SUBDIVISION REGULATIONS

for the Candlestick Point/Hunters Point Shipyard

2014

DEPARTMENT OF PUBLIC WORKS

CITY AND COUNTY OF SAN FRANCISCO

Adopted by Department of Public Works Order No. 182651

Approved June 5, 2014

Mohammed Nuru, Director of Public Works

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I. PURPOSE

These regulations are established pursuant to the Subdivision Code Section 1611, together with Public Works Code Section 147.2(b)(2) and Section 1204(b)(2) to serve as general guidelines for the planning, development, design and improvement of subdivisions in the City and County of San Francisco, and also to supplement said Code.[1]

II. APPLICABLE LAWS

Subdivision maps and all procedures in connection with the subdivision of land within the City and County of San Francisco shall conform with all applicable laws of the State of California and ordinances of the City and County of San Francisco, and all amendments thereto. The principal laws and ordinances in effect governing subdivisions and related public improvements are as follows:

Subdivision Map Act (State of California),Government Code Sections 66410 et. seq.

San Francisco Subdivision Code

[1] Department of Public Works Order No. 124,677 adopted Subdivision Regulations on January 6, 1982 that apply City-wide pursuant to Subdivision Code Section 1311, except where separate development-specific regulations were subsequently adopted. Department of Public Works Order No. 171,379 adopted separate Subdivision Regulations on November 18, 1998 that apply to the development of property in Mission Bay North and South Redevelopment Areas pursuant to Subdivision Code Section 1411.

San Francisco Public Works Code

San Francisco Administrative Code

III. DEFINITIONS

Terms used shall have the meanings defined herein except where an alternate definition already exists in the applicable Codes or State Law in which case the Code or State Law definition shall prevail.

Subdivision Code shall refer to the applicable Code referenced in Section 1 of these Regulations.

Director of Public Works or Director shall mean the Director of Public Works, City and County Surveyor or City Engineer where these Regulations refer to the processes governed under the Subdivision Map Act and as further promulgated under these Regulations; provided however, that where these Regulations specify the City and County Surveyor or the City Engineer, only such individual is authorized to take the action identified.

Surveyor shall mean a Professional Land Surveyor or Civil Engineer authorized to practice land surveying, and who is currently licensed by the California Board for Professional Engineers, Land Surveyors and Geologists.

City as used herein shall mean the City and County of San Francisco.

Department or DPW shall mean the City and County of San Francisco Department of Public Works

Global Navigation Satellite System (GNSS) shall refer to the satellite surveying methods employed by Surveyors as consistent with the applicable Public Resources Code.

Record Map shall refer to any map prepared by a Surveyor and required to be recorded pursuant to the Professional Land Surveyors Act Section 8762 or the Subdivision Map Act.

Improvement Agreement, Public Improvement Agreement and Subdivision Improvement Agreement shall be synonymous for the purposes of these regulations and refer to the agreements entered into pursuant to the Subdivision Map Act (SMA) and applicable Code for completion of public improvements pursuant to a condition of approval of a tentative subdivision map.

DPW Website shall refer to the internet page maintained by the Department of Public works for dissemination of information regarding the subdivision and mapping process. The site address is http://www.sfdpw.org/index.aspx?page=1710. Or, http://www.sfdpw.org, then select "Services A-Z", and select "Subdivisions". The DPW Bureau of Street Use and Mapping is physically located at 1155 Market Street, 3rd Floor, San Francisco, CA.

IV. GENERAL PROCEDURES

The procedures described herein conform with State and local laws and with such additional procedures that the Director of Public Works has found necessary and desirable for the expeditious handling of Subdivision Maps. These Regulations supersede the 1982 Regulations and amendments thereto. DPW's Standard Plans and Specifications, Bid Set Project Manual and Reference Documents, and Departmental Procedures Manual, shall be viewed as supplemental to these Regulations; provided, however, that if there is a conflict between these Regulations and the Standard Plans and Specifications or Departmental Procedures Manual in regard to subdivision specific requirements, these Regulations shall prevail.

A. SUBMISSION OF TENTATIVE MAP

The initial official act to obtain the approval of a subdivision is the formal submission of a Tentative Map and other application materials to the City and County Surveyor. Either a Registered Civil Engineer or a Licensed Land Surveyor may prepare and submit an application. This application shall include all of the documents that the Subdivision Code and the Application Packet require. The "Application Packet" is available at DPW's offices or on the DPW website. The Subdivider shall collate and submit the required number of copies specified within the Application Packet. The City and County Surveyor shall then submit a copy of the map and application materials to the Planning Department and other appropriate governmental agencies for review and recommendations.

1. Vesting Tentative Maps

The Subdivider may submit a Tentative Map or Vesting Tentative Map. Because a Vesting Tentative Map vests the Subdivider with rights to proceed with development, subject to the laws, ordinances, and standards in effect at the time of application submittal, the requirements of an application for Vesting Tentative Map are more extensive as set forth in the applicable Subdivision Codes. Of chief concern is the necessity of a Site Plan that a Surveyor prepares. Such Site Plan need not constitute a final boundary survey, but it must show actual property boundary lines and any title gaps or physical encroachments that would necessarily impact the subdivision process.

2. Required Tentative Maps

A Tentative Map is required for all Final Maps (consisting of five or more units or lots), and all Parcel Maps (consisting of four or less units or lots) except as provided for otherwise in the applicable Subdivision Code. In cases where the Subdivision Code permits submittal of an application without a Tentative Map, the content requirements of such application shall be consistent with the content requirements of the applicable Parcel Map Application to the extent consistent with, and as set forth in the applicable Subdivision Code.

3. Multiple Phased Final Maps Must Be Requested in Application

a) A Subdivider may request to submit multiple phased Final Maps when permitted by the applicable Subdivision Code or with prior authorization do so from the Director of Public Works. Such a request shall be made at the time of application and affirmed in the conditions of approval for the Tentative Map.[2]

b) Where authorized by the Subdivision Code, and because multiple phased final maps typically record over the span of several years, it is not uncommon that the Subdivider may request a deferral of certain required items when such information will necessarily change, be refined or become outdated during the time before the submittal of phased Final Maps or associated Improvement Plans. Any such request for deferral shall be in writing and identify each item being requested for deferral. In such case, the Director of

[2] Gov. Code Sec. 66452.6 requires DPW to determine the number of phased final maps in conditions of approval when a Tentative Map application is pursuant to a development agreement with the City.

Public Works, in his or her sole discretion, may defer such items, in accordance with the Subdivision Code, and condition the deferral in a manner that her or she deems appropriate. The Subdivider shall include all deferred information as part of the submission of a Deferred Materials Submittal.

c) The Subdivider may request in writing waivers of items required in a Tentative Map application only in accordance with the applicable provisions of the Subdivision Code. The Director of Public Works, in his or her sole discretion, may grant such waivers in writing and condition the waivers in a manner that he or she deems appropriate.

4. Transfer Maps

Where authorized by the Subdivision Code, a Subdivider may submit a Tentative Transfer Map. Transfer Maps are meant to create legal parcels for the purpose of financing and conveyancing only, but do not grant any development rights. Because no development rights are granted, a Subdivider may request in writing the waiver or deferral of many items generally required in a Tentative Map Application Packet in accordance with the applicable provisions of the Subdivision Code for Conveyancing or Finance Maps. The Director of Public Works, in his or her sole discretion, may grant such deferrals and/or waivers in writing and condition the deferrals and/or waivers in a manner that he or she deems appropriate.

B. CITY AGENCY REVIEW

As required by the State Subdivision Map Act, the Subdivision Code and other applicable local laws, all proposed subdivisions shall be reviewed by the Planning Department for consistency

with the General Plan and any applicable Area Plan.[3] The Planning Department also shall review the application to determine consistency with the priority policies of Planning Code Section 101.1 and in accordance with the applicable environmental laws including the California Environmental Quality Act and Administrative Code Chapter 31 and report its determination to DPW. In order to be informed of the various policies applicable to a particular subdivision, it is recommended that the Subdivider consult with the Planning Department prior to submittal of a Tentative Map application.

Other City Agencies and interested persons may also review and comment on the Tentative Map as provided for in the applicable State law and Subdivision Code.

C. NOTICE OF PUBLIC HEARINGS AND NOTICE OF TENTATIVE MAP DECISION

The Subdivider shall submit the following materials with the Application Packet:

(1) 300-foot radius map: A map drawn to scale showing the property that is the subject of the application and all other properties within a radius of 300 feet of the exterior boundaries of the subject property, the Assessor's Block number on each block and Assessor's Lot number on each lot, and the names of all streets shown. The drafting scale shall be sufficiently sized to show and identify individual properties. The 300' Radius line shall be shown in a bold dashed linetype and shall be annotated in several places with leaders from the offset perimeter to the subject development boundary.

[3] Subdivision Map Act (SMA) Sec. 66473.5

(2) Address List: A printed and electronic list, showing in numerical order by Assessor's block and lot, the names and mailing addresses of the last known owners of all properties touching or within the 300-foot radius of the subdivision shown on the map. These names and addresses are available at the Tax Collector's Office and are shown on the latest city-wide assessment roll. The list also shall include the names of the residents within the subdivision itself. In addition, the Subdivider should include on the list names and addresses of the persons, organizations or any other agencies that have made a formal request to DPW to receive notification concerning the subdivision. The electronic copy of the list shall be in *.xls or *.txt format or other format acceptable to the Director of Public Works.

(3) Mailing Envelopes: One set of #10 regular envelopes with rounded gummed flap, stamped and addressed to the parties in the Address List and printed with the DPW return address. Envelopes are available upon request from the City and County Surveyor’s office.

(4) Mailing Envelopes for a Public Hearing on the Tentative Subdivision: In the case of vesting tentative maps or multiple phased final maps or when the DPW Director elects to hold a public hearing, the applicant shall submit an additional set of Mailing Envelopes.

D. ACTION ON TENTATIVE MAP

After the determination that a Tentative Map application is deemed complete and the Planning Department issues its determination under CEQA , the Director of Public Works shall approve,

conditionally approve, or deny the application within 50 days (or other time period as specified in the Subdivision Code) unless such time shall have been extended by mutual agreement.

In advance of the Tentative Map decision, the Department may hold a Director's Hearing, as determined in accordance with the provisions of the applicable Subdivision Code. A Subdivision Conference between DPW and the Subdivider may be held, as determined in accordance with the applicable Subdivision Code or the request of the Subdivider.

The Director shall notify the Subdivider in writing of his or her findings and decision with regard to said Tentative Map. The Director also shall mail notice of the decision to all parties listed on the 300' Radius Map.

E. CONDITIONS OF APPROVAL

Conditions of Approval (COA) on a Tentative Map allow for a Final Map to be approved and recorded subject to the satisfactory completion of necessary and important tasks related to the subdivision and construction of improvements for the subdivision. Compliance with the COA are an important link in a long chain of tasks that culminate in a complete and successful development. COA typically include the requirement for the submission of materials or the completion of tasks by specified deadlines, various improvement plans, and construction permits[4]. If the Subdivider may not complete required public infrastructure at the time of Final Map Approval, the COA also shall address the following:

(a) Improvement Agreements

[4] See Section V. Tentative Map Requirements, (D) Engineering Plans and Documents.

(b) Submission to the City of irrevocable Offers of Real Property in Fee and/or Improvements (or rarely, Offers of Easements and Easement Agreements)

(c) Bonds to guarantee completion of and payment to contractors for future public improvements

(d) Determinations of completeness, acceptance of offers of dedication, acceptance of public improvements, release of bonds, and warranties

Unless otherwise addressed through an Improvement Agreement, COA shall be satisfied prior to the recordation of a Final Map. Conditions of Approval shall include but not be limited to the following:

1. Availability of Sufficient Water Supply

Unless a statutory exception applies or the Subdivider has previously satisfied this requirement as part of environmental review, subdivisions involving a proposed residential development of more than 500 dwelling units shall require proof to the satisfaction of the Director of Public Works that a sufficient water supply shall be available.[5] The Subdivider shall request proof from the San Francisco Public Utilities Commission (PUC) and submit to the Department written verification from the PUC within 90 days of the request.

[5] SMA Sec. 66473.7; see also subsection (i), excluding certain urbanized areas

2. Public Easements

To the extent that the design or improvements of a subdivision will conflict with easements acquired by the public at large, conditional approval shall provide for alternate easements substantially equivalent to the ones previously acquired by the public along with any associated City actions necessary to accomplish this.[6]

3. Substantial Compliance with Tentative Map

Final Maps shall be in substantial compliance with an approved Tentative Map and any conditions of approval issued thereto.[7]

To assist the Department in confirming this requirement, the Subdivider shall submit to DPW a tracking document in spreadsheet form as pre-approved by the City and County Surveyor. The spreadsheet shall address how each COA has been or will be satisfied. The spreadsheet shall be submitted with the Final Map Checkprint. In the case of Phased Final Maps, the Subdivider also shall submit a tracking spreadsheet with any Deferred Materials Submittal, if and when such a Submittal is required.

4. Vesting Tentative Map

A condition for Vesting Tentative Maps shall be that the Subdivider provide a date-stamped copy of the Subdivision Regulations in effect on the date of approval of the Vesting Tentative Map. DPW shall maintain a copy of this document in its files on the Subdivision.

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[6] SMA Sec. 66474

[7] SMA Sec 66474.2

5. Timing of Submittals for Multiple Phased Final Maps

Where a Subdivider has requested and obtained approval to submit multiple phased final maps, the Director of Public Works shall condition and address the timing of interim submittals such as Deferred Materials Submittals and Improvement Plans, to provide for efficient review by the various City agencies.

6. Other Conditions

Other concerns associated with the proposed subdivision shall be addressed through additional conditions as the Director of Public Works deems necessary. Conditions related to engineering or land surveying shall be reviewed by the City Engineer or the City and County Surveyor, as appropriate, to determine compliance with generally accepted engineering or surveying practices.

F. DEFERRED MATERIALS SUBMITTAL

Where Phased Final Maps are allowed under the Subdivision Code, the Subdivider shall submit to the Director of Public Works a Deferred Materials Submittal at the same time as and concurrent with each application for phase approval in accordance with local laws and rules related to phased approvals. The Deferred Materials Submittal shall update the Tentative Map with all items previously deferred and an explanation of any materially changed site conditions that would affect the Conditions of Approval.

The Subdivider shall prepare and submit a tracking spreadsheet addressing each condition of approval, the estimated date and method of satisfaction, and what if any conditions are being satisfied through the submittal of the Deferred Materials Submittal.

The Director of Public Works shall review the Deferred Materials Submittal and if the previously deferred information affects the prior Conditions of Approval, the Director of Public Works reserves the right to impose reasonable conditions necessary for the development and to refine, adjust, supplement, modify, and/or delete the Conditions of Approval to the extent consistent with the earlier approval.[8]

If the Subdivider fails to timely submit any deferred item in the Deferred Materials Submittal, the Director of Public Works shall return the Submittal to the Subdivider with a statement that identifies what materials are absent. As consistent with the applicable Subdivision Code, the Subdivider may request in writing the continued further deferral of these materials. The Director of DPW, in his or her sole discretion, may grant such additional deferral in writing and condition the deferral in a manner that he or she deems appropriate.

G. SUBMISSION OF FINAL MAP

Within 24 months[9] after the approval or conditional approval of the Tentative Map or maps, and as that time may be extended according to applicable provisions of the Subdivision Map Act, the Subdivider shall prepare a Final Map in accordance with the Tentative Map as approved, and submit it to the Director of Public Works in the form of a Final Map Checkprint. Upon written

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[8] See also SMA Sec. 66474.3(f) which provides that, "[a]n approved or conditionally approved tentative map or vesting tentative map shall not limit a legislative body from imposing reasonable conditions on subsequent required approvals or permits necessary for the development…"

[9] Refer to provisions of the applicable City Subdivision Code. In some cases, the Subdivision Code extends the initial life of a tentative map to 36 months.

request of the Subdivider, the Director of Public Works may grant an extension of time, in his or her sole discretion, and within the limits prescribed by the Subdivision Map Act. The Subdivider's failure to submit a Final Map within the applicable time limits shall result in the Tentative Map being automatically denied.

H. ACTION ON FINAL MAP

The Director shall forward all Final Maps or Parcel Maps associated with a Public Improvement Agreement to the Board of Supervisors for approval. After all required City approvals are completed, the Final Map shall be recorded in the County Recorder's Office.

I. PUBLIC IMPROVEMENTS, IMPROVEMENT AGREEMENTS, AND SECURITY

As set forth in the Subdivision Code and pursuant to the longstanding policy of the City, if the Subdivider constructs public right-of-way on private property, the Subdivider **shall dedicate such property to the City in fee simple through a grant deed**. The Director of Public Works may waive such a requirement and accept a public easement in lieu of fee ownership only for good cause and after consultation with the City Attorney's Office and any affected City department. The Subdivider shall request such a waiver in writing as early as possible in the subdivision process.

The property underlying the right-of-way proposed for dedication to the City for public use within a subdivision shall be clearly labeled on the Tentative Map as "to be dedicated in fee to the City" or "to be dedicated as a public easement." Where the property underlying

improvements will remain privately owned but used for public purposes, the Subdivider, in consultation with DPW, shall determine whether the easement can be dedicated solely on the face of the map or requires an additional easement agreement with the City. If an easement agreement is required, the Board of Supervisors shall approve such easement agreement unless local law provides for an alternate form of approval. Privately owned improvements and other encroachments are generally precluded from occupying the public right-of-way. When such use is required, the Subdivider shall obtain a separate approval or permit from the appropriate City agency, board or commission in accordance with local law.

V. TENTATIVE MAP REQUIREMENTS

A. GENERAL

It is the longstanding policy of the City that if the Subdivider constructs public improvements on private property, the Subdivider **shall dedicate such property to the City in fee simple through a grant deed**. The Director of Public Works may waive such a requirement and accept a public easement in lieu of fee ownership only for good cause and after consultation with the City Attorney's Office and any affected City department. The Subdivider shall request such a waiver in writing as early as possible in the subdivision process.

The property underlying the improvements proposed for dedication to the City for public use within a subdivision shall be clearly labeled on the Tentative Map as "to be dedicated in fee to the City" or "to be dedicated as a public easement." Where the property underlying improvements will remain privately owned but used for public purposes, the Subdivider, in

consultation with DPW, shall determine whether the easement can de dedicated solely on the face of the map or requires an additional easement agreement with the City. If an easement agreement is required, the Board of Supervisors shall legislatively approve such easement agreement unless local law provides for an alternate form of approval. Privately owned improvements and other encroachments are generally precluded from occupying the public right-of-way. When such use is required, the Subdivider shall obtain a separate approval or permit from the appropriate City agency, board or commission in accordance with local law.

B. APPLICATION PACKET

The Application Packet containing detailed instructions, checklists and requirements for each particular type of subdivision of land is available in the most current and updated form is available at DPW's offices or on the DPW website.

C. CONTENTS OF TENTATIVE MAP

The following items are arranged in a checklist format for sheets in a typical Vesting Tentative Map submittal.

Refer to the applicable Subdivision Code for additional items that may be required for Vesting Tentative Maps or other requirements below that may be omitted from a Tentative Map that is not a "vesting" tentative map.

The contents of the Tentative Map application do not substitute for any required engineering documents such as grading plans, improvement plans or utility plans, but should be consistent

with the design criteria for such documents as set forth in greater detail in the applicable engineering-specific Appendix attached hereto.

The Tentative Map shall be neatly drawn at a scale sufficiently large to present the required information clearly and accurately. All lettering and numerals on the drawings shall be legible from the bottom or right-hand side. In general, a tentative map shall contain the following information.

1. Cover Sheet

- Title stating: “Tentative Subdivision Map” or “Vesting Tentative Subdivision Map” or “Tentative Parcel Map” or “Vesting Tentative Parcel Map” or other title as authorized by the applicable Subdivision Code[10].
- Title stating the location, “San Francisco, California."
- Include “condominium purposes” in Title if applicable and include the number of residential and/or commercial units proposed.
- Vicinity Map showing the project location within the region.
- Location Map showing the project extents.
- Project Data including:

  Street address of project

  Assessor’s Block and Lot Numbers

  Owner/Subdivider’s Name and contact information

  Existing and proposed Land Use/Zoning

[10] a “Vesting” Tentative Map is subject to the requirements of SFSC§1333.2 and Gov. Code §66452.

Project Area in Acres to the nearest hundredth acre

Existing and proposed Utility Providers and contact information

- Legend showing abbreviations, symbology and linetypes.
- Name, address, "wet" seal and signature of the Surveyor (wet seal required on printed copy – electronic seal and signature acceptable for pdf copies - 16 CCR 411).
- Surveyor's and/or Engineer's Statement.

  Note: actual boundary survey only required for "vesting" maps. If the tentative map contains the work of more than one licensed professional, the map should indicate their respective responsibilities and portions of the map completed under their supervision.
- A notation superimposed over the Surveyor's seal stating "preliminary" or "for examination only."
- Sheet numbers: "Sheet ___ of ___" in the lower right corner of each sheet.
- Sheet size: 24" x 36" or 30" x 42" with a marginal line drawn 1" from all borders.
- Index containing a description of each sheet in the plan set.
- Basis of bearings, units of measurement, vertical and horizontal datum.
- Statements regarding existing use of property, proposed development, proposed improvements, variances and exceptions, retention of ownership in common areas, and whether use of multiple phased final maps is planned.
- A reference to environmental evaluation data on the appropriate Planning Department forms.

2. Existing Site Conditions

- The names of the adjacent subdivisions, or the record vesting information of adjacent parcels of land, and the Assessor's block and lot numbers of adjacent parcels.
- Location, dimensions and approximate size of existing lots.
- The location of all existing buildings within the subdivision and on adjacent land which may be affected by the proposed subdivision.
- The location and names of all existing streets within or adjacent to the proposed subdivision, together with overall widths of roadways.
- The locations and widths of existing railroad right-of-way, MUNI right-of-way, sewer and other easements within or affecting the proposed subdivision.
- Location and dripline of large trees, 8" or larger diameter at breast height, within the proposed subdivision.
- Location of all existing visible surface utilities present at the proposed subdivision. Include: drain inlets, clean-outs, water valves, fire hydrants, gas valves, electrical and telephone vaults, utility poles, MUNI poles, street lights, traffic lights, and all other surface utilities fronting or within 25 feet of the subject property.
- Location of all existing visible sub-surface utilities present at the proposed subdivision. Include material, diameter and direction of flow (can be based on record information).
- Topography with contours delineated at 1' intervals; spot elevations may be added for flat sites as necessary to depict slope.
- Location of existing improvements including, building envelopes, sidewalks, top face of curb and flowline, driveways, and other improvements fronting public areas. Note the

source (i.e. GIS records, aerial survey, field survey, etc.) and date of the above information and whether any significant changes occurred between then and the time of application.

- Note whether buildings or other improvements are to be demolished or preserved in the proposed subdivision development.
- North arrow (usually pointing to left or top of sheet), graphic scale, date of drafting, and a submission number, i.e. first submission, second submission, etc.

3. Proposed Parcelization (Lots, Parcels, or Units)

- Proposed streets within or adjacent to the proposed subdivision; indicate if proposed streets are to be public or private. If street names have not been selected and approved by the Department of Public Works, identifying letters may be used.
- Location, dimensions and approximate size of proposed lots.
- All parcels of land proposed to be dedicated for public use such as parks, open space, right-of-way, etc., together with the purposes, conditions, and limitations, if any. Note the party who will be the beneficiary of the offer of dedication if it is an entity other than the City, e.g. non-City governmental agency, Private Utility, Non-Profit, Homeowner's Assoc., etc.

4. Proposed Street Improvements

- Proposed streets within or adjacent to the proposed subdivision, together with overall widths of roadways and sidewalks. Indicate curb return radius. Indicate if proposed

streets are to be public or private. If street names have not been selected and approved by the Department of Public Works, identifying letters may be used.

