approximately 42,000 gpd in December to a high of 92,000 gpd in June under the maximum residential variant. Similarly, total recycled water use will range from approximately 54,000 gpd in December to a high of 106,000 gpd in June under the maximum commercial variant. The remainder of the project's wastewater will be discharged to the City sewer through the previously described pump stations and force main. Note that Tables 2 and 3 do not account for on-site treatment but only show total estimated wastewater flows. Refer to Tables 4 and 5 for a projected monthly breakdown of estimated on-site wastewater treatment and

reuse. Under the commercial variant the on-site WWTP will be nominally larger in footprint with its increase in treatment flow than under the residential variant.

Additional modeling of the sanitary sewer system will be performed as part of detailed technical studies for the *'Infrastructure Master Plan'* that is currently being developed by BKF Engineers. Refer to memoranda prepared by MKA for a description of wastewater issues associated with the planned development of 900 Innes and India Basin shoreline Park.

**TABLE 1: EXISTING WATER DEMAND/WASTEWATER GENERATION**

| DESCRIPTION OF USE | WATER DEMAND[7] | | SANITARY SEWER GENERATION | | |
|---|---|---|---|---|---|
| **Land Use** | **Average Daily Demand (gpd)** | **Average Daily Demand (gpm)** | **Average Daily Generation (gpd)[8]** | **Average Daily Generation (gpm)** | **Peak Daily Generation (gpm)[6]** |
| *RESIDENTIAL*[2] | 750 | 1 | 675 | 1 | 3 |
| *COMMERCIAL/RETAIL*[3] | 1,997 | 2 | 1,797 | 2 | 6 |
| INFLOW & INFILTRATION[4] | --- | --- | 2,000 | 1 | 1 |
| **EXISTING TOTALS** | **2,747** | **3** | **4,472** | **4** | **10** |

**NOTES:**

1) The onsite existing buildings and their uses are based on information documented in the June 1, 2016 Initial Study for the India Basin Mixed-Use Project.

2) Existing residential potable water demand based on 150.0 gpd/du. The approximately 11,600 sf of existing residential use was assumed to be equivalent to 5 dwelling units for this analysis.

3) Existing commercial and retail potable water demand based on 0.15 gpd/sf.

4) Per WCSMP, city wide inflow and infiltration is estimated to be 500gpd for each acre served by a collection system.

5) It is estimated that 10% of potable water is used consumptively or otherwise diverted from the sewer system, so wastewater generation equals 90% of total water demand.

6) A peaking factor of 3 has been applied to peak minute flows.

7) From *'India Basin – Water Demands Memorandum'* prepared by BKF Engineers, dated July 18th Revised October 10th 2016.

8) A peaking factor of 3 has been applied to average daily flows to estimate peak discharge rates.

**TABLE 2: MAXIMUM RESIDENTIAL[1,2] WATER DEMAND/WASTEWATER GENERATION**

**700 INNES**

| DESCRIPTION OF USE | WATER DEMAND (from BKF) | | WASTEWATER GENERATION | | |
|---|---|---|---|---|---|
| Land Use | Average Daily (gpd) | Average Daily (gpm) | Average Daily (gpd) [10] | Average Daily (gpm) | Peak Daily (gpm) [11] |
| *RESIDENTIAL*[3] | 144,460 | 101 | 130,014 | 90 | 271 |
| *COMMERCIAL/RETAIL*[4] | 19,274 | 14 | 17,347 | 12 | 36 |
| *INSTITUTIONAL/EDUCATION*[4] | 3,500 | 3 | 3,150 | 2 | 7 |
| *IRRIGATION*[5] | 20,455 | 14 | n/a | n/a | n/a |
| *COOLING WATER*[6] | 2,699 | 2 | n/a | n/a | n/a |
| *INFLOW & INFILTRATION*[8] | --- | --- | 5000 | 3 | 3 |
| **700 INNES TOTALS** | **190,388** | **134** | **155,511** | **108** | **317** |

**INDIA BASIN OPEN SPACE**

| DESCRIPTION OF USE | WATER DEMAND (from BKF) | | WASTEWATER GENERATION | | |
|---|---|---|---|---|---|
| Land Use | Average Daily (gpd) | Average Daily (gpm) | Average Daily (gpd) [10] | Average Daily (gpm) | Peak Daily (gpm) [11] |
| *RESIDENTIAL*[3] | 0 | 0 | 0 | 0 | 0 |
| *COMMERCIAL/RETAIL*[4] | 0 | 0 | 0 | 0 | 0 |
| *INSTITUTIONAL/EDUCATION*[4] | 0 | 0 | 0 | 0 | 0 |
| *IRRIGATION*[5] | 9,848 | 7 | n/a | n/a | n/a |
| *COOLING WATER*[6] | 0 | 0 | 0 | 0 | 0 |
| *INFLOW & INFILTRATION*[8] | 0 | 0 | 0 | 0 | 0 |
| **INDIA BASIN OPEN SPACE TOTALS** | **9,848** | **7** | **0** | **0** | **0** |

| | | | | | |
|---|---|---|---|---|---|
| **PROJECT TOTALS** | **200,236** | **141** | **155,511** | **108** | **317** |
| Existing Demands[7] | 2,747 | 3 | 4,472 | 4 | 10 |
| **NET INCREASE** | **197,489** | **138** | **151,039** | **104** | **307** |

