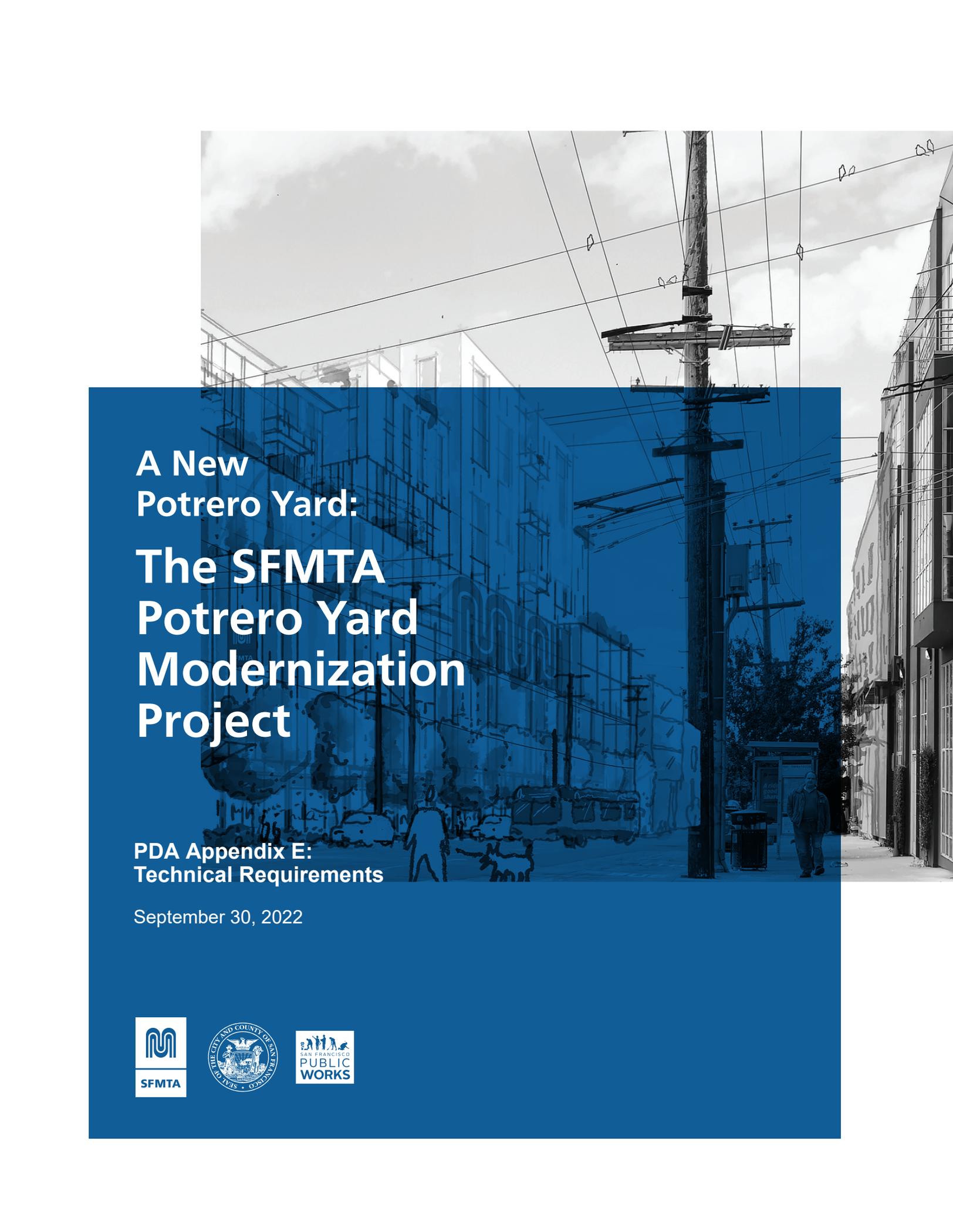


APPENDIX E

TECHNICAL REQUIREMENTS

All initially-capitalized, undefined terms or abbreviations used in this Appendix that are not otherwise defined in this Appendix will have the meanings given to them in Article 1 (*Definitions*) of the Agreement.



A New Potrero Yard: The SFMTA Potrero Yard Modernization Project

PDA Appendix E:
Technical Requirements

September 30, 2022



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Introduction to the Technical Requirements

All terms that are not defined in the Technical Requirements are defined in Section 1 (Definitions) of the Agreement.

Division 1: Cost and Scope Allocation Requirements

Introduction

This Division 1 sets forth the requirements for cost and scope allocation among the three components of the Project.

1 Cost Allocation

Table 1 as follows shows how Project costs incurred by the City are allocated to different sources of funding or revenue for cost recovery, given the Project's dual use/purpose. These allocations must be included in the financial model for the Infrastructure Facility (consisting of the Bus Yard Component (BYC) and the Common Infrastructure) and in the pro forma for the Housing and Commercial Component (HCC).

The Principal Project Company (PPC) will pay City for the City's Predevelopment Costs (incurred during the PDA Term) at Financial Close. The allocation of those costs to the financings of the Infrastructure Facility and the HCC shall be as shown in **Table 1**.

Table 1. Allocation of Costs Incurred by the City

| | Allocation according to the Funding or Revenue Source for Repayment | | |
|----------------------------------|---|--|--------------------------------------|
| | City Sources: Other City funding | City Sources: Availability Payments and Milestone Payment | LD/PPC Sources: HCC rental income |
| City's Prior Costs | 100% | N/A | N/A |
| City's Predevelopment Costs | N/A | Pro rata share based on PCIC | Pro rata share based on PCIH |
| City's Contract Management Costs | 100% | N/A | N/A |
| SFMTA O&M costs | 100% | N/A | N/A |

LD = Lead Developer

PCIC = Percentage of Common Infrastructure Cost allocated to the City.

PCIH = Percentage of Common Infrastructure Cost allocated to the Housing and Commercial Component, which is equal 100% minus the PCIC.

PPC = Principal Project Company

Table 2 as follows shows how Project costs incurred by the Lead Developer (LD) during the PDA Term or the PPC following Commercial Close are allocated to different sources of funding or revenue for recovering. These allocations must be included in the financial model for the Infrastructure Facility and in the pro forma for the HCC.

Table 2. Allocation of Costs Incurred by the Lead Developer or the Principal Project Company

| | Allocation according to the Funding or Revenue Source for Repayment | | |
|--|---|--|--|
| | City Sources: Other City funding | City Sources: Availability Payments and Milestone Payment | LD/PPC Sources: HCC rental income |
| LD/PPC's Prior Costs | N/A | Excluded | Excluded |
| LD/PPC's Predevelopment Costs | N/A | Pro rata share based on PCIC | Pro rata share based on PCIH |
| LD/PPC's DB costs | N/A | BYC + pro rata share of the CI based on PCIC | HCC + pro rata share of the CI based on PCIH |
| LD/PPC's IFM costs | N/A | BYC + pro rata share of the CI based on PCIC | HCC + pro rata share of the CI based on PCIH |
| LD/PPC's Property Management costs | N/A | N/A | 100% |
| LD/PPC's Financing and Transaction Costs | N/A | BYC + pro rata share of the CI based on PCIC | HCC + pro rata share of the CI based on PCIH |
| Other PPC Management Costs | N/A | BYC + pro rata share of the CI based on PCIC | HCC + pro rata share of the CI based on PCIH |

BYC = Bus Yard Component

CI = Common Infrastructure

HCC = Housing and Commercial Component

IFM = Infrastructure Facility Maintenance

LD = Lead Developer

PCIC = Percentage of Common Infrastructure Cost allocated to the City.

PCIH = Percentage of Common Infrastructure Cost allocated to the Housing and Commercial Component, which is equal 100% minus the PCIC.

PPC = Principal Project Company

2 Scope Allocation

2.1 Common Infrastructure

Table 3 as follows defines the Facility's systems and spaces that are part of the physical scope of work of the Common Infrastructure.

All elements of the Facility that are not allocated to the Common Infrastructure shall be allocated either to the BYC according to the program requirements set forth in Division 3 (*Design Criteria Document*) or to the HCC according to the program requirements set forth in Division 6 (*Program for the Housing and Commercial Component*) of the Technical Requirements.

The sum of the Facility systems and spaces allocated to the Common Infrastructure, the BYC, and the HCC shall provide for a complete and functional Facility that meets the Technical Requirements.

Table 3. Facility's Systems and Spaces included in the Common Infrastructure

| Common Infrastructure Scope Item | Description |
|--|--|
| Building Systems | |
| Structural system | The portions of the vertical and lateral structural system of the BYC needed to support the HCC. This includes: (a) the BYC's roof structure supporting the HCC over it; (b) the vertical structure and complete foundations system; and, (c) the BYC's complete lateral force resisting system including foundations, collectors, etc. |
| Building envelope | The complete exterior envelope of the entire Facility, including cladding, waterproofing, and insulation. The building envelope includes the waterproofing system of the roof structure supporting the HCC over the podium. |
| Demising walls separating the BYC from the HCC | <p>If the LD's approach for the Project provides demising walls that are designed and constructed as a single wall assembly, then demising walls will be considered to be part of the Common Infrastructure.</p> <p>If the LD's approach for the Project provides demising walls that are designed and constructed as two separate and independent wall assemblies – one facing the BYC and the other facing the HCC –, then each will be considered to be part of the corresponding Project component.</p> |
| Signage and wayfinding systems | All signage and wayfinding components for the building spaces allocated to the Common Infrastructure. |
| Building mechanical, electrical, and plumbing systems and common utility systems | <p>If the LD's approach for the Project includes common utility systems for the Facility as a whole, as described in Section 3 (Common Utility Systems Requirements) of Division 4 (Supplementary Design Criteria) of the Technical Requirements, then the common utility systems will be considered to be part of the Common Infrastructure. In this case, they will include the Facility-wide Building Management System.</p> <p>If the LD's approach for the Project provides for separate building mechanical, electrical, and plumbing systems for each Project component, then each such system will be considered to be part of the corresponding Project component. In this case, each component will have an independent Building Automation System (BAS).</p> <p>In all cases each Project component shall have separate metering.</p> |
| Fire and life-safety systems | <p>If the LD's approach for the Project includes an integrated Facility-wide fire and life-safety system, then the fire and life-safety system will be considered to be part of the Common Infrastructure. In this case, it will include the Facility-wide fire and life-safety control systems.</p> <p>If the LD's approach for the Project provides for separate fire and life-safety systems for each Project component, then each such</p> |

| Common Infrastructure Scope Item | Description |
|---|--|
| | system will be considered to be part of the corresponding Project component. In this case, each component will have an independent fire and life-safety control systems. |
| Civil and Site utility systems | The Facility's stormwater drainage systems (including but not limited to risers, inlets, catch basins, sump pumps, sewer ejector pumps, surge tanks, sub-drains, separators, and piping), water distribution systems (including but not limited to mains, water treatment equipment, storage, controls, valves, irrigation for common use areas, non-potable/reuse systems, fire suppression systems, and meters), sanitary sewer systems (including but not limited to sewer lines, lift stations, main connections, underground delivery systems, separators, backflows, and traps), utility connections, and related systems. Each Project component shall have separate metering. |
| Building Spaces | |
| Building system spaces | All rooms containing a supportive function for any civil and site utility systems, MEP systems, and/or common utility systems that are allocated to the Common Infrastructure as described above. Includes their associated distribution chases, shafts, or raceways, whether vertical or horizontal. |
| Vertical circulation | All stairs, emergency egress, escalators, and elevators in the Facility, that have shared uses by the BYC and HCC. This includes all the mechanical and electrical systems for vertical conveyance systems that have shared used by the BYC and the HCC. For avoidance of doubt, vertical circulation elements that are for the exclusive use of either the BYC or the HCC are not included in the scope of the Common Infrastructure. |
| Common-use spaces | All common use enclosed or open spaces (whether public or private, including the podium roof open space), any shared entrance lobbies, shared restrooms (whether public or private), and shared service areas (e.g., loading docks, storage spaces, waste handling facilities). For avoidance of doubt, entrance lobbies or other spaces that are for the exclusive use of either the BYC or the HCC are not included in the scope of the Common Infrastructure. |
| Public right-of-way improvements | |
| Elements described in <u>Division 8</u> of the Technical Requirements | See Table 1 (<i>Public Benefits Cost Allocation Matrix</i>) in <u>Division 8</u> (<i>Public Benefits Principles</i>) of the Technical Requirements for elements allocated to the Common Infrastructure. |
| All other elements not otherwise described in <u>Division 8</u> of the Technical Requirements | All other public right-of-way improvements that are not otherwise described in <u>Division 8</u> (<i>Public Benefits Principles</i>) of the Technical Requirements and are nevertheless included in the Project to meet either regulatory requirements or the Technical Requirements shall be included in the scope of the Common Infrastructure. |

BYC = Bus Yard Component

HCC = Housing and Commercial Component

LD = Lead Developer

MEP = mechanical, electrical, and plumbing

2.2 Information Technology, Communications, and Security Systems

The purpose of this section is to define the intended allocation of responsibilities for provision and maintenance of Information Technology Systems, Communications, and Security Infrastructure and Equipment (collectively referred to as the IT/Comms Systems) associated with the BYC, as the general framework for development of these systems during the PDA Term.

The following tables organize the scope of the IT/Comms Systems for the BYC in two groups of scope of work, as follows:

1. **Table 4** defines the IT/Comms Infrastructure that the PPC will be responsible for. IT/Comms Infrastructure is generally defined as the fixed infrastructure in the BYC such as, but not limited to, IT/Comms rooms and their corresponding HVAC, cabling distribution support hardware (e.g., such as raceways and conduits), power feeds, etc.
2. **Table 5** defines the IT/Comms Equipment that the PPC or the City will be responsible for. IT/Comms Equipment is generally defined as equipment in the BYC such as, but not limited to, servers, LAN/Wifi networking equipment and cabling, displays, etc. This table allocates responsibilities for specific items of the IT/Comms Equipment to the PPC or the City – items allocated to the City will be furnished, installed, commissioned, operated, and maintained by the City, unless noted otherwise in Table 5.

The IT/Comms Systems associated with the Common Infrastructure will be designed and installed, unless noted otherwise, by the PPC and maintained as part of the Infrastructure Facility Maintenance (IFM) services. The IT/Comms Systems associated with the HCC will be provided by the PPC and maintained as part of the Property Management services.

Table 4 Scope of Work for the Infrastructure Facility's IT/Comms Infrastructure

| Component of the IT/Comms Infrastructure | PPC | City | Notes |
|--|-----|------|---|
| Facility infrastructure, rooms, pathways, Telecom vaults, and the MEP and Fire Protection systems required to support them | X | | Provision and maintenance responsibility of the PPC. |
| In-building pathways and distribution | X | | Provision and maintenance responsibility of the PPC. Horizontal cable trays and EMT conduit are acceptable. |

EMT = Electrical Metal Tubing

MEP = Mechanical, Electrical, and Plumbing

PPC = Principal Project Company

Table 5 Scope of Work for the Infrastructure Facility's IT/Comms Equipment

| Component of the IT/Comms Equipment | PPC | City | Notes |
|---|-----|------|--|
| Incoming Service – Telephone | | X | City orders or coordinates installation of telephone service via the PPC. |
| Incoming Service – Private Circuits | | X | City orders or coordinates installation of private circuits via the PPC. |
| Incoming Service – Internet | | X | The City provides internet service for Wireless LAN. |
| Fit-out of IT/Comms Infrastructure spaces | X | | Includes racks, pathways, and grounding system. |
| Active systems, servers, and switches | | X | City provides and installs in racks. The City will design and install the network and servers. The PPC needs to outfit the BYC for the City's network to be functional, including running the appropriate data drops to workspaces and offices per the PPC's design, and installing appropriate cable trays and conduit to properly route and support the cabling. |
| Fit-out of Security Office | X | | Includes furniture and connectivity – see <u>Division 3 (Design Criteria Document)</u> of the Technical Requirements. The City provides the needed technology. The PPC will provide the FF&E similar to a Class A office. |
| Active systems, servers, PC's, displays and equipment | | X | City procures, maintains, and manages any equipment that the City needs in the BYC. |
| Backbone cabling (fiber, multipair copper, and coax) | X | | Provision and maintenance responsibility of the PPC. |
| Horizontal/distribution cabling (in-building and on-site) | X | | Provision and maintenance responsibility of the PPC. |
| Tel/data terminations, patch panels, and outlets | X | | Provision and maintenance responsibility of the PPC. |
| Digital signage | X | | Provision and maintenance is the responsibility of the PPC. Digital signage is not specifically required by <u>Division 3 (Design Criteria Document)</u> of the Technical Requirements. If during design the LD or PPC recommends digital signage, the PPC will be responsible for its provision and maintenance. The City will review content and performance. |
| Master clock system and display clocks | X | | Provision and maintenance is the responsibility of the PPC. City will |

| Component of the IT/Comms Equipment | PPC | City | Notes |
|---|-----|------|--|
| | | | provide content for master clock. A master clock system is not specifically required by <u>Division 3</u> (<i>Design Criteria Document</i>) of the Technical Requirements. If during design the LD or PPC recommends a master clock system, the PPC will be responsible for its provision and maintenance. The City will review content and performance |
| Distributed antenna system for cellular/private mobile radios | X | | Provision and maintenance responsibility of the PPC. The City prefers a neutral host. |
| Wireless LAN (-65 dB on 95% of site 99.9% availability) | X | X | The PPC shall install conduit and Ethernet cabling to each of the Wireless Access Points (WAPs). The City will provide the WAP devices, and PPC shall install WAP devices. The PPC shall propose the locations of the WAP devices, subject to SFMTA approval, prior to PPC's installation of WAP devices that the City provides. The PPC will be responsible for proposing locations and installing the hardware. The PPC expected to design based on predictive analysis and will run appropriate network cabling. The City will be responsible for configuring the hardware, perform surveys, and create heat maps after the WAP installation. |
| Office automation systems (email, file servers, etc.) | | X | City provides, operates, and maintains. |
| Geographical Information Systems | | X | City provides, operates, and maintains. |
| CCTV cameras | X | | Provision and maintenance responsibility of the PPC. |

dB = decibels

FF&E = Furniture, Fixtures, and Equipment

LAN = local area network

LD = Lead Developer

PPC = Principal Project Company

SFMTA = San Francisco Municipal Transportation Authority

WAP = Wireless Application Protocol

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Division 2: Design Guidelines



A New Potrero Yard:

**The San Francisco
Municipal Transportation Agency
Potrero Yard Modernization Project**

Design Guidelines

The New Potrero Yard Design Guidelines

Contents

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The New Potrero Yard Design Guidelines

1 Introduction

1.1 Background

The Potrero Yard Modernization Project's primary objective is to replace the obsolete Potrero Yard—which was originally built in 1915 as a streetcar facility—with a single integrated Facility that includes a Bus Yard Component, a Housing and Commercial Component, and Common Infrastructure and has an exceptional building and streetscape design.¹

The San Francisco Municipal Transportation Agency (SFMTA) has been coordinating with the San Francisco Planning Department (SF Planning) and other City agencies since 2016 on preliminary work for the Project and has undertaken a robust stakeholder engagement program to receive and incorporate feedback.

These *Design Guidelines* provide the architectural and urban design principles and standards to guide the development of the Facility. The Project's Technical Requirements including these *Design Guidelines* are based on the work completed to date and should be used to develop the Project design.

These Design Guidelines convey general policies and urban design principles to which the Project should adhere. The guidelines help establish a common understanding of design principles and standards, but are not intended to dictate solutions to these principles and standards. Instead, they define a range of appropriate responses to a variety of specific design issues. Where the Design Guidelines state "shall", Lead Developer must interpret this language as a prescriptive design requirement. Where the Design Guidelines state "should," the City is promoting specific urban design principles and an encouraged urban design approach.

The following pages include examples and illustrations. These are included to illustrate concepts described; they are not intended to suggest a specific design solution or aesthetic.

¹ See Appendix D (*Project Objectives*) of the Agreement.

The New Potrero Yard Design Guidelines

1.2 Project Site and Context

The Project Site, located at 2500 Mariposa Street in San Francisco, is owned by the City and County of San Francisco under the jurisdiction of the SFMTA. The approximately 4.4-acre property is bound by Bryant, 17th, Hampshire, and Mariposa Streets.

The site is located in the *northeast eastern quadrant of the Mission District*, an area that includes mixed-use zones and has a variety of light industrial uses as well as residential, retail, office, and other uses. York Street terminates at Mariposa Street on the south side of the site. Franklin Square, a city neighborhood park, is located across 17th Street on the north side of the site.

The existing bus yard and Mariposa Street are relatively flat, while the surrounding terrain slopes up to the northeast. The sidewalk at the northeast corner of the Site at 17th and Hampshire Streets is approximately 22 feet higher than the sidewalk at southwest corner of the site at Mariposa and Bryant Streets.²

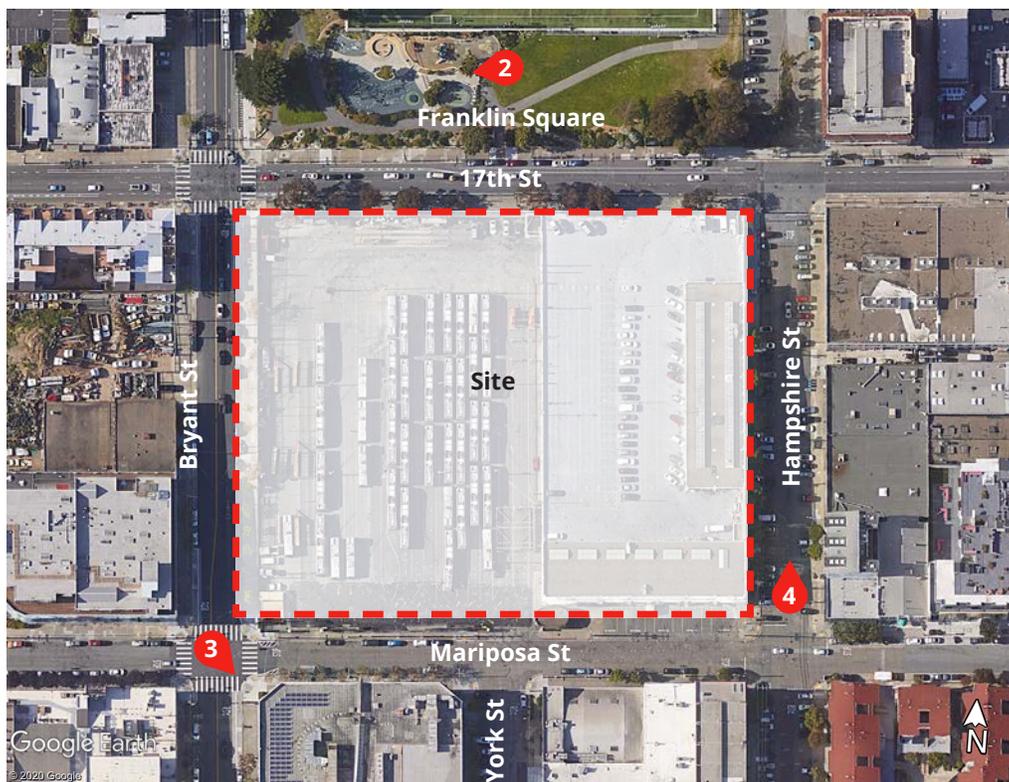


Figure 1. Site Aerial Photograph. Numbered keys refer to Figures on the following page.

² See Appendix A (*Description of the Project Site*) of the Agreement

The New Potrero Yard Design Guidelines

1.3 Zoning and CEQA

The Project Site, which is located within the area covered by the *Mission Area Plan* of the *San Francisco General Plan*, is currently designated as Public Use (P) Zoning District and a 65-X Height and Bulk District. SF Planning has determined that a new zoning designation that allows the proposed land uses and increased height and bulk limits will likely be required.

The Project requires environmental review in accordance with CEQA. The SFMTA filed an application for environmental review and the current CEQA schedule calls for public circulation of a Draft EIR (DEIR) by the summer of 2021.

In addition SF Planning has provided initial feedback on the Project Description, land use, and design parameters.



Figure 2. Franklin Square looking west.



Figure 3. Intersection of Bryant and Mariposa Streets looking southeast at KQED facility. Rendering by EHDD Architects.