- Typical cross-sections of proposed and existing streets showing the full width of existing right-of-way and any proposed addition to or reduction in right-of-way.

5. Proposed Underground Utilities

- Layout of drainage and sanitary facilities and utilities, including alignments and grades thereof. Show manhole covers and other underground structures together with distance between them and direction of flow. Label separation distances between water mains and other sanitary facilities.
- Layout of all other existing and planned utility facilities which would serve the proposed subdivision such as electric, gas, potable water, reclaimed water, AWSS, telephone, cable TV, solar, etc.
- Layout of the street lighting and facilities for the fire alarm and police communications system.
- Show proposed connections between existing and proposed utilities, between interim sub-phases of proposed development, and proposed lateral service connections to future lots. Show any temporary interim facilities that will function prior to completion of proposed final improvements.
- Show location and size of all required easements and right-of-ways needed to serve the public or private utilities.
- Note any infrastructure improvements necessary to make the utility facilities operable, whether on-site or off-site, to be constructed together.

- Note the party responsible for ownership and maintenance of the actual infrastructure if that party differs from the proposed owner in fee.

6. Proposed Grading Plan

Note: A separate grading plan is required for planned cut/fill involving more than 1,000 C.Y. of earth. Such grading plan should be consistent with the design criteria for such plan as described in greater detail in the applicable engineering specific Appendix attached hereto.

- Label proposed pad grades, streets, and other proposed hard surfaces. Label areas of cut/fill.
- Note the location, height and type of proposed structural retaining walls.
- Include a statement on whether the site grading is impacted by any applicable environmental mitigation measures.

D. ENGINEERING PLANS AND DOCUMENTS

Improvement plans, utility plans and other required engineering plans and documents shall comply with the requirements of the applicable engineering specific Appendices attached hereto.

- Appendix B: Technical Specifications Related To Engineering Documents Applicable City-Wide Unless Specified Otherwise In Subsequent Appendices
- Appendix C: Technical Specifications Related To Engineering Documents For Candlestick Point/Hunters Point Phase II Development.

If the engineering plans and specifications related to the proposed public improvements are not addressed in the Appendices, the Subdivider shall rely on the requirements set forth in DPW's

Standard Plans and Specifications and the other officially adopted regulatory standards of other City departments.

VI. DEFERRED MATERIALS SUBMITTAL

When a Subdivider requests both phased Final Maps and the deferral of application materials, and the Director of Public Works has approved such a request, DPW shall require the Subdivider to submit Deferred Materials Submittals prior to submittal of a Final Map Checkprint in accordance with Section IV. Subsection F. Such Submittal will graphically present the areas included within the proposed Final Map and include an overlay of all previously deferred items upon the approved tentative map. Additional information on the content and timing of Deferred Materials Submittals may be addressed in the conditions of approval of a tentative map.

VII. FINAL MAP

All applicable conditions of approval shall be satisfied prior to the recording of a Final Map. Public improvement requirements that are not satisfied prior to recording the Final Map shall be addressed in a Public Improvement Agreement in accordance with the provisions of the applicable Subdivision Code and these Regulations. City approved Improvement Plans are a prerequisite to all Public Improvement Agreements.

When submitting a Final Map Checkprint, the Subdivider shall prepare a tracking spreadsheet addressing each condition of approval, the date each was satisfied, and the method of satisfaction (actual compliance or future compliance by separate agreement and security).

Final Map Checkprints shall be submitted for review comments and redline corrections. Upon receipt of the requested revisions, the Subdivider shall revise and re-submit another Final Map Checkprint conforming with all requested changes.

Upon satisfactory review of the Final Map Checkprint, the Director of Public Works shall issue instructions for submittal of mylar copies of the Final Map for signatures and recording.

The content of Final Maps and Final Map Checkprints shall conform to the technical specifications described in Appendix A.

The Final Map shall bear the following certificates or acknowledgments:

(a) A certificate, signed and acknowledged by all parties having any record title interest in the land subdivided, consenting to the preparation and recordation of the Final Map and, if applicable, an irrevocable offer of dedication for public use of the streets and easements shown.

(b) Notary's acknowledgment of signatures.

(c) Approval of the Director of Public Works.

(d) Approval as to form by the City Attorney.

(e) Certificate of the City and County Surveyor.

(f) Certificate of the Surveyor.

(g) Certificate of the Clerk of the Board of Supervisors as to liens or taxes.

(h) Certificate of the Clerk of the Board of Supervisors approving the map and accepting and/or rejecting the offers of dedication.

(i) The Recorder's Certificate.

(j) Certificate of Compliance.

Recommended standard forms of the above certificates and acknowledgments are available at DPW's offices or on the DPW website.

VIII. PARCEL MAP

The DPW review and approval process for Parcel Maps shall be the same as for Final Maps indicated in the previous section. Parcel Maps shall include the same information specified for a Final Map with the exception that required certificates may vary as listed below.

A Parcel Map shall bear the following:

(a) Certificate of the Surveyor.

(b) Certificate of the City and County Surveyor.

(c) A certificate signed and acknowledged by all parties having any record title interest in the real property subdivided, consenting to the preparation and recordation of the parcel map. Note that when no offers of dedication are being made, then no signature blocks for Trustees or Beneficiaries are required to be shown.

(d) Notary's acknowledgment of signatures.

(e) The Recorder's Certificate.

Recommended standard forms of the above certificates and acknowledgments are available at DPW's offices or on the DPW website.

IX. RECORD OF SURVEY MAP

A Record of Survey (ROS) map may be filed for any purpose specified under applicable State law. All recorded maps shall comply with the technical requirements specified in Appendix A, A Record of Survey Map shall bear the following:

(a) Certificate of the Surveyor.

(b) Certificate of the City and County Surveyor.

(c) The Recorder's Certificate.

Recommended standard forms of the above certificates and acknowledgments are available at DPW's offices or on the DPW website.

X. ADDITIONAL REQUIREMENTS

A Tentative Map application shall be accompanied by the current application fees as published and available at DPW's offices or on the DPW website.

A Parcel Map or Final Map shall be accompanied by the following:

(a) A recording fee. Refer to the Office of the Assessor-Recorder for the current fee schedule.

(b) Title report or reports updated to within 45 days of recording.

(c) A tax certificate dated within 30 days of date of submittal.

(d) Any other item(s) requested by the mylar approval transmittal.

(e) A tracking spreadsheet document, signed by the Subdivider or Applicant, indicating how and when each Condition of Approval was satisfied.

A Parcel Map or Final Map, when applicable, also shall be accompanied by the following:

(f) Grant Deed: A deed(s) to the public right-of-way including street and sidewalk areas, pedestrian ways, and other property to be dedicated to public use transferring the title in fee to the City and County of San Francisco. A title report covering the parcels dedicated shall be furnished showing the parcels to be free and clear of all encumbrances. This deed also shall be accompanied by an irrevocable offer of the property and a separate irrevocable offer of the proposed improvements referencing approved improvement plans. An interim temporary construction easement also shall be offered by separate instrument such that the City can complete the public improvement obligations of the Subdivider in the event of the Subdivider's failure to complete the improvements.

(g) Grant of Easement: If the Director of Public Works authorizes a public easement in lieu of a grant deed, the Subdivider shall submit the easement at this time unless the easement can be shown and dedicated solely on the face of the map. The easement to the City and County of San Francisco shall contain the conditions and restrictions shown in the City's standard form for easements.

(h) Improvement Agreements: The Subdivider shall submit a draft version of the Improvement Agreement applicable to the Final Map at the time of Final Map Checkprint. The Subdivider shall submit to the Department a fully executed Improvement Agreement, along with bonds or other approved forms of security for performance and labor and materials, no less than 10 days prior to the Board of Supervisors action on the subject Map.

(i) Monument Bond: A bond in an amount that the City and County Surveyor determines is necessary to cover the cost of setting monuments if the monuments are to be set after the Final Map is recorded.

XI. SETTING MONUMENTS

The Surveyor shall set permanent survey monuments prior to the recordation of any map in such positions that another surveyor may readily retrace the lines of the survey or subdivision. The proposed number of monuments and their locations is subject to review and approval by the City and County Surveyor.

XII. REVISIONS AND CERTIFICATES OF CORRECTION

Upon written request of the Surveyor who prepared the map, the City and County Surveyor may allow a Final Map or Parcel Map, once submitted for recordation, to be recalled prior to recordation. The request for a recall shall state the reason for the recall and the nature and extent of the revisions to be made.

No recorded Final Map or Parcel Map may be repeatedly amended with certificates of corrections. Where the extent and occurrence of such corrections are excessive in the opinion of the City and County Surveyor, he or she shall require a new map to be filed and approved. The Department shall charge a fee, based on actual cost, for checking and processing each certificate of correction.

XIII. SEVERABILITY

If any section, subsection, sentence or provision of these Regulations is ruled inconsistent with the provisions of other existing State or local statutes and declared void, such said section, subsection, sentence or provision shall not in any way invalidate or change any other portion or portions of these Regulations.

XIV. EFFECTIVE DATE

The provisions of these Regulations, as amended, shall become operative upon approval and adoption by the Director of Public Works.

APPENDICES

APPENDIX A – TECHNICAL SPECIFICATIONS RELATED TO SURVEYS PERFORMED IN SAN FRANCISCO

APPENDIX B – RESERVED FOR FUTURE TECHNICAL SPECIFICATIONS RELATED TO ENGINEERING DOCUMENTS; APPLICABLE CITY-WIDE

APPENDIX C – TECHNICAL SPECIFICATIONS RELATED TO ENGINEERING DOCUMENTS FOR CANDLESTICK POINT/HUNTERS POINT PHASE II DEVELOPMENT

APPENDIX A – TECHNICAL

SPECIFICATIONS RELATED TO SURVEYS

PERFORMED IN SAN FRANCISCO

1. GENERAL

Boundary surveys completed in San Francisco are subject to procedures unique to this City. The historical and physical realities of the City and County of San Francisco (CCSF) mandate that certain customs and practices be formalized and practiced consistently to promote and maintain reliable land records.

2. RETRACEMENT SURVEY POLICY

a) Surveys Presumed to Reflect Deed

When a surveyor submits a survey to the CCSF for review and the survey is a retracement of lands described by metes and bounds, the survey shall reflect the measurements and boundary calls as those calls appear in the deed of record.

b) Exceptions

The City and County Surveyor, on a case by case basis, may examine evidence extrinsic to the record deed to aid a boundary resolution. The following guidelines have been found consistent with the historical practice of surveying in this community, but are not conclusive or meant to

preclude any private property rights or any other rights of the City and County of San Francisco or the State of California.

(1) Deed Calls at Variance From Long Occupation

If the physical occupation on the subject property is discrepant with the written deed and the Surveyor proposes a resolution based upon the physical occupation, a survey shall show the relationship (by dimensions on the survey map) between the resolved boundary location and the record deed location. At a minimum, the following should be addressed and included in the proposed resolution[1]:

- Title research that includes McEnerney deeds[2] for the subject parcel and all adjoiners.
- Field measurements documenting the present location of improvements along the full width of the block together with a comparison of those locations shown on historical surveys of known provenance.[3]
- The location of the physical occupation of the subject property and all adjoiners.

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[1] Professional Land Surveyor's (PLS) Act Sec. 8762(d)(2), requires the submittal of specific requested information where surveys have been previously performed by others.

[2] Research should extend back in time to a point of common ownership of the parent tract. Because land records prior to the 1906 fire were largely destroyed, the McEnerny decrees to establish title are often the earliest surviving documents of record in the City.

[3] This would include but not be limited to the Block Diagrams on file with the City. Original City field notes dating from the era of the 1906 fire have been found to support the information portrayed on many of the Block Diagrams.

- A finding that current evidence of occupation supports, or at the very least, does not contradict the historical evidence of occupation dating back to the era of the original McEnerny judgments.

In such cases, the Surveyor may, consistent with his or her professional opinion, monument and hold as the property boundary either the record deed line or the occupation line. However, in doing so, the survey shall be unmistakably clear which of the two lines is purported to be the property boundary (deed or occupation).

The rationale behind this policy is that the use of extrinsic evidence is supporting a conclusion that title never changed ownership, but rather that the reliably documented historical occupation is consistent with the true intent of the parties as expressed in light of the circumstances of the 1906 earthquake and fire that necessitated the McEnerny deeds.[4]

(2) Statutory Unwritten Rights

These cases are not correctable by the surveyor. They are characterized by relatively shorter (5+ years) occupation. An actual transfer of title may have occurred, but the City shall recognize such transfer only after formal judicial action (quiet title) or agreement between the concerned parties (lot line adjustment, grant of fee ownership, easement, etc.).

[4] Civ. Code Sec. 1069, establishes that a grant is to be interpreted in favor of the grantee. See also Code of Civ. Proc. Sec. 2077, that establishes principles for construing doubtful or uncertain descriptions of real property.

(3) Defective Deeds

A deed is presumed to have a defect in cases where the discrepancy between the deed and occupation is explained from evidence other than historical occupation alone. Such cases include among others, problems created through the chronology of McEnerney judgments, and subdivisions of property containing some deficiency. Such defects may be, but are not necessarily, correctable by the Surveyor. Such retracements shall be based on substantial record evidence that clearly explains why the evidence invariably supports the Surveyor's conclusion. The explanation may incorporate graphic and/or narrative formats, but must reach a logical conclusion that precludes all other explanations. The City and County Surveyor shall review the evidence and if he or she agrees with the proposed resolution and determines that the correction would not be harmful to the public interest, may at his or her sole discretion, assist the Surveyor in correcting the defect.

3. SURVEYS AND COMPUTATIONS

a) As a basis for a recorded map, a Surveyor shall make a complete and final survey of the land to be subdivided.

b) The Surveyor shall furnish to the Department a traverse closure sheet, in a form that the City and County Surveyor approves, that gives bearings, distances, and coordinates, and shows the mathematical closure. Alternatively, the Surveyor may submit a comparable least squares adjustment report, in a form that the City and County Surveyor approves, that is based on redundant observations for non-conventional (satellite, photogrammetric or laser scanning) surveys.

c) Before the Surveyor balances or undertakes other adjustments to the survey, the Surveyor shall ensure that the traverse of the exterior boundary and for each block of the subdivision, when computed from conventional field measurements, closes within a limit of error of one foot in 30,000 feet of perimeter.

d) The Surveyor shall tie to all monuments, property lines, street and alley lines, and all easements or right-of-ways associated with a survey and that serve to perpetuate and preserve existing survey control.

e) Surveys that show bearings shall tie to and have as a basis of bearings the San Francisco High Precision Network or other reference to the California State Plane Coordinate System of 1983 as approved by the City and County Surveyor.

4. DETAILS OF RECORD MAPS

a) A Surveyor shall clearly and legibly print all Record Maps using permanent black ink on mylar film. The Surveyor or Applicant shall print affidavits, certificates and acknowledgments and sign them using a permanent black ink that dries without tracking or sticking onto adjacent sheets. The Subdivider or Applicant shall file the Record Map with the City and County Surveyor for recording.

b) The Surveyor shall print all characters using a minimum text height of $1/10^{th}$ of an inch at the plotted scale of the map. No lines or symbols shall cross through or obscure the printed characters and any such lines or symbols shall be trimmed or masked to preserve map legibility.

c) The size of each sheet shall be 18 inches by 26 inches overall, with a marginal line drawn completely around each sheet leaving a blank margin one inch in width.

d) The Surveyor shall show a printed and graphic scale of the map. It must be sufficient to show all details clearly. The Surveyor may employ additional sheets to accomplish this purpose. Each sheet shall include a north arrow, the number of the sheet and the total number of sheets comprising the set, its relation to the adjoining sheets, and the basis of the bearings used.

e) The Surveyor shall show on the map all survey and mathematical information and data necessary to locate all monuments and to locate and easily retrace any and all interior or exterior boundaries, including angles or bearings and distances for all straight lines. The Surveyor shall show radius, length and central angle of all curves. For non-tangent curves, The Surveyor shall include additional curve elements such as chord length and chord bearing.

f) The Surveyor shall number each block and lot. The Surveyor shall shown angles or bearings and distances of each lot, block, and boundary line on the record map, except that when bearings or distances of lot lines in any series of lots are the same, the Surveyor may omit such bearings or lengths from each interior parallel lot line of such series. The Surveyor shall show each required bearing and distance in full. Angular measurements shall be shown to the nearest arc second and distances shall be shown to the nearest hundredth of a foot using U.S. Survey Feet as the unit of measurement, unless otherwise approved by the City and County Surveyor.

g) The Surveyor shall designate each street by the name that the Director of Public Works has authorized.

h) The Surveyor shall show locations of all new monuments and shall describe them with sufficient detail so that they can be easily identified. Monuments not set at the time of the Final Map shall be labeled "To Be Set."

i) The Surveyor shall indicate exterior boundary of land to be subdivided by means of a bold border of such a character that it will not obliterate any figures or other data.

j)

5. MONUMENTATION

Subdividers shall not place monuments located in pavement areas until construction of pavement is complete. If a Record Map is filed before pavements have been constructed, the City and County Surveyor shall require the Subdivider to post a bond with DPW in an amount the City and County Surveyor determines shall guarantee that the monuments will be set. The Subdivider is required to set all monuments within two years of the City Engineer's determination that the construction of pavement has been completed.

Monuments shall consist of the following alternatives as approved by the City and County Surveyor:

a) A granite or concrete monument, 5 x 5 inches at the top, 9 x 9 inches at the bottom and 30 inches long. Subdivider shall place a lead plug, one inch in diameter and two inches long, in the center of the top face and the exact monument point marked with a brass nail. The Subdivider shall cap the monument with a cast-iron frame and cover, the design of which shall be approved by the City and County Surveyor.

b) A surface brass disk countersunk and set flush in the surface of a concrete or rock structure of such a nature as to provide a permanent fixed and immoveable reference point.

c) Other sufficiently durable and identifiable monument as approved by the City and County Surveyor.

Where feasible, the Subdivider shall place a ½" x ¼" ceramic magnet below any monument to aid in future recovery and perpetuation of the monument.

6. MONUMENT DESTRUCTION AND PROCEDURES FOR PRESERVATION

Survey monuments in the City are a valuable public resource that Subdividers and applicable governmental agencies shall preserve and perpetuate. Monuments form the tangible substance of land boundaries and perpetuate the horizontal and vertical location of land-related rights and responsibilities. The improper disturbance of survey monuments is illegal[5] and may amount to a crime.[6]

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[5] Bus. and Prof. Code Sec. 8771(b) requires that survey monuments in the public way be referenced before construction, their positions recorded, and if disturbed or destroyed, be reset and perpetuated – all under the supervision of a Surveyor and in cooperation with DPW. See also The Greenbook – Standard Specifications for Public Works Construction Sec. 2-9.1, reiterating the above and explaining that a contractor is to provide notice before disturbing a survey monument and bears the expense of replacing a disturbed monument.

[6] Penal Code Sec. 605 makes the malicious intentional destruction of survey marks a misdemeanor.

a) Locating Monuments Prior to Construction

Prior to performing any construction within any public street, public easement, or other City owned property, a Surveyor shall located and reference all survey monuments on a Corner Record form or Record of Survey. The construction zone within which a survey monument is presumed to be disturbed shall include any work done within 10 feet of a survey monument. If the proposed work will disturb a survey monument the City owns or set, the Subdivider shall contact the City and County Surveyor at least two weeks prior to construction and submit a Monument Reference Request form and the appropriate fee. The form, instructions and amount of the fees are available on the DPW website. Examples of City monuments and additional identifying information for City-owned monuments are available from DPW upon request.

b) Replacing Monuments After Construction

When construction is substantially complete, but before certificate of final completion, the Applicant shall schedule an inspection of any monuments that existed prior to construction and within the construction zone. The Applicant shall reset and perpetuate any monuments that were disturbed or destroyed under the supervision of a Surveyor and file this information with the City and County Surveyor on a Corner Record or Record of Survey. If the monument was a survey monument that the City owns or set, the Applicant shall contact the City and County Surveyor at least two weeks prior to completion, finalize the Monument Reference Request, and submit the appropriate fee per replaced monument. The form, instructions and amount of the fees are available on the DPW website..

7. STANDARD FORMS AND AGREEMENTS FOR EASEMENTS AND FEE DEDICATIONS

All offers of dedication, grant deeds, and agreements to benefit the public shall be based on the standard forms available upon request from DPW. The content and form of all final offers, deeds and agreements shall be reviewed and approved by DPW, the City Attorney, and if required the Director of the Division of Real Estate and the Board of Supervisors prior to any City acceptance or recordation.

a) Private Easements between Private Parties

A Surveyor shall locate private easements on all record maps and identify them on the face of the map in a note describing the use of the easement and listing the easement recording information. Note that the map notation of the easement and the corresponding information in the title report should match.

b) Quasi Public Easements

A Surveyor shall locate private easements intended to benefit a public entity in their proprietary capacity on the face of all record maps and label them "Private Easement for Public Utilities" or as appropriate. These easements and agreements shall be in the form that the public entity, and if necessary, the City Attorney approves. The Subdivider shall submit a copy of the approved easement and if applicable, the approved easement agreement, with a Checkprint prior to recording the map. The Subdivider shall include a note describing the use of the easement and listing the easement's separate recording information on the face of the map. In the case of an

easement not separately recorded, then the Subdivider shall provide a copy of the public entity's official written interim acceptance of easement to DPW at the time of submittal of a Checkprint.

c) Public Easements

With prior approval and when permitted by the Director[7], the Subdivider shall irrevocably offer public Easements to the City on behalf of the public in perpetuity. The Subdivider shall offer such easements for dedication to the City, but the City will not accept such easement until City Engineer deems construction of associated improvements complete and the Board of Supervisors acts to accept the dedication. These easements shall be in the form acceptable to DPW and the City Attorney. The Subdivider shall submit a copy of the easement and easement agreement that the burdened property owner has executed with a Checkprint prior to recording the map. The Subdivider shall include a note making an irrevocable offer of the easement to the City, describing the use of the easement, and listing the easement recording information on the face of the map. Examples of some public easements are available from DPW upon request.

d) Public Dedications in Fee

The City generally requires dedications in fee for new public right-of-way associated with land development projects. Dedications in fee shall be irrevocably offered to the City. In addition, the Subdivider shall include an irrevocable offer of interim easement such that the City can complete the Subdivider's public improvement obligation in the event of default at any time prior to the City's final acceptance of the fee dedication. In most instances, after Board of Supervisors

[7] Subdivision Regulations Section Sec. V (A), note the City's policy to require fee dedications. See also Sec. E, Conditions of Approval.

approval and prior to recordation of the map, the Clerk of the Board of Supervisors shall accept the offer of easement if shown only on the map and reject the offer of fee dedication until the Subdivider completes the required public improvements. The Board of Supervisors shall accept the fee dedication (or easements that include an easement agreements) as part of subsequent legislation that will occur only after the City Engineer deems that the construction of associated improvements is complete, unless the Director determines that it is in the City's best interest to take this action earlier. All offers and dedications shall be in the form acceptable to DPW and the City Attorney and the Subdivider shall execute such offers and dedications prior to City approval. A copy of the approved offers and dedications shall be submitted with a Checkprint prior to recording the map. The Subdivider shall include a statement making the irrevocable offers of dedication to the City and describe the purposes of the dedications on the face of the map. Example documents of past dedications are available from DPW upon request.

8. EXEMPT CONVEYANCES

The Subdivision Map Act does not require that a parcel map or final map be filed for certain conveyances to or from a governmental agency, public entity, or public utility[8]. However, the Subdivision Map Act still applies to the division and it is the City and County Surveyor's longstanding policy to require that such conveyances be adequately memorialized. For each such exempt conveyance where parcel boundaries are newly created and not shown on any existing map of record, the authorized entity shall request a certificate of compliance from the City and County Surveyor for review and filing. Upon City and County Surveyor approval,

[8] SMA Sec. 66426.5 and Sec. 66428

which shall be issued on a case by case basis, the applicant shall prepare and simultaneously file a Record of Survey to memorialize the newly established boundaries and provide evidence of their physical locations.