*See notes on page 7.*



58 MAIDEN LANE, 3RD FLR, SAN FRANCISCO, CA 94108 (415) 677-7300 WWW.SHERWOODENGINEERS.COM

**TABLE 3: MAXIMUM COMMERCIAL[1,2] WATER DEMAND/WASTEWATER GENERATION**

**700 INNES**

| DESCRIPTION OF USE | WATER DEMAND (from BKF) | | WASTEWATER GENERATION | | |
|---|---|---|---|---|---|
| Land Use | Average Daily (gpd) | Average Daily (gpm) | Average Daily (gpd) [10] | Average Daily (gpm) | Peak Daily (gpm) [11] |
| *RESIDENTIAL*[3] | 58,250 | 41 | 52,425 | 41 | 123 |
| *COMMERCIAL/RETAIL*[4] | 70,000 | 49 | 63,000 | 49 | 147 |
| *INSTITUTIONAL/EDUCATION*[4] | 3,500 | 3 | 3,150 | 3 | 9 |
| *IRRIGATION*[5] | 20,455 | 14 | n/a | n/a | n/a |
| *COOLING WATER*[6] | 4,863 | 4 | n/a | n/a | n/a |
| *INFLOW & INFILTRATION*[9] | --- | --- | 5,000 | 3 | 3 |
| **700 INNES DEMAND TOTALS** | **157,068** | **111** | **123,575** | **96** | **282** |

**INDIA BASIN OPEN SPACE**

| DESCRIPTION OF USE | WATER DEMAND (from BKF) | | WASTEWATER GENERATION | | |
|---|---|---|---|---|---|
| Land Use | Average Daily (gpd) | Average Daily (gpm) | Average Daily (gpd) [10] | Average Daily (gpm) | Peak Daily (gpm) [11] |
| *RESIDENTIAL*[3] | 0 | 0 | 0 | 0 | 0 |
| *COMMERCIAL/RETAIL*[4] | 0 | 0 | 0 | 0 | 0 |
| *INSTITUTIONAL/EDUCATION*[4] | 0 | 0 | 0 | 0 | 0 |
| *IRRIGATION*[5] | 9,848 | 7 | n/a | n/a | n/a |
| *COOLING WATER*[6] | 0 | 0 | 0 | 0 | 0 |
| *INFLOW & INFILTRATION*[9] | 0 | 0 | 0 | 0 | 0 |
| **INDIA BASIN OPEN SPACE DEMAND TOTALS** | **9,848** | **7** | **0** | **0** | **0** |

| | | | | | |
|---|---|---|---|---|---|
| **PROJECT TOTALS** | **166,916** | **118** | **123,575** | **96** | **282** |
| Existing Demands[7] | 2,747 | 3 | 4,472 | 4 | 10 |
| **NET INCREASE** | **164,169** | **115** | **119,103** | **92** | **272** |

*See notes on page 7.*

**NOTES (TABLE 2&3):**

1) "Maximum Commercial Without Recycled Water" represents a maximum commercial development with no recycled water available at the start of the project.

2) The Build SF Development and RPD Development program quantities are based on program summaries documented in the June 1, 2016 Initial Study for the India Basin Mixed-Use Project.

3) Residential potable water demand based on 116.5 gpd/du. Assumes 50 gallons per capita per day (gpcd) and 2.33 residents per dwelling unit, based on water demands identified in the CCSF Retail Water Demands and Conservation Potential Report, November 2004.

4) Commercial and retail potable water demand based on 0.07 gpd/sf. Institutional/education also assumes potable water demand based on 0.07 gpd/sf.

5) Average, year-round irrigation water demand for Build SF Development provided by Bionic.

6) Cooling water demand for Build SF Development provided by Glumac.
Cooling water demand for RPD Development is expected to be small compared to the overall project demand and is noted as zero for this analysis.

7) Refer to Table 1 for existing demands calculations.

8) An average, long term inflow and infiltration rate of 500 gpd/acre was applied to the approximately 10 acres of the project site that are currently proposed for development.

9) It is assumed that 10 percent of domestic water demand will be consumed and not discharged to the sewer.

10) A peaking factor of 3 has been applied to average daily flows to estimate peak discharge rates.