Figure 4. Hampshire Street looking north.

The New Potrero Yard Design Guidelines

2 Overall Design Guidelines

“Good urban design is characterized by the thoughtful orchestration of buildings, landscape, open space, and streets ... San Francisco’s architecture spans various eras and architectural styles, but its urban fabric maintains a high degree of continuity and consistency ... [N]ew buildings have the responsibility to sensitively respond to their context and existing patterns of development while being of their moment.”³

2.1 Vision

The SFMTA is committed to its mission to “connect San Francisco through a safe, equitable, and sustainable transportation system.”⁴ The Project demonstrates the SFMTA’s commitment to providing zero-emission public transit, a safe and modern work environment for the SFMTA employees, and a new development with an exceptional building and streetscape design that enhances the Mission and Potrero neighborhoods.

The proposed Project vision should describe a single integrated Facility that incorporates the bus facility, residential and commercial uses, and infrastructure in a manner that makes it a great place for the building’s occupants and bus yard operations, and a great asset for the community.

The vision should:

- Celebrate the bus yard as the Site’s core use.
- Support a design that reflects the unique combination of bus, residential, and commercial uses and integrates them into a building that is contextual to its highly mixed-use neighborhood.
- Foster the Project’s Public Benefit Principles⁵ and placemaking and community-oriented activities in the building and streetscape design.

³ *San Francisco Planning, Urban Design Guidelines*, March 22, 2018, p 4.

⁴ <https://www.sfmta.com/about-us/sfmta-strategic-plan/mission-vision>, accessed 7/20/2020.

⁵ See Division 8 (*Public Benefit Principles*) of the Technical Requirements.

The New Potrero Yard Design Guidelines

2.2 Design

The concept should be clear, and the design compelling and implemented with care and consistency.

The design should:

- Achieve the Project Objectives and fulfill the Project vision.⁶
- Enhance the skyline and surrounding context with a building massing, that although larger and taller than surrounding buildings provides visual interest, an architectural character that relates to surrounding neighborhood, and active building facades that have a pedestrian orientation that engages the community.
- Meet the objectives and principles of policies such as *Mission Area Plan, Urban Design Guidelines, Sunlight Ordinance, Reduction of Ground-level Wind Currents, Guidelines for Ground Floor Residential Design*, as well as the Project's *Technical Requirements including these Design Guidelines*.

6. See Appendix D (*Project Objectives*) of the Agreement.

The New Potrero Yard Design Guidelines

3 Building Design Guidelines

3.1 Uses and Building Organization

The new Potrero Yard is planned to include the bus yard, residential, and possibly commercial uses such as retail and community serving storefront uses. The bus yard will occupy most of the first three floors while the commercial uses may occupy select areas of the ground floor and the residential uses will occupy select areas of the first three floors and the floors above the bus yard.

The Facility shall be designed to optimize modern and efficient bus operations in accordance with the *Design Criteria Document* and to incorporate residential and commercial uses and infrastructure into a cohesive building design. Each component shall be designed to meet its programmatic and other requirements and to function independently while being part of a harmonious building design.

For efficiency, identity, and wayfinding the bus, residential, and commercial uses should be organized in a simple and clear manner and should be easily distinguished from one another. For pedestrian safety, the residential entrances and commercial storefronts should be separated to the extent feasible from the bus entrances and exits.

To contribute to the urban context and complement surrounding uses, active ground-floor uses such as retail and community serving storefront uses are desired on Bryant and 17th Streets.

To optimize bus operations, incorporate residential and commercial uses, and enhance the urban context provide at a minimum:

- Bus and loading entrances and exits on Mariposa Street.
- At least one primary residential entrance and active ground-floor uses on Bryant Street.
- Active ground-floor uses on 17th Street.
- At least one primary residential entrance on Hampshire Street.

The New Potrero Yard Design Guidelines

3.2 Height, Bulk, and Open Space⁷

Consider how the building's massing is perceived from distant views such as from Dolores Park, Corona Heights, and Potrero Hill as well as from the close-in, street-level perspective of the surrounding neighborhood. Develop a clear design concept with a massing that provides visual interest, breaks down the building's height and bulk, and minimizes shadows on Franklin Square.



Figure 5. Different volumes breakdown building scale. Example: Five88, San Francisco, CA.



Figure 6. Different volumes breakdown building scale. Example: Avalon Hayes, San Francisco, CA.



Figure 7. Expressed stair and perforated metal facade provides visual interest. Example: Center Street Parking Garage, Berkeley, CA.

⁷ Building heights (the vertical distance by which a building rises above a point) shall be measured from the midpoint of the Mariposa Street property boundary. Refer to the San Francisco Planning Code for allowable equipment, appurtenances and penthouse height exceptions.

The New Potrero Yard Design Guidelines

The three floor—up to 75 feet tall—bus yard may be built to the property line but it should not appear monolithic. Reduce the scale of this mass by breaking it down into several volumes with plane changes and recesses while avoiding inactive or hidden spaces. Consider using an entrance alcove or plaza centered on the York Street axis to modulate the Mariposa Street facade and respond to the end of York Street.

The residential floors above the bus yard shall step back from the property lines and the overall massing shall step down from the south (Mariposa Street) side to north (17th Street) side.

Residential floors above the three floor bus yard, except residential lobbies and adjoining residential areas of up to 180 feet total cumulative width on the west, east, and south frontages which may be built to the property line, shall step back 10 to 20 feet on the south, west, and east frontages to provide visual relief. The residential floors above the three floor bus yard shall step back 60 to 70 feet on the north frontage to provide visual relief and so that shadows cast on Franklin Square are equivalent to or less than those of a 75 feet tall building.

The building shall not exceed 150 feet in height. The residential massing above the bus yard shall vary in height and layout to provide visual interest and reduce the apparent building mass, but no more than two masses should extend beyond 115 feet in height. These taller masses should have footprints of no more than 10,000 square feet on average, be located asymmetrically on the southern portion of the Site clear of the York Street right-of-way axis.

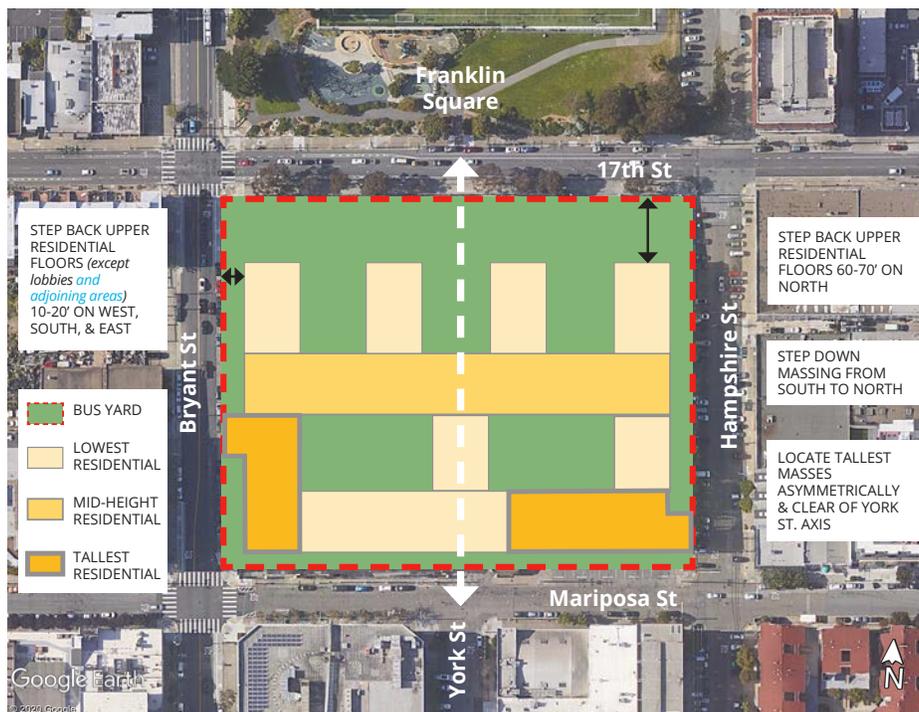


Figure 8. Diagram, which is based on the Reference Concept, illustrates the bulk requirements.

The New Potrero Yard Design Guidelines

Use open spaces to modulate the building massing and use the building massing to shape open spaces that optimize solar exposure and protection from prevailing winds.

Open spaces, including those on the roof of the bus yard, should be attractive spaces for enjoying the outdoors, gathering, and recreation.

Provide separate open space areas that are easily accessible by the SFMTA employees and housing residents.

Open spaces should be visible and well illuminated with no hidden corners and should have seating and other elements, including a children's play area to enliven them. Locate seating in sunlit and shaded areas that are protected from wind.

Integrate landscape and stormwater management into the open space design. Support water and local biodiversity conservation by using San Francisco Bay Area native plant species and consider creating a pollinator habitat.



Figure 9. Housing podium open space with mix of seating areas. Example: Dr George W. Senior Residence & Senior Center, San Francisco, CA.



Figure 10. Open space with mix of private and shared spaces. Example: Avalon Dogpatch, San Francisco, CA.



Figure 11. Open space with mix of seating areas and landscaping. Example: Family House, San Francisco, CA.

The New Potrero Yard Design Guidelines

3.3 Wall and Roof Treatment

The overall design should be a unified and cohesive composition that has a hierarchy and rhythm of architectural elements that have a pedestrian scale, provide visual interest, and are compatible with the surrounding context.

The design shall not have long expanses of flat, undifferentiated, or blank walls. Articulate the overall building massing into separate volumes and modulate these volumes with different materials and features such as recesses, bay windows, balconies, cornices, etc. The building articulation shall not rely on the use of surface applied elements, but use volumetric massing to create a hierarchy and rhythm that has a richness suitable to the surrounding neighborhood.

Differentiate bus, residential, and commercial components within the overall composition by the use of different materials, opening patterns, and/or features. Materials should be durable with an integral color such as concrete, masonry, glass, or factory finished metals.

Wind analysis indicates that wind mitigation, including porous facades will likely be required.⁸ Integrate wind mitigation measures into to the overall design.

The color scheme should be unified and enduring, but not bland. For example the bus yard accents could use the SFMTA and Muni color palette and the residential accents could reflect the Mission neighborhood's rich and varied color palette.

Design all facades and roofs with care and consistency. Consider approaches, such as views into

⁸ See Document 17 (CEQA Pedestrian Wind Study) of the Reference Documents.



Figure 12. Unified composition with hierarchy and rhythm of architectural elements. Example: 1100 Ocean Avenue, San Francisco, CA.



Figure 13. Variations of materials and planes provides visual interest. Example: Drs. Julian + Raye Richardson Apartments, San Francisco, CA.



Figure 14. Bay window tile color derived from local color accents. Example: La Fenix at 1950 Mission, San Francisco, CA.

The New Potrero Yard Design Guidelines

the bus yard and public art installations, to supplement active ground-floor uses and provide visual interest on all four facades, including the Hampshire Street facade.

Also consider ways to treat the building corners, especially the corners on Bryant Street. For example a commercial use at the development's northwest corner at Bryant and 17th Streets could activate this location and link active uses on Bryant and Mariposa Streets.

Provide intentional facade terminations at the bus and the residential roof lines and use these to reinforce the building massing and design intent. Use bus yard facade terminations to help define the predominant streetwalls.

The Project roofs will be visible from near and far vantage points and should be considered the “fifth facade”. Both occupied open spaces and unoccupied roofs should be designed with care. Consolidate rooftop equipment in fully screened areas and integrate these into the overall design.



Figure 15. Stacking elements creates a rhythm and glazed ground floor engaging entry. Example: 1601 Mariposa St., San Francisco, CA.



Figure 16. Mix of rich materials and elements creates visual interest and configuration a strong indoor-outdoor connection. Example: Five88 Mission Bay Blvd., San Francisco, CA.

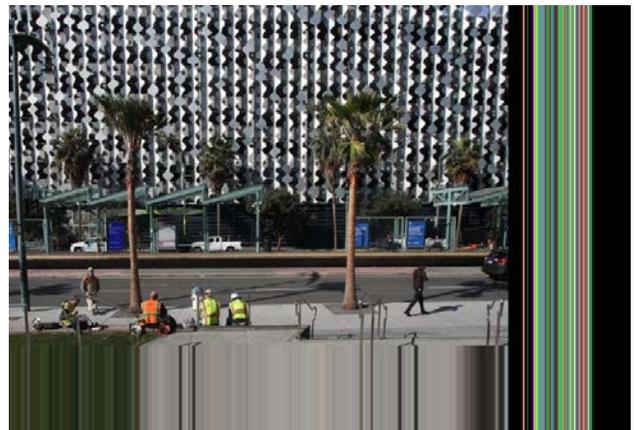


Figure 17. Porous facade. Example: 1630 Third St Parking Structure, San Francisco, CA.

The New Potrero Yard Design Guidelines

3.4 Lighting, Signage, and Public Art

Carefully integrate lighting, signage, public art, and other elements into the building design.

Lighting should be provided to support pedestrian comfort and safety along sidewalks and throughout open spaces. Lighting should provide general illumination and highlight pedestrian entrances, storefronts, and bus entrances and exits. Lighting should be shielded to mitigate light pollution.

Signage should be provided to aid in way-finding, but it should not be the primary means to identify entrances. Signage should be integrated into entrances and storefronts, and be made of high quality and durable materials. Rectangular internally illuminated signs surface mounted to the building walls are not allowed. Consider ways to creatively incorporate the SFMTA and Muni logos and color palettes into the bus yard signage.

The Project has a public art requirement. While developing the design concept, consider opportunities to incorporate public art that celebrates—without being kitschy—the SFMTA’s bus operations and the neighborhood’s rich history and arts community as well as other ideas that the San Francisco Arts Commission (SFAC) may identify. Work with the SFAC and the artist(s) to thoughtfully integrate public art into the Facility and/or streetscape design.



Figure 18. Lighting and signage integrated into entrance design. Example: Family House, San Francisco, CA.

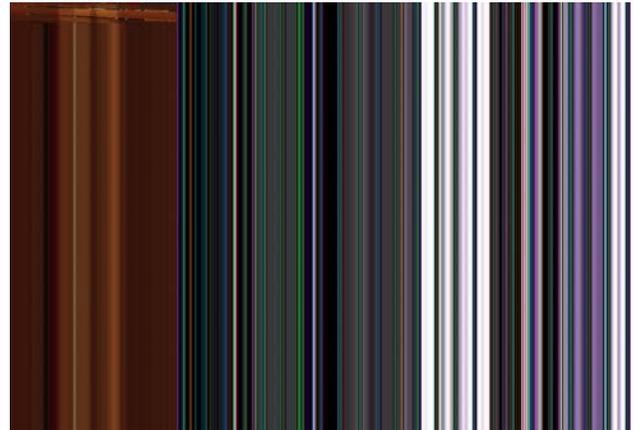


Figure 19. Art mural. Example: Vida Building, San Francisco, CA.



Figure 20. Art installation. Example: Kinetic Umbrellas, Project Artaud, San Francisco, CA.

The New Potrero Yard Design Guidelines

3.5 Ground Floor Uses

The bus yard, residential, and commercial entrances should be located as described in Section 3.1 and should be easily seen and distinguished from one another.

- As described in the Better Streets Plan and Guidelines (www.sfbetterstreets.org) the design of the ground floor uses and right-of-way, including allowance of curb cuts and placement of utilities, has significant impact on the street environment. Decisions regarding street design must consider and prioritize pedestrian safety, enjoyment, and comfort. Reducing driveways reduces the number of conflict points between pedestrians and vehicles and can dramatically improve safety. Maximum widths of industrial curb cuts serving two-way traffic should be 32 feet, though exceptions are permissible if bus or delivery vehicle turning templates require additional width due to the adjacent public street dimension. Where possible, curb cuts should be separated by a minimum dimension of 5' to provide safe waiting space for pedestrians. Vehicular entrances and exits should be kept to the minimum required for efficient and safe operations and should have a warning system. No more than four curb cuts with a total width of 230' shall be allowed on Mariposa Street, and less is desired. In addition one 32 foot wide curb cut for a second floor emergency bus exit shall be allowed.
- Bus and loading vehicular entrances and exits should have a warning system.
- The bus yard pedestrian entrance for the SFMTA employees and visitors should be easily identified to foster identity and way-finding.
- Residential entrance lobbies should be inviting and expressed prominently at the building exterior to foster identity and way-finding.
- Commercial spaces should have inviting storefronts with clear or lightly tinted glazing, high ceilings, and layouts that are flexible to support retail shops, cafes, small scale PDR, and/or community services such arts or educational spaces. The storefront entrances should be at grade and engage the sidewalk so that activity can spill out onto the sidewalk to support typical operations, special events and circumstances such as Covid-19.
- Pedestrian entrances should have weather protection and be well illuminated.
- Emergency exit alcoves should be integrated with entrance and storefront alcoves where possible. Any equipment rooms that must front the sidewalk should be integrated into the overall design.
- Where the bus yard fronts the sidewalk, provide views into the bus yard for visual interest.



Figure 21. Bryant Street frontage illustration prepared for community engagement planning workshop to show possible Project attributes.

The New Potrero Yard Design Guidelines

4 Streetscape Design Guidelines

The SFMTA led the passage of the *The San Francisco Better Streets Plan* which aims to improve the quality and character of sidewalks and streets and make them more usable, greener, and safer for all modes of travel.⁹

The plan identifies Bryant, 17th, Hampshire, and Mariposa Streets as mixed-use streets that should have 15 foot wide sidewalks with (building) frontage, through-way, furnishing and (curb) edge zones. In addition 17th Street, which has a bike lane, is a green connection street that links parks, the waterfront, and open space and Hampshire Street is used by bicyclists as an alternative to the busier Bryant Street.¹⁰

As the City's policy leader and implementer of award-winning streetscapes, the SFMTA is committed to excellent streetscape design. The streetscape should be an exemplar of design that:

- Enhances the Project vision and building design and supports and augments active ground-floor uses.
- Supports SFMTA fleet usage and fosters bicycle and pedestrian activity and safety.
- Integrates sidewalk elements to create a safe, convenient, and inviting public realm and needed outdoor space due to Covid-19.

Provide at least one bike parking area and one

⁹ Mayor Gavin Newsom's introductory letter to the *Better Streets Plan*.

¹⁰ *Guide to the San Francisco Better Streets Plan*, https://sf-planning.org/sites/default/files/archives/BetterStreets/docs/Guide_to_BSP.pdf, accessed 7/20/2020.



Figure 22. Streetscape zones. Example: San Francisco, CA.



Figure 23. Streetscape with cafe seating in frontage and furnishings zones. Example: San Francisco, CA.



Figure 24. Streetscape with bike racks, street trees, and parking meters integrated in furniture zone. Examples: San Francisco, CA.

The New Potrero Yard Design Guidelines

seating area on each frontage. Locate these in relation to the bus yard and residential entrances and the commercial storefronts and to maximize physical comfort considering solar orientation, wind, and noise.

Provide, in accordance with the San Francisco Street Design Advisory Team (SDAT) recommendations, bulb outs, pedestrian ramps, residential loading zones for pick-up/drop-off and package delivery, pedestrian lighting to enhance pedestrian access and safety.

Preserve healthy mature street trees where possible and provide new street trees that will have minimal impact on the trolley bus overhead contact system (OCS) where appropriate.

Integrate stormwater management into the streetscape and support water and local biodiversity conservation by using San Francisco Bay Area native plant species.

Consider opportunities to integrate public art into the streetscape.

Carefully design sidewalks to reduce clutter and integrate signage, lighting, bike racks, seating, landscaping, stormwater management, and possible public art. Consolidate OCS, lighting, and signage poles or replace OCS poles with catenary attached to the building.



Figure 26. Parklet with planter that provides a buffer from street traffic. Example: San Francisco, CA.



Figure 27. Public art bench. Example: Chinatown, San Francisco, CA.



Figure 25. Special Tree Grates. Example: Valencia Street, San Francisco, CA.

The New Potrero Yard Design Guidelines

The SFMTA is committed to encouraging sustainable modes of travel. The Project will include a robust Transit Demand Management (TDM) program. Transit Demand Management (TDM) elements that support active (walking and biking) and high occupancy vehicle transportation (bus, shuttle, van pool) use should be located for easy access and use and integrated into the design, rather than added as an afterthought.



Figure 29. Bike Storage, Example: Ashby BART Station

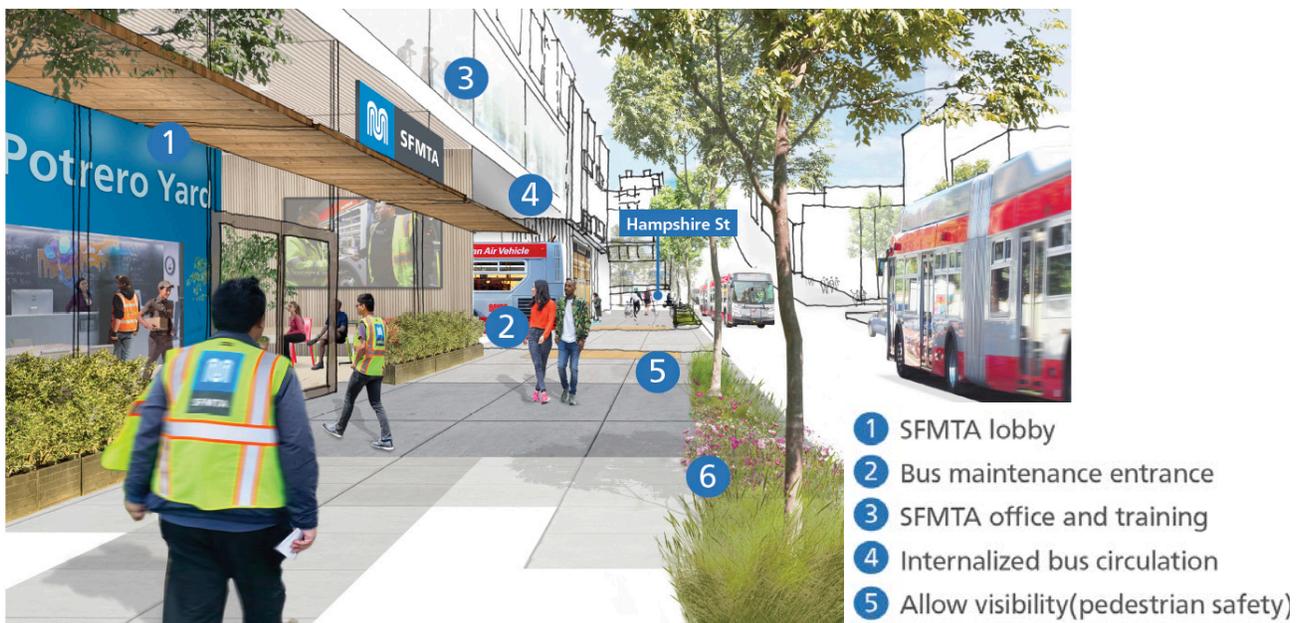


Figure 28. Mariposa Street frontage illustration prepared for community engagement planning workshop to show possible Project attributes.

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Division 3: Design Criteria Document

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(Division 3: Design Criteria Document is included in a separate PDF attachment)

Division 4: Supplemental Design Criteria

Introduction

This Division 4 provides selected supplementary design criteria for the Project, as part of the Project's Technical Requirements. These supplemental criteria shall be used in conjunction with other design criteria requirements set forth in the Technical Requirements, including, but not limited to, Division 3 (*Design Criteria Document*) and Division 5 (*Battery Electric Bus Supplemental Criteria*).

1 Supplemental Noise and Vibration Requirements

These Supplemental Noise and Vibration Requirements establish the design intent and design criteria for the Facility to meet the Project's noise and vibration requirements.

The Facility is comprised of the Bus Yard Component (BYC), the Common Infrastructure, and the HCC.

In addition to the requirements contained in the Division 3 (*Design Criteria Document, or DCD*) of the Technical Requirements, the Development Team shall also comply with the Supplemental Noise and Vibration Requirements in the design of the Facility, as defined in this document, as well as applicable Codes and regulatory requirements. In the event of any conflict between these other requirements and these Supplemental Noise and Vibration Requirements the stricter requirement shall govern. For any questions about which criteria to apply, the Development Team is to request clarification from the City.