APPENDIX C – TECHNICAL SPECIFICATIONS RELATED TO ENGINEERING DOCUMENTS FOR CANDLESTICK POINT/HUNTERS POINT SHIPYARD

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TECHNICAL SPECIFICATIONS RELATED TO ENGINEERING DOCUMENTS FOR CANDLESTICK POINT/HUNTERS POINT SHIPYARD PHASE II DEVELOPMENT

ATTACHMENT 1

REFERENCE DOCUMENTS SPECIFIC TO THE

CANDLESTICK POINT – HUNTERS POINT PHASE II

PROJECT

A. GENERAL

The Department of Public Works establishes these Subdivision Regulations pursuant to Section 1611 of the Subdivision Code of the City and County of San Francisco for Candlestick Point/Hunters Point Shipyard (the "Code"). The Board of Supervisors adopted this Code relative to the development of property in the Candlestick Point/Hunters Point Shipyard, which consists of: (i) the Phase II area of the Hunters Point Shipyard Redevelopment Plan Area; and (ii) Zone 1 of the Bayview Hunters Point Redevelopment Plan Area (together, the "Subdivision Area" for purposes of these Regulations). The Department intends these Regulations to supplement the Code, however there are several other documents that serve as reference documents for any subdivision work within the Hunters Point Shipyard and Candlestick Point area.

The Office of Community Investment and Infrastructure relies on the planning document for these two separate project areas (the Bayview Hunters Point Redevelopment Plan or the Hunters Point Shipyard Redevelopment Plan, as appropriate) depending upon the location of the proposed subdivision (each a "Plan" and, together, the "Plans").These Plans have related documents adopted as part of the Plans approvals, including the Candlestick Point Design for Development and Hunters Point Shipyard Design for Development (together, the

"D4Ds"), Infrastructure Plans and supporting Technical Memoranda, and the Candlestick Point/Hunters Point Shipyard Phase II Disposition and Development Agreement by and between the Redevelopment Agency of the City and County of San Francisco, a public body, corporate and politic, of the State of California and CP Development Co., LP, a Delaware limited partnership (the "DDA") and the exhibits thereto, the Interagency Cooperation Agreement (the "ICA"), and the Planning Cooperation Agreement (the "PCA").

The Technical Memoranda to the Infrastructure Plans includes utility master plans for the Sanitary Sewer System, Storm Drain System, Low Pressure Water System and Recycled Water System.

Other Documents that may be referenced in this Appendix "C" include: the Candlestick Point Streetscape Master Plan, the Hunters Point Shipyard Streetscape Master Plan, Major Phase Applications and Sub-Phase Applications.

For purposes of this Appendix, Developer and Subdivider have the same meaning.

B. ADDITIONAL SUBMITTAL REQUIREMENTS

In addition to the submittal requirements listed in the main body of the Subdivision Regulations, the Department shall require the Subdivider to submit specific interim submittals of information and reports.

1. The Department shall require the submittal of the following documents with each applicable Phase Application for review and approval:

a) An Overland Flow Study, which will serve as an update to the Storm Drain and Grading Master Plan. This Study shall show in further detail how the Developer proposes to convey the 100-year storm to the Bay and request any variances to City Standards that the Subdivider may need.

b) A Settlement Monitoring Plan, which establishes a framework for monitoring the settlement of City facilities during and after construction, along with critical timeframes and Developer obligations.

c) A Stormwater Control Plan that will establish how the Subdivider proposes to treat stormwater within the right-of-way and private property and detail how the project will comply with the PUC Stormwater Design Guidelines.

d) A Combined Sewer Flow Study that will show how a project intends to meet the City standard of no net increase of sewer flows to the existing Combined Sewer system. A Combined Sewer Flow Study that will establish any mitigation measures necessary, and detail any additional work that may be needed as part of the Sub-Phase or Major Phase.

e) A Geotechnical Report that covers, at a minimum, site subsurface soil conditions, estimated settlement, proposed pavement sections, remedial earthwork, compaction, soil corrosivity, utility trench over- excavation requirements, clay seals, soil bearing pressures and soils infiltration tests in the vicinity of any stormwater management facility that the Subdivider proposes to infiltrate.

C. MASTER SPECIFICATIONS AND DETAILS

Prior to, or concurrently with, the submittal of the first set of improvement plans within the Candlestick Point and Hunters Point Shipyard Phase II Project Area, the Developer shall submit a Candlestick Point and Hunters Point Phase II Master Specifications Set ("CP-HPSII Master Specifications") and a Candlestick Point and Hunters Point Phase II Master Details Set ("CP-HPSII Master Details") to the City for review and approval.

These documents shall establish the standard construction and maintenance specifications and construction details for all City facilities and structures within the Candlestick Point and Hunters Point Shipyard Phase II Project Area.

ATTACHMENT 2

DEFINITIONS

ATTACHMENT 3

GENERAL INFORMATION ON IMPROVEMENTS

A. DISTRICT-SCALE UTILITIES

Proposals to implement district-scale utilities shall be subject to PUC district-scale utility requirements at the time of submittal.

B. PHASING

OCII shall establish the phasing of development within the Subdivision Area through the Major Phase Approval and Sub-Phase Approval process set forth in the DDA. Within a Sub-Phase, where the orderly provision of services, the protection of existing infrastructure, or similar health safety or welfare considerations require that construction be phased in a certain manner, DPW shall require the Subdivider to reflect such phasing in the Public Improvement Agreements that the Subdivider and the City shall execute pursuant to Section 1651 of the Code.

C. WASTEWATER MAINS EXISTING CONDITIONS REPORT

Prior to geotechnical mitigation activities, the Subdivider shall provide an existing conditions report for the existing wastewater mains to remain, including adjacent existing wastewater systems constructed in previous phases. The report shall cover the area of the geotechnical mitigation activity and the area from the end of the geotechnical mitigation activity to the end of the next block. The Subdivider shall update the report at the end of the geotechnical mitigation activity and at the end of the construction.

The Subdivider shall be responsible for damage to the existing wastewater mains, including

adjacent wastewater mains constructed in previous phases, due to geotechnical mitigation activity and/or construction of the proposed improvements. The Subdivider shall make the repairs and shall be responsible for any permit violations due to the damage.

D. STREET IMPROVEMENT PLANS

Where the Subdivider will construct new streets within a subdivision for dedication to the City for public use, the Subdivider shall provide Improvement Plans in accordance with Article VI (Final Map). These Improvement Plans shall include the following:

Grading and street improvement plans, showing pavement design, proposed location of street lights, fire hydrants, traffic signals, and police and fire alarms, if any.

1. Contours shall be at intervals of five feet or less, depending on the topography. They shall be referenced to CP/HP Datum. The Subdivider shall show the City benchmarks used and elevations thereof.

2. On all streets within or adjacent to the subdivision, the Subdivider shall designate curb grades in the manner indicated on Bureau of Engineering drawing L-7215.2. The Subdivider shall show distances between such grade points and the rate of grade on curb lines. The Subdivider shall show the lengths of vertical curves in the same way.

3. The location, size, and rate of grade of all proposed sanitary sewers, storm drains or combined sewers, elevations at catch basins and the elevations of manhole inverts and rims of manhole covers in plan and profile views.

4. Location of catch basins and laterals.

5. Profiles of streets showing existing ground along both property lines and the center line (See drawing L- 7215.2). At the discretion of the Director, the profile may show

existing ground along the center line only. The horizontal scale of profiles shall be at least four times the vertical scale. The Subdivider shall plot the center line profile of a curved street in a continuous manner. Profiles shall show proposed grade line of curbs.

6. Typical cross-sections of each street, showing the width of the street, the width of official sidewalk area, width of concrete sidewalk that will be actually constructed and utilities to ensure that vertical separation requirements outlined in Attachment 16 have been met.

7. The Subdivider shall show the location of monuments on the plans. The Department of Public Works shall approve the number of monuments and their location.

E. STORM DRAIN, SANITARY SEWER AND COMBINED SEWER

Where new Storm Drain and Sanitary Sewer are proposed to be constructed, the Subdivider shall provide Improvement Plans in accordance with Article VI (Final Map) and shall show the proposed separate sanitary sewer, and new combined sewers and storm drains. The Subdivider shall submit such Improvement Plans with Final Maps and the Plans shall show the proposed system based on construction standards and design standards consistent with the Plans and Plan Documents as follows:

1. IMPROVEMENT PLANS AND SPECIFICATIONS

The Subdivider shall provide Improvement Plans and Improvement Specifications for sewer and stormwater work in accordance with Article VI (Final Map) and the Plans shall conform to the construction standards applying to work that the City performs and to the design standards described hereinafter consistent with the Plans and Plan Documents.

a) Improvement Plans.

The Subdivider shall submit Improvement Plans that delineate and label at least

the following improvements for both existing and future work:.

1. Abbreviations:

Abbreviations where used shall be as follows:

V.C.P. or VCP – Vitrified Clay Pipe

R.C.P. or RCP – Reinforced Concrete Pipe

C.I.P or CIP– Cast Iron Pipe

D.I.P. – Ductile Iron Pipe

C.M.P. or CMP – Corrugated Metal Pipe

M. H. or MH – Manhole

D.M.H. or DMH – Drop Manhole

C.B. or CB – Catch basin

O.G. – Official Grade (See drawing L-7215.2)

Inv. – Invert (Flow Line)

D.I. or DI – Drainage Inlet

HDPE – High Density Poly Ethylene

2. Drawings:

The Subdivider shall submit a general plan of the portion of the Project Area shown on the Tentative Map, or the area as shown on the Sub-Phase Final Map for larger phased projects, that shows the following:

i. Location, with reference to street lines of all existing and proposed manholes, catch basins, laterals, or other drainage appurtenances within the limits of the work.

ii. Approximate location of sewer laterals and storm laterals with reference to lot lines, and proposed sizes. With the approval of the Director and the consent of the PUC, the

Subdivider may defer –provision of this information c.

iii. Official or proposed street grades and anticipated settlement.

3. Profiles of all main sewers and storm drain lines shall be submitted showing:

i. Existing and proposed lines, with sizes noted thereon, together with manholes, and such structures as overflows and diversion weirs.

ii. Invert elevations of all existing and proposed lines at manholes and at grade changes.

iii. Rim elevations of all manholes.

iv. Pavement surface line or ground line on the centerline of lines.

v. Stationing along street centerline, including intersecting street lines.

4. Standard Plans:

Except as otherwise provided in the Plans or Plan Documents, the Subdivider shall construct all sewers, storm drains and appurtenances shall, to the extent consistent with Applicable City Regulations, in accordance with approved "Standard Sewer Plans," copies of which the Subdivider can obtain through application to the DPW Bureau of Engineering. Plan of special structures or systems not covered by any Standard Sewer Plans shall require the approval of the City Engineer with the consent of the PUC unless included in the Plans or Plan Documents.

5. Hydrology and Hydraulics Report:

A surface flow analysis for the overland flow and a hydraulic analysis of the 5-year storm drain pipe system.

b) Improvement Specifications:

The Subdivider shall describe in the improvement Specifications for the construction of sewer and storm drain systems, typed on 8 1/2" x 11" paper, or other mutually agreed upon format, all requirements as to material and workmanship. These requirements shall conform, to the extent consistent with the Subdivision Regulations, with the Candlestick Point and Hunters Point Phase II Master Specifications, or pertinent provisions thereof. For convenience, the Subdivider should reference any project specific Improvement Specifications against the Master Specifications as a base document, and show only variations from these Specifications.

c) Submittal:

The applicant shall deliver four sets each of the Improvement Plans and Improvement Specifications to the Director for review with the Final Map. The Director shall return one set of approved Improvement Plans and Improvement Specifications to the applicant.

d) Improvement Plans and Specifications Review, Approval, and Schedule:

Upon the DPW Director's approval, permitting of the infrastructure Improvement Plans, and written notice to the Subdivider that the infrastructure construction permit is ready to issue, the Subdivider shall have 12 months to obtain the infrastructure construction permit and shall have 24 months following issuance of the permit to commence construction. In the event the Subdivider does not achieve these

timeframes, the DPW and/or the PUC may require the Subdivider to resubmit the infrastructure Improvement Plans for review; provided, however, that the Successor Agency Director, in consultation with the DPW and PUC Directors, may extend each of the timeframes described in this paragraph by up to one year.

e) Expeditious Review:

DPW, PUC, and other City Agencies shall process, as expeditiously as reasonably feasible, the review and approval of the infrastructure Improvement Plans, Improvement Specifications, or any other submittals in support of an infrastructure construction permit or other permit applications.

2. FINAL ACCEPTANCE OF PUBLIC UTILITIES

The PUC shall not determine the completeness of or accept the public utility infrastructure that is under or within an uncompleted roadway. For the PUC to determine the completeness of or accept sewer or storm drain infrastructure and for the PUC to ensure regulatory and operational requirements are met, the sewer or storm drain infrastructure shall either have a downstream hydraulic connection to a permanent, completed, and accepted sewer or storm drain infrastructure or have a permanent connection to an existing PUC sewer or storm drain infrastructure. Neither the PUC or any other affected City Agency shall accept temporary infrastructure.

If the Subdivider intends the potable water, non-potable water, sewer, or storm drain infrastructure to operate with adjacent infrastructure (for example, pump stations or

Stormwater Management Controls), the Subdivider shall construct all components of the system prior to the City's acceptance of any piece of the infrastructure unless the Director with the consent of the PUC approves, on a case-by-case basis, an alternate arrangement.

The City's final acceptance of utility infrastructure intended for public use shall be contingent on testing that the Subdivider provides and the City witnesses. The Subdivider shall provide testing at no additional cost to the City.

3. PUBLIC UTILITY EASEMENTS

All easements that the Subdivider grants to the City for PUC utilities, including but not limited to sewer, storm drain, low pressure water, recycled water, Auxiliary Water Supply System (AWSS), municipal power and streetlighting, shall require Director, PUC, and Board of Supervisors approval on a case-by-case basis. If the Director, in consultation with the PUC, agrees to an easement in lieu of fee title, the Director with the consent of the PUC shall review and approve on a case-by-case basis any sewer, storm drain, low pressure water, recycled water, AWSS, municipal power or streetlighting easements. Where the City agrees to accept utility easements for sewer, storm drain, low pressure water, recycled water, AWSS, municipal power or streetlighting facilities, the Subdivider shall grant these easement to the City and the easements shall be for the exclusive use of the sewer, storm drain low pressure water, recycled water, AWSS, municipal power or streetlighting facilities.

Unless the Director with the consent of the PUC approves otherwise and on a case-by-case basis, all utility easements for low pressure water, Auxiliary Water Supply System

(AWSS), recycled water, sewers and drainage shall be a minimum of twenty-five (25') feet in width. SFPUC power facility easements shall extend a minimum of five (5) feet beyond the outermost edge of the conduit or conduits. This is the sole exception to the 25-foot width requirement. The maximum invert elevation (depth) of the bottom conduit shall be five (5) feet. The Subdivider shall design easement surface improvements for H-20 traffic loading to accommodate maintenance vehicles.

Easement Agreements shall follow the City's standard form which provides, in part, that the easement area shall not be used for the erection of any structure, nor for any other purpose that may damage or interfere with the proper use, function, maintenance, repair, or replacement of the utility facilities.

The Subdivider may construct and maintain fences on the easement area, but the City reserves the right of immediate access without any requirement for notification, clearance, or permission. The design, location and construction methods for fences that the Subdivider locates on or over PUC facilities shall require Director and PUC review and approval.

The Subdivider may plant low shrubs in the easement, provided that their roots or underground growth shall not damage the sewer, storm drain, low pressure water, recycled water, AWSS, municipal power or streetlighting facilities. Trees, tall plants or plants with invasive roots shall be prohibited in the easement area.

The Director shall require that the Subdivider install DPW standard paving above public utility facilities, but may approve with the consent of the PUC non-standard paving on a case-by-case basis.

The City shall not be liable for any damage to the plants or fences in the easement or restriction of access to the easement which may occur as a result of activity pursuant to the purpose of the easement. Further, the City may remove any improvements that may damage public facilities without any liability or obligations to replace the same. The City shall be obligated to restore only to base conditions of paved and unpaved easements. Base condition of paved easements is defined to be 3" thick asphalt concrete over 8" thick Portland cement concrete. Base condition of unpaved easements is defined to be native backfill.

For sewer or storm drain mains in easements, private property owners shall be responsible for maintaining and repairing the sewer service lateral from the property line to the point of connection with the utility main and for the water service lateral from the house pipe to the water meter.

F. AS-BUILTS

The City requires that the Contractor and Construction Manager sign and certify as-builts . The Contractor and/or Construction Manager shall provide scanned copies of the original redlines to the City.

G. RECORD DRAWINGS

Upon completion of improvements shown on a set of Improvement Plans, the Subdivider shall update the Improvement Plans with changes made during construction and provide the City with electronic files of the final record drawings and any reports that the Improvement Plans, Standard Plans, or Standard Specifications require . The record drawings shall be a separate document and shall not contain references to construction submittals, instructional bulletins, or

requests for information. The electronic files shall be in AutoCAD (.dwg), ESRI (.shp, personal or file geodatabase) and/or PDF format or some other form acceptable to the City and the Subdivider shall deliver these to the City for a permanent record. Pipe attributes shall include material, type and diameter information from DPW look up tables as Object Data or .shp or geodatabase as applicable. Node attributes shall include Rim, Invert, Node Type from DPW look up tables as Object Data or .shp or geodatabase as applicable. Structures shall include Type attribute (ie; Diversion, Junction, Weir, Pump Station, etc.) from DPW look-up table as Object Data or .shp or Geodatabase as applicable.

H. SEWER SURVEY MONITORING PROGRAM

The Developer shall be responsible for implementation of a survey program to monitor performance of sewer utilities within and adjacent to the geotechnical stabilization activities to ensure that the stabilization does not negatively impact newly constructed infrastructure or existing infrastructure to remain.

1. New Sewers:

For newly constructed sewers, a professionally licensed surveyor shall perform the survey program . Each survey shall consist of Baseline survey monitoring with elevation, immediately after construction and verified with construction documents. The surveyor and the City shall determine and agree upon the survey monument locations prior to setting them. The surveyor shall tie each survey to at least one existing City Survey Monument outside of the development area. It is strongly recommended that the surveyor check into at least one other City Survey Monument and verify accuracy requirements. Prior to construction, the surveyor and the City shall determine and agree upon the period between monitoring

observations. The Developer shall mitigate any movement beyond predicted settlement indicated in final geotechnical report at no additional cost to the City. The City prohibits any other deviation.

2. Existing Sewers:

For existing sewers, including sewers that the developer constructed in previous phases of development and existing sewers to remain, a professional licensed surveyor shall perform all surveys. Each survey shall consist of a Baseline survey monitoring with checks on both elevation and horizontal alignment, immediately before adjacent construction, including initiation of the surcharging program adjacent to a sewer. The surveyor and the City shall determine and agree upon the survey monument locations prior to setting them. The surveyor shall tie each survey to at least one existing City Survey Monument outside of the development area. It is strongly recommended that the surveyor check into at least one other City Survey Monument and verify accuracy requirements. Prior to construction, the surveyor and the City shall determine and agree upon the period between monitoring observations. At any time if existing sewers are determined to have moved in any direction due to construction activities, the Developer shall submit a condition assessment of the utility per PUC requirements. The PUC shall review the condition assessment and determine the mitigations that it requires to repair any damage. The developer shall be responsible for mitigation at no additional cost to the City.

ATTACHMENT 4

SEA LEVEL RISE (SLR)

A. GENERAL

The development area has three major areas that SLR impacts as follows:

- Shoreline – Consists of the land or marine structures at the parks and open space edge along San Francisco Bay.
- Parks and Open Space – Consists of the public land located between the shoreline and the edge of the development area.
- Development Area Perimeter – Consists of the development area closest to the shoreline that will have structures and facilities that the Subdivider will elevate above the adopted SLR elevation values.

The 100-year return period water elevation is the water elevation that is exceeded on average once every 100 years. Stated another way, the 100-year return period water elevation is the water elevation with a 1% annual chance of occurrence. The 100-year return period water elevation is different for the open space/development area and for the shoreline areas.

The 100-year return period water elevation for the design of the open space and development area (Base Flood Elevation or 100-year high tide) is 98.2 feet, CP/HP datum. The 100-year return period water elevation for the open space and development area includes the effects of tides, storm surges, and tsunamis.

The 100-year return period water elevation for the design of the shoreline varies by wave exposure. The 100-year return period water elevation for the shoreline includes the effects of tides, storm surges, tsunamis, and wind-driven waves.

The sea level rise design criteria for the three major zones are shown in Table X.1.

TABLE X.1

SEA LEVEL RISE DESIGN CRITERIA

AREA	MINIMUM DESIGN CRITERIA
Shoreline	The minimum shoreline elevation shall accommodate 16 inches of SLR above the 1% annual chance of occurrence water elevation with minimal overtopping.
Parks and Open Space Adjacent to the Shoreline	Provide a minimum parks and open space elevation of 98.2 feet (100-year high tide elevation) while allowing ponding during combined large rain and high tide events.
Development Area Perimeter – Streets	The street elevation shall accommodate 2 feet of freeboard between the 5-year storm drain system hydraulic grade line and the street gutter flow line. The starting hydraulic grade line design elevation for the storm drain system shall be 100.2 feet (98.2 feet 100-year high tide + 24 inches of SLR).
Development Area Perimeter – Structures	Provide a minimum finished floor elevation of 101.7 feet (98.2 feet 100-year high tide elevation + 36 inches of SLR + 6 inches of freeboard) for occupied facilities.
Development Area Perimeter – Separated Storm Drain System 5-Year Storm Event	The starting hydraulic grade line design elevation for the storm drain system shall be 100.2 feet (98.2 feet 100-year high tide + 24 inches of SLR). Provide a minimum 2 feet of freeboard between the storm drain system hydraulic grade line and the street gutter flow line.

TABLE X.1 (continued)

AREA	MINIMUM DESIGN CRITERIA
Development Area Perimeter – Separated Storm Drain System 5- to 100- Year Storm Event	Provide a starting hydraulic grade line design elevation for the overland flow of 100.2 feet (98.2 feet 100-year high tide elevation + 24 inches of SLR). Subdivider shall not convey overland flow in easements across private property. Subdivider may convey overland flow in easements across public property. Subdivider shall convey overland flow either within the City right-of-way, between the face of curb to face of curb, or within public property in channels. Subdivider shall contain overland flow within the City right-of-way between the face of curb to face of curb with no freeboard unless the Director with the consent of the PUC approves otherwise on a case-by-case basis. The City shall allow curb overtopping for the overland flow at the edge of the Project to flow into San Francisco Bay. When the overland flow overtops the curb at the edge of the Project and flows into San Francisco Bay, the overland flow water level shall be below the top of curb on the side of the street adjacent to structures such as buildings. Overland flow within channels shall have 1 foot of freeboard measured from the highest point between the channel and the edge of easement except where the depth of flow is less than 1 foot. For cases where the depth of flow is less than 1 foot, the freeboard shall be equal to the depth of flow.

B. ADAPTIVE MANAGEMENT PLAN (AMP)

Subdivider shall establish a special assessment district (District) as referenced in the Mitigation Measures. This District shall be responsible for developing a detailed Monitoring and Adaptive Management Plan (Plan) within 5 years of the establishment of the District. The City Agencies

shall review and approve Plan and updates to the Plan. The Plan shall include the following, but is not limited to:

- Clearly defined roles and responsibilities,
- A decision making framework,
- A projected spending plan for the planning, design, construction, implementation and maintenance of all adaptive management strategies.
- Detailed strategies to address 16", 24" and 36" of SLR.
- Detailed strategies to ensure SLR design criteria as outlined in Table X.1 are met.