58 MAIDEN LANE, 3RD FLR, SAN FRANCISCO, CA 94108 (415) 677-7300 WWW.SHERWOODENGINEERS.COM

**TABLE 4:**
**MONTHLY WATER DEMANDS AND SEWER GENERATION - MAXIMUM RESIDENTIAL VARIANT**

| | WATER DEMANDS | | | | | WASTEWATER GENERATION | | |
|---|---|---|---|---|---|---|---|---|
| | Indoor Potable[1] (gpd) | Indoor Non-Potable[1] (gpd) | Irrigation[2] (gpd) | Cooling[3] (gpd) | Total Non-Potable (gpd) | I&I[4] (gpd) | Wastewater Generation[5] (gpd) | Discharge to City Sewer[6] (gpd) |
| Jan | 132,733 | 34,501 | 8,325 | 124 | 42,950 | 5,000 | 158,961 | 116,010 |
| Feb | 132,733 | 34,501 | 11,714 | 687 | 46,903 | 5,000 | 158,961 | 112,058 |
| Mar | 132,733 | 34,501 | 23,622 | 1,303 | 59,427 | 5,000 | 158,961 | 99,534 |
| Apr | 132,733 | 34,501 | 35,131 | 1,924 | 71,556 | 5,000 | 158,961 | 87,404 |
| May | 132,733 | 34,501 | 44,281 | 2,979 | 81,762 | 5,000 | 158,961 | 77,199 |
| Jun | 132,733 | 34,501 | 53,057 | 4,041 | 91,599 | 5,000 | 158,961 | 67,362 |
| Jul | 132,733 | 34,501 | 50,751 | 4,717 | 89,969 | 5,000 | 158,961 | 68,992 |
| Aug | 132,733 | 34,501 | 47,408 | 6,021 | 87,930 | 5,000 | 158,961 | 71,031 |
| Sep | 132,733 | 34,501 | 40,630 | 6,221 | 81,352 | 5,000 | 158,961 | 77,609 |
| Oct | 132,733 | 34,501 | 25,878 | 3,103 | 63,482 | 5,000 | 158,961 | 95,479 |
| Nov | 132,733 | 34,501 | 14,811 | 834 | 50,146 | 5,000 | 158,961 | 108,815 |
| Dec | 132,733 | 34,501 | 6,951 | 310 | 41,763 | 5,000 | 158,961 | 117,198 |

**TABLE 5:**
**MONTHLY WATER DEMANDS AND SEWER GENERATION - MAXIMUM COMMERCIAL VARIANT**

| | WATER DEMANDS | | | | | WASTEWATER GENERATION | | |
|---|---|---|---|---|---|---|---|---|
| | Indoor Potable[7] (gpd) | Indoor Non-Potable[7] (gpd) | Irrigation[2] (gpd) | Cooling[3] (gpd) | Total Non-Potable (gpd) | I&I[4] (gpd) | Wastewater Generation[5] (gpd) | Discharge to City Sewer[6] (gpd) |
| Jan | 85,680 | 46,070 | 8,325 | 731 | 55,126 | 5,000 | 128,182 | 73,056 |
| Feb | 85,680 | 46,070 | 11,714 | 1,715 | 59,499 | 5,000 | 128,182 | 68,683 |
| Mar | 85,680 | 46,070 | 23,622 | 3,312 | 73,005 | 5,000 | 128,182 | 55,177 |
| Apr | 85,680 | 46,070 | 35,131 | 4,090 | 85,291 | 5,000 | 128,182 | 42,891 |
| May | 85,680 | 46,070 | 44,281 | 6,754 | 97,105 | 5,000 | 128,182 | 31,077 |
| Jun | 85,680 | 46,070 | 53,057 | 6,846 | 105,973 | 5,000 | 128,182 | 22,209 |
| Jul | 85,680 | 46,070 | 50,751 | 7,399 | 104,220 | 5,000 | 128,182 | 23,962 |
| Aug | 85,680 | 46,070 | 47,408 | 9,249 | 102,727 | 5,000 | 128,182 | 25,455 |
| Sep | 85,680 | 46,070 | 40,630 | 8,979 | 95,679 | 5,000 | 128,182 | 32,503 |
| Oct | 85,680 | 46,070 | 25,878 | 5,248 | 77,196 | 5,000 | 128,182 | 50,986 |
| Nov | 85,680 | 46,070 | 14,811 | 2,623 | 63,504 | 5,000 | 128,182 | 64,678 |
| Dec | 85,680 | 46,070 | 6,951 | 1,205 | 54,226 | 5,000 | 128,182 | 73,956 |

*See notes on page 9.*

**NOTES (TABLE 4&5):**

1) "Indoor Non-Potable" and “Indoor Potable” demands are from the Tables 4 of the BKF Water Demands Memorandum 10.10.16.

2) Annual “Irrigation” water demand for Build Development provided by Bionic. Monthly breakdown has been applied to the total using standard percentages from the SFPUC District Scale Non-Potable Water Calculator V5.3.

3) “Cooling” demands are also from Tables 4 and 5 of the BKF Memorandum, but distributed over the year through application of seasonal demand adjustments per Glumac.

4) An average, long term inflow and infiltration rate of 500 gpd/acre was applied to the approximately 10 acres of the project site that are currently proposed for development.

5) “Total Wastewater Generation” is the sum of “Indoor Non-Potable Demand” and 90 percent of “Indoor Potable Demand,” to account for an assumed 10 percent consumptive use.

6) “Total Discharge to City Sewer” equals “Total Wastewater Generation” plus “I&I” less “Total Non-Potable Demand”.

7) "Indoor Non-Potable" and “Indoor Potable” demands are from the Tables 5 of the BKF Water Demands Memorandum 10.10.16.