1.1 Intent of these Supplemental Noise and Vibration Requirements

The Development Team must demonstrate through Engineering Analysis that its design of the Facility will comply with Project's noise and vibration criteria, which include those defined in this document and the DCD.

Engineering Analysis refers to industry-standard or project-specific approaches (with technical back-up) that present the basis and results of airborne source-path-receiver calculations (and the same for structure-borne noise and vibration transmission where noted to be required), along with uncertainty estimation.

These Supplemental Noise and Vibration Requirements are intended to establish the:

1. Project criteria for noise and vibration

2. Deliverable requirements for the noise and vibration scope for each phase of the Project

The criteria for noise and vibration are established in the following categories:

| | |
|---|---|
| <i>Environmental Noise</i> | Includes all Facility systems and operations which shall be designed to comply with outdoor noise restrictions governed by applicable state and local ordinance(s). |
| <i>MEP Systems Noise and Vibration</i> | Includes but is not necessarily limited to: mechanical, HVAC, electrical, plumbing, vertical transportation, power generation and back-up systems, window cleaning and building maintenance systems, and other specialty systems that may generate noise or vibration. |
| <i>Building Envelope Sound Isolation / CalGreen</i> | Includes sound isolation performance of the building façade and the remainder of the building envelope, which shall be designed to comply with project criteria in these Supplemental Noise and Vibration Requirements. |
| <i>Acoustic Separation of Spaces</i> | Includes airborne sound transmission performance of demising constructions separating adjacent spaces. Composite calculations are required for constructions with multi-component floor/ceiling and partition/ door/ window systems. This includes estimation of flanking paths from ductwork, cable-passes and shaft-ways, and project-specific architectural detailing. |
| <i>Interior Room Acoustics</i> | Includes project requirements for interior room acoustics such as reverberation time and/or occupational noise levels to support the intended programmatic usage of spaces. |
| <i>Structure-borne Vibration</i> | This category specifically pertains to the transmission of structure-borne noise and vibration from Facility systems and operations (primarily, but not exclusively, from bus operations and maintenance equipment that are part of the Bus Yard Component) to the Housing and Commercial Component. |

1.2 Acoustic Consultant Qualifications

The Development Team shall, at all times, engage the services of a qualified, independent acoustics and vibration consulting firm (the Acoustic Consultant) with a minimum of 10 years of relevant acoustics and vibration consulting experience with projects of similar type and complexity. The acoustics and vibration consulting firm must have proven and demonstrated capabilities (as demonstrated by three projects minimum) both in predictive analysis of structure-borne vibration transmission and re-radiated noise in buildings. The firm must also have related experience in site testing and commissioning.

1.3 Applicable Codes and Standards

The latest published editions of the following Codes and Standards are referenced herein and made part of the Supplemental Design Criteria.

1. San Francisco Police Code Article 29
2. California Green Building Standards Code, Ch 5, CALGreen
3. California Uniform Building Code Title 24, with particular attention to Ch 12, Section 1206 Sound Transmission
4. International Building Code (IBC) Section 1206
5. International Code Council (ICC) G2-2010 Guidelines for Acoustics
6. If applicable: U.S. Department of Housing and Urban Development (HUD) regulation 24 CFR Part 51, Sub-part B
7. ASHRAE, American Society of Heating, Refrigerating and Air Conditioning Engineers, Fundamentals Handbook
8. NFPA 72

The Development Team is responsible for reviewing all applicable codes governing the Project to ensure compliance.

1.4 Criteria

Project acoustics, noise, and vibration criteria are listed below. It is a requirement of the Project for the Development Team to confirm that design concepts and strategies put forth are capable of meeting these criteria. During the PDA Term further analysis and proof of concept will be required, as described later in this document. These criteria shall be applicable to the Project throughout the PDA Term and the term of the Project Agreement.

1.4.1 Environmental Noise

Noise emissions from the Facility shall be designed to comply with the noise ordinance and requirements of San Francisco Police Code Article 29.

In addition, noise emissions from the Facility equipment or operations to the Site shall be limited to no more than 55 dBA Leq, 5min for outdoor areas frequented by people. Such areas include the grounds surrounding the Facility, including any outdoor courtyards, break areas, and other areas where people congregate or hold meetings.

The Facility should also consider all non-transportation sound sources related to the Project and their impact on existing and future nearby residential properties. Non-transportation sources include locations of loading docks, and outdoor services docks, if any.

1.4.2 Background Noise Criteria from MEP Systems

Mechanical, Electrical, and Plumbing (MEP) building systems shall be designed to comply with the Background Noise Criteria as defined per occupancy type in the latest published edition of the ASHRAE Fundamentals Handbook.

In addition to the ASHRAE criteria for background noise level, no occupied spaces shall be designed for a noise level in exceedance of NC 50 for this Facility. This is the highest recommended level which still allows for occupants to speak relatively comfortably without raising their voices.

Ductwork velocities are required to comply with ASHRAE Fundamentals Handbook Chapter 49, 2019 edition, per room noise criteria.

For spaces which do not require speech communication and are un-occupied but require occasional occupancy (e.g., monitoring, maintenance, etc.), MEP systems shall be designed for a background noise level below 85 dBA in each space, to comply with the lower action limit for OSHA requirements to protect worker noise exposure.

All Engineering Analysis for background noise level calculations shall be conducted in octave bands or one-third octave bands from 63 Hz to 4000 Hz spectra for each occupied space, inclusive of all system parameters including fan noise, flow-generated noise, self-generated noise of silencers, noise due to terminals, dampers, diffusers, duct breakout, radiated through partitions, structure-borne, and duct-borne noise.

If there is reason to anticipate high noise levels from very low frequency sources, a 31.5 Hz octave band analysis will also be required.

Occupied spaces in this Facility shall be free of pure tones. A pure tone is defined as an amplitude at any 1/3-octave band center frequency which is 5dB or more above the amplitude of adjacent bands. Manufacturer's data sheets for MEP equipment shall be assessed by the Acoustic Consultant to confirm equipment which exhibit pure tones are not selected.

Emergency generators and similar stand-by equipment such as smoke exhaust or stair pressurization fans shall be designed with noise and vibration control to meet the requirements of applicable Local Noise Ordinance(s) and to limit disturbance to Facility occupants during maintenance or testing, including the noise associated with any temporary load banks or load application systems.

Noise levels generated by emergency and stand-by systems also must be considered in the analysis of emergency evacuation or paging systems that require intelligibility. NFPA-72 should be referred to for guidance on intelligibility requirements for such systems design.

1.4.3 MEP Systems Vibrations Isolation

Vibration isolation of equipment and any associated piping, as well as structural stiffness and deflection requirements of structures supporting MEP equipment shall comply with requirements in ASHRAE Fundamentals Handbook Chapter 49, 2019 edition.

1.4.4 Building Envelope Sound Isolation

The Facility's façade and building envelope shall meet the requirements of California Green Building Standards Code, Ch 5, CALGreen and California Uniform Building Code Title 24, with particular attention to Ch 12, Section 1206 *Sound Transmission*.

1.4.5 Acoustic Separation of Spaces and Interior Room Acoustics

For the HCC residential acoustic design requirements will be required to comply with the International Building Code and the U.S. Department of Housing and Urban Development Guide (HUD). The HUD guidelines shall comply with "Average" rating or greater.

Project requirements also include the 2019 California Uniform Building Code (section 1206) and 2020 California Residential Building Code (Title 24, Part 2.5, section AK102-103) for indoor sound separation, noting that these are currently in line with IBC.

Project requirements for acoustic separation between demising spaces shall meet minimum standards for Class A office space in San Francisco. This includes, at minimum:

1. Open Plan workspace "Normal" Speech Privacy
 - a. Background Noise: NC 40 Maximum
 - b. Electronic Sound Masking: 40 to 45 dBA if background noise levels are calculated to be less than NC-35 on average.
 - c. Sound absorbing ceiling of NRC 0.70 Minimum (ASTM C423, Type E-400 mounting)
2. Offices and Meeting Rooms "Normal" Speech Privacy
 - a. Background Noise: NC 35 Maximum
 - b. Minimum Noise Reduction of Partitions: NIC 35 Minimum with sound masking and NIC 40 Minimum without sound masking (Noise Isolation Class defined per ASTM E336)
 - c. Sound absorbing ceiling of NRC 0.80 Minimum (ASTM C423, Type E-400 mounting)

- d. Sound absorbing wall panels on 25% of walls of NRC 0.70 minimum (ASTM C423, Type A mounting)
- 3. Private Offices and Meeting Rooms “Confidential” Speech Privacy
 - a. Background Noise: NC 30 Maximum
 - b. Noise Reduction of Partitions: NIC 45 Minimum
 - c. Provide absorption of NRC 0.80 Minimum on 25% of walls

1.4.6 Project Vibration Criteria

It is a Project requirement that there are no adverse noise and vibration impacts from the operations and maintenance activities in the Infrastructure Facility on residents of the HCC. To that end, it is also a Project requirement for noise and vibration control systems be provided to all Infrastructure Facility operations and maintenance activities (including but not limited to vehicle idling, vehicle movements over surface discontinuities, vehicle lifts and conveyance, tools, testing and other processes that occur within the yard), as well as all Facility building systems (architectural and /or structural), such that maximum mid-span floor vibration levels shall not exceed recommended criteria for residential dwellings in the HCC contained in the following two references:

- 1. ISO 2631 (part 1 and part 2) provides “base curves” for maximum allowable vibration in all 3 axes. For nighttime residential applications, Annex A requires no more than 1.4x the base curve. ISO requirements for steady state, transient vibration and “shock” should be used based on the type of activity analyzed.
- 2. The US industry standard is the 2018 FTA “Transit Noise and Vibration Impact Assessment Manual”. See Table 6-3 below. Applicable criteria are outlined in red, as applicable to elevated residential floors of this Project.

Table 6-3 Indoor Ground-Borne Vibration (GBV) and Ground-Borne Noise (GBN) Impact Criteria for General Vibration Assessment

| Land Use Category | GBV Impact Levels (VdB re 1 micro-inch /sec) | | | GBN Impact Levels (dBA re 20 micro Pascals) | | |
|--|---|-------------------|-------------------|--|-------------------|-------------------|
| | Frequent Events | Occasional Events | Infrequent Events | Frequent Events | Occasional Events | Infrequent Events |
| Category 1: Buildings where vibration would interfere with interior operations | 65 VdB* | 65 VdB* | 65 VdB* | N/A** | N/A** | N/A** |
| Category 2: Residences and buildings where people normally sleep. | 72 VdB | 75 VdB | 80 VdB | 35 dBA | 38 dBA | 43 dBA |
| Category 3: Institutional land uses with primarily daytime use. | 75 VdB | 78 VdB | 83 VdB | 40 dBA | 43 dBA | 48 dBA |

1.5 RFP Phase Requirements

In the RFP phase, the Development Team shall engage an Acoustic Consultant to develop and present concept-level design strategies along with preliminary analysis showing how the Project criteria will be met, specifically with respect to the strategy for mitigation of noise and vibration from the operations and maintenance activities in the Infrastructure Facility. The Acoustic Consultant shall continue to provide such services to the Development Team during the PDA Term and subsequent phases of the Project or may be replaced by the LD with a consultant of equal or greater qualifications, but only if approved by the City.

A written report from the Acoustic Consultant is required along with the Proposal, which clearly outlines the proposed strategy, analysis methodology and preliminary analysis showing how the intended scheme has been assessed to mitigate structure-borne noise and vibration transmission to comply with the Project's noise and vibration criteria, as it relates to noise and vibration from the operations and maintenance activities in the Infrastructure Facility and how that may impact the HCC.

The Development Team is responsible to confirm that the proposed design concept can meet the Technical Requirements within the proposed Fixed Budget Limit.

The results of site noise testing previously prepared by the City and its consultants for the preparation of CEQA documents are provided in Document 16 (*CEQA Noise and Vibration Assessment Methodology Report*) of the Reference Documents. The Development Team shall refer to that data to confirm if façade or building envelop upgrades are required and considered in its proposed design Fixed Budget Limit.

1.6 PDA Term Requirements

1.6.1 Site Due Diligence

For the Site Due Diligence to be conducted early in the PDA Term, the LD shall submit an Engineering Analysis, which includes cataloging major equipment source noise and vibration level (either estimates or measured data) the results from building structural dynamic modeling analysis, an assessment of risks and recommendations for opportunities and mitigation approaches. This Engineering Analysis shall demonstrate that the equipment and operational vibration levels from the BYC do not exceed project criteria for the Facility.

Back-up calculations shall be made available upon the City's request.

The LD shall conduct noise and vibration measurements during the Site Due Diligence phase to (a) document existing ambient vibration levels in order to

develop a baseline, and (b) document representative sources of BYC operations and maintenance activities for source level calculations.

The LD shall coordinate with SFMTA to measure source noise and vibration levels from existing Potrero Yard equipment and operations during this phase.

Additionally, the requirements in this phase shall include an updated table of Project criteria per program space, recommendations for space planning to avoid costly sound or vibration isolating constructions, and critical path coordination items still to be resolved which have major cost, schedule, or risk impact.

1.6.2 50% Schematic Design

The LD shall submit to City the 50% Schematic Design package that shall include all of the following:

1. Project acoustic criteria per program space
2. Recommendations and guidelines to comply with Project criteria for all related disciplines (architectural, structural, mechanical, etc.) for incorporation into their design
3. Identification of risks and critical path items in the Project design, including recommendations for resolution of the same
4. Engineering Analysis that meets the requirements of Section 1.8 (*Special Commentary on Required Engineering Analysis*) below, which includes updates to the design included in the LD's Proposal to reflect the level of progress shown in the 50% Schematic Design
5. Draft narrative description of Schematic Design-level noise and vibration control design, including specific measures programmed to abate noise to the Project and to the surrounding neighborhood

1.6.3 100% Schematic Design

The LD shall submit to City the 100% Schematic Design package that shall be the basis for the LD's competitive procurement of the DB Contractor and IFM Contractor. The 100% Schematic Design package shall include all of the following:

1. Project acoustic criteria per program space
2. Recommendations and guidelines to comply with Project criteria for all related disciplines (architectural, structural, mechanical, etc.) for incorporation into their design
3. Register of risks and critical path items in the Project design, including recommendations for resolution of the same

4. Engineering Analysis that meets the requirements of Section 1.8 (*Special Commentary on Required Engineering Analysis*) below, which includes the following:
 - a. Sample background noise calculations for each program space type, providing proof of design compliance with project criteria
 - b. Sample sound isolation and room acoustics calculation providing proof of design compliance for each category of acoustic privacy
 - c. Detailed analysis of structure-borne noise and vibration providing proof of compliance with project criteria

All noise control specifications which relate to these noise calculations shall be included in the written specifications for Mechanical Vibration and Seismic Control and/or provided in a schedule on the Project drawings.

These same technical calculations are to be updated in each subsequent design phases and as the design progresses to completion in order to validate the design mitigation measures in the final design.

1.7 Special Commentary on Vibration Control Approaches

Excess vibration from the Infrastructure Facility may have an adverse effect on the users and residents of the HCC. Given the high forces which can be imparted from some bus operations and maintenance equipment onto the building structure, the resulting vibration could travel through the building structure. If strong enough, this vibration can be re-radiated as audible noise and be felt in spaces, which can sometimes be quite far away from the source of vibration.

Based on the foregoing, the City's preferred hierarchy of methods for mitigating structure-borne vibration is in the order of precedence indicated as follows:

1. The preferred method is for the proposed building design to have decoupled structures between the Infrastructure Facility and the HCC, with sufficient mass in demising constructions to also mitigate airborne noise to project criteria levels.
2. Should a building design be proposed that does not entirely decouple the structures (per item 1 above), then acoustically-isolated architectural and/or structural systems shall be introduced where appropriate to meet the Project's vibration criteria.
3. Where both decoupled structures and acoustically-isolated systems are not possible (per items 1 and 2 above, respectively), the mass of the demising constructions must be capable of meeting the Project's vibration criteria.

1.8 Special Commentary on Required Engineering Analysis

In all design deliverables, Engineering Analysis is required to substantiate that the Project's vibration criteria is met in the proposed building design. Minimum requirements for the analysis include all of the following:

1. Measurement and/or other documentation of noise and vibration levels for all equipment planned for the Bus Yard Component
2. Conversion of the above into forcing functions representing each source
3. Analysis showing that the source forcing functions do not cause exceedance of Project Criteria in residences
4. Error analysis and factor of safety shall be included

The LD shall implement appropriate coordination with the Project's structural engineer to ensure that suitable assumptions regarding the stiffness and damping of floors are considered as part of the design parameters.

2 Seismic Resilience Performance Requirements

A high level of seismic resilience is required for this Project, both due to the SFMTA's role in emergency response and due to its interest in owning, operating, and maintaining a durable capital asset. Building codes aim for life safety but do not necessarily address resilience, which is the ability of a building to support its core functions quickly after an earthquake. Seismic resilience encompasses not just the structural performance of a building in an earthquake but also the performance of architectural, mechanical, electrical, plumbing, and other systems required to support those functions.

The seismic resilience requirements presented in this document draws on the recommendations from a 2009 report by the San Francisco-based think tank SPUR.¹ This report outlines desirable recovery scenarios for the San Francisco civic infrastructure following a major earthquake. Regarding the SFMTA transit system, the report recommends that "service [be] restored for 90 percent of MUNI customers" within 30 days of an "expected earthquake," which is defined as an earthquake event having 10% probability of occurrence in 50 years.

The SPUR report does not specifically address bus maintenance facilities such as Potrero Yard. It is expected that buses themselves may be able to run immediately after such an earthquake, while the facilities that support transit operations might

¹ San Francisco Bay Area Planning and Urban Research Association (SPUR), "Lifelines: Upgrading Infrastructure to Enhance San Francisco's Earthquake Resilience," https://www.spur.org/sites/default/files/publications_pdfs/SPUR_Lifelines.pdf

lose some functionality temporarily. However, functionality of such support facilities must soon be restored to maintain bus service. Hence it is judged that the Potrero Yard facility should be operational within that 30-day period of the event if 90% of bus service is to be achieved.

Consistent with the SPUR report, these seismic criteria define functionality requirements for a seismic hazard level given by an earthquake event having 10% probability of occurrence in 50 years, otherwise known as a 475-year event. In these criteria this seismic level is termed the “design-level” event.

An additional structural performance target is defined for a much larger event known as the Maximum Considered Earthquake (MCE). This event may be expected to cause more damage and consequent loss of functionality. The California Building Code targets a maximum 10% probability of collapse in the MCE event for most buildings. A higher level of performance in the MCE is not deemed necessary for the Potrero Yard facility. However, these seismic criteria do specify that the MCE performance be explicitly checked, which is not otherwise required by the code. This provides additional confidence that the intended performance will be attained.

This Project contemplates an integrated building housing both a transit maintenance facility and residences. These resilience goals apply specifically to the Infrastructure Facility, but the design of the HCC must consider the impacts of its performance on transit operations following a large earthquake. Structurally, the HCC must meet the same performance level as the Infrastructure Facility. However, these performance requirements do not address utilities which only serve the HCC and whose repair would not impede operation of the transit portion of the Facility.

The above objectives are translated into specific Project requirements in the following sections. The resilience standard for this Project exceeds the code design standard in many areas; however, it should be noted that this resilience standard does not replace full compliance with the governing building code.

2.1 Resilience Requirements

The Project’s resilience requirements are stated qualitatively as follows in terms of expected performance at two levels of seismic hazard:

1. Immediate re-occupancy of the Infrastructure Facility after the design-level event (“green tag” expected)
2. Recovery of essential functionality of the Infrastructure Facility within 30 days after the design-level event
3. Maximum 10% probability of collapse of the Facility in an MCE seismic event

The required approach to attaining these requirements is described in greater detail in the following sections. The seismic hazard levels are defined in Section 2.4 (Seismic Hazard Definition).

2.2 Compliance Standard

These seismic resilience requirements adopt the system outlined by the Resilience-based Earthquake Design Initiative (REDi). A copy of this standard can be downloaded free of charge.² Other systems of equivalent intent and approach may be used upon review and approval by the City.

In keeping with the resilience requirements stated in Section 2.1 (Resilience Requirements) above, the Project's resilience requirements shall be as given for REDi Gold Level, except as modified in this document.

2.3 Post-Earthquake Inspection

The Project shall participate in the Building Occupancy Resumption Program (BORP). This program establishes an earthquake inspection plan to minimize delay in re-occupying the building after a significant seismic event. The LD shall be responsible for the first phase of this program.

2.4 Seismic Hazard Definition

The design-level earthquake is represented by an elastic acceleration response spectrum having 10% probability of exceedance in a 50-year period (475-year return period) based on a site-specific Probabilistic Seismic Hazard Analysis (PSHA). The MCE event shall be as defined by the California Building Code, having a site-specific PSHA response spectrum with deterministic cap. The spectra shall incorporate damping as appropriate for the type of structure to be designed and the level of damage expected under the two hazard levels.

The design-level earthquake spectrum as defined by the California Building Code may not match the PSHA for all building periods at this site. The code-specified seismic hazard shall be utilized for confirming compliance with all code requirements. For evaluating structural and non-structural performance according to Section 2.6 (Structural and Non-Structural Performance Requirements), as well as for loss and downtime assessments according to Section 2.7 (Loss and Downtime Assessment), the PSHA shall be used in lieu of the code spectrum.

It should be emphasized that a structure designed solely according to code requirements will likely not meet the resilience requirements under the PSHA

² Arup, "REDi Rating System: Resilience-based Earthquake Design Initiative for the Next Generation of Buildings," Version 1.0, October 2013, <https://www.arup.com/perspectives/publications/research/section/redi-rating-system>

hazard; the design team must check these requirements at various stages of the design to ensure that appropriate decisions are made in a timely manner.

2.5 Structural Analysis Method

The LD shall conduct a Nonlinear Response History Analysis (NLRHA) to validate compliance with the Project’s resilience requirements. This analysis involves developing a detailed digital model of the Facility’s structural system and simulating the building’s response to earthquake ground motions (“time history records”) that have been selected specifically to match salient characteristics of the Project Site and nearby source faults. Deliverables and their timeline are outlined in [Section 2.9 \(Timeline of Deliverables\)](#). Structural response parameters required by [Section 2.6 \(Structural and Non-Structural Performance Requirements\)](#) and [Section 2.7 \(Loss and Downtime Assessment\)](#) shall be obtained from such analysis, which shall be conducted at both the design-level earthquake hazard and the MCE hazard as applicable.

Time history records shall be developed in conformance with ASCE 7 provisions. For this analysis, expected material properties may be used, as defined in ASCE 41. Nonlinear analysis guidelines given by NIST GCR 17-917-45, “Recommended Modeling Parameters and Acceptance Criteria for Nonlinear Analysis in Support of Seismic Evaluation, Retrofit, and Design,” are considered acceptable.

NLRHA need not be used for calculations to validate code compliance, unless required by the code.

2.6 Structural and Non-Structural Performance Requirements

The structural system of the Infrastructure Facility shall meet Immediate Occupancy performance as defined by ASCE 41 subject to the design earthquake. This performance level is deemed to satisfy the requirement of [Section 2.2.4](#) of the REDi standard referenced above.

The structural system of the Infrastructure Facility shall additionally meet Collapse Prevention performance as defined by ASCE 41 subject to the MCE hazard.

Non-structural performance for components necessary to the operations of the Infrastructure Facility shall meet, as a minimum, the Position Retention performance as defined by ASCE 41 subject to the design earthquake. Compliance with this requirement shall be confirmed using mean accelerations and displacements derived from response history analysis.

Additionally, equipment required to be operational for resumption of the Infrastructure Facility’s transit functions (as defined in [Section 2.7 \(Loss and](#)

Downtime Assessment)) shall be shake-table tested to confirm that any damage after the design earthquake would be repairable within the required recovery period.

2.7 Loss and Downtime Assessment

The LD shall conduct a downtime assessment as described in Section 4.3 of the REDI standard (referenced above) to confirm that the Project's requirement for post-earthquake recovery is met. The methods, assumptions and results of this assessment shall be documented in a written report as indicated in Section 2.9 (*Timeline of Deliverables*). This assessment shall utilize building response parameters extracted from the response history analysis at the 475-year hazard. The results corresponding to the 75% confidence level shall be used.