Subdivider shall compile updates to the Plan in a monitoring report (Report) that that Subdivider prepares at least once every five years or more frequently if new regulations require this or an increase in public health hazards or safety associated with flooding. The Report shall include, but is not limited to:

- Publication and analysis of SLR and local rainfall data.
- Determination of accepted SLR that has occurred and establishment of updated baseline data and criteria for ongoing analysis and planning.
- Changes and anticipated changes in Local, State or Federal regulations related to SLR and climate change and a discussion of how the Project complies with or will comply with any applicable new regulatory requirements as needed.
- A report of the funds that the special assessment district collects and expends for implementation of the adaptive management strategy.

- A summary of flooding issues that occur on a regular basis and the associated risk and potential impacts.
    - A description of any necessary changes to the Adaptive Management Strategy as outlined in the Plan that are necessary as a result of the new SLR and climate change information analyzed above.

When data that the Subdivider collects in the Report shows that SLR has exceeded or is projected to exceed the limits designed for in the initial improvements within the next 5 years or if flooding issues are documented to occur on a regular basis or impact public health and safety, the Subdivider shall update the Plan and activate the adaptive management strategies, including the development of work plans and schedules, and the determination of the process to implement the necessary improvements.

ATTACHMENT 5

RECOMMENDED DESIGN OF STREETS, BLOCKS, AND LOTS

The Infrastructure Plans for Candlestick Point Development and Hunters Point Shipyard Phase 2 Development and the corresponding Designs for Development approve the general layout and design of streets, blocks, and lots in the CP/HP Project Area. All subsequent Tentative and Final Maps shall substantially conform thereto except in instances where the Director determines that circumstances warrant approval of design modifications pursuant to the standards set forth in the aforementioned documents and these Regulations.

DPW incorporates by reference Administrative Code Chapter 98 and the concepts of the Better Streets Plan into these Subdivision Regulations. DPW also recognizes the City's General Plan, Transportation Element, Urban Design Element, various Neighborhood Plans, and Neighborhood Streetscape Plans as additional objectives and policies that will guide development and assist City agencies when reviewing and approving street designs so that streets are safe and compatible for all users and modes of travel in specific areas of the City.

DPW may consider modifying these standards on a case-by-case basis if the Subdivider or sponsoring City Agency presents adequate technical information that supports issuance of an exception or design modification.

A Design Modification shall refer to the process under which the Director of DPW in consultation with any affected City agencies may review a proposed alternative design, and for

good cause and as consistent with customary engineering practices, approve such alternative design.

A. PUBLIC STREETS

The following shall be the design criteria governing the layout and grades of City streets. In addition to DPW approval, streets dedicated to the public shall require Board of Supervisors approval for final City acceptance.

1. LAYOUT

a) Streets shall have a width generally as shown in the Infrastructure Plan and on a Tentative Map that the Director approves.

b) Streets shall not have an unobstructed paved width of less than 20 feet or a total right-of-way width of less than 40 feet. And, streets shall have a vertical clearance of at least 13.5 feet. Subdivider shall design streets to balance the width of travel lanes and parking lanes within a proposed street cross section with the needs of cyclists and pedestrians, and to accommodate emergency vehicles and fire apparatus access. Maneuvering room for fire apparatus vehicles at street intersections and along streets may require widening the unobstructed width of a street, or the removal of parking from certain building frontages, or the use of bicycle lanes, or the use of temporary parking and unloading zones, or some combination thereof. The Department of Building Inspection may not issue building permits if the Subdivider or Developer has not provided emergency access that meets the approval of the San Francisco Fire Department (SFFD).

c) All dead-end streets in excess of 150 feet, as measured from the throat of the intersection, shall provide a turnaround sufficient to accommodate fire apparatus vehicles.

d) Intersecting streets shall be as shown in the Infrastructure Plan and, when approved, on the Tentative Map in accordance therewith.

e) All streets shall, as far as practicable, align with existing streets. The Subdivider shall justify any modification thereto relying on environmental and design objectives. The City Engineer shall approve any such modification on a case-by-case basis.

f) Subdivider shall round street curb intersections by a curve with a radius large enough to accommodate the turning movements of vehicular traffic, including fire apparatus vehicles.

g) Streets of a proposed subdivision that are in alignment with an existing street shall bear the names of the existing streets.

h) Subdivider shall provide curb ramps at each curb return where there is a continuation of a pedestrian path of travel. Subdivider shall construct curb ramps in accordance to the Standard Plans, the Standard Specifications, and DPW Order Number 175,387.

i) Subdivider shall provide sidewalks on both sides of all streets except those streets shown in the Infrastructure Plan having sidewalks on one side only. Sidewalks shall have a width generally as shown in the Infrastructure Plan and in accordance with any Tentative Map the Director approves. In no case shall the clear width of a sidewalk be less than (4) feet.

j) Subdivider shall provide curb and gutters on both sides of all streets.

k) Subdivider may provide medians as shown in the Infrastructure Plan and in accordance with any Tentative Map the Director approves. Subdivider shall provide fire breaks in all medians to the satisfaction of the SFFD.

l) All street layouts and sections, including but not limited to the clear width, curb return radii and any traffic calming structures, shall meet fire vehicle access standards.

2. GRADING

a) Subdivider shall grade street intersections to be an approximate 2% max platform unless the City Engineer approves otherwise on a case-by-case basis. The platform shall extend beyond each crosswalk. This applies to all pedestrian way intersections including private streets, alleys, shared public ways, and Mid- Block Breaks, etc.

b) Crosswalks shall be in accordance with the Americans with Disabilities Act and the accessibility provisions of the California Building Code and the San Francisco Building Code unless the City Engineer approves otherwise on a case-by-case basis.

c) The Department prohibits street grades in excess of seventeen percent (17%) except under unusual conditions. , The City Engineer may approve modifications to this standard on a case-by-case basis.

d) Flow line slope shall be a minimum of 0.5%.

e) The Subdivider shall connect all changes in street grades in which the absolute value of the algebraic difference in grades exceeds 1.5% by vertical curves of approved length sufficient to provide safe stopping sight distances and good riding quality.

Subdivider shall design vertical curves based on the Caltrans Highway Design Manual. Where a street is an arterial that the City considers to be part of the Federal Highway System the Subdivider shall base the design of the street on "A Policy on Geometric Design of Highways and Streets" published by the American Association of State and Highway Transportation Officials (AASHTO). Where site layout conditions prevent the application of vertical curve design criteria, Subdivider shall apply a maximum practical vertical curve length subject to the City Engineer's approval on a case-by-case basis.

f) All changes in street grades shall have an absolute value of the algebraic difference in grades which does not exceed fifteen percent (15%), regardless of any vertical curves. The City Engineer with the consent of the SFFD shall approve of any design modification to this standard on a case-by-case basis.

g) The street cross slopes shall be 2% minimum and 5% maximum except at transit stops, accessible parking spaces, and accessible passenger loading zones.

h) The City Engineer shall approve on a case-by-case basis any street slopes exceeding 2% in any direction at transit stops, accessible parking spaces, and accessible passenger loading zones. The minimum street centerline longitudinal slope shall be 0.1% to facilitate overland flow of stormwater during the 100-year storm.

i) Street centerlines with a longitudinal slope greater than 0.5% shall be straight graded to provide a continuous downhill path.

j) Subdivider shall grade street centerlines with a longitudinal slope less than 0.5% to have one or more intermediate flow line low points to provide a minimum flow line grade of 0.5%. Streets with intermediate flow line low points shall have either:

(1) A continuous street centerline longitudinal slope with varying street cross slopes between 2% and 5% and variable curb heights between 6-inches and 8-inches (except at curb returns, crosswalks, accessible parking spaces, and accessible passenger loading zones) to achieve a flow line with a 0.5% minimum longitudinal slope. The low point of the flow line coincides with the steepest street cross slope and 8-inch curb.

At curb returns, crosswalks, accessible parking spaces, and accessible passenger loading zones the curb shall be a maximum height of 7 inches.

(2) A street centerline longitudinal slope that follows the flow line slope.

Subdivider shall place low points in between the high points such that the downstream flow line high point elevation is equal to or lower than the upstream flow line low point top of curb elevation.

Street centerlines with intermediate low points that follow the flow line slope shall provide overland flow paths for stormwater by decreasing the elevation of the high points, from the upstream intersection to the downstream intersection, at a minimum continuous slope of 0.1%.

3. DRAINAGE

a) Subdivider shall design street right-of-ways and drainage channel cross- sections to provide a transport channel for overland or surface flow. Subdivider's design shall carry flow in excess of the 5 year storm up to and including the 100-year storm in pipes, channels and/or the street right-of-way, between the face of curb to face of curb with no

freeboard. The City Engineer with the consent of the PUC may approve an exception to this standard on a case-by-case basis. The City allows curb overtopping for the overland flow at the edge of project to flow into San Francisco Bay, subject to the approval of all appropriate regulatory agencies. When the overland flow at the edge of project overtops the curb and flows into San Francisco Bay, the overland flow water level shall be below the top of curb on the side of the street adjacent to structures such as buildings.

b) If the City Engineer, with the consent of the PUC, approves on a case-by-case basis, Subdivider may convey 100-year storm overland flow in easements across public property. In no case shall Subdivider convey overland flow across private property. Subdivider shall convey overland flow either within the City right-of-way, between the face of curb to face of curb, or within public property in channels. Overland flow through public property shall require approval of the public agency responsible for the property.

B. SIDEWALKS

1) Sidewalks shall be per City standard plans and specifications and as shown in the Infrastructure Plan. Sidewalk design shall be in substantial conformance with the applicable Streetscape Master Plan, as approved by the City.

2) Sidewalks shall be accessible in accordance with the Americans with Disabilities Act and the accessibility provisions of the California Building Code, San Francisco Building Code, and the San Francisco Public Works Code except for sidewalks with longitudinal slopes steeper than 5%.

The City Engineer may approve on a case-by-case basis sidewalks with longitudinal slopes steeper than 5% .

Sidewalks shall have a cross slope of 1.67% unless otherwise specified and 2% maximum unless the City Engineer approves an alternate design on a case-by-case basis.

3) The City Engineer shall approve landscaping, sidewalk furniture, and other features within the sidewalk that are in substantial conformance with the applicable Streetscape Master Plan, as approved by the City.

4) Pedestrian throughway surfaces shall conform to all applicable federal, state, and local laws including, but not limited to, accessibility codes and regulations, the American with Disabilities Act and the accessibility provisions of the California Building Code and the San Francisco Building Code.

C. BLOCKS

1) Blocks shall have approximate lengths as shown in the Infrastructure Plan and Design for Development Plan, and any Tentative Map that the Director approves.

2) Subdivider shall shown mid-block Public Alleys and mid-block Private Alleys, if any, in accordance with the Infrastructure Plan and Design for Development.

3) The Assessor's Office shall approve Block numbers.

D. LOTS

1) Lots shall have approximate dimensions as shown in the Infrastructure Plan and Design for Development Plan, and any Tentative Map the Director approves.

2) The side lines of all lots shall be at right angles, or radial to the street line, insofar as practicable.

3) Setback lines shall be consistent with the provisions of the Design for Development Plan. Note, the Assessor's Office shall review and approve lot numbers.

E. STREET IMPROVEMENT REQUIRED

The Subdivider shall improve, or agree to improve, all streets, highways, or public ways which are part of the Subdivision. Such improvement shall include the necessary paving, curbs, sidewalks, curb ramps, catch basins, manholes, combined sewers, cisterns, sewer laterals, storm drain laterals, catch basin laterals, separated storm drains, separated sanitary sewers, stormwater management systems, and various utilities such as gas, electric, telephone, potable and non-potable water distribution system, fire protection, fire and police alarm, lighting, and other improvements as necessary.

All street improvements shall be in accordance with an approved Infrastructure Plan and the approved Utility Master Plans.

The Fire Department, PUC, DPW and the Department of Technology shall approve all water supplies for fire protection and all fire call-box facilities.

The PUC Bureau of Light, Heat and Power shall approve all street lighting facilities.

All potable water supply mains shall be in accordance with rules and regulations of the San Francisco Public Utilities Commission and the San Francisco Water Department.

All non-potable water supply mains shall be in accordance with the rules and regulations of the San Francisco Public Utilities Commission and the San Francisco Water Department.

F. RECOMMENDED DESIGN OF PAVEMENTS

1. PAVEMENT

Pavements shall be of the types and design specified in the City Standard Plans and Standard Specifications or in any approved CP-HPSII Master Specifications or CP-HPSII Master Details.

Pavement surfaces in crosswalks, accessible parking spaces, and accessible passenger loading zones shall conform to all applicable federal, state, and local laws including, but not limited to,

accessibility codes and regulations, the American with Disabilities Act and the accessibility provisions of the California Building Code and the San Francisco Building Code.

2. MODULAR PAVERS

The City Engineer may approve on a case-by-case basis all modular pavers in crosswalks, accessible parking spaces, and accessible passenger loading zones. These pavers shall substantially conform with the applicable Streetscape Master Plan, that the City approves. City Engineer approval of modular paver materials shall not constitute DPW agreement to maintain any modular pavers in the right-of-way.

Modular paver surfaces in crosswalks, accessible parking spaces, and accessible passenger loading zones shall conform to all applicable federal, state, and local laws including, but not limited to, accessibility codes and regulations, the American with Disabilities Act and the accessibility provisions of the California Building Code and the San Francisco Building Code.

G. CURBS AND GUTTERS

Concrete curbs or equivalent shall be provided adjacent to all pavements per the City Standard Plans and Specs. In no case shall curb heights be less than 4 inches. At curb returns, crosswalks, accessible parking spaces, and accessible passenger loading zones the curb shall be a maximum height of 7 inches. Curb heights shall meet the 100-year storm overland flow requirements. The City Engineer with the consent of the PUC may grant exceptions to the curb height on a case-by-case basis..

Subdivider shall provide concrete gutters on any flow line grade less than 1.0% and at all curb ramps per the City Standard Plans.

The concrete gutter width shall be 1-foot. The concrete gutter width in front of curb ramps shall be per the Standard Plans.

Subdivider shall construct concrete curbs and gutters in accordance to the City Standard Plans and Standard Specifications.

ATTACHMENT 6

EXISTING COMBINED SEWERS AND PROPOSED UTILITIES THAT CONNECT TO THE EXISTING COMBINED SEWERS

A. GENERAL

The following section establishes the design standards only for secondary combined sewer appurtenances, including but not limited to, laterals, manholes and catch basins which need to be replaced, relocated or added to an existing combined sewer main within the Project Area. The design of new combined sewer mains (including any associated appurtenances) within the Project Area or as part of any required off-site work shall be subject to citywide combined sewer design standards, including but not limited to, the latest version of City Subdivision Regulations, as they may be amended from time to time, and the PUC wastewater and stormwater utility Standards.

B. MAINTAINING CAPACITY OF THE EXISTING COMBINED SEWER SYSTEM

1. DESIGN BASIS

The Project shall not increase total flows to the existing combined sewer from pre-development conditions. The PUC shall review and approve all proposed new or changed connections to the existing combined sewer. The Subdivider shall submit calculations and modeling as necessary to prove that each sub-phase of the Project is not increasing flows to the existing combined sewer.

The City's preferred means for collecting and conveying sewage and stormwater from each lot or parcel of land shall be by separated sanitary sewers and separated storm drains.

2. EXISTING COMBINED SEWER MAIN

a) Location: Subdivider shall design the proposed public right-of-way to accommodate the existing combined sewer mains and structure appurtenances, or the existing combined sewer mains and shall relocate structure appurtenances so that the excavation and repair of mains and structure appurtenances will not encroach on private property without dedicated easements. Any exception to this requirement shall require the PUC's explicit consent and authorization.

b. Separation – See UTILITY, SURFACE IMPROVEMENTS, AND BMP SEPARATION section for the approximate location and separation of the existing combined sewer to the other utilities and improvements.

(1) Depth and Cover – The minimum depth of cover for existing combined sewers is six (6) feet, except that the City Engineer with the consent of the PUC may approve a modification to this standard on a case-by-case basis.

C. PROPOSED COMBINED SEWER SYSTEM UTILITIES THAT CONNECTS TO THE EXISTING COMBINED SEWER MAIN

1. HYDRAULIC CONSIDERATIONS OF GRAVITY UTILITY CONNECTIONS TO EXISTING COMBINED SEWERS

Subdivider should refer to the separated storm drain system in the SEA LEVEL RISE section for the starting hydraulic grade line to use for analysis related to the existing combined sewer design.

Subdivider shall base freeboard requirements between the hydraulic grade line of gravity utility mains connected directly to the existing combined sewer main and the street gutter flow line on the 100-year storm event.

Freeboard shall be a minimum of 2 feet between the hydraulic grade line of gravity utility mains connected directly to the existing combined sewer main and the street gutter flow line. Freeboard less than 2 feet between the hydraulic grade line of gravity utility mains connected directly to the existing combined sewer main and the street gutter flow line shall occur only in the combined sewer area where any overland flow from potential surcharges above the finished grade will reach a combine sewer catch basin and re-enter the combined sewer system.

a) MANHOLES AND MANHOLE COVERS

Subdivider shall locate manholes preferably at intervals of three hundred (300) feet but not more than three hundred fifty (350) feet. Subdivider shall provide manholes at every change in pipe size, grade, material, shape, or alignment, at all junctions of sewers, at ends of sewers, where catch basin laterals join sewers, and

at connections of proposed separated sanitary sewer and storm drain connections to the existing combined sewer.

Unless the City Engineer with the consent of the PUC approves otherwise on a case-by-case basis, Subdivider shall located manholes outside of all crosswalks. and a minimum of one (1) foot beyond the outside edge of crosswalk striping. Subdivider shall construct manholes in accordance with the Standard Plans unless the City Engineer with the consent of the PUC approves otherwise on a case-by-case basis.

Subdivider may use non-standard finish to manhole covers if the City Engineer with the consent of the PUC approves otherwise on a case-by-case basis.

b) CATCH BASIN LATERALS

Catch basin laterals shall be 10-inch inside diameter HDPE SDR 17 pipe conforming to ASTM D3035. When Subdivider joins sections of pipe, Subdivider shall immediately remove the bead formed on the interior of the pipe per the Manufacturer's recommendation .

Subdivider shall make connections to combined sewer mains at manholes and in accordance with the Standard Plans.

Subdivider shall cast-in catch basin lateral connections to new manholes with the construction of new manholes.

Catch basin lateral connections to existing manholes shall connect to the existing manhole using Tap-Tite or equal subject to approval, on a case-by-case basis, of the City Engineer with the consent of the PUC.

Unless the City Engineer with the consent of the PUC approves otherwise on a case-by-case basis, Subdivider generally shall lay all laterals with a depth of cover of approximately two (2) feet below pavement grade at the catch basin, with a fall towards the manhole or sewer main of approximately 12 inches, but in no case at a grade of less than two percent (2%).

c) CATCH BASINS AND CATCH BASIN GRATES

Subdivider shall locate catch basins in the gutter to most effectively serve the adjacent drainage areas. Subdivider shall not locate catch basins shall within crosswalks or in the curb return area. Subdivider shall place catch basins 12" minimum away from the footprint of curb ramps,

including flares, and curb returns. Subdivider typically shall locate catch basins outside the crosswalk, on the far side of the curb return from the intersection.

Subdivider shall provide catch basins at all low points and shall not space such catch basins more than six hundred (600) feet apart. The City Engineer or PUC may require closer spacing and additional catch basins to effectively drain the pavement. The City Engineer with the consent of the PUC shall decide where to require the installation of multiple inlets.

Subdivider shall construct catch basins in accordance with the Standard Plans and Standard Specifications.

Grates for catch basins flowing to the combined sewer shall be in accordance with Standard Plan 87,193 and the Standard Specifications.

2. UTILITY SERVICE LATERALS OF PROPOSED UTILITY MAINS CONNECTING TO THE EXISTING COMBINED SEWER MAINS

a) Connection – Combined sewers are designed to flow under surcharged conditions, and in the event of extreme storms, the surcharge may rise to the street for overland flow transport. Upstream separated sanitary sewer mains or upstream storm drain mains flowing to surcharged combined sewer mains also may surcharge.

In order to prevent backflow into improvements below street grade from service laterals connected to separated sanitary sewer mains that are connected to downstream combined sewer mains, Subdivider shall not make gravity sewer connections from basements to separated sanitary sewer mains that are connected to downstream combined sewer mains without backflow provisions.

In order to prevent backflow into improvements below street grade from service laterals connected to storm drain mains that are connected to downstream combined sewer mains, Subdivider shall not make gravity storm drain connections from sites lower than street grade to storm drain mains that are connected to downstream combined sewer mains without backflow provisions.

b) Backflow Preventers – Subdivider shall install backflow preventers for all properties below street grade and on all private property. Property owner(s) shall privately own and maintain these backflow preventers.

ATTACHMENT 7

I. SEPARATED GRAVITY SANITARY SEWER

A. REQUIRED CAPACITY OF SEPARATED GRAVITY SANITARY SEWER SYSTEM

1. DESIGN BASIS

Subdivider shall base sewer demand on 95% of the indoor low pressure water demand and 100% of the indoor recycled water demands of the Subdivision Area.

2. MINIMUM PIPE SIZE

Sanitary sewer mains shall be 8" inside diameter minimum unless the City Engineer with the consent of the PUC approves otherwise on a case-by-case basis.

3. VELOCITY

Subdivider shall design separated sanitary sewers for a minimum velocity of two (2) feet per second under Average Dry Weather Flow conditions. The City Engineer with the consent of the PUC may approve an exception, on a case-by-case basis, for any minimum velocity less than two (2) feet per second under Average Dry Weather Flow conditions.

Subdivider shall design separated sanitary sewers for a maximum velocity of ten (10) feet per second under Peak Wet Weather Flow conditions. The City Engineer with the consent of the PUC may approve an exception, on a case-by-case basis, for any maximum velocity greater than ten (10) feet per second under Peak Wet Weather Flow conditions.

4. PIPE ROUGHNESS COEFFICIENT

The pipe roughness coefficient “n” for HDPE pipe shall be 0.010.

5. PEAKING FACTOR

Peak Dry Weather Flow = 1.75 x Average Dry Weather Flow

Peak Wet Weather Flow = Peak Dry Weather Flow + Inflow/Infiltration

6. PIPE FLOW DEPTH

Subdivider shall set sanitary sewer pipe capacity by the proportional depth of flow, *d/D*. *d/D* is defined to be the ratio of the depth of flow (*d*) to the pipe inside diameter (*D*).

The maximum sanitary sewer pipe proportional depth of flow, *d/D,* at Average Dry Weather Flow shall be 0.50.

The maximum sanitary sewer pipe proportional depth of flow, *d/D,* at Peak Wet Weather Flow shall be 0.80.

B. RECOMMENDED STANDARDS OF DESIGN FOR SEPARATED GRAVITY SANITARY SEWER SYSTEM

1. GENERAL

Subdivider shall make provision for the removal of sewage from each lot or parcel of land.

2. SEPARATED SANITARY SEWER MAIN

a) Location

Subdivider shall located separated sanitary sewer mains and structure appurtenances either within the public right-of-way or within a dedicated

easement accessible to City personnel and equipment for maintenance, repair, and servicing. Subdivider shall locate separated sanitary sewer mains and structure appurtenances so that the excavation and repair of mains or structure appurtenances shall not encroach on private property without dedicated easements. Where public facilities have been shown within Mid-Block Breaks or across park property in approved Master Utility Plans and the City Engineer and PUC have determined allow such facilities within dedicated easements in lieu of fee dedication, the PUC shall be under no obligation to repair, maintain, or replace materials or improvements within such easements beyond generally applicable PUC standards and materials specifications. In other instances where the Subdivider proposes an easement to accommodate public facilities in lieu of fee dedication, the City Engineer with the consent of the PUC may approve such easement on a case-by-case basis. The City Engineer with the consent of the PUC shall review and approve any such easement.

Subdivider shall locate separated sanitary sewer mains as close as possible to the center of streets and alleys to adequately serve both sides of the right-of-way, except where separated storm drain mains are located near the center of the improvements or where physical constraints dictate, and meet utility pipe and structure appurtenance separation requirements. The City Engineer with the consent of the PUC may approve an alternate design on a case-by-case basis.

Where the Subdivider locates separated storm drain mains near the center of the improvements, the Subdivider shall locate separated sanitary sewer main as close as practical to the separated storm drain main. The PUC prefer, where possible, to have the Subdivider locate the separated sanitary sewer main as close to the center of lanes nearest the center of streets and alleys as possible with consideration of the placement of other utility pipes and structure appurtenances.

b) Separation

See Appendix C, Attachment 16 – "UTILITY, SURFACE IMPROVEMENTS, AND BMP SEPARATION" for the approximate location and separation requirements of the separated sanitary sewer to the other utilities and improvements.

c) Depth and Cover

The minimum depth of cover of separated sanitary sewers shall be six (6) feet, except if the City Engineer with the consent of the PUC approves otherwise on a case-by-case basis. Under such circumstances, the depth of cover over sewers in street areas shall not be less than four (4) feet in order to distribute surface loads and to provide clearance for utility service facilities.

For sewers located in the rear of lots or in easements, the minimum depth of cover shall be four (4) feet. Subdivider shall design surface drainage in these areas so that natural soil erosion does not result in a build-up of soil covering the manhole castings. The Subdivider may accomplish this by designing the casting to rise slightly above the surrounding surface. Castings that the

Subdivider installs above the surrounding surface shall have an 18" minimum reinforced concrete ring installed.

d) Material and Sizes

Sewer pipes 6” to 24” inside diameter shall be HDPE SDR 17 conforming to ASTM D3035.

Coordinate pipe materials for separated sanitary sewer mains larger than 24” inside diameter with the City Engineer and the PUC during design. Sewer pipes larger than 24” inside diameter may be HDPE SDR 17 conforming to ASTM D3035 subject to the approval of the City Engineer with the consent of the PUC on a case-by-case basis.

e) Joints

Subdivider shall make connections of HDPE pipe to HDPE pipe by heat (butt) fusion. when the Subdivider joins sections of pipe, the Subdivider shall immediately remove the bead formed on the interior of the pipe per the Manufacturer’s recommendation .

The Director with the consent of the PUC may approve on a case-by-case basis an exception for connections of HDPE pipe to HDPE pipe by electrofusion of pipe ends using electrofusion couplings. Subdivider shall make connections of different pipe materials by manholes.

f) Alignment

Subdivider shall lay all pipes on straight lines and grades between manholes.

g) Encasement and Bedding

Subdivider shall place all sanitary sewer pipes on a crushed rock foundation. Subdivider shall not place pipes at slopes greater than 30%.

h) Clay Seals

The City Engineer and PUC shall determine the requirement for clay seals based on a soil or environmental report.

i) Settlement

Subdivider shall design pipes to comply with the criteria herein both at the time of construction and after 100% of the predicted 50-year settlement.

3. MANHOLES AND MANHOLE COVERS

Subdivider shall locate manholes preferably at intervals of three hundred (300) feet but not more than three hundred fifty (350) feet. Subdivider shall provide manholes at every change in pipe size, grade, material, shape, or alignment, at all junctions of sewers, and at ends of sewers.

Unless the City Engineer with the consent of the PUC approves an alternate design on a case-by-case basis, Subdivider shall locate manholes outside the crosswalks and a minimum of one (1) foot beyond the outside edge of crosswalk striping.

Unless the City Engineer with the consent of the PUC approves an alternate design on a case-by-case basis, Subdivider shall construct manholes in accordance with the Standard Plans.

The Director with the consent of the PUC shall approve all manhole covers and the Subdivider shall show them in the Improvement Plans or Master Details.

The separated sanitary sewer manhole shall differ from the combined sewer manhole. Separated sanitary sewer manhole covers shall not have holes and shall seal to prevent stormwater flowing into the separated sanitary sewer to the maximum extent practical. The size of separated sanitary sewer manhole covers shall be standardized and differ in size from the storm drain manhole covers.

Subdivider shall provide one additional non-standard manhole cover or 10% of the total number of manhole covers in each sub-phase, whichever is greater, to the PUC upon completion of each sub-phase. Subdivider shall provide one corresponding casting mold to the PUC for the entire Project.

4. SANITARY SEWER SERVICE LATERAL CONNECTIONS

a) Y-and T-Branches

Subdivider shall install Y- and T- fittings on the sanitary sewer main for sanitary sewer lateral connections 8” inside diameter and smaller.

Subdivider shall connect sanitary sewer service laterals to the side of the main that the sanitary sewer service lateral is on and these shall connect either between the 9 o’clock and 11 o’clock position or the 1 o’clock and 3 o’clock position of the main.

Subdivider shall make the openings for connections to existing sanitary sewer mains with a sharp cutting tool.

Subdivider shall saddle fuse an approved saddle of appropriate size to HDPE sanitary sewer mains.

b) Manholes

Subdivider shall install manholes on the sanitary sewer main for sanitary sewer lateral connections 10” inside diameter and larger.

Subdivider shall cast-in sanitary sewer lateral connections to new manholes with the construction of new manholes.

Subdivider shall connect sanitary sewer lateral connections to existing manholes to the existing manhole using Tap-Tite or equal if the City Engineer with the consent of the PUC approves an alternate design on a case-by-case basis.

5. SANITARY SEWER SERVICE LATERALS

a) General

Subdivider shall design sanitary sewer laterals and install them in accordance with the San Francisco Plumbing Code, Standard Plans, City Sanitary Sewer Lateral Standard Details, latest revision, and Standard Specifications.

The San Francisco Plumbing Code shall apply to the building lateral and upper sanitary sewer lateral (the section of sanitary sewer lateral from the face of curb to the property line). The Standard Plans and Standard Specifications shall apply to the section of sanitary sewer lateral from the face of curb to the sewer main.

b) Layout

Unless the City Engineer with the consent of the PUC approves an alternate design on a case-by-case basis, Subdivider shall design sanitary sewer laterals and install them perpendicular to the sanitary sewer main. The perpendicular alignment of the sanitary sewer laterals shall take precedence over locating other utilities when the City Engineer with the consent of the PUC has authorized an adjacent sanitary sewer main to have less than six (6) feet depth of cover. The City may require that any deviation from a standard perpendicular alignment that the City Engineer with the consent of the PUC approves be privately owned and maintained.

c) Sizes

Sanitary sewer laterals for residential lots shall be 6" inside diameter minimum. Sanitary sewer laterals for industrial or commercial lots shall be 8" inside diameter minimum.

d) Installation

Unless the City Engineer with the consent of the PUC approves on a case-by-case basis, Subdivider shall install sanitary sewer laterals concurrently with the construction of the sanitary sewer and these shall extend one (1) foot beyond the property line.

Subdivider shall lay sanitary sewer laterals on a uniform grade upward from the sanitary sewer main and, in n o case, shall the grade shall be less than 2%.

Subdivider shall cap the upper end of each sanitary sewer laterals not in service when Subdivider backfills the work . Subdivider shall mark these with a redwood post and with the letter “S” on the curb as specified in the Standard Specifications.

e) Material

Sanitary sewer lateral pipe shall be HDPE SDR 17 conforming to ASTM D3035.

f) Depth

The sanitary sewer laterals shall be of sufficient depth to provide adequate drainage for the property served and in no case shall the pipe centerline at the face of curb be less than four (4) feet below the top of curb.

g) Connection

Separated sewer mains may flow to downstream combined sewer mains. Combined sewers are designed to flow under surcharged conditions, and in the event of extreme storms, the surcharge may rise to the street for overland flow transport. Upstream separated sewer mains flowing to surcharged combined sewer mains may also surcharge.

In order to prevent backflow into improvements below street grade from service laterals connected to the separated sewer main, Subdivider shall not make gravity sewer connections from basements to sewer mains that may surcharge without backflow provisions.

h) Backflow Preventers

Subdivider shall install backflow preventers for all properties below street grade and on private property. The property owner(s) shall privately own and maintain these backflow preventers.

II. SANITARY SEWER FORCE MAIN

A. MATERIALS AND JOINTS

Sanitary sewer force main materials may be the following:

1. HDPE

HDPE pipes and fittings 24" inside diameter and smaller shall be PE 4710 (125psi) SDR 17 conforming to ASTM D3035.

Subdivider shall make connections of HDPE pipe to HDPE pipe by electrofusion of pipe ends with electrofusion couplings or by heat (butt) fusion. When the Subdivider joins sections of pipe, the Subdivider shall immediately remove the bead formed on the interior of the pipe per the Manufacturer's recommendation.

2. OTHER

The City Engineer with the consent of the PUC may approve on a case-by-case basis an alternative sanitary sewer force main materials that the Subdivider proposes during design.

B. VELOCITY

Minimum flow velocity shall be 2 feet per second. Maximum flow velocity shall be 8 feet per second.

C. DESIGN METHOD

Subdivider shall size force mains using the Hazen-Williams formula.

HAZEN-WILLIAMS COEFFICIENT

For HDPE pipe, Subdivider shall use a Hazen-Williams coefficient C=130 with bend losses accounted for separately.

If the Subdivider proposes alternative materials, the City Engineer with the consent of PUC may approve such materials on a case-by-case basis. Under such circumstances, the City Engineer with the consent of the PUC shall approve of the Hazen-Williams coefficient for the alternative materials.

D. SEPARATION

See UTILITY, SURFACE IMPROVEMENTS, AND BMP SEPARATION section for the separation of the sanitary sewer force main to the other utilities and improvements.

III. SANITARY SEWER PUMP STATION

Pump station systems and design criteria shall comply with the "Minor Sewage Pump Station Standards Design Guide," dated May 29, 2003, or latest revision, that the PUC Wastewater Enterprise prepares . The Subdivider shall coordinate the pump station systems design with the City Engineer and the PUC.

ATTACHMENT 8

STORMWATER MANAGEMENT

A. GENERAL

1. SAN FRANCISCO STORMWATER DESIGN GUIDELINES

New or redevelopment projects built in San Francisco can increase stormwater flows that affect San Francisco's wet weather infrastructure capacity and permit compliance. The stormwater management of development within the Subdivision Area disturbing 5,000 square feet or more of ground surface shall comply with the *San Francisco Stormwater Design Guidelines* (*Guidelines*). The PUC adopted the *Guidelines* on January 12, 2010. Subdivider shall comply with the Stormwater Management Ordinance that requires the development and maintenance of stormwater management controls outlined in the *Guidelines* which were effective on May 22, 2010.

The PUC conducts project reviews to ensure that new development and redevelopment projects comply with the *Guidelines*. The Developer for any project disturbing 5,000 square feet or more of ground surface shall submit to the PUC for review and approval a project Stormwater Control Plan (SCP) demonstrating compliance with the *Guidelines*.

2. PUBLIC STREETS

Public streets shall incorporate stormwater Best Management Practice (BMP) measures that comply with the *Guidelines* in the public right-of-way or in the public open space parks. The Subdivider shall show typical concepts and locations of stormwater BMP measures consistent with the Master Plan.

Subdivider's final placement and design of the stormwater BMP measures shall be as shown in the Stormwater Control Plan. The PUC shall review and approve all design of stormwater BMP measures.

3. DEVELOPMENT PARCELS

Subdivider may incorporate stormwater BMP measures that comply with the *Guidelines* either on-site or regionally (in public open space parks) as part of a master-planned or multi-parcel development. The final placement and design of the stormwater BMP measures shall be as shown in the Stormwater Control Plan. The PUC shall review and approve all design of stormwater BMP measures.

B. BEST MANAGEMENT PRACTICES (BMPs)

The bottom of the bio-treatment soil of the BMP measures shall be at the same elevation as or higher than the 5-year storm hydraulic grade line for the separated storm drain system. The starting hydraulic grade line design elevation for the storm drain system shall be 100.2 feet (98.2 feet Mean Higher High Water (MHHW) + 24 inches of SLR).

See Appendix B, Attachment 16 – "UTILITY, SURFACE IMPROVEMENTS, AND BMP SEPARATION" section for the approximate location and separation requirements of the BMPs to the other improvements.

ATTACHMENT 9

I. SEPARATED GRAVITY STORM DRAIN

A. REQUIRED CAPACITY OF SEPARATED GRAVITY STORM DRAIN SYSTEM

1. DESIGN BASIS

Separated storm drains shall have sufficient capacity, when flowing full or surcharged, to carry the computed stormwater runoff, based on the ultimate development of the area including the natural drainage from upstream areas. Subdivider shall include upstream stormwater runoff from watersheds adjacent to the development area in the stormwater flow analysis.

2. MINIMUM PIPE SIZE

Unless the City Engineer with the consent of the PUC approves otherwise on a case-by-case basis, storm drain mains shall have a minimum 12" inside diameter

.

3. VELOCITY

Subdivider shall design storm drains for a minimum velocity of two (2) feet per second when flowing full. The City Engineer with the consent of PUC may approve on a case-by-case basis a minimum velocity less than two (2) feet per second when flowing full.

Subdivider shall design storm drains for a maximum velocity of ten (10) feet per second when flowing full. The City Engineer with the consent of PUC may

approve on a case-by-case basis a maximum velocity greater than ten (10) feet per second when flowing full.

4. HYDRAULIC CONSIDERATIONS

Refer to the SEA LEVEL RISE section for the storm drain system freeboard and starting hydraulic grade line to use for the storm drain design.

5. RUN-OFF

Subdivider shall compute stormwater run-off by the Rational Formula, as herein described, or other such methods that the City Engineer with the consent of the PUC determine to be City practice.

Rational Formula: Q = CIA, where

Q = Quantity of Run-off in cubic feet per second, which is equal to the cubic feet per second per acre for the duration of rainfall corresponding to the time of concentration

C = Coefficient of Run-off = Ratio of Run-off to Rainfall.

I = Rate or Intensity of Rainfall in inches per hour.

A = Drainage Area, tributary to the point under consideration, in acres.

Coefficient of Run-off (C) for any area depends upon the type of development, character of the soil, slope and general topography, and the proportion of the area occupied by improvements. The coefficient that the Subdivider uses in design shall be in accordance with the values shown in Table XVII.1 below and shall be subject to the approval of the City Engineer with the consent of the PUC.

Rainfall Intensity (I), or rate, that the Subdivider uses in design shall be from the tabulation entitled "San Francisco Rainfall Rate Table 1941," Plan L-3903.4 dated February 1941, or subsequent revisions thereof, and is defined as a 5-year storm. The intensity, or rate, that the Subdivider uses at any point along the storm drain line shall be the intensity corresponding to the total time of concentration at that point.

The 100-year Intensity-Duration-Frequency (IDF) curve equation for overland flow shall be the following:

$$I = \frac{11.802}{T_c 0.54}$$

The 100-year IDF curve equation is the best fit log-linear line of the Rainfall Depth-Duration-Frequency table for the San Francisco City Station E70 7772 00 published by the California Department of Water Resources.

Area (A) – The Subdivider shall use the total area tributary to the point under consideration in design.

Time of Concentration and Inlet time – Time of concentration at any given point is the time required for the run-off from the most remote point in the drainage area to reach that point and is equal to the inlet time plus the time of flow in the storm drain to the point under consideration.

Inlet time is the time required for the water from the most remote point of the drainage area to reach the uppermost inlet of the storm drain system. The inlet times that the Subdivider uses in

design shall be in accordance with the values shown in Table XVII.1. For inlet times of less than five minutes, the Subdivider shall use the intensity of 3.13 inches per hour.

Coefficients of run-off and inlet times for various types of districts are shown in Table XVII.1. For those districts that do not fit into any of the categories below, Subdivider shall submit proposed coefficients with rationale to the City Engineer and PUC for review and approval.

The time of concentration for overland flow shall be the inlet time adjusted for travel time in the streets.

TABLE XVII.1

COEFFICIENTS OF RUN-OFF AND INLET TIMES

	Range of Values	Inlet Time in Minutes	
Type of District	Run-Off Coefficient "C"	Slope 3% & Over	Slope Under 3%
Commercial	0.80 to 0.95	3	5
Industrial	0.60 to 0.90	3-5	4-6
Apts. & Flats	0.60 to 0.80	3	5
Residential (Attached Homes)	0.45 to 0.70	4	6
Residential (Detached Homes)	0.40 to 0.65		
Suburban	0.25 to 0.35	6	10
Open Space	0.30	5	5
Undefined Undeveloped Space Within Parcel	0.70	5	5
Developed Space Within Parcel			
	0.90	5	5
Streets and Paved Areas			
	0.95	5	5

6. SELECTION OF STORM DRAIN SIZES, STREET SECTIONS, AND CHANNELS

Subdivider's design shall carry flow up to and including the 5-year storm in the pipes. Subdivider shall compute storm drain sizes using the Rational Method.

Subdivider's design shall carry flow in excess of the 5-year storm up to and including the 100-year storm in the pipes and/or the City right-of-way or in the channels as overland flow. Subdivider shall compute overland flow within the City right-of-way or channels using the Rational Method.

Subdivider shall contain overland flow within the City right-of-way between the face of curb to face of curb with no freeboard unless the City Engineer with the consent of the PUC approves otherwise on a case-by-case basis. The City will allow curb overtopping for the overland flow at the edge of the Project to flow into San Francisco Bay. When the overland flow overtops the curb at the edge of the Project and flows into San Francisco Bay, the overland flow water level shall be below the top of curb on the side of the street adjacent to structures such as buildings.
Overland flow within channels shall have 1 foot of freeboard measured from the highest point between the channel and the edge of easement except where the depth of flow is less than 1 foot. For cases where the depth of flow is less than 1 foot, the freeboard shall be equal to the depth of flow.

The values of the coefficient of roughness "n" to be used for different materials of storm drain pipes and the street shall be as shown below in Table XVII.2.

TABLE XVII.2	
Type of Sewer	Coefficient "n"
HDPE	0.010
Monolithic Concrete	0.013
Centrifugally Spun or Vertically Cast Concrete Pipe	0.012 - 0.013
Street and Gutter Flow	0.015 – 0.016

B. RECOMMENDED STANDARDS OF DESIGN FOR SEPARATED GRAVITY STORM DRAIN SYSTEM

1. GENERAL

Subdivider shall make provision for the removal of stormwater from each lot or parcel of land and the stormwater from all roads, streets, and sidewalks.

2. SEPARATED STORM DRAIN MAIN

a) Location – Subdivider shall locate storm drain mains and structure appurtenances either within the public right-of-way or within a dedicated easement accessible to City personnel and equipment for maintenance, repair, and servicing. Subdivider shall locate storm drain mains and structure appurtenances so that the excavation and repair of mains or structure appurtenances will not encroach on private property without dedicated easements. Where the Subdivider shows public facilities within Mid-Block Breaks or across park property in approved Master Utility Plans, the City Engineer and PUC determined that accommodating such facilities within dedicated easements in lieu of fee dedication is permissible. However, the PUC shall be under no

obligation to repair, maintain, or replace materials or improvements within such easements beyond generally applicable PUC standards and materials specifications. In other instances where the Subdivider proposes an easement to accommodate public facilities in lieu of fee dedication, City Engineer with the consent of PUC may allow such easement on a case-by-case basis. The City Engineer with the consent of the PUC shall review and approve any such easement.

Subdivider shall locate storm drain mains as close as possible to the center of streets and alleys to adequately serve both sides of the right-of-way, except where physical constraints dictate.
Location of separated storm drain mains near the center of the improvements takes precedence over locating other utilities.

Where possible, the City prefers that the Subdivider locate the storm drain main as close to the center of lanes nearest the center of streets and alleys as possible with consideration of the placement of other utility pipes and structure appurtenances..

b) Separation – See Attachment 16 for the approximate location and separation of the separated storm drain to the other utilities and improvements.

c) Depth and Cover – the minimum depth of cover for separated storm drains shall be six (6) feet, except if the City Engineer with the consent of the PUC approves an alternate design. Under such circumstances , the

minimum depth of cover over storm drains in street areas shall not be less than four (4) feet in order to distribute surface loads and to provide clearance for utility service facilities. The City Engineer or the PUC may require additional support over the pipe or high strength pipe.

For storm drains located in the rear of lots or in easements, the minimum depth of cover shall be three (3) feet. Subdivider shall design surface drainage in these areas so that natural soil erosion does not result in a build-up of soil covering the manhole castings. Subdivider may accomplish this by designing the casting to rise slightly above the surrounding surface. Castings that the Subdivider installs above the surrounding surface shall have an 18" minimum reinforced concrete ring installed.

d) Material and Sizes – Storm drain pipes 12” to 24” inside diameter shall be HDPE SDR 17 conforming to ASTM D3035 or Class IV reinforced concrete pipe conforming to ASTM C76.

Storm drain pipes larger than 24” diameter shall be Class IV reinforced concrete pipe conforming to ASTM C76. The City Engineer with the consent of the PUC shall approve on a case-by-case basis the use of HDPE SDR 17 conforming to ASTM D3035 for storm drain pipes larger than 24” diameter.

Standard Plans are available for most monolithic types of sewer sections and the City Engineer with the consent of the PUC may approve on a case-

by-case basis the use of similar monolithic storm drain sections. The City Engineer with the consent of the PUC may approve on a case-by-case basis a alternative pipe materials for specific purposes and situations.

e) Joints – Subdivider shall make connections of HDPE pipe to HDPE pipe by heat (butt) fusion. When Subdivider joins sections of pipe, the Subdivider shall immediately remove the bead formed on the interior of the pipe per the Manufacturer's recommendation.

The City Engineer with the consent of the PUC may approve on a case-by-case basis connections of HDPE pipe to HDPE pipe by electrofusion of pipe ends using electrofusion.

Reinforced concrete pipe (RCP) shall have bell and spigot or other approved joints. Subdivider shall make connections of different pipe materials by manholes.

f) Alignment – Subdivider shall lay all pipes on straight lines and grades between manholes.

g) Encasement and Bedding – Subdivider shall place all storm drain pipes on a crushed rock foundation.

h) Subdivider shall not place pipes at slopes greater than 30%.

i) Clay Seals – The City shall require clay seals except where a Geotechnical Report or Environmental Report determines that they are not necessary for a specific area. Under such circumstances, the City

Engineer with the consent of the PUC may approve an alternative design on a case-by-case basis.

j) Settlement – Subdivider shall design pipes to comply with the criteria herein both at the time of construction and after 100% of the predicted 50-year settlement.

3. MANHOLES AND MANHOLE COVERS

Subdivider shall locate manholes preferably at intervals of three hundred (300) feet but not more than three hundred fifty (350) feet. Subdivider shall provide manholes at every change in pipe size, grade, material, shape, or alignment, at all junctions of storm drains, at ends of storm drains, and where catch basin laterals join storm drain mains.

Unless the City Engineer with the consent of the PUC approves an alternative design on a case-by-case basis, Subdivider shall locate manholes outside the crosswalks and a minimum of one (1) foot beyond the outside edge of crosswalk striping.

Subdivider shall construct manholes in accordance with the Standard Plans. The City Engineer with the consent of the PUC may approve on a case-by-case basis an alternative manhole designs.

The City Engineer with the consent of the PUC shall approve the manhole covers and the Subdivider shall show them in the Improvement Plans.

The size of storm drain manhole covers shall be standardized and differ in size from the separated sanitary sewer manhole covers.

The Subdivider shall provide one additional non-standard manhole cover or 10% of the total number of manhole covers in each sub-phase, whichever is greater, to the PUC upon completion of each sub-phase. The Subdivider shall provide one corresponding casting mold to the PUC for the entire Project.

4. CATCH BASIN LATERALS

Catch basin laterals shall be 10-inch inside diameter HDPE SDR 17 pipe conforming to ASTM D3035. When the Subdivider joins sections of pipe, the Subdivider shall immediately remove the bead formed on the interior of the pipe per the Manufacturer's recommendation.