The direct financial loss assessment described in Section 4.2 of the REDI standard may be omitted. This assessment may, but need not, utilize the PACT software which is mentioned in the REDI standard.

For this analysis, functional recovery is deemed to have been achieved when the following systems are functional:

1. For the entire Facility:
 - a. Fire protection systems and fire-rated barriers
 - b. Sanitary sewer and storm drain systems
2. For the Infrastructure Facility:
 - a. Power and lighting systems
 - b. Domestic hot and cold water systems
 - c. Bus maintenance equipment
 - d. Access controls systems
 - e. Security systems

In order to meet the REDI Gold standard, only aesthetic damage to the above systems will be permissible immediately after the design earthquake, unless the LD can demonstrate that a given component in the above systems can be easily and readily replaced to achieve the same functional recovery criterion.

In January 2020, a City ordinance banned the use of natural gas in new construction. In addition, in the event of a large earthquake the City's existing supply of natural gas will very likely be disrupted for a period of time that is greater than the Project's required functional recovery time. For both of these reasons natural gas will not be permitted for the Facility's systems which provide the above essential functions.

2.8 Seismic Peer Review

The City will retain a seismic peer review consultant during the PDA Term and during the term of the Project Agreement to perform the following scope work:

1. Review of basis of design document, which shall include design criteria for structural and non-structural components
2. Review of structural analysis model assumptions and methods
3. Review of seismic hazard and ground motions used for analysis
4. Review of downtime assessments
5. General review of seismic system and non-structural detailing

The seismic peer review will be initiated during the Site Due Diligence and Schematic Design stages of the PDA Term, and peer reviewers will be periodically re-engaged to confirm design intent is being met, as outlined in Section 2.9 (Timeline of Deliverables), and at every design deliverable.

The LD shall support the peer review process (e.g., by working with the peer review team and incorporating their comments) and incorporate the appropriate peer review check points into the PDA Term. The PPC shall do the same during the term of the Project Agreement.

2.9 Timeline of Deliverables

| Deliverable | Corresponding Project Phase | Peer Reviewer Actions |
|---|------------------------------|-------------------------------|
| Report of the proposed seismic resilience strategy and preliminary analysis showing how the proposed design has been assessed to comply with the Project's seismic criteria, including: <ul style="list-style-type: none"> • List major equipment and structural components that will need to be protected • Identify preliminary displacement and acceleration criteria that can achieve the resiliency goals • Illustrate through sketches and narrative what approaches will be taken to meet the criteria: structural systems, configuration and approximate scale; additional steps taken to reduce the vulnerability of critical components. • Information and inputs relevant for the cost proposal. | RFP Phase | Not applicable. |
| Seismic hazard report including development of the response spectra for design earthquake and MCE. | PDA Term, Site Due Diligence | Sign off on response spectra. |

| Deliverable | Corresponding Project Phase | Peer Reviewer Actions |
|--|----------------------------------|---|
| Draft Basis of Design document: a report containing a description of structural systems and their expected seismic behavior, loading assumptions, design criteria for overall performance and for each type of element, analysis assumptions and a description of the NLRHA model. | PDA Term, Site Due Diligence | Provisional agreement of the design criteria, analysis approach and definition of which elements are considered part of the primary seismic force resisting system. |
| Seismic hazard report including development of the time history records from the response spectra. | PDA Term, 50% SD | Sign off on time history records. |
| Updated Basis of Design document and detailed NLRHA model documentation. | PDA Term, 50% SD | Agreement on design criteria and analysis approach. Detailed review of analysis model. |
| Preliminary NLRHA results including checks against design criteria. | PDA Term, 100% SD | Review of analysis results. |
| Schematic structural drawings showing geometry and preliminary sizing, as well as critical connection details, of seismic force resisting system. | PDA Term, 100% SD | Provisional agreement on arrangement and proportioning of primary seismic force resisting elements. |
| Public-facing narrative description of the SD-level seismic resilience design. | PDA Term, 100% SD | Not applicable |
| Structural drawings showing all sizes and connection details for elements of the primary seismic force resisting system | Project Agreement phase, 50% DD | Confirmation that design meets agreed intent. |
| Final Basis of Design document including final NLRHA results, and downtime assessment report. | Project Agreement phase, 100% DD | Confirmation that basis of design meets agreed intent, and that sufficient NLRHA and downtime assessment results are presented to validate intended performance. |
| Structural Drawings showing final configuration and sizing of seismic force resisting system and related details. | Project Agreement phase, 90% CD | Confirmation that no changes are made which materially alter the agreed design intent. |

3 Common Utility Systems Requirements

Given the size of the Facility and that it is a major civic programmatic use, the Project may warrant the consideration of Common Utility Systems to serve the

Facility in an economic manner. The Development Team shall evaluate the possible use of Common Utility Systems serving the Facility that incorporates some or all of the following:

1. Thermal (heating and cooling)
2. Electrical
3. Water
4. Waste
5. Logistics

Common Utility Systems may provide an efficient and economically advantageous alternate to separate mechanical, electrical, recycled water, and logistics services for each of the Facility's components, including the HCC.

An evaluation of Common Utility Systems alternates based on life-cycle cost analysis shall be made as part of the design process, with allowance for comparison of two Common Utility System alternates compared to a baseline of independent services.

If Common Utility Systems are incorporated into the proposed design of the Facility, providing services to all components including the HCC, then for the purposes of commercial and financial allocation of responsibilities and risk under the eventual Project Agreement they shall be considered to be part of the Common Infrastructure.

3.1 RFP Phase

Proposers shall consider the potential use of a Common Utility System in their Proposals. Proposers shall include in their Proposals a preliminary evaluation of the feasibility of using common thermal, electrical, water, waste, and logistics for the Facility, potential benefits and risks of shared and non-shared approaches. The Proposals shall also identify points requiring further analysis or negotiation during the PDA Term to achieve success should a Common Utility System approach be considered feasible.

Utility service provider application, review and approval processes, schedule requirements, and utility capacity technical considerations must be addressed in the Proposal.

Either a Common Utility System serving the Facility or individual building systems for the BYC, Common Infrastructure, and HCC may be included in the Proposal, provided that (a) justification is provided and (b) the cost is captured within the proposed Fixed Budget Limit.

3.2 PDA Term

The LD shall perform a detailed evaluation of Common Utility Systems alternates, including individual building systems for each Project component as one of the alternates. The required analysis shall evaluate:

1. Space required and location of Common Utility Systems within the Facility as part of the Common Infrastructure, considering potential for space efficiencies, compared to the space required and location of individual building systems
2. Diversity of use, and opportunities for resource recovery, system capacity reduction, and economies of scale in equipment selection
3. Implications for structural design
4. Resilience/redundancy benefits consistent with resilience guidelines for the Project
5. Sustainability and energy efficiency impacts: At a minimum, shared alternatives must comply with codes designated in the Design Criteria Document and the San Francisco Municipal Green Building Code (Environment Code Chapter 7)
6. For thermal systems, all-electric heating and cooling shall be considered, consistent with State of California and City of San Francisco decarbonization goals
7. Capital cost, operations and maintenance cost, and life cycle cost impacts of common vs. stand-alone systems for the Facility: life cycle cost analysis shall at a minimum include evaluation of phased capital, operations and maintenance cost, resource cost (e.g., energy and water), and equipment replacement; prior to commencement of the life cycle cost analysis, analysis parameter and categories (e.g., discount rate, study lifetime) shall be reviewed and agreed with the City
8. For security, controls and equipment for common thermal systems shall be accessible without requiring passage through sensitive areas of the Bus Yard Component
9. Access considerations and the maintenance plan shall be evaluated with the SFMTA
10. Utility service provider application, review and approval processes, required timelines, and utility capacity technical considerations

Common Utility Systems alternates to be evaluated must provide a means for measuring and optimizing resource performance and enable cost sharing/recovery among the BYC, the Common Infrastructure, and the Housing and Commercial Component. A provision for connection and separate commissioning of each

Facility component in the case of electrical and mechanical systems shall be included. Each component shall have separate metering to allow separate billing.

Considerations may include innovative grant funding, financing, and ownership models as well, as appropriate.

The outcome of the analysis shall guide final decision of Common Utility Systems or individual building systems. The final system cost shall fall within the Project's Fixed Budget Limit.

For further information on the requirements for the PDA Term, refer to Appendix B-2 (*Project Management, Design Deliverables, Software, and Document Control Requirements*) of the Agreement.

4 Design Criteria for the Housing and Commercial Component

4.1 Sustainability

At a minimum, the Housing and Commercial Component should meet the requirements of the 2019 San Francisco Green Building Code, Administrative Bulletin AB-093³, California Title 24, and the California Tax Credit Allocation Committee regulations regarding sustainable buildings. Buildings that exceed this measurement and achieve net-positive sustainability strategies are highly encouraged. The selected Development Team will also be required to comply with Chapter 7 of the Environment Code of the City and County of San Francisco, which specifies green building requirements for City buildings. Among other resources, more information is available at <https://tinyurl.com/yhyy3xer> and <https://tinyurl.com/fzxxnyrp>.

For the purposes of the Technical Proposal as it relates to the HCC, proposers shall assume that the more stringent of the above requirements and the sustainability requirements for the Bus Yard Component as set forth in Division 3 (*Design Criteria Document*) of the Technical Requirements shall apply.

During the PDA Term, the LD is encouraged to investigate whether the Project may pursue a separate approach to sustainability for the HCC and Infrastructure Facility to maximize flexibility in design, control costs, and deliver the greatest level of affordability for the HCC.

³ <https://sfdbi.org/sites/default/files/AB-093.pdf>

Division 5: Battery-Electric Bus Supplemental Criteria

1 Introduction

This document contains detailed information on the SFMTA's battery-electric bus (BEB) conversion planning and provides Lead Developer with the SFMTA's:

1. Envisioned implementation of BEB support infrastructure in its bus facilities in general, and in multi-level bus facilities in particular
2. Specific approach to BEB improvements for this Project, including fleet conversion plans, and site-specific information that will assist Lead Developer to deliver the SFMTA's vision during the PDA Term

For the purposes of designing the Infrastructure Facility and developing cost, schedule, and risk analyses, and during the PDA Term the Lead Developer (LD), shall adhere to the following definitions and categories:

- a. **BEB Charging Infrastructure:** refers to the necessary switchgear, power distribution systems, foundations, housings, integrated structural components, mounting solution(s), and associated wire ways, conduit, and cable trays, and all associated IT cabling (whether fiber optic or of other types), as set forth in this document. Regardless of the design approach, the Charging Infrastructure shall include all Facility improvements required to begin BEB deployment upon Substantial Completion of the Infrastructure Facility and to meet the SFMTA's BEB fleet growth plans. There shall be no additional capital improvements needed to run the BEB system, unless agreed to and approved by the SFMTA, in its sole discretion. Charging Infrastructure feeds and supports the Charging Equipment, as described in the next item.
- b. **BEB Charging Equipment:** refers to the overhead inverted pantographs, charging cabinets, dispensers, and associated wire ways, conduit, and cable trays that provide the point-to-point contact where individual BEBs connect to the overall charging system. The Charging Equipment must be connected to the Charging Infrastructure to enable charging of a BEB fleet according to the performance requirements defined in this document and according to the SFMTA's BEB fleet growth plans. The BEB Charging Equipment shall include the charge management/operations software solution (including the Electric Vehicle Charge Management System) to enable the Infrastructure Facility to successfully operate a BEB fleet, meeting the requirements set forth in Section 2.4 (BEB to Charger Software Requirement) of this Division 5.

The interface point between the Charging Infrastructure and the Charging Equipment shall be the termination point of all wire ways, conduit, and/or cable trays to the charging cabinets or future location of charging cabinets.

1.1 Background

Per the California Air Resources Board's Innovative Clean Transit legislation, the SFMTA is required to convert to a zero-emission bus fleet by 2040. To enable this transition, the SFMTA is currently drafting a Zero Emission Facility and Fleet Master Plan (Zero-Emission Plan) through a partnership with WSP USA, Inc. The Zero-Emission Plan, which is planned to be completed approximately by October 2021, will provide a roadmap for the SFMTA's successful facility and infrastructure transition and upgrade, and will position the SFMTA to put these capital projects forward for capital funding that may become available in the future for BEB facility projects. The first two chapters of the Zero-Emission Plan, the *Existing Electrical Supply and Electrical Demand Baseline Assessment* and *Facility Power Need and Technology Assessment* is included in Document 13 (*SFMTA Zero Emission Facility and Fleet Transition Plan*) of the Reference Documents.

SFMTA currently operates the largest fleet of zero emission electric trolley vehicles in North America. The SFMTA plans to transition all routes that are currently served by diesel/hybrid buses and trolley buses with fully BEBs; this move will necessitate converting all of the SFMTA's existing bus maintenance facilities into facilities capable of charging, maintaining, and operating these vehicles.

These criteria are requirements are based on the best information available to the SFMTA and may be updated by the SFMTA from time to time.

As part of the SFMTA's goal to achieve a 100% zero-emission fleet by 2040, the SFMTA will begin the large-scale procurement of BEBs in or around 2025. Through the Zero-Emission Plan, the SFMTA is carefully charting a schedule for the adoption of new vehicles, gradual retirement of existing coaches, overhaul of existing facilities, and integration of charging infrastructure.

1.2 2021 SFMTA 40-Foot BEB Pilot Program

Starting in 2021, the SFMTA intends to conduct a pilot program to evaluate the performance, reliability, operability, and maintainability of the 40-ft BEBs that are currently available on the market, and to gain experience with BEB charging infrastructure to prepare for future fleetwide adoption (the "2021 40-ft Pilot").

The SFMTA expects that the 2021 40-ft Pilot will provide valuable insight into the state of the BEB market and expects that the conclusion of the 2021 40-ft Pilot will pave the way for successful adoption of 40-ft BEB as part of the SFMTA's future BEB procurement strategy.

The SFMTA also intends to conduct a 60-ft BEB pilot to evaluate the feasibility of those vehicles in the SFMTA's operating environment; however, the SFMTA

does not have an established project or a known timeline to conduct a 60-ft BEB pilot program.

As part of the 2021 40-ft Pilot, the SFMTA has procured three 40-ft BEBs each (total of nine) from a variety of bus manufacturers, including New Flyer, BYD, and Proterra, and plans to procure three 40-ft BEBs from Nova in summer 2021. These buses are to be tested in regular revenue service in San Francisco for a period of 18 months. Upon the conclusion of the 2021 40-ft Pilot, the SFMTA will develop guidance on the following topics:

1. Which existing 40-ft BEB models can meet the SFMTA's service requirements
2. The routes and service roles, if any, that cannot be serviced by BEBs
3. The maintenance requirements and practices for a BEB fleet
4. The replacement ratio that will be required when transitioning from diesel hybrid buses and trolley buses to BEBs
5. Which specifications and requirements (battery capacity, ground clearance, telematics systems, etc.) will be kept or modified for future full-scale procurements
6. The charging methodology and operating profile required for sustained operation of BEBs in full-scale deployment
7. Optimum bus yard storage and yard management practices

2 BEBs at Potrero Yard

The Project provides an ideal and timely opportunity to house one of the SFMTA's first procurements of BEBs upon Substantial Completion of the Infrastructure Facility. As described Division 3 (*Design Criteria Document*) of the Technical Requirements, Potrero Yard currently houses 146 trolley buses: 53 40-ft buses and 93-60ft buses.

The 2021 40-ft Pilot is focused on 40-ft BEBs only, as 60-ft BEBs are not yet deemed by the SFMTA to be suitable for revenue service. Table 1.A in the Design Criteria Document indicates that the expanded capacity of Potrero Yard beyond the existing trolley fleet should be reserved for 60-ft vehicles. However, due to limitations of vehicle technology, and the need for a BEB facility to support the SFMTA's early procurements, additional capacity at Potrero Yard upon Substantial Completion in 2026 is expected to be allocated to 40-ft BEBs. The SFMTA will develop the feasibility and schedule for 60-ft BEB fleetwide adoption after a 60-ft BEB pilot program is conducted.

The Project shall accommodate the vehicle size and type specified in Exhibit A (*Battery-Electric Bus Specification*) of this Division 5 document, which includes specifications for the anticipated 40-ft BEB fleet. The initial BEB fleet shall be

parked in a contiguous area in the Project's allocated bus parking layout, unless agreed to and approved by the SFMTA, in its sole discretion.

Table 1 shows the capacity and fleet size allocation for the Project upon Substantial Completion of the Infrastructure Facility in 2026. **Table 2** below shows the total planned capacity for the Project after the Facility is fully transitioned to BEBs.

Moving from the fleet capacities shown in **Table 1** to those in **Table 2** will require the SFMTA to perform off-site fleet management to move some 40-ft vehicles off the Project Site, over time, to accommodate more 60-ft vehicles at Potrero Yard. It will also require modifications to the location of the overhead charging equipment to serve the fleet in use at a given time.

Table 1: Potrero Bus Fleet Capacity upon Substantial Completion of the Infrastructure Facility in 2026

| Location | BEBs | | Trolley Buses | | Total Buses |
|------------------|------|-----|---------------|-----|-------------|
| | 40' | 60' | 40' | 60' | |
| Potrero Bus Yard | 85 | -- | 53 | 93 | 231 |

Table 2: Potrero Bus Fleet Capacity After Fully Transitioning to BEBs after 2026

| Location | BEBs | | Trolley Buses | | Total Buses |
|------------------|------|-----|---------------|-----|-------------|
| | 40' | 60' | 40' | 60' | |
| Potrero Bus Yard | 53 | 160 | - | - | 213 |

2.1 BEB Procurement Schedule and Phasing

The SFMTA's master fleet procurement schedule dictates that the SFMTA will procure BEBs starting as early as 2025, depending on availability of facilities that can accommodate BEB's. If no BEB-capable facility is available by 2025, the SFMTA may procure hybrid buses in 2025.

The next fleet procurement is planned in 2027, and that procurement would replace the SFMTA's existing fleet of 60-ft diesel hybrid buses which were first purchased in 2016. As discussed in [Section 1.2 \(2021 SFMTA 40-Foot BEB Pilot Program\)](#) and [Section 2 \(BEB's at Potrero Yard\)](#), the SFMTA has concerns about 60-ft BEB performance and has not yet initiated a pilot program on 60-ft vehicles. Consequently, SFMTA does not have at this time a solidified plan for replacement of its fleet of 60-ft hybrid buses.

To solve for this uncertainty, the SFMTA requires that the Facility have the capacity and capability to serve 40-ft BEBs at the time of Substantial Completion of the Infrastructure Facility. As shown in **Table 3** below, the Project will include

capacity at opening for 85 40-ft BEBs, which are planned to arrive on-site in 2028 and 2029, but may arrive earlier pending completion of the Project.

The 40-ft Allison Hybrid and 40-ft BAE Hybrid buses shown in **Table 3** currently operate out of the SFMTA's Woods hybrid bus facility.

The SFMTA envisions modifying the capacity and fleet distribution according to **Table 2**. However, as this is reliant on the development of BEB technology, the SFMTA reserves the right to update the fleet distribution shown in **Table 3** as needed. The Facility shall be designed with flexibility to respond to changes in technology, BEB performance and costs, and the SFMTA's needs.

Table 3: Anticipated BEB Fleet Replacement Procurement Schedule specific to Potrero Yard

| Year | 40 ft Buses to be replaced with BEBs | | | | 60 ft Buses to be replaced with BEBs | | Total BEBs |
|----------------------------|--------------------------------------|-------------------|-----------|------------------|--------------------------------------|------------------|------------|
| | Allison Hybrid | BAE Hybrid | Trolley | Total 40 ft BEBs | Trolley | Total 60 ft BEBs | |
| 2028 | 42 ⁽¹⁾ | 24 ⁽¹⁾ | | 66 | | | 66 |
| 2029 | 19 ⁽¹⁾ | | | 19 | | | 19 |
| 2030 | | | | | 24 | 24 | 24 |
| 2031 | | | | | 36 | 36 | 36 |
| 2032 | | | | | 20 | 20 | 20 |
| 2033 | | | 53 | 53 | 13 | 13 | 66 |
| Fleet mgmt. ⁽²⁾ | | | | -85 | | 67 | -18 |
| Total | 61 | 24 | 53 | 53 | 93 | 160 | 213 |

Notes:

(1) These buses are currently operating out of SFMTA's Woods hybrid bus facility.

(2) Fleet management is for buses to be moved off Potrero Yard to another SFMTA facility – TBD.

2.2 BEB Power Supply Approach

The Facility shall be designed to operate BEBs on an optimized charging strategy to integrate all vehicle battery charge and depletion data, data from the bus telematic system, and revenue route planning with available Facility utility and power information. The optimized charging strategy requirements are addressed in Section 2.4 (BEB to Charger Software Requirements) below.

Table 4 summarizes the Facility's anticipated BEB power needs, as estimated by WSP for the SFMTA's Zero-Emission Fleet and Facility Plan, which is currently being drafted. This table indicates that the BEB component is currently estimated to require approximately 12.2 MW of maximum hourly load when the Facility has fully transitioned to a BEB fleet. It is important to note that the service load required by the remainder of the Project is not included in **Table 4**.

Table 5 is a summary of existing circuit capacity near the Project Site, based on information provided by PG&E to SFMTA in 2020.

It is evident from these figures that existing nearby circuits do not have the capacity needed to meet the Facility's power demand, and that additional substation capacity will be required as part of the Project's design and construction.

Table 4: Project's Estimated BEB Power Requirement

| | Potrero |
|---|-----------------------------------|
| Address | 2500 Mariposa St |
| Assumed Quantity – charging cabinets | 116 |
| Assumed Quantity – pantographs | 213 |
| Total kVA (@205kVA) | 23,780 |
| PV Solar (kW) | TBD |
| PV Solar (kWh) | TBD |
| Electric Load Information | Primary Voltage (>2400V), 600A |
| BEB Fleet Size (projected by 2040) | 213* |
| Monthly peak demand (kW) Summer | 12,758 |
| Monthly peak demand (kW) Winter | N/A |
| Monthly electric consumption in peak demand month (kWh) | 2,250,512 |
| Annual electric consumption (kWh) | 27,006,138 |
| Max summer day and winter day by hour | 12,242 |

(*): Two Services contemplated: Service 1 for 162 buses; Service 2 for 51 buses

Table 5: Summary Information on Existing Circuits near the Project Site

| | Potrero |
|-------------------------|--------------------|
| PG&E Substation | Potrero Substation |
| Current Feeder | Potrero 1119 |
| Available Capacity (MW) | 2.50 |
| Nearby Feeder (1) | Mission 1125 |
| Available Capacity (MW) | 4.73 |
| Nearby Feeder (2) | Potrero 1101 |
| Available Capacity (MW) | 1.70 |

Note: All Feeders are 12kV

Due to the timeline required for the electrical service applications and system studies, the SFMTA has submitted two applications for electrical service to the San Francisco Public Utilities Commission, who serves as intermediary for City departments for all communications concerning Hetch Hetchy Power with PG&E. Further information on electrical utility roles for the SFMTA's municipal project can be found in Division 3 (Design Criteria Document) of the Technical Requirements.

These applications have requested the full electrical load that has been estimated by SFMTA to be required to operate the total anticipated 213 battery electric buses on an optimized charging strategy. This estimate is based on the fleet

procurement information shown in **Table 3** as the basis to guide the phased transition planning to BEB through 2033. Per the applications for electrical service, this supply for BEB's is split across two feeders to allow for immediate redundancy (see Section 2.5 (*BEB Emergency Backup Power Requirements*)).

In addition, the SFMTA has been advised by the SFPUC that the maximum service request per application is 10 MW.

The applications are included as Appendix C to Division 3 (*Design Criteria Document*) of the Technical Requirements.

2.3 BEB Power and Infrastructure Performance Requirements

Upon execution of the PDA, the LMD shall take over the ongoing electrical service applications and continue working with the SFPUC and PG&E toward a full resolution of the engineering design and construction challenges, the cost, and the schedule to bring the requested electrical service to the Project Site.