The Subdivider shall make connections to storm drain mains at manholes and in accordance with the Standard Plans.

The Subdivider shall cast-in catch basin lateral connections to new manholes with the construction of new manholes.

Catch basin lateral connections to existing manholes shall connect to the existing manhole using Tap-Tite or equal if the City Engineer with the consent of the PUC approves an alternative design on a case-by-case basis.

Subdivider shall generally lay laterals with a depth of cover of approximately two (2) feet below pavement grade at the catch basin, with a fall towards the manhole or storm drain main of approximately twelve (12) inches, but in no

case at a grade of less than two percent (2%). The City Engineer with the consent of the PUC may approve variations to these standards on a case-by-case basis.

5. CATCH BASINS AND CATCH BASIN GRATES

Subdivider shall locate catch basins in the gutter to most effectively serve the adjacent drainage areas. The Subdivider shall not locate catch basins within crosswalks or in the curb return area. Subdivider shall place catch basins 12" minimum away from the footprint of curb ramps, including flares, and curb returns. Subdivider shall typically locate catch basins outside the crosswalk, on the far side of the curb return from the intersection.

Subdivider shall provide catch basins at all low points and shall not space them more than six hundred (600) feet apart. The City Engineer and the PUC may require closer spacing and additional catch basins to effectively drain the pavement. The Director with the consent of the PUC shall determine where the Subdivider shall install multiple inlets on a case-by-case basis .

The Subdivider shall label catch basins draining to the separated storm drain system with "No Dumping Only Rain Down the Drain Report Pollution" decals per the PUC template.

The Subdivider shall construct catch basins draining to the separated storm drain system in conformance with City Standard Plan 87,188, including but not limited to the provision for a cast iron trap. However, the structure should be

rectangular, rather than round, similar to the State of California Department of Transportation Standard Plan D73, Drainage Inlet Type G3.

Catch basin grates shall be State of California Department of Transportation Standard Type 24-12X Bicycle Proof Grate.

Prior to, or concurrently with, the first improvement plan submittal for this project area, the Subdivider shall submit a standard detail for a separated storm drain system catch basin and grate, to the City for approval. The Subdivider shall incorporate the approved design into the CP-HPSII Master Details.

6. STORM DRAIN SERVICE LATERAL CONNECTIONS

a) Y-and T-Branches

Subdivider shall install Y- and T- fittings on the storm drain main for storm drain lateral connections 8" inside diameter and smaller.

Storm drain service laterals shall connect to the side of the main that the storm drain service lateral is on and shall connect either between the 9 o'clock and 11 o'clock position or the 1 o'clock and 3 o'clock position of the main.

Subdivider shall make the openings for connections to existing storm drain mains or existing combined sewer mains with a sharp cutting tool.

Subdivider shall epoxy or strap an approved saddle of appropriate size to non-HDPE mains. Subdivider shall provide reinforced concrete collars for lateral connections to non-HDPE mains.

Subdivider shall saddle fuse an approved saddle of appropriate size to HDPE mains.

b) Manholes

Subdivider shall install manholes on the storm drain main for storm drain lateral connections 10” inside diameter and larger.

Subdivider shall cast-in storm drain lateral connections to new manholes with the construction of new manholes.

Storm drain lateral connections to existing manholes shall connect to the existing manhole using Tap-Tite or equal if the City Engineer with the consent of the PUC approve an alternate design on a case-by-case basis.

7. STORM DRAIN SERVICE LATERALS

a) Layout – Subdivider shall design storm drain laterals and install them perpendicular to the storm drain main. The City Engineer with the consent of the PUC may approve an alternate design standard on a case-by-case basis. The perpendicular alignment of the storm sewer laterals shall take precedence over locating other utilities when the City Engineer with the consent of the PUC approves an adjacent storm drain main with less than six (6) feet depth of cover. The City may require that any deviation from a standard perpendicular alignment that the City Engineer with the consent of the PUC approve be privately owned and maintained.

b) Sizes – Storm drain laterals for residential lots shall be 6" inside diameter minimum. Storm drain laterals for industrial or commercial lots shall be 8" inside diameter minimum.

c) Installation – Subdivider shall install storm drain laterals concurrently with the construction of the separated storm drain main and these shall extend one (1) foot beyond the property line. The Director with the consent of the PUC may approve a variance to this standard on a case-by-case basis.

Subdivider shall install storm drain laterals in accordance with the San Francisco Plumbing Code. Subdivider shall law storm drain laterals on a uniform grade upward from the storm drain main and the grade shall in no case be less than 2%.

The Subdivider shall cap the upper end of each storm drain laterals not in service when the Subdivider backfills the work The Subdivider shall mark the laterals with a redwood post and with the letter "D" on the curb as similarly specified in the Standard Specifications for side sewers.

d) Material – Storm drain lateral pipe shall be HDPE SDR 17 conforming to ASTM D3035.

e) Depth – The storm drain laterals shall be of sufficient depth to provide adequate drainage for the property served and in no case shall the pipe

centerline at the face of curb be less than three (3) feet below the top of curb.

f) Connection – Separated storm drains are designed to flow under surcharged conditions, and in the event of extreme storms, the surcharge may rise to the street for overland flow transport. In order to prevent backflow into improvements below street grade from service laterals connected to the storm drain main, the Subdivider shall not make gravity storm drain connections from sites lower than street grade to storm drain mains without backflow provisions.

g) Backflow Preventers – Subdivider shall install backflow preventers for all properties below street grade and on private property. The property owner(s) shall privately own and maintain the backflow preventers.

II. STORM DRAIN FORCE MAIN

A. MATERIALS AND JOINTS

Storm drain force main materials may be the following:

1. HDPE

HDPE pipes and fittings 24" inside diameter and smaller shall be PE 4710 (125 psi) SDR 17 conforming to ASTM D3035.

The Subdivider shall make connections of HDPE pipe to HDPE pipe by electrofusion of pipe ends with electrofusion couplings or by heat (butt) fusion.

When Subdivider joins sections of pipe, Subdivider shall immediately remove the bead formed on the interior of the pipe per the Manufacturer's recommendation.

2. OTHER

The Director with the consent of the PUC may approve an alternative storm drain force main material on a case-by-case basis.

B. VELOCITY

Minimum flow velocity shall be 2 feet per second. Maximum flow velocity shall be 8 feet per second.

C. DESIGN METHOD

Subdivider shall size force mains using the Hazen-Williams formula.

D. HAZEN-WILLIAMS COEFFICIENT

For HDPE pipe, use a Hazen-Williams coefficient C=130 with bend losses accounted for separately.

The City Engineer with the consent of the PUC may approve alternate materials on a case-by-case basis. Under such circumstances, the City Engineer with the consent of the PUC shall approve of the Hazen-Williams coefficient for such materials.

E. SEPARATION

See UTILITY, SURFACE IMPROVEMENTS, AND BMP SEPARATION section for storm drain for the separation of the storm drain force main to the other utilities and improvements.

III. STORM DRAIN PUMP STATION

Pump station systems and design criteria shall comply with the "Minor Sewage Pump Station Standards Design Guide," dated May 29, 2003, or latest revision, that the PUC Wastewater Enterprise prepares. The City Engineer with the consent of the PUC shall approve any pump station design criteria that the Subdivider uses.

The storm drain pump station pump capacity shall be the 5-year storm, or, when applicable for stormwater treatment, the 2-year storm of the contributing tributary area. Pump stations for the 2-year storm shall have only one pump with no back-up power required.

The storm drain pump station shall have a bypass recirculation system to allow for wet testing of pump station pumps without posing a discharge threat.

Subdivider's storm drain pump station designs shall provide pump curves and system curves that show the full operating range of the pump station at high and low dynamic head. Subdivider's designs for future pump stations shall provide a means to monitor flow volume.

Subdivider's design for all improvement projects including or adjacent to future storm drain pump stations shall provide a sanitary sewer lateral and empty electrical conduits reserved in the joint trench utility. Subdivider shall stub utility connections nearby for future use.

ATTACHMENT 10

LOW PRESSURE WATER SYSTEM

A. WATER DEMAND AND DISTRIBUTION DESIGN CRITERIA

1. GENERAL

Subdivider shall design the low pressure water system to serve the potable water, fire flow, and interim recycled water demands for the Subdivision Area.

2. WATER DEMAND

Water demands shall simulate water usage patterns for the proposed Candlestick Point and Hunters Point Shipyard Phase II parcel development layout. Water demands shall include recycled water demands until an independent recycled water supply system is developed by the City. The Subdivider shall design fire flow demands for each structure and construction type based on the San Francisco Fire Code, National Fire Protection Act, SFFD administrative bulletins, and applicable industry, City, State, and federal codes and standards. The SFFD and PUC shall review and approve fire flow demands.

3. ISOLATION CONFIGURATION

The City Distribution Division (CDD) requires low pressure water mains to achieve isolation during emergency shutdowns by using gate valves. Subdivider shall install gate valves in the water main so that the City can isolate the length of the pipe within each City block.

4. HYDRAULICS

In addition to conforming to pertinent PUC and SFFD standards, the City shall require a hydraulic analysis to confirm adequacy of the water supply for both potable, non-potable and fire use. If current distribution system pressures and flows are inadequate, the Subdivider shall be responsible for any capital improvements required to meet the water demands. Depending upon the size and complexity of the subdivision, the City may require that the Subdivider pay for the hydraulic analysis. Additionally, the City shall assess a capacity fee for the entire project rather than on a sub-parcel or individual building basis.

5. PEAKING FACTOR

Maximum Day Demand = 1.6 x Average Day Demand Peak Hour Demand = 2.4 x Average Day Demand

6. MAXIMUM VELOCITY

Peak Hour Demand: 5 feet per second

Maximum Day Demand + Fire Flow: 12 feet per second

7. RESIDUAL PRESSURE

Peak Hour Demand: 40 psi

Maximum Day Demand + Fire Flow: 20 psi

HAZEN-WILLIAMS COEFFICIENT

For new ductile iron pipe, use a Hazen Williams coefficient C=110.

For existing pipe, use a Hazen Williams coefficient C=80.

B. RECOMMENDED STANDARDS OF DESIGN FOR LOW PRESSURE WATER

1. WATER SYSTEM REVIEW

The City Engineer with the consent of the PUC shall approve the water system layout.

2. CODES AND STANDARDS

Subdivider shall design and construct the low pressure water system in accordance with all applicable City, State, and federal codes and standards.. Applicable codes and standards include:

- California Code of Regulations, Title 22, CA DPH
- California Waterworks Standards, R-14-03, CA DPH
- American Water Works Association (AWWA) Standards
- City and County of San Francisco Department of Public Works – Bureau of Engineering Standard Plans and Standard Specifications
- San Francisco Water Department Standard Plans and Standard Specifications

3. TRANSMISSION AND DISTRIBUTION MAINS

a) Size

Subdivider shall use pipe diameters of 8, 12 and 16 inches for all distribution and feeder mains. The City Engineer with the consent of the PUC may approve an alternative pipe size on a case-by-case basis; provided; however, that that Subdivider shall not use pipe diameters of 10 and 14 inches.

b) Material

The water transmission and distribution main material shall be Class 53 ductile iron conforming to ANSI/AWWA C151/A21.51 and shall conform to CCR Title 22, Section 64570.

The ductile iron pipe shall be cement-mortar lined conforming to ANSI/ASTM C104/A21.4 and shall be asphaltic outside coated conforming to ANSI/AWWA C151/A21.51. The cement-mortar lining shall be double the standard thickness.

The ductile iron pipe joints shall be Tyton joints with U.S. Pipe “Field-Lok” gaskets.

The pipe fittings shall be ductile iron conforming to ANSI/AWWA C110/A21.10 or ANSI/AWA C153/A21.53. Except for caps, fittings shall have Tyton joints with U.S. Pipe “Field-Lok” gaskets. Subdivider shall fasten caps to the pipe by use of tie rods and lugs or restrainers.

c) Certification

Water main materials, linings, and coatings shall be certified by the National Sanitary Foundation (NSF).

4. SERVICE LATERALS

a) Size

Service lateral diameters shall be 1, 2, 4, 6, 8, and 12 inches.

The Subdivider shall not use service lateral diameters of 3 inches and less than 1 inch.

b) Material

(1) 1 and 2 inch service laterals – Service lateral diameters 1 and 2 inches shall be copper tubing type K and shall conform to CCR Title 22, Section 64570. Soft or hard type K copper tubing shall be per service size as shown in SFWD Standard Drawings.

Subdivider shall use service lateral valves and fittings of bronze or brass conforming to AWWA C800.

(2) 4 inch and larger service laterals – Service lateral diameters 4 inches and larger shall be Class 53 ductile iron conforming to ANSI/AWWA C151/A21.51 and shall conform to CCR Title 22, Section 64570.

The ductile iron pipe shall be cement-mortar lined conforming to ANSI/ASTM C104/A21.4 and shall be asphaltic outside coated conforming to ANSI/AWWA C151/A21.51. The cement-mortar lining shall be double the standard thickness.

The ductile iron pipe joints shall be Tyton joints with U.S. Pipe "Field-Lok" gaskets.

Service lateral fittings shall be ductile iron conforming to ANSI/AWWA C110/A21.10 or ANSI/AWA C153/A21.53. Except for caps, fittings shall have Tyton joints with U.S. Pipe "Field-Lok" gaskets. Subdivider shall fasten caps to the pipe by use of tie rods and lugs or restrainers.

i. Joints – Subdivider shall restrain joints on all laterals to the main per SFWD Standard Drawings. Subdivider shall restrain all joints and gate valves on 4 inch or larger service laterals per the SFWD Standard Drawings.

ii. Certification – Water service lateral materials, linings, and coatings shall be certified by the National Sanitation Foundation (NSF).

5. FIRE LATERALS

The Subdivider shall install separate fire service connection to residential and Commercial customers for the purpose of providing private fire protection. PUC-CDD Engineering shall review and approve the required fire flow, type and size of the fire protection through a hydraulic analysis. Subdivider shall not connect this fire protection system and any other water distribution system on the premises. The Subdivider's design shall preclude the use of water dedicated to the fire protection services except for purposes of extinguishing fires.

a) Size

Fire Service lateral diameters shall be 1, 2, 4, 6, 8, and 12 inches.

The Subdivider shall not use fire Service lateral diameters of 3 inches and less than 1 inch.

b) Material

(1) 1 and 2 inch fire service laterals – Fire Service lateral diameters 1 and 2 inches shall be copper tubing type K and shall conform to CCR Title 22, Section 64570. Soft or hard type K copper tubing shall be per service size as shown in SFWD Standard Drawings.

The Subdivider shall use fire Service lateral valves and fittings of bronze or brass conforming to AWWA C800.

(2) 4 inch and larger fire service laterals – Fire Service lateral diameters 4 inches and larger shall be Class 53 ductile iron conforming to ANSI/AWWA C151/A21.51 and shall conform to CCR Title 22, Section 64570.

The ductile iron pipe shall be cement-mortar lined conforming to ANSI/ASTM C104/A21.4 and shall be asphaltic outside coated conforming to ANSI/AWWA C151/A21.51. The cement-mortar lining shall be double the standard thickness.

The ductile iron pipe joints shall be Tyton joints with U.S. Pipe "Field-Lok" gaskets.

Fire Service lateral fittings shall be ductile iron conforming to ANSI/AWWA C110/A21.10 or ANSI/AWA C153/A21.53. Except for caps, fittings shall have Tyton joints with U.S. Pipe "Field-Lok" gaskets. The Subdivider shall fasten caps to the pipe by use of tie rods and lugs or restrainers.

i. Joints – Subdivider shall restrain joints on all laterals to the main per SFWD Standard Drawings. Subdivider shall restrain all joints and gate valves on 4 inch or larger service laterals per the SFWD Standard Drawings.

ii. Certification – Fire service lateral materials, linings, and coatings shall be certified by the National Sanitation Foundation (NSF).

c) Pressure and Supply

PUC-CDD assumes no responsibility for loss or damage due to lack of water or pressure, either high or low, and merely agrees to furnish such quantities and pressures as are available in its distribution system. The fire service is subject to shutdowns and fluctuations from time to time, as the City operations of the system may require.

d) Meter

The private fire service and all equipment up to and including the meter shall belong to the PUC. The Subdivider shall equip each fire service with a meter, and if water is used through the fire service connection for any purpose other than extinguishing fires, the PUC shall have the right to charge the customer an applicable fire service penalty and the PUC may assess any other pertinent fees. The PUC shall not charge for water that the City uses through a fire service for fighting accidental fires.

6. INSTALLATION OF WATER MAINS

a) Location

Subdivider shall locate low pressure water mains and structure appurtenances within the public right-of-way. The City Engineer with the consent of the PUC may approve facilities outside the public right-of-way on a case-by-case basis must. The City Engineer with the consent of the PUC shall approve any dedicated easements

on private property accessible to SFWD personnel, SFFD fire trucks, and equipment for maintenance, repair, and servicing. Subdivider shall locate low pressure water mains and structure appurtenances so that the excavation and repair of the main or appurtenances will not encroach on private property without dedicated easements.

Subdivider shall locate the low pressure water main 4’ clear minimum between the low pressure water main centerline and the face of curb. The City Engineer , with the consent of the PUC may approve of a clearance less than 4’ from pipe centerline to the face of the curb on a case-by-case basis.

b) Separation

See UTILITY, SURFACE IMPROVEMENTS, AND BMP SEPARATION section for the approximate location and separation of the low pressure water to the other utilities and improvements.

c) Layout

Subdivider shall lay out water mains in segmented grids and loops. The Subdivider may install dead-end water mains only if:

(1) Looping or gridding is impractical due to topology, geology, pressure zone boundaries, unavailability of easements, or location of users; or

(2) The Subdivider plans to extend the main in the near future and the planned extensions would eliminate the dead-end conditions.

(3) The City Engineer with the consent of the PUC approves this design on a case-by-case basis.

d) Cover

Low pressure water mains that the Subdivider installs below ground shall have the following minimum cover:

Pipe Size	Minimum Cover
8-inch or less	30 inches
12 and 16-inch	32 inches

The City requires that low pressure water mains with less than the minimum cover have a protecting slab or other structural protective measures. In addition, such alternate design shall require approval, on a case-by-case basis, of the City Engineer with the consent of the PUC.

e) Trench width

Minimum pipe trench widths shall be as follows:

Pipe Size	Minimum Trench Width
4, 6, and 8-inch	18 inches
12-inch	24 inches
16-inch	30 inches

f) Thrust blocks

Subdivider shall install thrust blocks on pipes larger than 12” diameter at all fittings or angular bends of 11-1/4 degrees or larger. The City does not require thrust blocks for lines 12” in diameter and smaller, except at fire hydrant laterals, where the City does require thrust blocks per the SFWD Standard Drawings.

Subdivider shall design thrust blocks to resist the thrust reaction forces at the bends or fittings whose magnitude will depend on the pipe diameter, internal pressures, and allowance for water hammer. Subdivider shall design thrust blocks to transfer and distribute the thrust forces to the undisturbed soil surface. The City Engineer and the PUC shall determined the surface bearing capacity of soil based on a soil investigation or report. The Subdivider shall design the thrust block with a minimum factor of safety of 1.25.

g) Polyethylene encasement

Subdivider shall encase the entire pipe system, including service laterals, in an 8 mil, low density, and clear polyethylene in accordance with ANSI/AWWA C105/A21.5

7. BYPASS CONFIGURATION

PUC-CDD requires the connection between perpendicular crossing low pressure water mains (one on top of the other) to be achieved using a bypass pipe with a gate valve and air release valve/blow-off on the bypass pipe. Subdivider shall locate gate valves in the water mains so that the City can isolate the length of pipe within each City block.

a) Location

1) Center to center spacing between the air release valve and blow-off valve to the gate valves shall be between (2.5) to (3) feet.

2) The first air release valve/blow-off valve shall not be more than (3) feet behind the property line (typically in line with the crosswalk striping at the intersection.

3) The air release valve/blow off and gate valve shall not be under the sidewalk, bulb-out or concrete gutter.

4) The City requires only the gate valve and (1) air release valve/blow-off at tee connections.

8. CATHODIC PROTECTION

Subdivider shall design and install cathodic protection in conjunction with ductile iron pipe low pressure water mains and ductile iron and copper low pressure water laterals.

9. JOINT RESTRAINT DEVICES

Joint restraint devices shall be per the SFWD Standard Drawings, except that bolts, nuts, and tie-rods shall be stainless steel TP304.

10. BACKFLOW PREVENTER

The SFWD Water Quality Bureau shall determine the required type of backflow preventer . Subdivider shall design and install the backflow preventer shall in accordance with CCR Title 17, Sections 7601, 7602, 7603, and 7604, and City Ordinance 356 -84, Article 12A. The location of all backflow preventers shall be outside of the City right-of-way, within 25’ of the water meter; provided, however, that the City Engineer with the consent of the PUC may approve an alternate design on a case-by-case basis.

Where the recycled water system connects to the low pressure water system on a temporary basis, the City shall require a backflow preventer. The location of this backflow preventer shall be outside of the City right of way, within a public utility easement to the satisfaction of the City. The City Engineer with the consent of the PUC may approve such alternate design and allow the use of a public easement on a case-by-case basis. If the City Engineer and PUC agree to allow use of a public easement on private property, the City

Engineer and PUC shall approve the easement.

11. FIRE HYDRANTS AND FIRE HYDRANT LATERALS

a) Fire hydrant laterals shall have gate valves in conformance to CCR Title 22, Section 64577.

b) The SFFD and City Engineer shall approve the location of fire hydrants. To the extent practicable, the Subdivider shall locate hydrants near street intersections. The City may change the proposed locations, layout and quantity of low pressure water hydrants during vertical design depending upon both fire flow requirements and proximity to building fire department connections. All building fire department connections shall be within (100) feet of a fire hydrant.

c) Subdivide shall install fire hydrants near the street curb where they are accessible to fire trucks and protected from traffic. Subdivider shall locate hydrants at a distance of 24" minimum and 27" maximum from the fire hydrant centerline to the face of curb and four (4) feet minimum from a utility pole, traffic control box, or fixed object or structure.

Subdivider shall not install fire hydrants within curb return areas or in sidewalk areas serving crosswalks.

d) In additional to "Field-Lok" gaskets, Subdivider shall restrain all joints on hydrant laterals as shown on SFWD Standard Drawings.

e) SFWD shall furnish and install the fire hydrant laterals, valves, fire hydrant buries, risers, breakaways and fire hydrants for existing water main connections.

The Subdivider shall furnish and install fire hydrant laterals, valves, fire hydrant buries, and risers for new water main connections. The SFWD shall furnish and install

breakaways and fire hydrants for new water main connections.

12. VALVES

a) Location – Subdivider shall locate valves per CCR Title 22, Section 64577 and as specified herein.

Subdivider shall provide all taps to existing mains with valves. Subdivider shall locate valves on all branches of the main, all service pipes, and on all fire hydrant branches. Subdivider shall install valves on mains in commercial areas at a minimum interval of 500 feet. Valves shall be installed on mains in non-commercial areas no more than one block apart or within an interval of 800 feet.

Subdivider shall not locate valves within the crosswalks. The City Engineer with the consent of the SFFD may approve a valve within a crosswalk on a case-by-case basis. Subdivider shall provide dead ends for future expansion with a valve.

b) Corporation stops – Subdivider shall use corporation stops for service laterals 2" diameter and smaller.

Subdivider shall tap corporation stops into the main as shown in the SFWD Standard Drawings.

c) Gate valves – Subdivider shall use gate valves for pipe sizes 4" diameter and larger. Gate valves shall conform to ANSI/AWWA C509 and NSF 61 certified.