At Substantial Completion of the Infrastructure Facility, the Facility's electrical room and all necessary electrical equipment, appurtenances, and provisions shall be microgrid controller compatible and built to accommodate the BEB program at full build-out, as shown above. Additionally, the Facility shall accommodate the full BEB program based on an optimized charging strategy, and shall adhere to the following requirements:

1. The Facility shall be equipped with all the Charging Infrastructure and Charging Equipment to operate 85 battery electric buses at Substantial Completion of the Infrastructure Facility.
2. Beyond the initial 85 40-ft BEBs, all Charging Infrastructure required for the remainder of all future BEB phasing (per **Table 3** above) shall be installed and operational by Substantial Completion of the Infrastructure Facility as a complete system. The Charging Infrastructure shall be ready to connect to all future placement of additional Charging Equipment in such a way to ensure minimal intrusion and disruption to transit operational continuity at the time of installation and connection of the future placement of additional Charging Equipment.
3. The mounting provisions for the trolley bus OCS parking spaces shall be designed to ensure a seamless transition from trolley bus parking spaces to BEB parking spaces.

All testing and commissioning of the Charging Infrastructure shall be completed before Substantial Completion of the Infrastructure Facility. A written report shall be submitted to the SFMTA by the PPC listing all findings and how the issues were corrected, within the context of the Project's overall commissioning and operational readiness processes and procedures.

Commissioning and testing processes shall ensure that the charging solution integrates with and charges a test bus, and that there are no physical obstructions blocking access to the charging solution. The PPC will be required to create a Charging Infrastructure Commissioning Plan during PDA Term and seek the SFMTA's approval of it. A full commissioning plan will be required as part of the Facility design and DB Contractor procurement processes.

The technical specifications and select design modules of the Charging Equipment are attached as Exhibits B, C, and D to this Division 5 document. The Charging Infrastructure design in Exhibit D (*Conceptual Design Module Package*) is a proof of concept of one approach to charging equipment layout and technology and is not to be considered prescriptive or limiting the development of alternative charging approaches, equipment layouts, required power analyses, or to exclude other physical arrangements and charging technologies. Refer also to the Exhibit D's General Notes for additional context.

The following are the basic technical requirements for the Charging Equipment. Additional requirements may be developed during the PDA Term.

- a. All charging will be done at the Project Site.
- b. Overhead DC inverted pantograph chargers shall be utilized for all bus parking spaces.
- c. Plug-in DC charging systems shall be programmed for all preventive maintenance bays that require overhead charging for the trolley bus configuration per Division 3 (*Design Criteria Document*) of the Technical Requirements. Plug-in DC charging dispensers shall be installed at the rear left side of the maintenance bays with charging cable stored on a cable reel.
- d. All overhead in-yard charging systems shall be capable of providing a minimum charging level of 150 kW, and safely recharge 40-ft BEB Bus Energy Storage System (ESS) from 10% State of Charge (SOC) usable in vehicle to 90% SOC usable in vehicle in less than four (4) hours.
- e. All plug-in DC charging systems shall provide a minimum charging level of 50 kW, and safely recharge 40-ft BEB ESS from 10% SOC usable in vehicle to 90% SOC usable in vehicle in less than ten (10) hours.
- f. Plug-in charging systems shall utilize a concurrent charging enabled charger to energize multiple connected dispensers at once.
- g. The maximum charging cabinet to plug-in dispenser ratio is 4:1, so long as DC/Communications 300-foot limit is maintained, and all other Technical Requirements are achieved.

To the extent feasible while still achieving the number of maintenance bays outlined in the Division 3 (*Design Criteria Document*) of the Technical Requirements, the SFMTA requests Lead Developer to accommodate, as a preferred criterion, an additional 18" width to maintenance bays on the left side of preventive maintenance bays equipped with plug-in charging systems. The goal is

to allow for safe staff movement around a BEB connected to a plug-in charge connector without impacting charge connector or port door.

The charging system must be compatible, at a minimum, with the following long-range e-bus manufacturers:

- i. Proterra
- ii. New Flyer
- iii. BYD
- iv. Nova Bus

The SFMTA understands and appreciates that the BEB infrastructure industry is experiencing rapid development and innovation. The criteria described in Exhibits B and C are set forth as minimum standards and technical requirements.

2.4 BEB to Charger Software Requirement

The cloud-based subscription service for the chargers shall provide troubleshooting, diagnostics, remote charging status on a per-dispenser level, and energy consumption data. The cloud service license shall be accessible on mobile devices and shall allow for a minimum of 20 simultaneous users. The cloud service shall broadcast charging information from the charging solution through OCPP 2.0 protocol or newer.

Necessary data and integration requirements shall be provided to capture charger operational data in real time for optimized charging. The optimized charging strategy will integrate all vehicle data, planning, utility information and other data sources. Optimized charging shall include, but not be limited to load balance between chargers, the ability to set maximum demand limit, integration of vehicle route scheduling and planning (SFMTA utilizes Trapeze for this purpose), prioritize charge sessions manually, avoid peak time-of-use periods, real time status of chargers, KPI charge reports, remote reset of chargers, and automated incident reporting.

The yard management solution shall be developed with input from the SFMTA's transit division and must be approved by the SFMTA before deployment. In addition, the Contractor must demonstrate the successful operation of their cloud-based subscription service is fully functional.

2.5 BEB Emergency Backup Power Requirements

PG&E reliability data from 2006 to 2015 show that there is an average of approximately one power outage every two years. On average, a power outage in the San Francisco service environment lasts 78 minutes before service is restored. In recent years, power outages have been intentionally implemented by Northern

California utility companies in anticipation of wildfires during summer months, which may increase outage length and frequency in future years.

As the SFMTA converts its fleet to BEB's, the fleet becomes heavily dependent on electrical utility partners and the resiliency of the SFPUC's and PG&E's electrical infrastructure. In the event of large-scale, sustained electrical outage, the BEB fleet would not have the ability to operate. The SFMTA is seeking cost-efficient methods of achieving electrical redundancy to continue providing service and emergency response functions.

The SFMTA's first layer of redundancy is in the electrical service applications, where the SFMTA has split the BEB fleet electrical loads into two separate applications. As such, two feeders will enter the site, allowing a portion of the fleet to be powered in the event one feeder is out of service. Once the SFMTA begins a conversation in earnest with PG&E and the SFPUC on these applications, the SFMTA will also investigate the potential for the two feeders to be fed by two separate PG&E substations, which will add to the resiliency of the fleet.

The SFMTA is not currently analyzing procuring a redundant power supply from the SFPUC and PG&E (i.e. doubling the facility and BEB electrical requirement) due to cost.

The SFMTA seeks built-in redundancy to power a portion of the BEB fleet. In addition to the emergency backup power requirements in Division 3 (*Design Criteria Document*) of the Technical Requirements, the SFMTA requires that 10% of the overall Potrero fleet (approximately 43 vehicles) shall be connected to a redundant power supply, subject to applicable codes. The backup power requirement is achieved by fully charging 10% of the fleet vehicles in under 9 hours. To the extent feasible, this backup power should be provided by on-site renewable sources (e.g. photovoltaic panel and battery storage system) that are not dependent on fossil fuels. In addition, to bolster the SFMTA's ability to add additional backup power in the future, space shall be allocated for three (3) Energy Storage System (ESS) battery packs. Space requirements for a single ESS batter pack is 10 feet by 40 feet (with clearances to be confirmed in the applicable code). During the PDA Term, the LD shall complete an emergency operations plan describing how the emergency fleet would function based on the Facility backup power design.

Lead Developer should also consider the long-term role the SFMTA's proprietary DC traction power system could play in backup power, once the Facility transitions fully to BEB.

2.6 Design Criteria Document Figures Related to BEBs

Section 5 (*Requirements for Bus Yard Component Space Modules*) of Division 3 (*Design Criteria Document*) of the Technical Requirements, includes a sample design solution for accommodating the required Charging Infrastructure. The sample design includes an overhead gantry to mount pantographs and charging cabinets.

The SFMTA encourages creativity and innovation in the design of the Charging Infrastructure and the Charging Equipment, and holds the LD during the PDA Term to the minimum standards outlined in Section 2 (*BEB's at Potrero Yard*) of this document, while at the same time leaving the spatial design approach to them.

2.7 Requirements for Facility Conversion Phasing

As highlighted above in **Table 3** above, starting in 2030, 60-ft trolley buses are expected to be replaced with BEBs. The SFMTA requires that:

1. During the PDA Term, the LD will work with the SFMTA to plan for the transition, including adapting to any changes that SFMTA may need to implement to its fleet transition plan, and design the Facility to accommodate the opening day requirements with optimal flexibility
2. Following Commercial Close, the PPC implement those plans and continue to work with SFMTA to prepare for its fleet transition
3. Following Substantial Completion, the PPC manage the necessary changes to the Infrastructure Facility for the transition, including contracting of any future required construction or capital works, as part of the ongoing Infrastructure Facility Maintenance (IFM) scope of work

For the transition, the SFMTA requires that:

- a. The trolley bus to BEB transition should occur in phases, preferably one bus parking lane at a time to align with the procurement schedule of the BEB's
- b. The OCS for the trolley buses shall be replaced with the overhead Charging Equipment required for the BEBs, at the time of transition from trolley buses to BEB's
- c. Future Charging Equipment shall seamlessly integrate with the existing Charging Equipment and Charging Infrastructure and shall be backwards-compatible with existing BEBs
- d. Future Charging Equipment shall be incorporated in the Facility's management solution upon activation/commissioning of the Charging Equipment and any modifications to the Charging Infrastructure

2.8 RFP and PDA Requirements

Lead Developer shall engage the Key Personnel designated with experience in the design of direct current (DC) fast charging and BEB facility infrastructure at all stages of design to develop the Infrastructure Facility's design to demonstrate how the BEB Supplemental Criteria requirements set forth in this Division 5 document will be met.

The Charging Infrastructure and the Charging Equipment shall be addressed and included in the Facility's design. From a cost perspective, the BEB requirements shall be treated as BYC costs, as follows:

1. The Charging Infrastructure, required to be ready for operation at the time of Substantial Completion of the Infrastructure Facility, shall be included in the Fixed Budget Limit as a DB cost.
2. The Charging Equipment for the first 85 40-ft BEB's, required to be ready for operation at the time of Substantial Completion of the Infrastructure Facility, shall be provided as an Allowance included in the DB costs.
3. The Charging Equipment for the transition from trolley buses to BEB's as described in Section 2.7 (*Requirements for Facility Conversion Phasing*) above, required after the time of Substantial Completion of the Infrastructure Facility, shall be provided as an Allowance included in the IFM costs.

Division 5 - Exhibit A: Battery-Electric Bus Specifications

Table A-1 as follows provides a description of the fleet vehicle the SFMTA is pursuing. The below general dimensions exclude exterior mirrors, marker and signal lights, flexible portions of the bumpers, and fender skirts.

Table A-1: Coach Requirements

| Item | 40' E-bus | 60' E-bus |
|---|-----------------|-----------------|
| Length, excluding bumpers | 41' +/- 2' | 60' +/- 2' |
| Width - exterior, excluding mirrors | 102" max | 102" max |
| Height Overall, without roof-mounted HVAC system | 134" max | 134" max |
| Height Overall, with roof-mounted HVAC system | 140" max | 140" max |
| Seating Capacity: | 32 min | 57 min |
| Width of Seat (one passenger) | 18" min | 18" min |
| Width of Seat (two passenger) | 35" min | 35" min |
| General Aisle Width | 22" min | 22" min |
| Headroom along Center Aisle, at Front Axle Wheelhouse | 79" min | 79" min |
| Headroom along Center Aisle, at Rear Axle Wheelhouse | 73" min | 73" min |
| Front Door Height from Ground (normal) | 15.5" max | 15.5" max |
| Front Door Height from Ground (kneeled) | 13" max | 13" max |
| Rear Door Height from Ground (normal) | 17.5" max | 17.5" max |
| Body Ground Clearance | 8" min | 8" min |
| Approach Angle with/without Over-raise Feature | 9 degrees min | 9 degrees min |
| Break over Angle with/without Over-raise Feature | 8.9 degrees min | 8.9 degrees min |
| Departure Angle with/without Over-raise Feature | 9 degrees min | 9 degrees min |
| Turning Radius (Outside Body Corners) | 45 feet max. | 45 feet max. |
| Axle Zone Clearance | 5" min | 5" min |

BEB's will be equipped with overhead chargers compliant with SAE J3105 (ISO 15118 and IEC 61851 Parts 1 and 23). The center of the overhead charging rails shall be installed above the center of the front door of the coach.

The SFMTA requires that any charging system used is capable of 2-way communication with the Bus ESS and Battery Management System (BMS). The charge management/operations software solution must include the following protections and driver alerts: (i) dynamic state of charge of the energy storage system, and (ii) charge rate. The SFMTA requires that both the bus and charger systems can independently command an emergency stop of the recharge cycle should a critical fault occur. The SFMTA requires a contact style charging interface (SAE J1772 CCS Type 1) to be provided on the rear of the coach on both streetside and curbside.

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**Division 5 - Exhibit B: Basis of Design – Section 11
11 36.14 Commercial Electric Vehicle Charging
Unit for Transit Depots**

SECTION 11 11 36.14

COMMERCIAL ELECTRIC VEHICLE CHARGING UNIT FOR TRANSIT DEPOTS

PART 1 - GENERAL

The General Provisions of the Contract, including General and Special Conditions and the requirements of Division 1, apply to the Work in this Section.

1.01 WORK INCLUDED

- A. Guide specification of equipment items as listed below by Equipment Mark Number are provided to establish minimum performance requirements, operational criteria, and standards compliance of a DC charging system for commercial battery electric vehicles charged via automated connection to overhead charging rail on vehicle roof and by handheld manually inserted plug. Alternative systems that comply with these minimum performance requirements, operational criteria and standards compliance but are achieved by physically different equipment configurations than the guide layout and the components listed but achieve the same verifiable results will be considered and reviewed by Owner as equivalents. DC overhead charging system to consist of:
1. CHARGING CABINET, BATTERY ELECTRIC BUS, 150kw DC POWER
Equipment Mark Number: 8012
 2. CHARGING PANTOGRAPH, INVERSE, FACILITY MOUNTED
Equipment Mark Number: 8020
 3. REMOTE PLUG-IN DISPENSER
Equipment Mark Number: 8025
- B. Installation of equipment with labor, services, and incidentals necessary for complete and operational equipment installation.
- C. Utilities to be roughed in at location recommended by manufacturer.
- D. Coordination of equipment and vehicle to allow for automated operation and communication of the Charging Pantograph, Inverse, Facility Mounted, Equipment Mark Number: 8020 with the Owner's battery electric bus fleet. Coordination with other equipment and/or items shall include, but not necessarily be limited to, the following:
1. Equipment Mark Number 8030 Electric Vehicle Yard Management System as specified in Section 11 11 36.20 Electric Vehicle Yard Management System
- E. Coordination of equipment and vehicle to allow for corded handheld plug (charge connector) and communication of the Remote Plug-In Dispenser Mark Number: 8025 with the Owner's battery electric bus fleet. Coordination with other equipment and/or items shall include, but not necessarily be limited to, the following:
1. Equipment Mark Number 8030 Electric Vehicle Yard Management System as specified in Section 11 11 36.20

1.02 QUALITY ASSURANCE

- A. Equipment shall be produced by a manufacturer of established reputation with a minimum of five years' experience supplying specified equipment.

- B. Manufacturer's Representative:
 - 1. Installation: Provide a qualified manufacturer's representative at site to supervise work related to equipment installation, check out and start up.
 - 2. Training: Provide technical representative to train Owner's maintenance personnel in operation and maintenance of specified equipment.
 - 3. Testing: Provide technical representative for final testing of equipment.
- C. Installation of this equipment item requires initial mock-up and acceptance by design team and owner. Refer to Part 3.02 of this specification section Installation for more details

1.03 STANDARD AND REGULATORY REQUIREMENTS

- A. Equipment indicated within this specification section shall comply with all applicable national, state and local codes and regulations, including seismic, fire, and racking codes and regulations. Additional, more specific compliance requirements may be listed under individual equipment headings.

1.04 SUBMITTALS

- A. Submittal requirements for all equipment items included in this section are listed below.
- B. Product Data:
 - 1. Submit Product Data in accordance with Division 1 - General Requirements of these specifications.
 - 2. All Product Data submittals shall identify proposed project specific items marked by arrow, circle, underline, reproducible highlight, or other markings clearly discernable by the reviewer, to show which specific items, parts and accessories are being submitted for the project product data review. Non-marked or generic product data submittals with no marks indicating specific items, parts and accessories will be a cause for rejection.
 - 3. Restrict submitted material to pertinent data. For instance, do not include manufacturer's complete catalog when pertinent information is contained on a single page.
- C. Operation and Maintenance Manual:
 - 1. Provide a Complete parts list, operating instructions, and maintenance manual covering equipment at time of installation including, but not limited to:
 - a. Description of system and components.
 - b. Manufacturer's printed operating instructions.
 - c. Printed listing of periodic preventive maintenance items and recommended frequency required to validate warranties. Failure to provide maintenance information will indicate that preventive maintenance is not a condition for validation of warranties.
 - d. List of original manufacturer's parts, including suppliers' part numbers and cuts, manufacturer's recommended spare parts stockage quantity and local parts and

service source based on anticipated frequently replaced and or long lead (more than five workdays) components.

2. Assemble and provide copies of manual in 8-1/2 by 11-inch format. Foldout diagrams and illustrations are acceptable. Manual to be reproducible by dry copy method. Provide copies per provisions of Division 1 - General Requirements.
- D. Shop Drawings: Submit shop drawings in accordance with Division 1 -General Requirements of these specifications.
1. Submitted shop drawings shall be project specific and shall include a minimum 1/8 inch to 1 foot scaled (or larger standard architectural imperial scale), dimensioned, graphical representation of the size, orientation, and location for all instances of submitted equipment in a floor plan view and reflected ceiling plan view for DC charging cabinets, dispenser (pantographs and remote plug-in cabinets) and other system elements. The drawings shall further include dimensions from structural elements or architectural grid lines, to each major charging equipment item (8012, 8020 & 8025) operational clearances, locations of any utility service connection points, power and communication output points, mounting requirements, and structural supports required for the submitted equipment. Indicate which specific dispensers are connected to and energized by which specific DC charging cabinet.
 2. Manufacturer's standard installation drawings will be accepted and reviewed but are not considered as a replacement to project specific shop drawings.
- E. Test Reports: Testing and Commissioning reports are required for all systems included in this specification and shall be included as part of the close-out documents. Provide to the equipment consultant a copy of all testing and commissioning reports for equipment specified herein. Refer to Part 3.03 Testing, of this specification.
- F. Required Documents for Permit and Local Jurisdictional Approval: Where required by local jurisdiction and/or code officials, the contractor/supplier shall be responsible for producing and submitting all documentation required for obtaining all applicable approvals related to the specified equipment. This documentation may include, but may not be limited to, engineered signed and stamped plans, details, anchorage layouts for equipment on stands and as racks to show compliance with locally adopted ASCE, seismic, fire, and other codes. A copy of these required documents shall be included with the product submittal to the Design Team/consultant team for their review.

1.05 WARRANTY

- A. Warrant work specified herein for one year from substantial completion against defects in materials, function, workmanship and charging system operational design.
- B. Warranty shall include materials and labor necessary to correct defects including replacement of charging system operational elements with re-designed components.
- C. Defects shall include, but not be limited to loose, damaged and missing parts and abnormal deterioration of finish, excessive cord wear.
- D. Operational design defects include for pantograph charger and dispenser include systemic bent or non-flexing conductor rails, non-extending / retracting of pantograph due to factory installed elements, failure or intermittent failure to instigate charging process and pantograph deployment due to inability to connect and / or non-communications with vehicle properly aligned below pantograph, failure to deploy pantograph, initiate or complete charging process due to interference from adjacent installed pantographs is an operational design defect. Pantographs conforming to this performance

specification are intended to perform in a dense bus parked environment with anticipated adjacent pantographs and battery electric buses on all four sides of surrounding each installed pantograph. Operational design defects for DC charging cabinet and plug-in dispenser include systemic bent charging and charging communications connector pins, damaged charging cord conductors and internal wiring, breakage and deterioration of charging plug-in mating elements (ports, charging connector) during routine daily use of charging system. Submit warranties in accordance with Division 1 - General Requirements of these specifications.

- E. All parts shall be readily available locally in the United States.

1.06 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver equipment in manufacturer's containers, appropriately packaged and/or crated for protection during shipment and storage in humid, dusty conditions. Equipment shall be stored per manufacturer's recommendation.
- B. Indelibly label all containers, including those contained in others, on outside with item description(s) per title and Mark Number of this specification.
- C. Provide equipment and materials specified complete in one shipment for each equipment item. Split or partial shipments are not permissible.

1.07 LABELING

- A. Manufacturer shall securely attach in a prominent location on each major item of equipment a non-corrosive nameplate showing manufacturer's name, address, model number, serial number, and pertinent utility or operating data.
- B. All electrical equipment and materials shall be new and shall be listed by Underwriter's Laboratories, Inc. (U.L.), or other US National Recognized Testing Laboratory (NRTL) acceptable to both the design team and local code officials, in categories for which standards have been set by that agency and labeled as such in the manufacturer's plant.

PART 2 – PRODUCTS

2.01 CHARGING CABINET, BATTERY ELECTRIC BUS, 150kw DC POWER Equipment Mark Number: 8012

- A. General:
 - 1. Description: Upright cabinet(s) connected to multiple charger dispensers including:
 - a. Facility mounted inverse charging pantograph, and capable of automatically charging the connected battery electric bus (BEB) utilizing direct current (DC) electrical power. Intended for long term charging of BEBs in overnight parking positions. Unit must be capable of operating in dense installation of multiple mark 8012 charging cabinet units located in same general area.
 - b. Facility mounted standalone stationary cabinet dispenser capable of charging a battery electric bus utilizing (DC) electrical power after being manually connected to a battery electric bus by a flexible power cord and handheld plug. Intended for short term charging of BEBs in maintenance and service bays.

2. Coordination: Specification information indicated herein is intended as general requirement only. Final design of the system shall be by the manufacturer and shall be presented in the project specific shop drawings in coordination with the Charging Pantograph, Inverse, Facility Mounted Equipment Mark Number: 8020 and Remote Plug-In Dispenser Mark Number 8025 as a fully coordinated, complete design.
3. Compliance: The equipment and final design shall comply with the most current editions of all applicable local, state, and federal codes and regulations, including, but not limited to, those listed below.
 - a. SAE International Standard J3105, Electric Vehicle Power Transfer System Using a Mechanized Coupler, most recent edition
 - b. SAE International Standard J3105/1, Infrastructure-mounted Pantograph (Cross-Rail) Connection
 - c. SAE J1772: SAE Electric Vehicle and Plug-in Hybrid Electric Vehicle Conductive Charge Coupler, most recent edition.
 - d. NFPA 70: National Electric Code (NEC), most recent edition.
 - e. NFPA 70E: Standard for Electrical Safety in the Workplace, most recent edition
 - f. Underwriter's Laboratory UL 2202, Standard for Electric Vehicle (EV) Charging System Equipment, most recent edition.
 - g. Underwriter's Laboratory UL 2231-1, Standard for Safety for Personnel Protection Systems for Electric Vehicle (EV) Supply Circuits: General Requirements
 - h. Underwriter's Laboratory UL 2231-2, Standard for Safety for Personnel Protection Systems for Electric Vehicle (EV) Supply Circuits: Particular Requirements for Protection Devices for Use in Charging Systems.
 - i. ANSI/IEC 60529: Degrees of Protection Provided by Electrical Enclosures (IP Code), most recent edition.
 - j. IEC 61851-1; 23; 24: Electric Vehicle Conductive Charging System, most recent edition.
 - k. IEC 61000-6-2: Electromagnetic Compatibility (EMC) – Part 6-2: Generic Standards – Immunity Standard for Industrial Environment.
 - l. ISO 15118: Road Vehicles – Vehicle to Grid Communication Interface.
 - m. 29 CFR 1910.147: General Environmental Controls, The Control of Hazardous Energy (Lockout/Tagout), as enforced by OSHA, most recent edition.
 - n. International Electrotechnical Commission (IEC) 60309, most recent edition.
 - o. Federal Communications Commission (FCC) rules and regulations, as applicable.
 - p. Open Charge Point Protocol OCPP 2.0 or higher to allow charger control and monitoring by a third-party charge management system

4. Components:

- a. Power Cabinet(s).
- b. All components, interconnecting cabling and conduits/ducts between components, software, and accessories for a fully and properly operational device.

B. Capacities and Dimensions:

1. Cabinet equipment unit performance to allow total output charge power, direct current (DC): Nominal 150 kilowatts (kW), minimum capable to charge a 675kWh battery electric bus (BEB) from a ten percent usable by vehicle state of charge to ninety five percent usable by vehicle state of charge in a consecutive four-hour period from a single dispenser.
 - a. Systems that combine power outputs from two or more separate standalone cabinets to produce the total output charge power of the nominal 150kW minimum and charger time are acceptable and considered equivalent to a single 150kW cabinet unit.
 - b. Systems that employ a single larger kW cabinet with multiple outputs to dispensers that produce the total output charge power of the nominal 150kW minimum and charger time are acceptable and considered equivalent to a single 150kW cabinet unit.
 - c. Quantity of inverted pantographs charging dispensers in bus parking areas, output charge power from entire overhead DC charging system to be capable of charging full quantity of overhead electrically charged vehicles identified on the project drawings in a single consecutive (8) eight-hour period minimum inclusive of charge management peak power reductions, state of charge (SOC) diversity factor as described in addendums and other proposed and verifiable max charging power reduction systems. Additional chargers provided in maintenance and services bays are not to be factored in to charging systems ability to charge the identified BEB fleet size in an eight-hour period.
2. Output voltage range: 200-1,000 volts, DC.
3. Rated DC output current range: 3-250 Amps, bi-directional.
4. Operating temperature range: -22 degrees Fahrenheit (F) to 113 degrees F.
5. Input connections: 3 phase plus protected earth ground wire
6. Input power rating: nominal 205 kVA (full load) / 100 VA (idle)
7. Input AC line-line voltage range: 480 VAC +6/-13%
8. Input AC phase current: nominal 283 amps, maximum / 385 amps fused.
9. Power factor, total harmonic distortion: 0.95, minimum.
10. Power conversion efficiency at full load: 96 percent, minimum.
11. Dielectric withstand: 3,000 volts, root mean square (RMS).

12. Network connection: 4G/LTE modem, minimum, utilizing Open Charge Point Protocol (OCPP) 2.0 or later network communication.
13. Protection: IP54 and IK 10 or equivalent NEMA rating.
14. Operational noise level: 85 decibels, maximum.
15. Overall dimensions, power cabinet(s), maximum nominal:
 - a. Width: 40 inches.
 - b. Depth: 40 inches.
 - c. Height: 91 inches.
 - d. Weight: 2,200 pounds.

C. Features and Construction:

1. Each electrical cabinet to be a standalone unit capable of meeting the specification herein. The cabinet shall include capability for entry of alternating current (AC) electrical supply, main isolation transformer cabinet, AC to DC power conversion, AC grid coupling and protective devices, DC output coupling and protective devices, controller for charger circuit and the communication equipment, and forced-air over coolant chiller functions.
2. Capable of being connected to power supply grid or low voltage power distribution station.
3. Charge cabinet configurable to support either multiple overhead pantograph dispensers or plug-in dispensers. Individual cabinet not required to be capable of being connected to and simultaneously or concurrently energizing a mix of both pantographs and plug-in dispensers. Concurrent charging is preferred but sequential charging systems in bus parking areas will be considered based on submitted charging performance. Concurrent charging only to be used at maintenance bay plug-in dispensers.
 - a. On concurrent controlled and powered dispensers, shared dispensers connected (dispenser A, dispenser B+), to a single DC power cabinet, the nominal output (voltage, current, power, charging telemetrics and controls) to the simultaneously connected remote dispensers will be split from the DC power cabinet and, as controlled by the DC power cabinet's shared dispenser charging priority system, power one remote dispenser unit (dispenser A) up to the nominal maximum outputs while simultaneously and concurrently providing minimal or remaining DC power cabinet's output to the other shared connected remote dispenser units (dispenser B+) until all BEBs connected to the shared charging dispensers are fully energized. During this concurrent controlled charging process, after BEBs initial dispenser connection, plug-in or pantograph connection at the beginning of the charging process, no manual re-plugging / disconnection, re-plugging / reconnection, re-parking or wireless connection of charge connector or pantograph will be necessary.
 - b. On sequentially controlled and powered dispensers, shared dispensers connected to a single DC power cabinet, the nominal output (voltage, current, power) to the simultaneously connected remote dispensers (dispenser A, dispenser B+) will be shifted from the DC power cabinet and, as controlled by the DC power cabinet's shared dispenser charging priority system, power one remote dispenser (dispenser

A) unit up to the nominal maximum outputs while not providing output to any other connected shared remote dispenser units (dispenser B+). As controlled by the DC power cabinet's shared dispenser charging priority system, the DC power cabinet's output will then automatically switch and shift the output (from dispenser A) to another connected and shared remote dispenser unit (dispenser B) up to the nominal maximum outputs (to dispenser B) while not providing output to any other connected shared remote dispenser units (dispenser A, C+). The shifting of power output between the various connected shared remote dispenser units continues until all BEBs connected to the shared charging dispensers are fully energized. During this sequential controlled charging process, after BEBs initial dispenser connection, plug-in or pantograph connection at the beginning of the charging process, no manual re-plugging / disconnection, re-plugging / reconnection, re-pairing or wireless connection of charge connector or pantograph will be necessary.

4. Capable of being configured to operate dispenser configuration and energizing a minimum quantity of:
 - a. Two (2) Charging Pantograph, Inverse, Facility mounted Equipment Mark Number: 8020 and capable of providing charging power to each pantograph either sequentially or concurrently. Includes all interconnecting electrical cabling, data cabling, conduit / ducts, distribution boxes, DC switches (internal to charging cabinet and external from charging cabinet) and all other components necessary for interconnection.
 - b. Four (4) Remote Plug-In Dispenser Equipment Mark Number: 8025 and capable of providing charging power to each plug-in dispenser concurrently. Includes all interconnecting electrical cabling, data cabling, conduit / ducts, and all other components necessary for interconnection.
5. Capable of providing bi-directional charging to facilitate grid to vehicle (G2V) and vehicle to grid (V2G) power transfers.
6. Intended for, and fully capable of, installation in an outdoor environment, with a thermal and water-resistant enclosure. Cabinet(s) shall include an integral raised base for protection of equipment and fastening to sub-structure. Raised base should allow for mounting to an elevated steel support frame and not require direct to concrete pad installations.
7. Includes an on-board transformer / rectifier, allowing the power cabinet to receive an alternating current (AC) input power connection from the facility electrical supply and convert it to direct current (DC) electrical output to the charge box and connected bus.
8. Includes a chiller unit capable of maintaining manufacturer's required temperature for power conversion components. Chiller shall include protective air intake grill(s) and fan(s).
9. Include internal DC distribution box / DC Switch to control and manage DC outputs within the charger cabinet enclosure.
 - a. Charging cabinets relying on DC distribution boxes / DC switches that are external to the charging cabinet are acceptable but all components of the external multiple DC output control / management system are to be supplied and installed as part of the charging cabinet system including additional conduits, power and control wiring, DC distribution boxes / DC switches, mounting and supporting structural

elements to locate the DC distribution boxes / DC switches from the building structure.

- 1) All additional structural loading (weights and reactions), physical space requirements (sizes, clearances, requirements for manual interactions) of an external to charging cabinet DC distribution box / DC Switch to be included with initial approval submission of charging system by owner. Additional charging system components, installation labor, software, or physical controls added to approved charging cabinet system that were not presented as required in initial charging cabinet system review are grounds for negating original submission approval.
10. Unit is designed to be installed with multiple similar mark 8012 charging cabinet units in a dense location and vent locations of cabinets to facilitate close proximity installations between similar cabinets to sides and rear of unit.
 11. Include forklift pockets at base of unit or lifting lugs on top and or side of unit. Units that utilize no mechanical connections for lifting and rely solely on wrapped / strapping connections around unit cabinet case to install, position or remove unit are not acceptable.
 12. Controller shall include the protective ground connection, the DC output voltage connections, and the supervisory control components.
 13. Communications portion of the controller equipment shall be capable of being connected to other computer networks, including networks with charge management systems, through Ethernet and/or wireless connection. The power cabinet shall be capable of communicating to that charge management system by means of an open source, non-proprietary, communication protocol.
 14. Includes a cellular antenna, 4G/LTE or better, enabling connection to cellular networks.
 15. Includes on-board computer and/or programmable logic devices, software, and wireless communication devices that, at a minimum, also provide the following functionality to the power cabinet:
 - a. Pantograph Dispenser
 - 1) To wirelessly detect BEB mounted transponders within each attached Facility Mounted Inverse Charging Pantograph's (Pantograph) operational area and ignore transponders outside each attached Pantograph's operational area including similar transponders located on all four sides surrounding transponder installation. This process shall be automatic, and performed at system start-up / system re-start, and at programmable intervals and times, up to and including near continuous detection.
 - 2) To initiate wireless signal with, receive wireless signal from, and establish a wireless communication protocol with any bus in the Owner's BEB fleet that is determined by the system as being parked within the pantograph's operational area, and that has an on-board transponder (by others).
 - 3) To communicate with, and automatically cause each attached individual Pantograph to descend once a BEB has been identified, communication established, and has been detected as 'parked' within that Pantograph's

individual operational area. The equipment shall ignore BEBs passing through a Pantograph's operational area.

- 4) Automatically cause an attached Pantograph to retract upon receiving a 'disengage' signal from a connected BEB that is parked in that Pantograph's operational area,
- 5) Automatically cause each Pantograph to retract to a 'fail safe' state when receiving pertinent error codes, and upon facility power outages and major fluctuations. 'Fail safe' Pantograph retraction shall occur for individual isolated Pantographs and system wide for all Pantographs, depending on error code.
- 6) Automatically terminate wireless communication with any BEB after a pre-programmed time, and after detecting the BEB is no longer in operational range, or when the BEB is disengaged.

b. Plug-In Dispenser

- 1) To initiate signal with, receive signal from, and 'handshake' with any bus connected by means of the charge connector while charge connector is plugged into the charging port of a bus.
- 2) To automatically start, stop, and regulate any charge to any bus battery connected by means of the charge connector while charge connector is plugged into the charging port of a bus.
- 3) To communicate wirelessly collected bus information to a charge management system regardless of whether the charge connector is plugged into or disconnected from the charging port of a bus.

c. Once wireless communication is established with the bus, to communicate with, request and receive from the BEB the following information: bus identification and battery information such as charge status, temperature, etc.

d. Information collected shall be stored, and able to be transmitted to a charge management system.

e. To automatically start, stop, and regulate any charge to any bus battery connected by means of the Facility Mounted Inverse Charging Pantograph or charge connector.

f. To request, receive, and store bus battery information such as ID, charge status, temperature, etc. from the bus by means of wireless communication with the bus being charged.

g. To allow Owner's charge management system to control and report a minimum feature set of each charging cabinet in real time:

- 1) Cabinet connected dispenser / pantograph status – connected to a vehicle / not connected to a vehicle
- 2) Cabinet on (allowing charging to occur) / off (not allow charging to occur)

- 3) Total cabinet power output
 - 4) Report vehicle ID connected to each dispenser / pantograph connected to DC charging cabinet
 - 5) Cabinet not operational / unit issuing trouble code
16. Lock-out / Tag-out functions – preference is for AC input to charging cabinet to enter at a charging cabinet internally integrated disconnecting means compliant with NEC 625.42 and not require a separate external disconnect. Systems requiring external disconnects will be considered but requirement of need for separate disconnect means and inclusion of external disconnects are required on all submitted product data and project specific shop drawings and charger layouts. Lock-out / Tag-Out functions shall include, at a minimum, the following:
- a. AC supply entry cabinet shall not be allowed to open under live grid conditions and shall only be allowed to open only if the main power supply to the charger is locked out.
 - b. Main transformer cabinet(s) and AC/DC converter cabinet shall not be allowed to open under live grid conditions and shall only be allowed to open if there are no live grid conditions to the charger and if the main power supply breaker is locked out.
 - c. The chiller cabinet shall not be allowed to open while the charger is energized but shall only be allowed to open if the charger is de-energized and the auxiliary switch is locked out.
17. Emergency Stop Button directly accessible on the outside of the power cabinet. Allows for emergency stopping of the charger and de-energizing of the charging system.
18. Group Remote Emergency Stop Button capable. Allows for connections to auxiliary emergency stop buttons remotely located in the facility and connected to multiple equipment mark 8012 charging cabinet units to stop / reset charging cabinet units as a group. Remote emergency stop reset should not require individual resetting of mark 8012 charging cabinet's factory installed cabinet integrated emergency stop button after remote emergency stop button reset.
19. Remote manual override controls for the Pantograph, capable of extending or retracting the Pantograph on demand and re-start charging wireless validation and the charging process without the need to physically re-park or reset individual vehicle parking brakes. Override controls shall include a key switch and keys for operation.
20. Includes all other components for necessary and proper function of the unit including, but not necessarily limited to, metal support frame and protective panel enclosure, foundation support base, air intake and exhaust vents, forced air cooling fans, air filters, grounding devices and connections, cables, cords, connectors, etc.
- D. Finish: Exterior panels of power cabinet to have protective finish to prevent corrosion of enclosure. Provide in Owner's choice of manufacturer's standard colors.
- E. Accessories:
1. Refer to Equipment Mark Number 8020 for Charging Pantograph.

2. Refer to Equipment Mark Number 8025 for Remote Plug-In Dispenser.
3. Coolant, in quantity and type as required by manufacturer.
4. Fabricated steel support stand, capable of elevating and properly supporting the DC power cabinet unit. Steel shall be hot-dip galvanized in accordance with ASTM A123 Standard. Refer to drawings for details.
5. Emergency Stop Button (E-Stop) – directly accessible on the outside of the DC power cabinet. Allows for emergency stopping / de-energizing output of all remote dispenser units connected to a single DC power cabinet whose E-Stop button is activated
6. Group Remote Emergency Stop Button (E-Stop) – in quantities and locations as shown on the drawing. Allows for emergency stopping / de-energizing output of all remote dispenser units connected to a multiple DC power cabinets in groupings as shown on the drawings.
7. External DC Output Distribution Box / DC Output switches if required

F. Utilities:

1. Electrical: 480 VAC, 3 Phase, 60 Hz, nominal 283 amps maximum / 365 amps, maximum inrush (fused).

2.02 CHARGING PANTOGRAPH, INVERSE, FACILITY MOUNTED

Equipment Mark Number: 8020

A. General:

1. Description: An overhead facility mounted retractable pantograph capable of automatically connecting to the roof mounted charging contacts of buses in the Owner's battery electric bus (BEB) fleet, and then automatically charging the connected bus utilizing direct current (DC) electrical power via the connected Charging Cabinet, Battery Electric Bus, 150kw DC Power, Equipment Mark Number: 8012.
2. Coordination: Specification information indicated herein is intended as general requirement only. Final design of the system shall be by the manufacturer and shall be presented in the project specific shop drawings in coordination with the Charging Cabinet, Battery Electric Bus, 150kw DC Power, Equipment Mark Number: 8012 as a fully coordinated, complete design.
3. Compliance: The equipment and final design shall comply with the most current editions of all applicable local, state, and federal codes and regulations, including, but not limited to, those listed below.
 - a. SAE International Standard J3105, Electric Vehicle Power Transfer System Using a Mechanized Coupler, most recent edition.
 - b. SAE International Standard J3105/1, Infrastructure-mounted Pantograph (Cross-Rail) Connection
 - c. NFPA 70: National Electric Code (NEC), most recent edition.
 - d. Underwriter's Laboratory UL 2202, Standard for Electric Vehicle (EV) Charging System Equipment, most recent edition.
 - e. Underwriter's Laboratory UL 2231-1, Standard for Safety for Personnel Protection Systems for Electric Vehicle (EV) Supply Circuits: General Requirements
 - f. Underwriter's Laboratory UL 2231-2, Standard for Safety for Personnel Protection Systems for Electric Vehicle (EV) Supply Circuits: Particular Requirements for Protection Devices for Use in Charging Systems.
 - g. ANSI/IEC 60529: Degrees of Protection Provided by Electrical Enclosures (IP Code), most recent edition.
 - h. ANSI/IEC 61851-23: Electric Vehicle Conductive Charging Systems, DC Electric Vehicle Charging Station.
 - i. 29 CFR 1910.147: General Environmental Controls, The Control of Hazardous Energy (Lockout/Tagout), as enforced by OSHA, most recent edition.
 - j. International Electrotechnical Commission (IEC) 60309, most recent edition.
 - k. Federal Communications Commission (FCC) rules and regulations, as applicable.

B. Capacities and Dimensions:

1. Pantograph:

- a. Rated Voltage: 1,000 volts, DC, minimum
- b. Rated charging current: 250 Amps (A), minimum.
- c. Operating temperature range: -22 degrees Fahrenheit (F) to 150 degrees F
- d. Pantograph operating range, from partial to full extension (nominal): 30 inches to 90 inches

2. Pantograph controller and motor:

- a. Supply voltage: 24 volts, DC
- b. Current: 40A nominal.
- c. Pantograph contact force with vehicle: 112 foot-pounds, maximum
- d. Total time to raise pantograph from full extension to full retraction: 5 seconds, maximum.
- e. Total time to lower pantograph from full extension to full retraction: 5 seconds, maximum.
- f. Compensation of pantograph to the parked bus, nominal:
 - 1) X-axis: 30 inches to the vertical axis
 - 2) Y-axis: +/- 12 inches to the transversal axis
 - 3) Z-axis: +/- 12 inches to the longitudinal axis

3. Compensation of angles: 5 degrees each direction

4. Wireless Communication System:

- a. Wireless system communication: CAN bus with SAE J1939 communication protocol.
- b. Wireless data interface between antenna and antenna controller: RS-232, Ethernet
- c. Communication protocol between antenna and antenna controller: Serial.
- d. Wireless antenna:
 - 1) Dimensions, nominal: 12 inches, 9 inches, 6 inches.
 - 2) IP Rating: IP 66 or equivalent NEMA rating
 - 3) Specified range: Capable of detecting bus mounted system transponder within an 8-foot radius of the antenna. Capable of transmitting to and

receiving information from any bus mounted system transponder with the 8-foot radius from the antenna. Able to ignore similar surrounding transponders directly adjacent to but outside of the 8-foot radius.

5. Wireless Antenna Controller:
 - a. Dimensions, nominal: 36 inches, 28 inches, 16 inches.
 - 1) IP Rating: IP 66 or equivalent NEMA rating
 6. Wireless Transponder and Data Collector:
 - a. Connect to vehicle via SAE J1939 connectors.
 7. Overall dimensions, nominal:
 - a. Length: 57 inches nominal maximum
 - b. Width: 40 inches nominal maximum
 - c. Height: 42 inches nominal maximum in retracted position
 - d. Necessary clearance in x-axis: 2 inches
 - e. Necessary clearance in y-axis (length of rails + clearance): 25 inches + 2 inches
 8. Dimensions of interface, nominal:
 - a. Length (total): 57 inches
 - b. Length (single contact): 40 inches
 - c. Width: 30 inches
 9. Pantograph positions, from mounting plane (underside of facility structure), as noted on drawings
- C. Features and Construction:
1. Pantograph and Pantograph Controller:
 - a. 'Inverted' pantograph down design mounted to the facility structure and extending down to contact vehicle mounted charging contact bars.
 - b. Pantograph and pantograph controller shall have integrated fail-safe functions. Functions shall include automatic full retract of the Pantograph upon error code, power loss, or other system malfunction.
 - c. Independently insulated multi-pole contacts: positive, negative, protected earth (ground) and control pilot.
 - d. Zero electrical potential frame components.

- e. Includes flexible head and spring-loaded connection allowing for compensation of the pantograph system.
 - f. Capable of raising and lowering the pantograph to pre-programmed height/positions.
 - g. Capable of both quick duration contact fast-charge and long duration depot charging.
 - h. Includes an internal sensor to provide a soft-stop landing on the bus roof rails.
 - i. Capable of being de-energized by charging cabinet e-stop systems (cabinet mounted e-stop and additional remote group e-stops)
2. Wireless Communications System Antenna and Antenna Controller: Shall be mounted in a fixed position near the pantograph and contain a programmable logic controller, or similar computing device, along with all accessories (such as cooling devices) necessary for proper operation. Together, the Antenna and Antenna Controller shall be able to perform the following functions:
- a. The Controller shall be able to compute relative distances of bus mounted transponders from the Antenna.
 - b. The Controller shall be able discriminate between bus mounted transponder distances and acknowledge and communicate with any bus mounted system transponder located only within the programmed Pantograph operational area. Transponder signals outside of the operational area shall be ignored.
 - c. The Controller shall be able to instantly compare each Bus Identification Number received from a bus transponder signal within the specified range to a central Bus Identification Number Authorization File (or similar). The Controller shall continue to try and communicate with bus transponders allowed by the Authorization File and shall ignore signals from bus transponders disallowed by the Authorization File.
 - d. Upon initial detection of any bus transponder within the Pantograph operational area, and allowed by the Authorization File, the Controller will immediately search for confirmation signals that the same bus transponder is still within the operational area. If confirmation signals are detected, then the “handshake” communication protocol shall be established between the Controller and the transponder, via the Antenna. If confirmation signals are not detected, then no communication protocol shall be established, and the Antenna and Controller shall continue to search for a transponder signal within the operational area.
 - e. Upon successful establishment of the “handshake” communication protocol, a communication link shall be established to enable the Controller to read information from the bus mounted Transponder via wireless communication through the Antenna. For the duration of the communication link, the antenna will only accept information from the connected transponder. All other transponder signals shall be ignored.
 - f. During the life of the communication link, the Controller shall periodically ping the linked transponder and confirm the transponder is still within the specified range of the Antenna and Controller. If so, the communication link shall not be

- e. NFPA 70E: Standard for Electrical Safety in the Workplace, most recent edition.
- f. CFR 1910.147: Code of Federal Regulations, Occupational Safety and Health Standards, General Environmental Controls, The Control of Hazardous Energy (Lockout / Tagout), most recent edition.

B. Capacities and Dimensions:

- 1. Output voltage range at the remote dispenser, refer to Equipment Mark Number: 8012
- 2. Output current at the remote dispenser, refer to Equipment Mark Number: 8012
- 3. Output power at the remote dispenser, refer to Equipment Mark Number: 8012
- 4. Overall dimensions, remote dispenser, nominal:
 - a. Width: 24 inches.
 - b. Depth: 9 inches.
 - c. Height: 32 inches.
 - d. Weight: 60 lbs (including weight of cord and charge connector below)
 - e. Cable length: 22 feet - nominal.
 - f. Charging Connector – SAE J1772 CCS Level 2 plug-in connector with strain relief

C. Features and Construction:

- 1. Remote dispenser unit shall be connected to and receive power output (voltage, current, power, charging telemetrics and controls) from the DC power cabinet, then regulate and transmit that output to the bus, when manually connected by the charging connector.
 - a. Include glass fiber (or similar) communications lines between the DC power cabinet and remote dispenser, as well as all necessary protective conduits, seals, and fasteners.
 - b. Remote dispenser enclosure shall be rated IP65 protection, per ANSI/IEC 60529.
- 2. Dispenser cabinet to be mounted in locations shown on plans but anticipated to be mounted to existing facility structural elements or being suspended from overhead structural frame supported by existing facility structure. Ground mounted support stands for plug-in dispensing cabinet located in Maintenance and Service bays are not to be utilized unless specifically call for on plans.
- 3. Charging connector and attached cord shall be capable of being manually connected to, and disconnected from, the bus charger. Charging connector shall conform to SAE J1772 SAE standard.
- 4. Charger Status Indicator Light on bottom or side of remote dispenser cabinet and visible to an operator below the plug-in dispenser cabinet when mounted overhead. If charge status indicator light is standard on the top of the cabinet and cabinet orientation does not allow a

user below to see the cabinet, providing a secondary cabinet mounted or adjacent mounted to facility structure remote charger status indicator light is acceptable. Three (3) color or more to indicate via color and blinking the following:

- 1) Charger Energized and Ready
 - 2) Charger Connected and Charging
 - 3) Charger Connected and Charge Complete
 - 4) Charger Not Ready / Not Charging / Warning Indicator
5. Coordinate installation of the dispenser cord, the dispenser cabinet, and the charging connector in the field so that, once installed, there is minimal bending and/or twisting of the dispenser cord, or 'flipping' of the charge connector, when personnel attempt to plug the charge connector into a battery electric bus.
 6. Emergency Stop Button directly accessible on the outside of the remote dispenser box. Allows for emergency stopping of the charger and de-energizing of the plug-in charging system.
 7. Group Remote Emergency Stop Button capable. Allows for connections to auxiliary emergency stop buttons remotely located in the facility and connected to multiple equipment mark 8025 charging cabinet units to stop / reset charging cabinet units as a group. Remote emergency stop reset should not require individual resetting of mark 8025 charging cabinet's factory installed plug-in cabinet integrated emergency stop button after remote emergency stop button reset.
- D. Finish: Exterior panels of charger box to have protective powder coat finish in Owner's choice of manufacturer's standard colors.
- E. Accessories:
1. Modular metal framing system to provide support and stability to items suspended from existing horizontal or vertical structural facility elements. Configuration, quantity and spacing to be determined as part of contractor's final design. Kindorf or equal.
 2. Cord hook / rack to store and secure flexible power cord and charge connector at nominal five foot above finish floor when not in use.
 3. Remote secondary charge status indicator light as needed.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Coordinate location of rough-in work and utility stub-outs to assure match and/or non-interference with equipment to be installed.
- B. Inspect delivered equipment for damage from shipping and exposure to weather. Compare delivered equipment with packing lists and specifications to assure receipt of all items.