Gate valves shall have push-on by push-on (Tyton by Tyton) ends that the Subdivider designs to accommodate U.S. Pipe "Field-Lok" gaskets. Such values shall have a non-rising stem and be resilient seated, right turn open, nut operated, and epoxy coated. Gate valves shall be the approved make and model per the latest City Purchasing Contract for gate valves.

13. AIR OR BLOW-OFF VALVES

a) Subdivider shall design and install air and blow-off valves to conform to DPH requirements and to CCR Title 22, Section 64575 and Section 64576.

b) Air valves and blow-off valves shall be manual type and the assembly shall be as shown in the SFWD Standard Drawings.

c) Subdivider shall design the low pressure water distribution system to minimize high points where air can accumulate. Subdivider shall provide all high points in the distribution system with air release valves. Subdivider shall install air valves next to a shut-off valve, at the high end of the segment isolated by two gate valves.

d) Subdivider shall install blow-offs at low points and dead ends. Subdivider also shall install blow-offs next to a shut-off valve, at the low end of the segment isolated by two gate valves.

14. VALVE BOXES AND COVERS

Valve boxes and covers shall be per SFWD Standard Drawings.

15. SERVICE LATERALS, VALVES, METERS, AND METER BOXES AND COVERS

a) Service laterals – Each type of low pressure water service shall have a separate service lateral and valve.

b) New service to existing main connection – Subdivider shall coordinate the new service to existing main with the SFWD prior to the service lateral installation.

c) New service to new main connection – The Subdivider shall install the new service lateral connection to new mains.

d) Subdivider shall install new service laterals in conjunction with the construction of new water mains. Where the Subdivider will pave a street prior to lot improvements,

Subdivider shall construct the service lateral prior to the last lift of paving. The City Engineer with the consent of the PUC may approve a variance to this standard on a case-by-case basis.

e) Meter covers – Meter covers shall meet accessibility requirements when the Subdivider locates them in pedestrian areas such as the sidewalks.

f) Meter boxes – Subdivider shall not locate meter boxes within the pedestrian throughway zone of the sidewalks. The City Engineer with the consent of the PUC may approve a variance to this standard on a case-by-case basis.

g) Installation of new service lateral, meter, meter box, and cover – For new service laterals from new mains, the Subdivider shall furnish and install the service lateral, valve, and fittings to a point inside the meter box, up to and excluding the meter and meter box, and thence from the meter to one (1) foot beyond the back of public sidewalk. SFWD shall furnish and install the meter and meter box at cost for the developer. The City Engineer with the consent of the PUC may approve a variance to this standard on a case-by-case basis.

For new service laterals from existing mains, SFWD shall furnish and install the service lateral, meter, and meter box at cost for the developer. The Subdivider shall be responsible for shoring, excavation, backfill, and pavement restoration.

h) Location of service – In general, Subdivider shall install the meter at the principal frontage of the premises, in the area between the curb line and the customer's premises. The Subdivider shall not located the meter in the traveled way of City streets, private roads or driveways except in certain unusual situations. The City Engineer with the consent of the PUC may approve an alternate location, on a case-by-case basis. In all

cases, whether initial installation or relocation of existing service, the City Engineer with the consent of the PUC shall approve the specific location of the meter. The Subdivider shall install the meter in the approved location upon payment of applicable PUC charges.

ATTACHMENT 11

RECYCLED WATER SYSTEM

A. RECYCLED WATER DEMAND AND DISTRIBUTION DESIGN CRITERIA

1. GENERAL

The City currently does not have an independent recycled water system to serve the recycled water system in the Subdivision Area. The recycled water system in the Subdivision Area shall be temporarily served by the low pressure water system until the City develops an independent recycled water system. The Subdivider shall design the recycled water system in the Subdivision area to serve the recycled water demands using the interim cross connection(s) to the low pressure water system. The recycled water system design for the Subdivision Area shall assume that the future recycled water system will be able to provide connection boundary conditions meeting or exceeding the boundary conditions provided by the interim connection to the low pressure water system.

2. RECYCLED WATER DEMAND

Recycled water demand shall simulate recycled water usage patterns for the proposed Candlestick Point and Hunters Point Shipyard Phase II parcel development layout. Subdivider shall include recycled water demands with the low pressure water demands in the low pressure water system analysis to reflect the interim connection of the recycled water system to the low pressure water system.

3. PEAKING FACTOR

Peak Hour Demand for Parcels = 2.4 x Average Day Demand

Peak Hour Demand for Parks & Open Spaces = 6.7 x Average Day Demand

4. MAXIMUM VELOCITY

Peak Hour Demand: 5 feet per second

5. RESIDUAL PRESSURE

Peak Hour Demand: 40 psi

6. HAZEN-WILLIAMS COEFFICIENT

For new ductile iron pipe, use a Hazen Williams coefficient C=110. For existing pipe, use a Hazen Williams coefficient C=80.

B. RECOMMENDED STANDARDS OF DESIGN FOR RECYCLED WATER

1. RECYCLED WATER SYSTEM REVIEW

The City Engineer with the consent of the PUC shall approve the recycled water system layout.

2. STANDARDS

The Subdivider shall design and construct the recycled water system similar to the low pressure water system and in accordance with all applicable City, State, and federal codes and standards. Applicable codes and standards include:

- California Code of Regulations, Title 22, CA DPH
- California Waterworks Standards, R-14-03, CA DPH
- American Water Works Association (AWWA) Standards
- City and County of San Francisco Department of Public Works – Bureau of

Engineering Standard Plans and Standard Specifications

- San Francisco Water Department Standard Plans and Standard Specifications

3. TRANSMISSION AND DISTRIBUTION MAINS

a) Size –Subdivider shall use pipe diameters of 6, 8, 12 and 16 inches for all distribution and feeder mains. The City Engineer with the consent of the PUC may approve alternative pipe sizes on a case-by-case basis; provided, however, that the Subdivider shall not use pipe diameters of 10 and 14 inches.

b) Transmission main material – The recycled water transmission main material shall be Class 53 ductile iron conforming to ANSI/AWWA C151/A21.51 and shall conform to CCR Title 22, Section 64570.

The ductile iron pipe shall be cement-mortar lined conforming to ANSI/ASTM C104/A21.4 and shall be asphaltic outside coated conforming to ANSI/AWWA C151/A21.51. The cement-mortar lining shall be double the standard thickness.

The ductile iron pipe joints shall be Tyton joints with U.S. Pipe “Field-Lok” gaskets.

The pipe fittings shall be ductile iron conforming to ANSI/AWWA C110/A21.10 or ANSI/AWA C153/A21.53. Except for caps, fittings shall have Tyton joints with U.S. Pipe “Field-Lok” gaskets. Subdivider shall fasten caps to the pipe by use of tie rods and lugs or restrainers.

c) Distribution main material – The recycled water distribution main material shall be Class 53 ductile iron pipe conforming to ANSI/AWWA C151/A21.51 and conforming CCR Title 22, Section 64570 for all pipe sizes.

Ductile iron pipe shall be cement-mortar lined conforming to ANSI/ASTM

C104/A21.4 and shall be asphaltic outside coated conforming to ANSI/AWWA C151/A21.51. The cement-mortar lining shall be double the standard thickness. Ductile iron pipe joints shall be Tyton joints with U.S. Pipe "Field-Lok" gaskets. The pipe fittings shall be ductile iron conforming to ANSI/AWWA C110/A21.10 or ANSI/AWA C153/A21.53. Except for caps, fittings shall have Tyton joints with U.S. Pipe "Field-Lok" gaskets. Subdivider shall fasten caps to the pipe by use of tie rods and lugs or restrainers.

d) Certification – Recycled water main materials, linings, and coatings shall be certified by the National Sanitary Foundation (NSF).

4. SERVICE LATERALS

a) Size – Service lateral diameters shall be 1, 2, 4, 6, 8, and 12 inches. Subdivider shall not use service lateral diameters of 3 inches and less than 1 inch.

b) Material –

(1) 1 and 2 inch service laterals – Service lateral diameters 1 and 2 inches shall be copper tubing type K and shall conform to CCR Title 22, Section 64570. Soft or hard type K copper tubing shall be per service size as shown in SFWD Standard Drawings.

Subdivider shall use service lateral valves and fittings of bronze or brass conforming to AWWA C800.

(2) 4 inch and larger service laterals – Service lateral diameters 4 inches and larger shall be Class 53 ductile iron conforming to ANSI/AWWA C151/A21.51 and shall conform to CCR Title 22, Section 64570.

The ductile iron pipe shall be cement-mortar lined conforming to ANSI/ASTM C104/A21.4 and shall be asphaltic outside coated conforming to ANSI/AWWA C151/A21.51. The cement-mortar lining shall be double the standard thickness.

The ductile iron pipe joints shall be Tyton joints with U.S. Pipe "Field-Lok" gaskets.

Service lateral fittings shall be ductile iron conforming to ANSI/AWWA C110/A21.10 or ANSI/AWA C153/A21.53. Except for caps, fittings shall have Tyton joints with U.S. Pipe "Field-Lok" gaskets. Subdivider shall fasten caps to the pipe by use of tie rods and lugs or restrainers.

(3) Joints – Subdivider shall restrain joints on all laterals to the main per SFWD Standard Drawings. Subdivider shall restrain all joints and gate valves on 4 inch or larger service laterals per the SFWD Standard Drawings.

(4) Certification – Recycled water service lateral materials, linings, and coatings shall be certified by the National Sanitary Foundation (NSF).

5. INSTALLATION OF RECYCLED WATER MAINS

The installation criteria for recycled water are similar to the low pressure water.

a) Location – Subdivider shall locate recycled water mains and structure appurtenances within the public right-of-way unless the City Engineer with the consent of the PUC approves an alternate design on a case-by-case basis. The City Engineer with the consent of the PUC shall approve any dedicated easements on private property accessible to SFWD personnel and equipment for maintenance,

repair, and servicing on a case-by-case basis. Any easement that the Subdivider proposes to accommodate public facilities in lieu of fee dedication shall require the City Engineer with the consent of PUC to approve such easement on a case-by-case basis. Subdivider shall locate recycled water mains and appurtenances so that the excavation and repair of the main or structure appurtenances will not encroach on private property without dedicated easements.

Subdivider shall locate the recycled water main 4' clear minimum between the recycled water main centerline and the face of curb. The City Engineer with the consent of the PUC may approve a clearance of less than 4' from the main centerline to the face of curb on a case-by-case basis.

b) Separation – See UTILITY, SURFACE IMPROVEMENTS, AND BMP SEPARATION section for the approximate location and separation of the recycled water to the other utilities and improvements.

c) Layout – Subdivider shall lay out recycled water mains in segmented grids and loops. Subdivider may install dead-end recycled water mains only if:

   (1) Looping or gridding is impractical due to topology, geology, pressure zone boundaries, unavailability of easements, or location of users; or

   (2) The main that the Subdivider proposes to extend in the near future and the planned extensions would eliminate the dead-end conditions.

   (3) The City Engineer with the consent of PUC to approve such design on a case-by-case basis.

d) Cover – Subdivider shall install recycled water mains below ground shall have the following minimum cover:

Pipe Size	Minimum Cover
8-inch or less	30 inches
12 and 16-inch	32 inches

Recycled water mains with less than the minimum cover shall have a protecting slab or other structural protective measures, if the City Engineer with the consent of the PUC approves an alternate design to distribute surface loads on a case-by-case basis.

e) Trench width – Minimum pipe trench widths shall be as follows:

Pipe Size	Minimum Trench Width
4, 6, and 8-inch	18 inches
12-inch	24 inches
16-inch	30 inches

f) Thrust blocks – Subdivider shall install thrust blocks on pipes larger than 12" diameter at all fittings or angular bends of 11-1/4 degrees or larger. The City shall not require thrust blocks for lines 12" in diameter and smaller.

Subdivider shall design thrust blocks to resist the thrust reaction forces at the bends or fittings whose magnitude will depend on the pipe diameter, internal pressures, and allowance for water hammer. Subdivider shall design thrust blocks to transfer and distribute the thrust forces to the undisturbed soil surface. The City Engineer and the PUC shall determine surface bearing capacity of soil based on by a soil investigation or report. Subdivider shall design thrust block with a minimum factor of safety of 1.25.

g) Polyethylene encasement – Subdivider shall encase the entire ductile iron pipe

system, including service laterals, in an 8 mil, low density, and purple polyethylene in accordance with ANSI/AWWA C105/A21.5.

6. CATHODIC PROTECTION

Subdivider shall design and install cathodic protection in conjunction with ductile iron pipe recycled water mains and ductile iron and copper recycled water laterals.

7. JOINT RESTRAINT DEVICES

For ductile iron pipe, joint restraint devices shall be per the SFWD Standard Drawings, except that bolts, nuts, and tie-rods shall be stainless steel TP304.

8. BACKFLOW PREVENTER

The , Water Quality Bureau (WQB) shall determine and approve type of backflow . The Subdivider shall design and install the backflow preventer in accordance with CCR Title 17, Sections 7601, 7602, 7603, and 7604, and City Ordinance 356 -84, Article 12A.

The location of all backflow preventers shall be outside of the City right-of-way, within 25’ of the recycled water meter, unless the City Engineer with the consent of the PUC approves a variance to this standard , on a case-by-case basis.

Where the recycled water system connects to the low pressure water system on a temporary basis, the City shall require a backflow preventer. The location of this backflow preventer shall be outside of the City right-of-way, within a public utility easement, unless the City Engineer with the consent of the PUC approves of an alternative location , on a case-by-case basis. Any such public easement on private property shall require approval of the City Engineer and the PUC.

9. VALVES

a) Location – Subdivider shall locate valves per CCR Title 22, Section 64577 and as specified herein.

Subdivider shall provide all taps to existing mains with valves. Subdivider shall locate valves on all branches of the main and all service laterals.

Subdivider shall install valves on mains in commercial areas at a minimum interval of 500 feet. Subdivider shall install valves on mains in non-commercial areas no more than one block apart or within an interval of 800 feet.

Subdivider shall locate valves outside of all crosswalks with a1'minimum clearance. The City Engineer with the consent of the PUC may approve a variance for valves located within the crosswalks on a case-by-case basis.

Subdivider shall provide dead ends for future expansion with a valve.

b) Corporation stops – Subdivider shall use corporation stops for service laterals 2" diameter and smaller.

Subdivider shall tap corporation stops into the main as shown in the SFWD Standard Drawings.

Subdivider shall identify corporation stops with a stamped brass or engraved plastic disc not less than 1.5 inches in diameter that is permanently affixed to the corporation stop with the inscription:

"RECYCLED WATER" with a universal icon for non-potable water.

c) Gate valves – Subdivider shall use gate valves for pipe sizes 4" diameter and larger. Gate valves shall conform to ANSI/AWWA C509 and NSF 61 certified. Gate valves shall have push-on by push-on (Tyton by Tyton) ends designed to accommodate U.S. Pipe "Field-Lok" gaskets, have a non-rising stem, and be

purple in color, resilient seated, right turn open, nut operated, and epoxy coated. Subdivider shall identify gate valves with a stamped brass or engraved plastic disc not less than 1.5 inches in diameter that is permanently affixed to the gate valve with the inscription:

"RECYCLED WATER" with a universal icon for non-potable water.

Gate valves shall be the make and model that the City approved in the latest City Purchasing Contract for gate valves.

10. AIR OR BLOW-OFF VALVES

a) Subdivider shall design and install air and blow-off valves to conform to DPH requirements and to CCR Title 22, Section 64575 and Section 64576.

b) Air valves and blow-off valves shall be manual type and the Subdivider shall show the assembly in accordance with the PUC SFWD Standard Drawings.

c) Subdivider shall identify air valves and blow-off valves with a stamped brass or engraved plastic disc not less than 1.5 inches in diameter that is permanently affixed to the valve with the inscription:

"RECYCLED WATER" with a universal icon for non-potable water.

(1) Subdivider shall design the recycled water distribution system to minimize high points where air can accumulate. Subdivider shall provide all high points in the distribution system with air release valves. Subdivider also shall install air valves next to a shut-off valve, at the high end of the segment isolated by two gate valves.

(2) Subdivider shall install blow-offs at low points and dead ends. Subdivider also shall install blow-offs next to a shut-off valve, at the low end of the

segment isolated by two gate valves.

11. VALVE BOXES AND COVERS

The valve box assembly shall consist of a ductile iron frame and valve box similar to the auxiliary water supply system (AWSS) hydrant valve box in the Standard Plans. The valve cover shall be triangular shape with the following inscription cast on the top:

"RECYCLED WATER" with a universal icon for non-potable water.

12. SERVICE LATERALS, VALVES, METERS, AND METER BOXES AND COVERS

a) Service laterals – Each type of recycled water service shall have a separate service lateral and valve.

b) New service to existing main connection – Subdivider shall coordinate the new service to existing main connection with the PUC/SFWD prior to the service lateral installation.

c) New service to new main connection – The Subdivider shall install the new service lateral connection to new mains.

Subdivider shall install new service laterals in conjunction with the construction of new recycled water mains. Where the Subdivider proposes to pave a street prior to lot improvements, Subdivider shall construct the service lateral prior to the last lift of paving. The City Engineer with the consent of the PUC may approve of any variance to this standard on a case-by-case basis.

d) Meters – The recycled water meters shall be purple in color. Subdivider shall identify meters with a stamped brass or engraved plastic disc not less than

1.5 inches in diameter that is permanently affixed to the meter with the inscription:

"RECYCLED WATER" with a universal icon for non-potable water.

e) Meter covers – Meter covers shall meet accessibility requirements when the Subdivider locates them in pedestrian areas such as the sidewalks.

f) Meter boxes – Subdivider shall not locate meter boxes within the pedestrian throughway zone of the sidewalks except the City Engineer with consent of the PUC approves an alternate location on a case-by-case basis.

g) Installation of new service lateral, meter, meter box, and cover – For new service laterals from new mains, the Subdivider shall furnish and install the service lateral, valve, and fittings to a point inside the meter box, up to and excluding the meter and meter box, and thence from the meter to one (1) foot beyond the back of public sidewalk. SFWD shall furnish and install the meter and meter box at cost for the Subdivider.

For new service laterals from existing mains, SFWD shall furnish and install the service lateral, meter, and meter box at cost for the Subdivider. The Subdivider shall be responsible for shoring, excavation, backfill, and pavement restoration.

ATTACHMENT 12

AUXILIARY WATER SUPPLY SYSTEM (AWSS)

A. DESIGN

For all Subdivision projects in the City, the Subdivider shall provide an Auxiliary Water Supply System (AWSS) to the satisfaction of the SFFD, including but not limited to high pressure water mains and hydrants, cisterns, a Portable Water Supply Systems (PWSS), suction inlets and fireboat manifolds. The City Engineer with the consent of the SFFD may approve of a variance to this standard on a case-by-case basis. The PUC shall design any AWSS features on behalf of the SFFD.

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B. SEPARATION

See UTILITY, SURFACE IMPROVEMENTS, AND BMP SEPARATION section for the approximate location and separation of the AWSS to the other utilities and improvements.

ATTACHMENT 13

STREET LIGHTS AND LIGHTING SYSTEMS

A. GENERAL

1. The Subdivider or its authorized representative shall make arrangements with the serving utility for service points. Subdivider shall show service points on the improvement plans. The Subdivider shall be responsible for all costs associated with connecting the street lights. Subdivider shall pay these costs directly to the serving utility. The Subdivider shall verify the street light service point location(s) with the serving utility and have plans with the utility approved service points to installation. The Subdivider shall coordinate with the PUC Bureau of Heat, Light, and Power (BLHP) to request energization from the serving utility.
2. Subdivider shall design street lighting systems utilizing street light lamps up to, and including, 150 watts for 120-volt service unless connecting to an existing system. When connecting to an existing system, the Subdivider's design shall conform to the system to which it is connected. The PUC BLHP may approve a variance to this standard on a case-by-case basis. Street lighting systems that utilizes street light lamps above 150 watts shall require 240-volt service.
3. Street lighting materials and installations shall conform to the National Electrical Code (N.E.C.) and applicable sections of the Standard Plans and Standard Specifications.
4. PUC BLHP shall review, approve, and inspect all street lighting projects. The PUC

BLHP may approve any variations to these design standards on a case-by-case basis.

B. ROADWAY ILLUMINATION REQUIREMENTS

1. Area Classifications

   Subdivider shall base area classifications on the American National Standard Practice for Roadway Lighting (Illuminating Engineering Society (IES) RP-8).

2. Average Maintained Foot-Candle Requirements

   Subdivide shall base average maintained foot-candle requirement on the American National Standard Practice for Roadway Lighting (IES RP-8). For calculation, use a Light Loss Factor equal to 0.81 for Light Emitting Diode (LED).

C. STREET LIGHTS

1. PUC BLHP shall approve the street light poles and fixtures that the Subdivider proposes to use. Street light poles and fixtures shall be in substantial conformance with the applicable Streetscape Master Plan, that the City approves.
2. Each street light shall have a number for identification. The PUC BLHP shall assign and provide the identification number. The Subdivider shall provide and apply the decals to the poles as shown on PUC BLHP standard drawing 1277A, revision 1. The decals shall be pressure sensitive and have a reflectorized yellow-colored number that is 2-1/2 inch high on a black background. The overall decal dimension shall be 1-3/4 inches wide x 2-7/8 inches high. Panduit shall manufacture the decals, part number PRL250YB unless PUC BLHP approves an alternate equivalent decal. Subdivider shall not install the decals shall during threatening or inclement weather.

D. PHOTOCELLS

1. For street lights that the Subdivider equips with photoelectric control, the photocell shall be Type IV consisting of a photoelectric unit which plugs into an EEI-NEMA twist lock receptacle integral with the luminaire.
2. The photoelectric controls shall be operable within a minimum voltage range between 105 and 305 volts.
3. Subdivider shall orient the photoelectric controls to the north.
4. Photoelectric controls for luminaires shall be Dark to Light Model #D124-1.5-SM or an alternate equivalent model that the PUC BLHP approves which has an instantaneous turn on at 1.5 + 0.3 foot-candles and having a turn off/on ratio of 1.5:1.

E. WIRING

1. Unless otherwise noted, all wiring methods and equipment construction shall conform to the National Electric Code (N.E.C.) and applicable sections of the Standard Specifications, Bureau of Engineering, Department of Public Works, City and County of San Francisco dated November 2001 and Standard Plans dated April 2007.
2. Subdivider shall make all splices in accordance with DPW Standard Plan 87,204.
3. The wiring for the street light shall conform to the requirements of DPW Standard Plan 87,203.
4. PUC BLHP prohibits the use of insulating boot on each fuse holder for service connection. Subdivider shall wrap installed connectors with a minimum of four half-lapped layers of rubber or rubber mastic tape. For this overlap Subdivider

shall use at least two half-lapped layers of Scotch 33+ vinyl or an alternate premium tape that the PUC BLHP approves. After taping splices, Subdivider shall apply Scotchkote electrical coating evenly over splices or as the manufacturer recommends.

5. Unless PUC BLHP authorizes otherwise, Subdivider shall use No. 10 AWG wiring that is solid copper for street lights and No. 8 AWG or larger that is stranded copper for street lights. Subdivider shall insulate street light wiring for 600 volt with Type THW insulation.
6. Wiring shall be of the following sizes:

   Field wiring: #8 minimum (N.E.C.)

   Pull box to street light: #10 minimum (N.E.C.)

   Wire in pole: #10 minimum (N.E.C.)

F. CONDUIT

1. Conduit shall be 1 1/2–inch, hot-dip galvanized rigid steel as indicated in Section 601 of the Standard Specifications.
2. Subdivider shall hot-dip galvanize all steel conduit and other metal parts, including bonding bushing, shall and list these for the use. The Subdivider shall bonded and ground conduit in a continuous manner in accordance with NEC requirements. All threads shall either have factory installed hot dip galvanizing or a listed thread protection compound.
3. Subdivider shall make all bends and offsets with listed conduit benders or use of listed factory-made bends. The total of bends in one run of conduit shall not exceed 360 degrees.