3.02 INSTALLATION

- A. Perform work under direct supervision of Foreman or Construction Superintendent with authority to coordinate installation of scheduled equipment with Design Team.
- B. Coordinate work with Manufacturer's Representative indicated in Part 1.02 of this specification section
- C. Install equipment in accordance with plans, approved shop drawings, and manufacturer's instructions:
 - 1. Initial owner mockup for positioning pantograph Equipment Mark: 8020: At a parked bus charging position to be identified by owner, provide installation mockup of DC charging cabinet connected to an overhead pantograph, wireless communications system to allow for testing and proofing of DC charging system component mounting heights and overhead locations or components relative to parked bus. Mock-up to allow for in-field adjustment of individual charging components, including but not necessarily limited to, electrical junction boxes, mounting and support brackets, and pantograph orientation and auxiliary control connection points. In field adjustments shall consist of those necessary to allow the overhead pantograph to be deployed automatically when a bus is properly parked in the charging position and wireless communications system is engaged. Mock-up shall be reviewed and approved by design team and owner prior to installation of other overhead charging components. Overhead components purchased or installed prior to mock-up approval shall be modified to conform to the approved mock-up without additional material or labor charges to owner
 - 2. Positioning: Place equipment in accordance with any noted special positioning requirements generally level, plumb and at right angles to adjacent work.
 - 3. Fitting: Where field cutting or trimming is necessary, perform in a neat, accurate, professional manner without damaging equipment or adjacent work.
 - 4. Anchorage: Attach DC charging cabinet equipment securely to floor or elevated support frame, in conformance with manufacturer's instructions and as directed by Design Team, to prevent damage resulting from inadequate fastening and to resist seismic movement. Installation fasteners shall be installed to avoid scratching or damaging adjacent surfaces. Upon completion of work, finish surfaces shall be free of tool marks, scratches, blemishes, and stains.

3.03 TESTING

- A. After final connections are made and prior to authorizing payment, specified equipment shall be tested for compliance with specification in the presence of the Design Team using acceptance procedures provided by the manufacturer.
- B. Final testing and post installation inspection are required and shall be performed by the manufacturer or the manufacturer's designated representative only. Final testing and inspection shall not be performed by the installer, unless the installer is also the manufacturer.
- C. Manufacturer / Installer shall provide a testing procedure and checklist that indicates proper testing of all major functions of the equipment. This procedure and checklist will form the basis of the testing process.

3.04 CLEANUP

- A. Touch-up damage to painted finishes.
- B. Wipe and clean equipment of any oil, grease, and solvents, and make ready for use.
- C. Clean area around equipment installation and remove packing or installation debris from job site.
- D. Notify Design Team for acceptance inspection.

3.05 TRAINING

- A. Direct the technical representative to provide specified hours of training to designated Owner's maintenance personnel in operation and maintenance of the following equipment. Coordinate, with Owner, training schedule and list of personnel to be trained.
 - 1. CHARGING CABINET, BATTERY ELECTRIC BUS, 150KW DC POWER
Equipment Mark Number: 8012
Hours Required: 16
 - 2. CHARGING PANTOGRAPH, INVERSE, FACILITY MOUNTED
Equipment Mark Number: 8020
Hours Required: Included in training for Equipment items listed above.
 - 3. REMOTE PLUG-IN DISPENSER
Equipment Mark Number: 8025
Hours Required: Included in training for Equipment items listed above.
- B. Obtain, from technical representative, a list of Owner's personnel trained in equipment operations and maintenance.
- C. Provide a Windows compatible movie file format recording on USB stick of the training session. The training movie can be a recording of a live session or a produced training video

END OF SECTION 11 11 36.14

**Division 5 - Exhibit C: Basis of Design – Section 11
11 36.20 Electric Vehicle Charge Management
System**

SECTION 11 11 36.20

ELECTRIC VEHICLE YARD MANAGEMENT SYSTEM

PART 1 - GENERAL

The General Provisions of the Contract, including General and Special Conditions and the requirements of Division 1, apply to the Work in this Section.

1.01 WORK INCLUDED

- A. Guide specification of equipment items as listed below by Equipment Mark Number are provided to establish minimum performance requirements, operational criteria, and standards compliance of an electric vehicle yard management system. Alternative systems that comply with these minimum performance requirements, operational criteria and standards compliance but are achieved by physically different equipment configurations than the guide layout and the components listed but achieve the same verifiable results will be considered and reviewed by Owner as equivalents. Electrical vehicle charge management system to consist of:
1. ELECTRIC VEHICLE YARD MANAGEMENT SYSTEM
Equipment Mark Number: 8030
- B. Installation of software and equipment with labor, services, and incidentals necessary for a complete and properly operational equipment installation.
- C. Utilities to be roughed in at location recommended by manufacturer.
- D. Wiring, and switching between equipment and utilities.
- E. Coordination of equipment, controls, system, and vehicle to allow for proper charge management of electric bus vehicles by means of multiple charge cabinets and dispensers – both inverted overhead pantographs and plug-in dispensers. Coordination with other equipment and/or items shall include, but not necessarily be limited to, the following:
1. Equipment Mark Number 8012 Charging Cabinet, Battery Electric Bus, 150kw DC Power, as specified in Section 11 11 36.14 Commercial Electric Vehicle Charging Unit for Transit Depots.
 2. Equipment Mark Number 8020 Charging Pantograph, Inverse, Facility Mounted, as specified in Section 11 11 36.14 Commercial Electric Vehicle Charging Unit for Transit Depots.
 3. Equipment Mark Number 8025 Remote Plug-In Dispenser, as specified in Section 11 11 36.14 Commercial Electric Vehicle Charging Unit for Transit Depots
 4. The SFMTA selected and procured battery electric bus (BEB) vehicle with integrated charge management system components
 5. The SFMTA selected computer terminals.

1.02 QUALITY ASSURANCE

- A. Experience: Equipment shall be produced by a manufacturer of established reputation with a minimum of five years experience supplying specified equipment.
- B. Manufacturer's Representative:
 - 1. Installation: Provide a qualified manufacturer's representative at site to supervise work related to equipment installation, check out and start up.
 - 2. Training: Provide technical representative to train Owner's maintenance personnel in operation and maintenance of specified equipment.
 - 3. Testing: Provide technical representative for final testing of equipment.

1.03 STANDARD AND REGULATORY REQUIREMENTS

- A. Equipment indicated within this specification section shall comply with all applicable national, state and local codes and regulations, including seismic, fire, and racking codes and regulations. Additional, more specific compliance requirements may be listed under individual equipment headings.

1.04 SUBMITTALS

- A. Submittal requirements for all equipment items included in this section are listed below.
- B. Product Data:
 - 1. Submit Product Data in accordance with Division 1 - General Requirements of these specifications.
 - 2. All Product Data submittals shall identify proposed project specific items marked by arrow, circle, underline, reproducible highlight, or other markings clearly discernable by the reviewer, to show which specific items, parts and accessories are being submitted for the project product data review. Non-marked or generic product data submittals with no marks indicating specific items, parts and accessories will be a cause for rejection.
 - 3. Restrict submitted material to pertinent data. For instance, do not include manufacturer's complete catalogue when pertinent information is contained on a single page.
- C. Operation and Maintenance Manual:
 - 1. Provide a Complete parts list, operating instructions, and maintenance manual covering equipment at time of installation including, but not limited to:
 - a. Description of system and components.
 - b. Schematic diagrams of electrical, plumbing and compressed air systems.
 - c. Manufacturer's printed operating instructions.
 - d. Printed listing of periodic preventive maintenance items and recommended frequency required to validate warranties. Failure to provide maintenance

information will indicate that preventive maintenance is not a condition for validation of warranties.

- e. List of original manufacturer's parts, including suppliers' part numbers and cuts, recommended spare parts stockage quantity and local parts and service source.
2. Assemble and provide copies of manual in 8-1/2 by 11-inch format. Foldout diagrams and illustrations are acceptable. Manual to be reproducible by dry copy method. Provide copies per provision of Division 1 - General Requirements.
- D. Shop Drawings: Submit diagram schematic of system including graphic representations of software installations and modules and their hosting hardware, hardware components and their physical location or hosting element. Include operational decision tree including:
1. Typical operational configuration with monitoring and charging control activates noted
 2. System integration and override points available real time to on-site SFMTA personnel.
 3. Mock up of all SFMTA cloud-based subscription interface points including
 - a. Dashboards
 - b. Collected Data access pages – minimum all component data listed in Part 2 of this section
 - c. Report Pages – minimum all reporting features listed in Part 2 of this section
 - d. Smart Charging interface pages – minimum all charger monitoring, performance and power limiting setting, and charger control pages
- E. Test Procedure and Test Reports: Testing Procedures and Testing Reports are required for all systems included in this specification. Testing procedures shall be submitted to the Owner and Design Team prior to installation, and shall, at a minimum, outline the manufacturer's procedure for successful testing of the equipment after installation. Testing Reports shall be record documents of the post installation test, itemizing the requirements of the Test Procedure and noting if individual requirements were met or not met, with notes and comments as needed. Testing reports shall be provided to the Owner and Design team upon completion of testing, prior to final invoice. Provide duplicates of all test reports as part of the Close-Out Documents. Refer to Part 3.03 Testing, of this specification.
- F. Required Documents for Permit and Local Jurisdictional and or Power Utility Approval: Where required by local jurisdiction, power utility provider and/or code officials, the contractor/supplier shall be responsible for producing and submitting all documentation required for obtaining any and all applicable approvals related to the specified equipment. This documentation may include, but may not be limited to, engineered signed and stamped plans, system features and diagrams of functionality and operational decision tree, details, anchorage layouts, as well as other documents to show compliance with locally adopted codes and utility regulations and requirements. A copy of these required documents shall be included with the product submittal to the Design Team/consultant team for their review.

1.05 WARRANTY

- A. Warrant work specified herein for one year from substantial completion against defects in materials, function, and system operational design.

- B. Warranty shall include materials, software, and labor necessary to correct defects including replacement of the charge management system in its entirety.
- C. Defects shall include, but not be limited to substandard and intermittent operation; interference with or non-compatibility with other existing owner hardware and software systems.
- D. Submit warranties in accordance with Division 1 - General Requirements of these specifications.
- E. All parts shall be readily available locally in the United States.

1.06 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver equipment hardware in manufacturer's containers, appropriately packaged and/or crated for protection during shipment and storage in humid, dusty conditions.
- B. Indelibly label all containers, including those contained in others, on outside with item description(s) per title and Mark Number of this specification.
- C. Provide equipment hardware and materials specified complete in one shipment for each equipment item. Split or partial shipments are not permissible.

1.07 LABELING

- A. Manufacturer shall securely attach in a prominent location on each major item of equipment hardware a non-corrosive nameplate showing manufacturer's name, address, model number, serial number, and pertinent utility or operating data.
- B. All electrical equipment hardware and materials shall be new and shall be listed by Underwriter's Laboratories, Inc. (U.L.), or other National Recognized Testing Laboratory (NRTL), in categories for which standards have been set by that agency and labeled as such in the manufacturer's plant.

PART 2 – PRODUCTS

2.01 ELECTRIC VEHICLE YARD MANAGEMENT SYSTEM
Equipment Mark Number: 8030

- A. General:
 - 1. Description: A cloud-based subscription service (yard management solution) for the chargers shall be provided. The yard management solution will be utilized to dispatch buses, including the existing and new trolley buses. The yard management solution shall integrate with the on-board telematic system on the buses (ViriCiti), scheduling software (Trapeze), CAD/AVL system (Conduent), passenger information system (Cubic) and other related systems. The cloud service shall broadcast charging information from the Contractor's charging solution via the OCPP 2.0 or newer protocol as well as control and manage the connected charger cabinets and dispensers. The Contractor shall provide the necessary data and integration requirements to capture charger operational data in real time for smart charging

2. Coordination: Specification information indicated herein is intended as general requirement only. Final design of the system shall be by the manufacturer and shall be presented in the shop drawings as a fully coordinated, complete design.
3. Compliance: The equipment and final design shall comply with the most current editions of all applicable local, state, and federal codes and regulations. Additional compliance shall include, but not necessarily be limited to, the following:
 - a. NFPA 70, National Electric Code (NEC), most recent edition.
 - b. Federal Communications Commission (FCC) rules and regulations, as applicable.
 - c. Open Charge Point Protocol 2.0 (OCPP 2.0), or later network communication by the Open Charge Alliance.
4. Components and Services:
 - a. Capable of communicating with wireless Transponder and Data Collector (bus vehicle mounted)
 - b. Hosting/Charge Management Software: Access to web-based software for monitoring BEBs and Charger Cabinets, as well as automatically and remotely controlling Charger Cabinets to optimize charging.
 - c. Capable of locating vehicles (BEBs, conventional buses and trolley buses) within the property boundary of the facility with a precision resolution to allow dispatch staff to rely on reported vehicle's location when dispatching buses without physical visual verification.
 - d. Smart Charging – capable to integrate all available vehicle, planning, scheduling, and utility information, as well as other data sources. Smart charging features shall include, but not be limited to, load balancing between chargers, the ability to set maximum demand limit, integration of vehicle planning, prioritization of charge sessions manually, avoiding peak time-of-use periods, reporting the real time status of chargers, developing KPI charge reports, remotely resetting chargers, and automated incident reporting.

B. System Operation:

1. Wireless Transponder and Data Collector installed on each BEB shall regularly and periodically record information from the BEB to which it belongs and securely communicate specified information over both wireless and cellular networks in real-time to a web-based and private secure server(s).
2. Collected information from each Wireless Transponder and Data Collector shall be uploaded to a web based private and secure server(s). Manufacturer's/service provider's software system shall organize information and make available to the subscribing client.
3. Manufacturer's/service provider's software system shall be able to engage in two-way communication with each of the Owner's charging cabinets and optimize charging capabilities for the full array of charging cabinets.
4. Owner shall be able to access specified information gathered through the web-based software system, and generate reports as needed.

C. Features and Construction:

1. Information Collected from Wireless Transponder and Data Collector on Vehicle:

a. Yard Management System shall be capable of collecting information in real time, making pertinent calculations based on that information, and transmitting the information via the transponder and data collection unit (ViriCiti) on vehicle. At a minimum, the information shall include:

- 1) Bus Identification Number
- 2) Location (via received GPS signals)
- 3) Energy usage (consumption, kWh/miles)
- 4) Current speed
- 5) Odometer reading
- 6) Remaining range of the bus in miles and operation time depending on the routes
- 7) Faults, warnings, and diagnostic messages per bus
- 8) Vehicle state (In service, not in service, charging)

b. The Yard Management System shall be able to compile and generate statistic reports. At a minimum, these reports shall include:

- 1) Driven miles per bus/fleet per day/month/year
- 2) Used energy and state of charge per bus/fleet per day/month/year
- 3) Driven routes and usage per route.

2. Web Hosting/Smart Charging Management:

a. Cloud based subscription (hosting service) shall offer storage and analysis of Owner's data on the manufacturer's/service provider's server(s), and secure, unlimited Owner access to that data 24 hours a day, 365 days a year for a minimum three-year period with options to extend access to the data.

- 1) Access shall be by means of online web-based software, compatible with a wide array of both desktop and mobile devices.
- 2) The system shall allow the Owner to set various levels of hierarchal user access, restricting and allowing certain information to the various levels.
- 3) Information collected from both BEBs and Charging systems shall be accessible through the same web-based software.

b. Hosting service shall be able to automatically connect and establish two-way communication (per OCPP 2.0 protocol) to each DC power cabinet of the

charging system installed at the Owner's site via cellular connection and wireless connection through the Owner's network.

- c. Once connected, the hosting service shall be able to automatically read, analyze, store, and monitor information from the cabinet, as well as automatically control the charging functions of the cabinet remotely based on that information, all in real-time. Categories of this service shall include, at a minimum, the following:
- 1) Monitor and record charging power
 - 2) Monitor and record charging current
 - 3) Monitor and record charging voltage
 - 4) Monitor and record battery state of charge
 - a) Record battery state of charger prior to charge
 - b) Record battery state of charger at end of charging cycle (terminated by bus charge controller or remote emergency stop button)
 - 5) Monitor and record charging status (charging, not charging, error state)
 - 6) Remote reset / reboot.
 - 7) Record and generate live and historical logs of chargers
 - 8) Generate charger session overview
 - 9) Store utility rate structuring configuration for generating reports
 - 10) Record uptime monitoring
 - 11) Remotely change the availability of chargers
 - 12) Diagnostics messaging
 - 13) Upload firmware updates to the charger
 - 14) Edit charge status configuration
- d. The hosting service shall be able to analyze the collected information and generate statistical reports on each charger, on demand. At a minimum, statistical reports shall include information on:
- 1) Recorded amount of charged energy per charging session
 - 2) Determine efficiency of each charging session by comparing the charged energy measured at the bus side to the AC input at the charge cabinet.
 - 3) Recorded charge sessions per day per facility
 - 4) Charging cost per bus

- a) Vehicle ID specific
 - b) Average of BEB fleet
- 5) Charging cost per day
- 6) Recorded automated incidents (flags and triggers)
- e. The web hosting service shall, by means of two-way communication, be able to automatically control functions of each charging cabinet to dynamically 'smart' charge the BEB fleet. The hosting service shall be able to automatically collect, analyze and store the following information in real-time from each charging cabinet and the Owner's computer network.
 - 1) Owner's schedule of the buses, including blocks and routes
 - 2) Analyze and re-distribute load balance between charger cabinets.
 - 3) Avoid peak time-of-use periods set by the Utility.
 - 4) Set maximum demand limit.
 - 5) Prioritize charge sessions manually.
 - 6) Implement charge window and duration.
 - 7) Energy rate structure response.
 - 8) Analyze and calculate a charging response based on received Utility demand limits.
 - 9) Analyze and calculate a charging response based on received renewable energy requirements.
 - 10) Analyze and calculate a charging response based on received available back-up power requirements.
 - 11) Control and optimize on-site energy storage systems
 - 12) Predict optimal energy required based on BEB battery state of health and battery lifecycle cost estimates.
- 3. Other System Functions: Together, the data collector, transponder, and hosting service shall be able to provide the system functions listed below:
 - a. Record pertinent driving style information based on driver, and analyze, store, and report.
 - b. Record regenerative braking information, and analyze to establish a profile, store and report.
 - c. Compile and provide summary reporting.
 - d. Provide actionable insights based on recorded information.

- e. Provide remote diagnostics of buses and charging system.
- f. Record and compile battery statistics.
- g. Balance load between all chargers.
- h. Set number of maximum power peaks.
- i. Prioritize chargers based on collected information.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Coordinate location of rough-in work and utility stub-outs to assure match and/or non-interference with equipment to be installed.
- B. Inspect vehicle mounted equipment hardware and software and the other third party SFMTA centralized and facility local installed software systems (minimum Telematics, Scheduling, CAD/AVL, Passenger Information System) for applicable outputs, signals, formats, frequencies, connectors to all for successful and useful input into the Yard Management System.
- C. Compare existing vehicle mounted and facility installed equipment hardware and software outputs with requirements of the Yard Management System to assure compatibility of all items.

3.02 INSTALLATION

- A. Perform work under direct supervision of Foreman or Construction Superintendent with authority to coordinate installation of scheduled system (hardware and software) with Design Team.
- B. Install system (hardware and software) in accordance with plans, shop drawings and manufacturer's instructions:
 - 1. Positioning: Place equipment in accordance with any noted special positioning requirements generally level, plumb and at right angles to adjacent work.
 - 2. Fitting: Where field cutting or trimming is necessary, perform in a neat, accurate, professional manner without damaging equipment or adjacent work.
 - 3. Anchorage: Attach equipment securely to floor, as directed by Design Team, to prevent damage resulting from inadequate fastening. Installation fasteners shall be installed to avoid scratching or damaging adjacent surfaces.
 - 4. Upon completion of work, finish surfaces shall be free of tool marks, scratches, blemishes, and stains.
- C. Install equipment software in accordance with manufacturer's instructions. Coordinate with Owner's IT department.

3.03 TESTING

- A. Scheduling, phasing, documenting, and coordinating testing shall be the responsibility of the Contractor. Requests for items, equipment, information or personnel needed for the testing shall be put into writing and made known to the respective party no less than 30 days prior to any testing. A testing plan and schedule shall be submitted to the Owner and Design Team no less than 30 days prior to any testing.
- B. After final connections and installations are made and prior to authorizing payment, specified equipment shall be tested for compliance with all specified features in the presence of the Design Team using acceptance test procedures provided by the manufacturer and testing requirements listed herein.
- C. Testing of specified system shall include on-site inter-operability testing with the following equipment and systems:
 - 1. Equipment Mark Number 8012 Charging Cabinet, Battery Electric Bus, 150kw DC Power, as specified in Section 11 11 36.14 Commercial Electric Vehicle Charging Unit for Transit Depots – DC Overhead Charging.
 - 2. Equipment Mark Number 8020 Charging Pantograph, Inverse, Facility Mounted, as specified in Section 11 11 36.14 Commercial Electric Vehicle Charging Unit for Transit Depots – DC Overhead Charging
 - 3. The SFMTA selected and procured battery electric bus (BEB) vehicle
 - 4. The SFMTA selected computer terminals.
- D. At a minimum, testing shall include the following:
 - 1. Demonstration of manufacturer’s software running on The SFMTA selected computer terminals and displaying specified information.
 - 2. Linking and communication with each instance of Equipment Mark Number 8012 Charging Cabinet, Battery Electric Bus, 150kw DC Power, as specified in Section 11 11 36.14 Commercial Electric Vehicle Charging Unit for Transit Depots – DC Overhead Charging installed on site.
 - 3. Full 24 hour charging period of a single SFMTA provided Battery Electric Bus at a charging cabinet of the SFMTA’s choosing, and a demonstration of the ability of the system to provide a full report on the history of the charge cycle.
 - 4. Connection of a SFMTA provided Battery Electric Bus to each charging cabinet with a demonstration of the software’s ability to read and display the test bus information at each connection.
- E. The testing shall demonstrate the entire system operates as intended and to the Owner’s satisfaction. All testing shall be recorded in Test Reports and submitted to the Owner and Design Team for review.
 - 1. Test reports indicating non-performance or failure of any item shall result in immediate notification to the Owner and Design Team. Manufacturer shall then submit to the Owner a schedule and plan an action to address all deficiencies. Upon agreement from the Owner any necessary repair, adjustment, etc. to bring the system into conformance with the specification shall be conducted by the manufacturer. Once complete a re-test of the system shall be conducted.