4. All empty conduits shall have a one-quarter inch polypropylene pull rope provided inside and sealed with a dual seal, on both ends of the conduit. The PUC BLHP shall approve of the dual seal that the Subdivider uses.
5. Subdivider shall seal with a duct seal the ends of all conduits that the Subdivider installs. Subdivider shall cap conduits that Subdivider stubs for future extension. PUC BLHP shall approve the duct seal that the Subdivider uses.

G. PULL BOXES AND PULL BOX COVERS

1. Subdivider shall install all pull boxes per Standard Plan 87,201 with a crushed rock pad as shown in the referenced Standard Plan and Subdivider shall install these within five feet of the base of all street light poles.
2. Subdivider shall not place pull boxes where they will be subject to vehicular traffic.
3. Subdivider shall not install pull boxes within curb ramps including the grooved borders as defined in Standard Plan CR-1.
4. Subdivider shall not install pull boxes more than 250 feet apart on long runs.
5. Subdivider shall inscribe pull box covers with the first line, "STREET LIGHTING", and the second line, “120/240 VOLT”. The letters shall be 1-inch high and shall be made with 1/4-inch wide strokes. The letters inscribed in concrete lids covers shall be made with 1/8-inch minimum deep imprints. Subdivider shall make legends in steel covers with weld bead letters.

ATTACHMENT 14

ELECTRICAL SYSTEMS

A. GENERAL

PUC BLHP intends these Regulations to serve as a guide in the preparation of design plans and specifications for the electrical power supply and distribution system within the Subdivision Area. Subdivider shall use the recommendations to indicate desirable procedures or methods and serve as guidelines for designers. Subdivider's design of the electrical system shall provide for, but not be limited to:

- Personnel and public safety
- Environment impacts, including electric and magnetic fields, insulation, and clearances
- Reliable service
- Flexibility for the addition of future loads
- Ease of maintenance
- Convenience of operation
- Interchangeability of equipment
- Aesthetics
- Cost

The design shall conform to Pacific Gas and Electric's (PG&E) Electric and Gas Service Requirements (Greenbook).

Subdivider also shall prepare the design of the electrical systems and components in

accordance with the laws and regulations of the Federal government, State of California, and industry standards. If there are conflicts between the cited documents, the more conservative requirement shall apply. The following codes, standards, and design considerations shall apply to the electrical aspects of the power facility.

- American National Standards Institute (ANSI)
- American Society for Testing and Materials (ASTM)
- California State General Order 95 (GO 95)
- California State General Order 128 (GO 128)
- Edison Electrical Institute (EEI)
- Insulated Cable Engineers Association (ICEA)
- Institute of Electrical and Electronics Engineers (IEEE)
- Illuminating Engineering Society (IES)
- National Association of Corrosion Engineers (NACE)
- National Electrical Code (NEC)
- National Electrical Manufacturers Association (NEMA)
- National Electrical Safety Code (NESC)
- National Fire Protection Association (NFPA)
- Occupational Safety and Health Act (OSHA)
- Underwriters' Laboratories (UL)
- Design drawings and provide support documentation
- Joint trench/pole intent drawings
- Gas layout drawings
- Single line drawings, key sketch

- Base Maps
- Construction detail drawings
- Street light design-coordinate with applicable government agency
- Engineering calculations (e.g., voltage drop, flicker, pulling tension, pole sizing,

guying, etc.)
- Substructure information
- Stub/full/branch service locations (that a utility pre-approves)
- Main locations
- Meter locations (pre-approved by utility)
- Identify permits
- Identify right-of-ways that utilities may require
- Trench cost allocation estimate
- Coordination with other utilities if joint trench or joint pole
- Tentative design and construction scheduling
- Gas handling procedures
- Leak test requirements
- Conflict checks
- Material list
- Stamped by a Registered Professional Engineer (PE)

B. SEPARATION

See Attachment 16 for the approximate location and separation of the joint trench to the other utilities and improvements.

ATTACHMENT 15

AUTOMATED WASTE COLLECTION SYSTEM (AWCS)

A. GENERAL

The Subdivider may implement AWCS upon mutual agreement between the City and the Subdivider. The AWCS operator shall provide the final AWCS design subject to the approval of the City.

B. LOCATION

The right to occupy the public right-of-way shall be subject to either an encroachment permit or a franchise or license agreement.

C. SEPARATION

See UTILITY, SURFACE IMPROVEMENTS, AND BMP SEPARATION section for the approximate location and separation of the AWCS to the other utilities and improvements.

ATTACHMENT 16

UTILITY, SURFACE IMPROVEMENTS, AND BMP SEPARATION

A. UTILITY MAIN TO UTILITY MAIN SEPARATION

1. Horizontal separation – The horizontal utility main to utility main separation shall be as shown in Table XXVI.1; provided, however that the City Engineer with the consent of the PUC may approve an alternate design on a case-by-case basis.

   Subdivider and/or affect utilities shall locate each specific utility main one (1) foot minimum clear away from the structure appurtenances of other utilities such as manholes, catch basins, valve boxes, etc. (measured from the outside pipe diameter to outside structure edge); provided, however, that the City Engineer with the consent of the PUC may approve an alternate design on a case-by-case basis.

   The designer shall determine which separation condition, either pipe to pipe separation or pipe to utility structure appurtenances separation, controls the alignment of the utility. The utility main layout shall avoid sectional horizontal pipe offsets to meet separation requirements provided, however, that the City Engineer with the consent of the PUC may approve an alternate design on a case-by-case basis.

   The typical horizontal utility main layout shall be as shown in Figure XXVI.1

"Typical Pipe Separation Street Utility Layout" and Figure XXVI.2 "Typical Pipe Separation Street Utility Section."

2. Vertical separation – Subdivider shall locate potable water mains one (1) foot minimum clear (measured from the outside diameter to outside diameter) above non-potable water mains in conformance to DPH requirements and CCR Title 22, Section 64572; provided, however, that the City Engineer with the consent of the PUC may approve an alternate design on a case-by-case basis.

   Potable water utility to potable water utility crossings shall be one (1) foot minimum clear (measured from the outside diameter to outside diameter); provided, however, that the City Engineer with the consent of the PUC may approve an alternate design on a case-by-case basis.

   Non-potable water utility to non-potable water utility crossings shall be (1) foot minimum clear (measured from the outside diameter to outside diameter).; provided, however, that the City Engineer with the consent of the PUC may approve an alternate design on a case-by-case basis.

   Subdivider shall locate the storm drain main pipe invert at a street section equal to or higher than the combined sewer main pipe invert and the separated sanitary sewer main pipe invert; provided, however, that the City Engineer with consent of the PUC may approve an alternate design on a case-by-case basis.

   Subdivider shall show the typical vertical utility main separation consistent with Figure XXVI.2 "Typical Pipe Separation Street Utility Section."

3. Trenching – Subdivider and/or utility providers shall not locate different utilities in the same utility trench.

B. UTILITY LATERALS AND APPURTENANCES TO UTILITY MAIN SEPARATION

Utility laterals shall have (1) foot minimum vertical separation from other utility mains where they cross; provided, however that the City Engineer with consent of the PUC may approve an alternate design on a case-by-case basis. Utility laterals shall not cross below any other utility structures; provided, however that City Engineer with consent of the PUC may approve an alternate design on a case-by-case basis. Utility laterals with approval for less than (1) foot minimum vertical separation from other utility mains or that the Subdivider and/or utilities install below other utility structures shall be in casings that the PUC approves.

C. UTILITY TO SURFACE IMPROVEMENTS SEPARATION

1. Utility Structure Surface Appurtenances to Surface Improvements Separation – In general, Subdivider and/or utilities shall locate utility structure surface appurtenances such as manhole rims, valve covers, valve boxes, etc. clear of the gutter; provided, however, that the City Engineer with the consent of the PUC may approves an alternate design on a case-by-case basis. Subdivider and/or utilities shall locate utility structure surface appurtenances one (1) foot minimum beyond the crosswalk edge.

   The typical utility structure surface appurtenances to surface improvements separation shall be as shown in Figure XXVI.1 "Typical Pipe Separation Street Utility Layout."

2. Utilities to Surface Improvements Separation – Subdivider and/or utilities shall locate utility mains except for joint trench and automated wasted collection system in the street and clear of the curb and gutter except at bulb-out locations.

   At bulb-out locations, the City may allow only low pressure water, recycled water, and AWSS mains to travel under the bulb-out, curb, and gutter in order to meet minimum

utility clearance requirements, where the Subdivider can demonstrate that it is necessary. The City Engineer with the consent of the PUC may allow such alternate design on a case-by-case basis. The City Engineer's approval and PUC's consent for such a design may grant have conditions, including by not limited to: pipe sleeves under the bulb-out, concrete encasement, and/or no joints or laterals under the bulb-out.

The typical utility mains to surface improvements separation shall be as shown in Figure XXVI.1 "Typical Pipe Separation Street Utility Layout" and Figure XXVI.2 "Typical Pipe Separation Street Utility Section."

Subdivider shall not locate combined sewer, separated sanitary sewer, and storm drain mains below surface improvements such as bulb-outs, medians, BRT lanes, landscaped areas, and other similar surface improvements; provided, however, that the City Engineer with the consent of the PUC may approve an alternate design on a case-by-case basis.

The City shall allow utility service laterals to cross below surface improvements such as bulb-outs, medians, BRT lanes, landscaped areas, and other similar improvements as necessary to provide service to each lot or parcel of land. The City shall allow storm drain and sanitary sewer laterals to cross below surface improvements if the Subdivider places lateral vent per City requirements. Where possible, the Subdivider and/or utilities shall avoid utility service laterals crossing below surface improvements.

D. UTILITY TO BMP SEPARATION

1. Horizontal separation – Subdivider and/or utility shall locate utility mains, service laterals, and structure appurtenances one (1) foot minimum clear from the outside edge of BMP measures; provided, however, that the City Engineer with the consent of the PUC

may approve an alternate design on a case-by-case basis.

The typical utility main to BMP separation shall be as shown in Figure XXVI.1 "Typical Pipe Separation Street Utility Layout" and Figure XXVI.2 "Typical Pipe Separation Street Utility Section."

2. Vertical separation – Utility mains and service laterals shall not cross through or below BMPs; provided, however, that the City Engineer with the consent of the PUC may approve an alternate design on a case-by-case basis.

Table XXVI.1

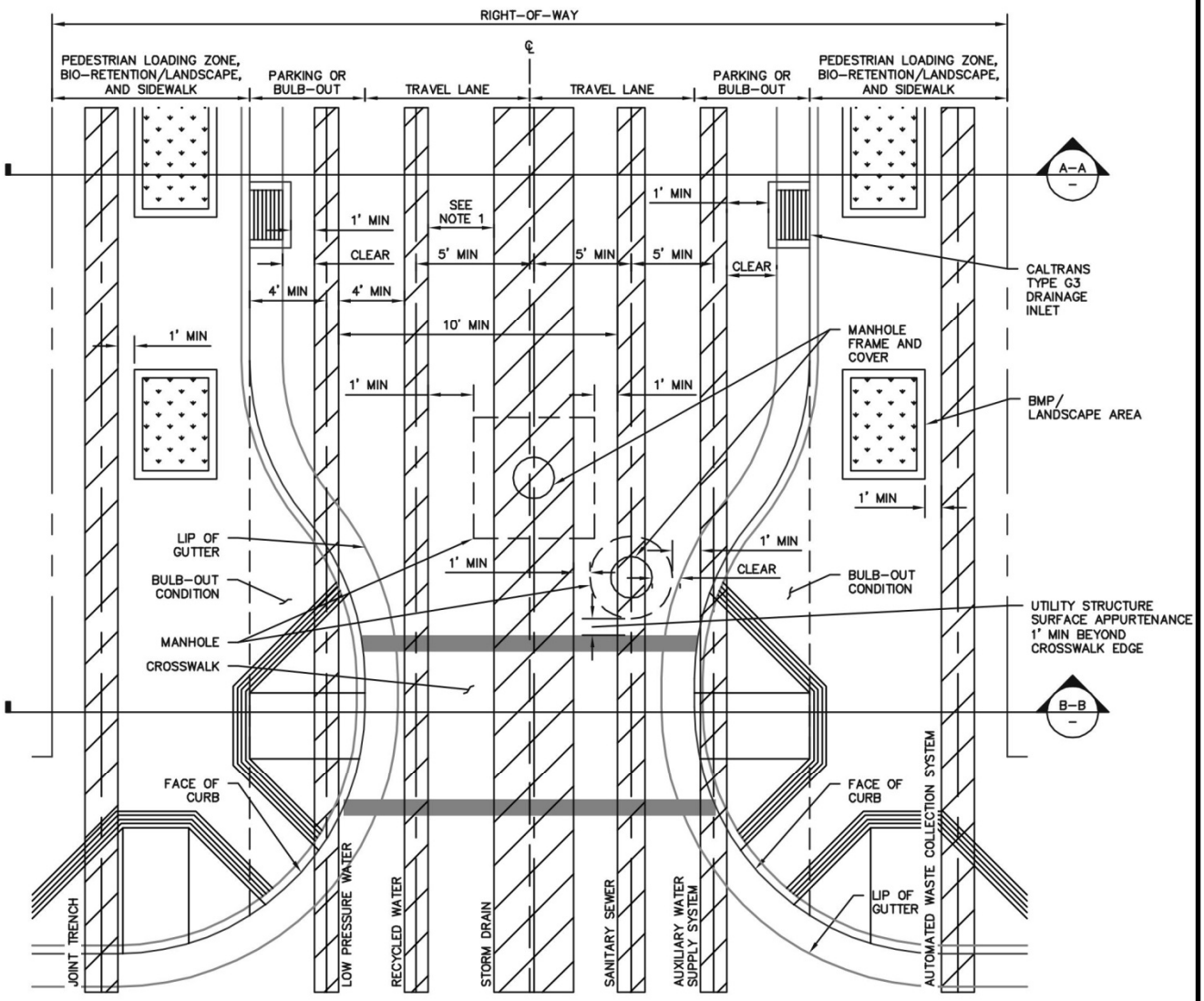
HORIZONTAL UTILITY MAIN SEPARATION

Utility Separation	Combined Sewer	Sanitary Sewer	Storm Drain	Sanitary Sewer Force Main	Potable Water	Recycled Water (Tertiary)	Auxiliary Water Supply System	Joint Trench	Automated Waste Collection System	Structure Appurtenance of Other Utilities
Combined Sewer	----	5' minimum centerline to centerline. See Note 2.	5' minimum centerline to centerline. See Note 2.	5' minimum centerline to centerline. See Note 2.	10' clear minimum outside diameter (OD) to outside diameter (OD) (per DPH requirements and CCR Title 22, Section 64572)	5' minimum centerline to centerline. See Note 2.	5' minimum centerline to centerline. See Note 2.	5' minimum outside edge to outside edge	5' minimum centerline to centerline. See Note 2.	1' minimum clear from outside diameter to outside structure edge
Sanitary Sewer	----	----	5' minimum centerline to centerline. See Note 2.	5' minimum centerline to centerline. See Note 2.	10' clear minimum OD to OD (per DPH requirements and CCR Title 22, Section 64572)	5' minimum centerline to centerline. See Note 2.	5' minimum centerline to centerline. See Note 2.	5' minimum outside edge to outside edge	5' minimum centerline to centerline. See Note 2.	1' minimum clear from outside diameter to outside structure edge
Storm Drain	----	----	----	5' minimum centerline to centerline. See Note 2.	4' clear minimum OD to OD (per DPH requirements and CCR Title 22, Section 64572)	5' minimum centerline to centerline. See Note 2.	5' minimum centerline to centerline. See Note 2.	5' minimum outside edge to outside edge	5' minimum centerline to centerline. See Note 2.	1' minimum clear from outside diameter to outside structure edge
Sanitary Sewer Force Main	----	----	----	----	10' clear minimum OD to OD (per DPH requirements and CCR Title 22, Section 64572)	5' minimum centerline to centerline. See Note 2.	5' minimum centerline to centerline. See Note 2.	5' minimum outside edge to outside edge	5' minimum centerline to centerline. See Note 2.	1' minimum clear from outside diameter to outside structure edge
Potable Water	----	----	----	----	----	4' clear minimum OD to OD (per DPH requirements and CCR Title 22, Section 64572)	4' clear minimum OD to OD, similar to storm drain main. Conform to DPH requirements and CCR Title 22, Section 64572.	5' minimum outside edge to outside edge	10' clear minimum OD to OD, similar to sanitary sewer main. Conform to DPH requirements and CCR Title 22, Section 64572.	1' minimum clear from outside diameter to outside structure edge
Recycled Water	----	----	----	----	----	----	5' minimum centerline to centerline. See Note 2.	5' minimum outside edge to outside edge	5' minimum centerline to centerline. See Note 2.	1' minimum clear from outside diameter to outside structure edge
Auxiliary Water Supply System	----	----	----	----	----	----	----	5' minimum outside edge to outside edge	5' minimum centerline to centerline. See Note 2.	1' minimum clear from outside diameter to outside structure edge
Joint Trench	----	----	----	----	----	----	----	----	5' minimum outside edge to outside edge	1' minimum clear from outside diameter to outside structure edge
Automated Waste Collection System	----	----	----	----	----	----	----	----	----	1' minimum clear from outside diameter to outside structure edge
Utility Structure Appurtenance	----	----	----	----	----	----	----	----	----	----

Notes:

1. The designer shall determine which separation condition, either pipe separation to other pipes or pipe separation to other utility structure appurtenances, controls the alignment of the utility. The utility layout shall generally avoid horizontal pipe offsets to meet separation requirements unless otherwise approved by the Director.

2. For horizontal utility main separation determined by the distance from pipe centerline to pipe centerline, the minimum outside pipe diameter to outside pipe diameter separation shall be 1'.



NOTE:

1. FOR HORIZONTAL UTILITY MAIN SEPARATION DETERMINED BY THE DISTANCE FROM PIPE CENTERLINE TO PIPE CENTERLINE, THE MINIMUM OUTSIDE PIPE DIAMETER TO OUTSIDE PIPE DIAMETER SEPARATION SHALL BE 1'.

STREET UTILITY LAYOUT - PLAN

SCALE: 1" = 10'

NOTES:

1. FOR HORIZONTAL UTILITY MAIN SEPARATION DETERMINED BY THE DISTANCE FROM PIPE CENTERLINE TO PIPE CENTERLINE, THE MINIMUM OUTSIDE PIPE DIAMETER TO OUTSIDE PIPE DIAMETER SEPARATION SHALL BE 1'.

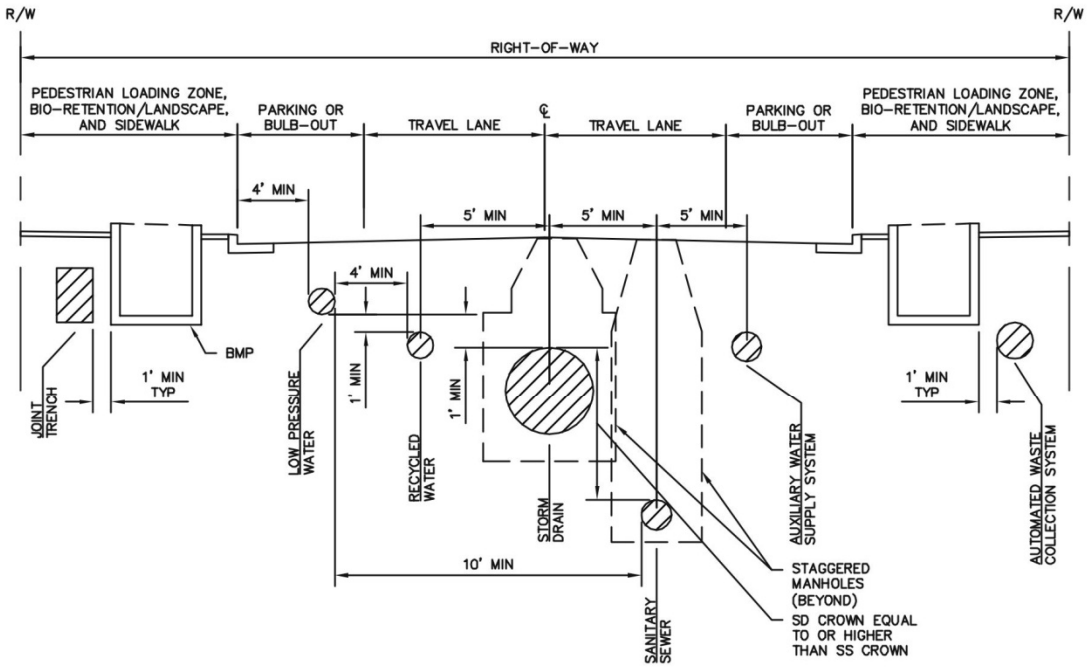
ABBREVIATIONS:

℄	CENTERLINE
MIN	MINIMUM
R/W	RIGHT-OF-WAY

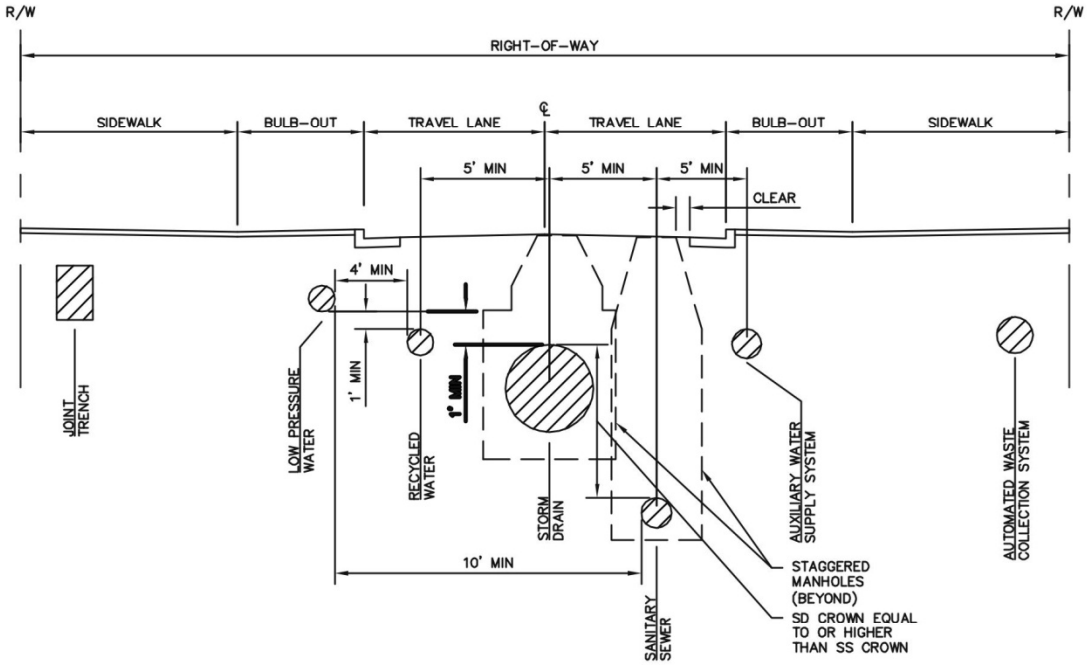
GRAPHIC SCALE

10 0 10

CP/HPS PHASE II SUBDIVISION REGULATIONS
FIGURE XXVI.1
TYPICAL PIPE SEPARATION
STREET UTILITY LAYOUT



SECTION A-A
STREET UTILITY LAYOUT
SCALE: 1" = 10'



SECTION B-B
STREET UTILITY LAYOUT
SCALE: 1" = 10'

ABBREVIATIONS:

℄	CENTERLINE
MIN	MINIMUM
R/W	RIGHT-OF-WAY

GRAPHIC SCALE
10 0 10

CP/HPS PHASE II SUBDIVISION REGULATIONS
FIGURE XXVI.2
TYPICAL PIPE SEPARATION
STREET UTILITY SECTION