2. Continued non-performance or failures of the system or its components and/or features may result in a determination of 'non-compliance' of the entire system by the Owner.
3. Prior to authorization for final payment, all testing shall be complete with test reports indicating proper operation of the system submitted to the Owner and Design Team for final review.

3.04 CLEANUP

- A. Touch-up damage to painted finishes.
- B. Wipe and clean equipment of any oil, grease, and solvents, and make ready for use.
- C. Clean area around equipment installation and remove packing or installation debris from job site.
- D. Notify Design Team for acceptance inspection.

3.05 TRAINING

- A. Direct the technical representative to provide specified hours of training to designated Owner's maintenance personnel in operation and maintenance of the following equipment. Coordinate, with Owner, training schedule and list of personnel to be trained.
 1. ELECTRIC VEHICLE YARD MANAGEMENT SYSTEM
Equipment Mark Number: 8030
Hours Required: 16
- B. Obtain, from technical representative, a list of Owner's personnel trained in equipment operations and maintenance.
- C. Provide a Windows compatible movie file format recording on USB stick of the training session. The training movie can be a recording of a live session or a produced training video

END OF SECTION 11 11 36.20

**Division 5 - Exhibit D: Conceptual Design Module
Package**

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Division 6: Program for the Housing and Commercial Component

1 Vision, Goal, and Context

1.1 Vision

The HCC should deliver an equitable joint development—one that delivers housing and other benefits to disadvantaged communities—in concert with the core expanded BYC. The SFMTA offers to leverage the construction opportunity on the Project Site to advance the City’s ambitious housing policy vision. As expressed by policy makers and stakeholders, housing development on the Project Site should maximize affordable housing, even up to 100% affordable.

The SFMTA expects proposers during the RFP phase and the LD during the PDA Term to identify funding resources and an HCC that has the greatest number of affordable units feasible. The LD should leave no potential affordable housing funding source untapped. SFMTA invites proposers and the LD to join in this vision and use best efforts to pursue affordable housing funding sources for a groundbreaking, equitable housing development with maximum affordability at the Project Site.

1.2 Goals for the Housing and Commercial Component

The Project is a once in a century opportunity to build a truly exemplary project that serves as a model, not just nationally but internationally, for what an infrastructure project can be. The Project is an opportunity for the SFMTA and City to build a world class bus facility, provide much needed affordable housing, embody equitable development in a diverse neighborhood, and transform the Project Site into a true community amenity.

To that end, the specific goals for the HCC are as follows:

1.2.1 Equity, Affordability, and Target Populations

1. Provide a significant number and maximize the percentage of affordable⁴ residential rental units even up to 100% affordable. A minimum of 50% of the units shall be affordable, and the LD shall diligently seek to maximize the percentage well above 50%.

⁴ The language within this section is intentionally qualitative. For more specific and quantitative guidance see [Section 2 \(Technical Guidelines\)](#) of this [Division 6 \(Program for the Housing and Commercial Component\)](#) of the Technical Requirements.

2. Ensure that a substantial percentage of the units are for very low-income⁵ families and reflect the income profile of those in the surrounding neighborhood that have been displaced or are at risk of displacement.
3. Market and lease the units with certain tenant preferences in mind, consistent with existing City requirements⁶. Tenant preferences include: Certificate of Preference Holders, Displaced Tenants, and qualifying Neighborhood Residents (all as defined in San Francisco Administrative Code Chapter 47). Furthermore, work with the City to determine the feasibility of including a tenant preference for SFMTA employees in conformance with local, state, and federal law.
4. Advance racial equity by aligning the HCC with the implementation of City policies on anti-displacement, racially inclusive communities, and creating stable housing for vulnerable populations.

1.2.2 Unit Count and Unit Mix

1. Leverage the size and location of the Project Site and the construction opportunity to build a substantial number of housing units, including maximizing the number of affordable units.
2. Provide a large number and percentage of multi-bedroom units to accommodate families.

1.2.3 Designing for Community and Sustainable Transportation

1. Ensure that the design and management of the HCC facilitates as much cohesion, community building, and socioeconomic mixing among HCC residents as possible.
2. Deliver an HCC that exemplifies best practices in TDM and encourages the HCC residents and businesses to use sustainable modes of transportation.

1.2.4 Commercial Component

1. Provide commercial and other active ground floor uses that respond to the needs of a diverse neighborhood, BYC employees, and future HCC residents, including specific uses that address persistent racial and income disparity.
2. Ensure that commercial and other active uses are culturally sensitive and are accessible to a diverse range of patrons.

⁵ Households earning 50% of AMI and below. "Very low income housing" or "very low income units" denote housing that is affordable to very low income households. For more information, see <https://sfmohcd.org/ami-levels>

⁶ See Chapter 47 of the San Francisco Administrative Code.

3. Locate commercial and active uses along Bryant Street and, if feasible, 17th Street to foster a connection between the Facility and Franklin Square.

1.2.5 Cost Sharing

1. Finance and deliver an HCC that accomplishes the above goals while contributing to the capital cost and on-going maintenance of the Common Infrastructure.

1.3 Background

The vision and goals for the HCC are the product of several years of feasibility work and community engagement, as well as the City's policy framework for housing on public land. Several studies of SFMTA facilities completed over the past ten years conceptually analyzed pairing mixed-use development with rebuilt bus maintenance facilities. The interest in this innovative idea grew more pronounced as the city's housing crisis has deepened and as the City, in turn, looked to publicly owned land as a mechanism to deliver housing⁷.

The severity of San Francisco's housing crisis cannot be overstated. While COVID-19 has disrupted the housing market and provided some relief in market rents, the city remains unaffordable to many. The problems in the housing market are illustrated by several key data points:

1. The city witnessed a nearly 20% increase in the homeless population from 2015 to 2019, with over 8,000 San Franciscans being unhoused as of 2019⁸.
2. As of 2020, the city had met only 24% of its housing production goal for moderate income units, 49% of its goal for low income units, and 30% of its goal for very low-income units⁹.
3. At the outset of the COVID-19 pandemic, San Francisco was the most expensive rental market in the United States by a considerable margin¹⁰. In the spring of 2020, the median one bedroom rent in San Francisco was 23% higher than the next most expensive market, New York City.

While these problems cannot be resolved in a single project, they underscore the imperative to build a large housing component with a substantial number of affordable units at the Project Site. Furthermore, the Project Site is especially well situated for dense housing. Adopted plans at the local and regional level call for housing to be built in centrally located, transit-rich locations that are close to employment centers and neighborhood amenities. The Project Site has all of these characteristics.

⁷ <https://sfplanning.org/public-land-housing>

⁸ https://hsh.sfgov.org/wp-content/uploads/2020/01/ExecutiveSummary_SanFrancisco2019.pdf

⁹ <https://www.hcd.ca.gov/community-development/housing-element/index.shtml>

¹⁰ <https://www.zumper.com/blog/zumper-national-rent-report-april-2020/>

1.3.1 Feasibility Analysis and Initial Outreach Efforts

Detailed planning and feasibility work on both the BYC and the HCC began in earnest in late 2017. For the HCC, this work initially focused on outlining the contours of a feasible project. Given the unconventional mix of uses and the massing of the BYC, the SFMTA and its consultant partners examined potential building height and massing scenarios, code compliance, the interface between the HCC and BYC, potential unit counts, and an initial test of financial feasibility.

This preliminary work indicated that there was a reasonable path to an HCC that was feasible from both a design and financial standpoint—with the substantial caveat that the details of the HCC (e.g. sources of funding, level of affordability) would be critical to successfully delivering it.

From the fall of 2018 through 2019, the SFMTA began to engage the community and other City departments in a dialogue about the Project, with the goal of arriving at a draft project concept. Community outreach efforts during this period included a series of open houses, presentations before community groups, discussions with stakeholders, and the formation of the Potrero Yard Neighborhood Working Group, a steering committee comprised of community members and two frontline Muni employees, which meets monthly.

The SFMTA conducted extensive conversations with the following City departments to refine the project concept: the Planning Department, MOHCD, OEWD, and SFPW. The SFMTA also met with the San Francisco County Transportation Authority and elected policy makers at the local and state levels. Key discussion topics included urban form, the availability of MOHCD loans to support affordable housing, and Project feasibility in general.

Finally, the SFMTA engaged its frontline staff (e.g. operators, mechanics) to determine their priorities for the Project.

Several themes emerged from these discussions, which informed the HCC vision and goals:

1. Interest in a high number and percentage of affordable housing units. There was overwhelming agreement that the HCC should be very ambitious on the affordable housing percentage, especially given that the Project Site is publicly owned. There have been several calls for a 100% affordable development on the Project Site.
2. Interest in a substantial number of housing units. By virtue of its size and location, many community members see the Project Site as a prime opportunity site for a large-scale project, while being mindful of neighborhood context.
3. Desire for deeply affordable units and a concern that even standard affordable units funded with low income housing tax credits are beyond the

means of displaced families in the neighborhood and those that have the greatest housing need.

4. A strong interest in housing for SFMTA employees, especially frontline employees. These employees are often priced out of San Francisco, endure long commute times, and may have incomes that are above the income-restrictions for traditional affordable housing developments.
5. A profound concern about gentrification and its ripple effects in the Mission neighborhood—involuntary displacement of thousands of poor and working class residents, the loss of many longstanding small businesses, and a sudden and undesirable shift in the character and quality of life of a beloved and diverse San Francisco community.
6. Interest in housing for special needs populations, especially the homeless and transitional age youth.
7. For the HCC's commercial component, a preference for ground floor active uses that will enhance public safety, enliven the streetscape, and meet the needs of neighborhood residents and BYC employees.

1.3.2 2020-2021 Increased Policy Interest in HCC Affordability

In October 2019, the SFMTA presented a draft Project concept at a community open house. This concept was generally well received and has been the basis for the Project's environmental review under CEQA which commenced in November 2019. Over the past year, policy makers and community stakeholders have continued their call for greater affordability within the HCC with renewed vigor.

There is a strong sentiment that the Project should achieve a minimum affordability percentage of 50% and that the City expressly challenge the LD to provide as many affordable units as possible, even up to 100% affordable. The unequivocal policy direction now confirms 50% as an affordability floor.

One factor that is shaping the SFMTA's decision making on this Project and other initiatives is a renewed commitment to equity as a guiding principle. The events of 2020 and the start of 2021 put a harsh light on a broad range of unequal and racially-motivated policies that have resulted in profound and inexcusable racial disparities.

The SFMTA has taken this opportunity to reckon with its own history and with City policies more broadly that have destabilized communities of color. Accordingly, the SFMTA has developed Phase I of a Racial Equity Action Plan¹¹.

The SFMTA's frontline staff comprise the largest population of Black, indigenous, and people of color employees. The SFMTA supports the City's

¹¹ Available at: <https://tinyurl.com/y45xjf66>

affordable housing vision, affirms the HCC’s potential to provide housing to frontline Black, indigenous, and people of color employees and to other communities of concern, and enthusiastically endorses the call for an HCC that maximizes affordability and equity.

2 Technical Guidelines

2.1 Introduction

This Section 2 provides the technical guidelines for the HCC. The SFMTA expects the LD to be as creative and entrepreneurial as possible in meeting or exceeding the guidelines in this Division 6. To that end, the SFMTA expressly encourages the LD to aggressively pursue a wide range of external funding sources and innovations to deliver an HCC that is as equitable and ambitious as possible, as described in Section 1 (*Vision, Goal, and Context*)¹² above.

The guidelines listed below are grouped by topic.

2.2 Housing Component – Unit Mix, Affordability, Target Population

2.2.1 Total Housing Units and Unit Composition by Bedroom

1. Provide as many units as possible—up to the 575 maximum in the DEIR project description.
2. A minimum of 50% of the total HCC units must be low income or moderate income units¹³.
 - The HCC is expressly encouraged to provide as many affordable units as possible, even up to 100% affordable.
3. The HCC should have a minimum of 300 residential units, though the City will consider a 100% affordable housing project that falls below this unit threshold and that otherwise meets the guidelines in this Division 6.
 - Any HCC with 300 or more residential units must meet the requirements of California Government Code Section 54221(f)(1)(F)(ii).
 - Any HCC with fewer than 300 residential units must meet the requirements of California Government Code Section 54221(f)(1)(F)(i).
4. Provide as many family units (2BR and 3BR+) as possible. To be consistent with MOHCD policies and to improve the competitiveness of the HCC for

¹² [Not used].

¹³ See Section 2.2.2 (*Equity, Affordability Mix, and Tenant Preferences*) of this Division 6 for definitions of low income and moderate income.

certain funding sources, the City recommends that at least 50% of the affordable units be 2BR+ units and that of those 2BR+ units, at least 25% of the total affordable units be 3BR+ units¹⁴.

- For the Urban Mixed Use (UMU) zoning district that comprises many parcels adjacent to the Project Site¹⁵, the Planning Code mandates that at least 40% of the total units be 2BR+ units or that at least 30% of the total units be 3BR+ units.

2.2.2 Equity, Affordability Mix, and Tenant Preferences

The HCC is envisioned to be composed of three housing components, described as follows, plus a commercial component described in Section 5 (Commercial Component) of this Division 6.

While the housing components presented in this Section 2 are described as discrete elements of the HCC, the LD may choose to structure the HCC as a single transaction or multiple separate transactions—whichever structure is best able to deliver the greatest amount of affordability and implement the technical guidelines described in this Section 2.

1. **Housing Component 1.** Housing for low income, rather than moderate income or market rate, households. Low income is defined as 80% of Area Median Income (AMI) and below¹⁶.
 - a. The LD shall strive to make Housing Component 1 as large a component of the HCC as possible, given the community’s call for housing for low income individuals.
 - b. During the PDA Term, the LD shall work with the City and community to finalize the precise AMI mix within Housing Component 1.
 - c. A substantial percentage of the units in Housing Component 1 should be very low income units (defined as 50% AMI and below).
 - d. Tenant preferences for units in Housing Component 1 shall conform to established MOHCD policy as described in Chapter 47 of the San Francisco Administrative Code.
 - e. The LD shall work with the City to determine the feasibility of including a tenant preference for SFMTA employees in conformance with local, state, and federal law. If determined to be feasible and legally

¹⁴ For reference, the DEIR project description analyzes up to 228 2BR+ units with up to 34 being 3BR units. Also refer to California Tax Credit Allocation Committee guidelines for the latest requirements for unit mix by bedroom for projects that receive an allocation of housing tax credits.

¹⁵ The Project will need all required land use entitlements and permits. See section 843 of the Planning Code for unit mix requirements in the UMU District.

¹⁶ Note that the AMI guidelines refer to the MOHCD/City AMI rather than the AMI established by the California Tax Credit Allocation Committee.

permissible, work with the City to include such a preference for Housing Component 1 units.

- f. The LD shall work with the City and community to determine if special target populations (homeless, transitional age youth) may be included in Housing Component 1.
2. **Housing Component 2.** This component shall consist of additional affordable units in the HCC beyond those in Housing Component 1. Units in this component are for moderate income households. Moderate income is defined as 81% - 120% of AMI. Rents for moderate income units must be at least 20 percent below the median market rents for the neighborhood.
 - a. The LD shall aim for Housing Component 2 to comprise as large a portion of the balance of HCC units as possible (i.e. other than Housing Component 1 units).
 - b. The LD shall work with the City and community to finalize the precise AMI mix in Housing Component 2.
 - c. Tenant preferences for units in Housing Component 2 shall conform to established MOHCD policy as described in Chapter 47 of the San Francisco Administrative Code.
 - d. The LD shall work with the City to determine the feasibility of including a tenant preference for SFMTA employees in conformance with local, state, and federal law. If determined to be feasible and legally permissible, work with the City to include such a preference for Component 2 units.
 3. **Housing Component 3.** This component shall consist of market rate units, as needed, to cross-subsidize/generate the capital needed to finance Housing Components 1 and 2 and deliver an HCC with a density of units appropriate for a 4.4-acre site.
 - a. Strive to make Housing Component 3 as small a component of the HCC as possible, even as low as 0% of the HCC's units.
 - b. In conformance with local, state, and federal law and as part of a broader public-facing marketing effort, market units in Housing Component 3 to SFMTA employees and employees of other public agencies (e.g. other City departments and other, non-City public agencies like the San Francisco Unified School District).

In addition to the above, the HCC shall advance racial equity by aligning the HCC with the implementation of City policies on anti-displacement, racially inclusive communities, and creating stable housing for vulnerable populations:

- i. Work within a culturally competent approach through the development process

- ii. Create opportunities for the growth of organizations that are smaller and led by Black, indigenous, and people of color in a development role or as members of the development team
- iii. Select partners throughout the development process that are able to work with the City to deploy City resources, tools, and expertise to create an HCC that is responsive to populations disproportionately impacted by systemic racism

3 Compliance with MOHCD Requirements

3.1 Lease-Up and Affirmative Marketing Plan

1. Select tenants in Housing Components 1 and 2 in accordance with standard MOHCD lease-up policies and practices. Collaborate with MOHCD and City during the PDA Term to incorporate a tenant preference for SFMTA employees, provided that such a preference is deemed to be both feasible and legally permissible.
2. Develop and implement an affirmative marketing plan that will facilitate a robust response during lease-up and ensure engagement with diverse potential tenants¹⁷. The plan must include specific outreach strategies for the parties with preferences identified in Chapter 47 of the San Francisco Administrative Code and must commit to providing all marketing and application materials in all City-recognized languages. The LD shall comply with MOHCD's marketing requirements, including but not limited to requirements for language access and integration of Chapter 12T of the San Francisco Administrative Code and Article 49 of the San Francisco Police Code¹⁸.
3. Develop a marketing plan that reaches households with limited or no English language proficiency, households with limited computer access, and households that may be hard to reach through traditional means generally.
4. Develop a marketing plan for SFMTA employees. Work with the SFMTA's Human Resources division and with labor leadership to reach as many SFMTA employees as possible to ensure robust employee interest in the HCC units.
5. Develop a marketing plan for SFMTA employees and other public sector employees for Housing Component 3 units, to the extent that the HCC includes market rate units.

¹⁷ The LD shall include in its marketing efforts outreach to the artist community, among other groups.

¹⁸ For more information, please see <http://sfgov.org/olse/fair-chance-ordinance-fco>.

3.2 Resident Services

1. For all low-income units in the HCC, develop and implement a trauma-informed services plan that demonstrates an understanding of the housing and services needs of low-income households. If the LD is proposing to include in the HCC units for special needs populations, such as homeless or transitional age youth households, incorporate the expected needs of these populations into this services plan.
2. The Services Plan shall include:
 - a. Access to and coordination with mainstream community services, subcontracted and/or partner services, and a commitment by each service provider to coordinate with onsite supportive services and property management through regularly scheduled meetings to ensure sound operational and building management practices.
 - b. A description of the minimum services to be provided that are appropriate for residents of low-income units in the HCC, the estimated frequency of the services, and the plan for encouraging resident access to services. Examples of the service activities performed by supportive services staff may include:
 - i. Early intervention with property management in resident selection to conduct assessments of tenants' needs.
 - ii. Ongoing outreach and engagement of the tenant population with the goal of achieving housing stability.
 - iii. Thorough outreach to outside providers to teach, coach and mentor adults and teens on various key areas, including, mental health needs, substance abuse treatment, domestic violence, and food security.
 - iv. Help accessing benefits, pre-vocational and vocational training, legal services, and/or educational opportunities, as appropriate.
 - v. Referrals and assistance with accessing primary medical care and other community services as needed and connection with neighborhood community clinics.
 - vi. Eviction prevention support and referrals.
 - c. Staffing information (number of full-time equivalents (FTEs) or percent thereof, type of services staff, roles of services staff) and a services budget. If the HCC is to include homeless-serving units, services for these units should be provided through a case manager to unit ratio of no less than one case manager for every 35 units; services for the non-homeless households should be provided at one services coordinator/connector for every 100 households. If there are homeless-serving units in the HCC, the LD will be required to work with the San Francisco Department of Homelessness and Supportive Housing to

determine final staffing ratios and budgets to successfully serve the homeless households.

3.3 General Compliance

1. Consistent with standard City practice, a notice of special restriction or declaration of restrictions must be recorded for the building or portion of the building containing affordable housing.
2. Housing Components 1 and 2 must remain affordable at least for the term of the Housing Term.
3. Housing Components 1 and 2 must conform to MOHCD's affordable housing and underwriting guidelines (these may be found at <https://sfmohcd.org/housing-development-forms-documents>).
4. The Project's affordable housing will be administered by MOHCD and must be consistent with MOHCD's housing program and policies (see link above), except if expressly modified by City during the PDA Term.

4 Designing for Community and Sustainable Transportation

4.1 Housing Component that Builds Community

1. Strive to create an HCC that is cohesive and seamless across income strata.
 - a. The City would strongly prefer a project that is designed, financed, delivered, and managed in a way that facilitates as much socio-economic mixing as possible and as much of a sense of community as possible. During the PDA Term, the LD will work with the City and community to determine the best way to meet this objective while pursuing a feasible, financeable HCC.
2. Design physical spaces that will promote rather than inhibit a sense of community. Possible approaches include the design and programming of open spaces on the roof of the BYC's podium, the design of HCC lobbies and other common areas, and the provision of common areas not only at the main entrances but also on the upper floors of the HCC.
3. Develop and implement a calendar of community-building events that facilitate social mixing including across the HCC's income strata.
4. Structure the provision of resident services to bring residents of all unit types together for community events.

4.2 A Housing Component that Exemplifies Transportation Demand Management Practices

1. Develop and implement a robust TDM plan for the HCC to discourage driving and instead encourage sustainable modes of transportation, such as public transportation, walking, and biking.
2. The Project does not include any parking for the HCC aside from a minimal number of car share spaces. The absence of parking on-site, however, does not guarantee that residents will gravitate toward walking, biking, and transit as their primary modes of transportation. A well thought-out, robust TDM program is an essential element of a sustainable transportation strategy for the HCC.
3. The LD shall propose a TDM program in its Proposal and subsequently during the PDA Term shall work with the SFMTA, SF Planning, and the community to validate and refine the TDM program.
4. Possible components of a TDM program include:
 - a. Enhanced bicycle storage beyond the base requirements of the Planning Code.
 - b. Making cargo bikes available for residents to use to complete shopping trips.
 - c. Providing real time displays of transit arrival and departure information in common areas.
 - d. Providing an orientation to residents at move-in to inform them of transit options.
 - e. Enrolling residents in programs that encourage the use of sustainable modes of transportation, such as free and reduced-price Muni passes and discounted bike share.
 - f. Providing a Clipper Card machine on-site for dispensing and recharging Clipper Cards.
5. Where TDM practices proposed by the developer require or result in right-of-way design enhancements and built features, the Project shall provide innovative and state-of-the-art concepts that directly implement goals of the SFMTA's overall agency policies.
6. Design and program the HCC in such a way as to be competitive for funding through the Affordable Housing and Sustainable Communities (AHSC) program.

5 Commercial Component

This Division 6 refers to the non-residential portion of the HCC as its commercial component. In fact, the commercial component may comprise a wide variety of active uses as long those are permitted and authorized by the City in its regulatory capacity, including but not limited to retail, restaurants and cafes, social service providers, laundromats, repair services, art galleries, spaces for community use, child-care, cultural centers, medical clinics, and personal services to the extent allowed under Applicable Law.

Note that the guidelines below complement, but do not supersede, the public benefit principles in Division 8 (*Public Benefit Principles*) of the Technical Requirements. The Public Benefit Principles also address aspects of the commercial component. Lead Developer shall consult both Divisions in developing the HCC.

5.1 Location and Design Characteristics

1. The HCC shall include a commercial component of up to approximately 33,000 square feet (i.e., the size of commercial component included in the DEIR project description).
2. For the design guidelines of the commercial component, refer to Division 2 (*Design Guidelines*) of the Technical Requirements.
3. Provide a mix of uses that will succeed in activating the sidewalk and enhancing public safety at different times of day (morning, daytime, evening).
4. The design of the Project should accommodate active uses along 17th Street, program uses along 17th Street that will create a symbiotic relationship with Franklin Square, thereby enhancing public safety, attracting people to the park, and providing an amenity for patrons of the park.

5.2 Desired Uses

1. During the PDA Term, the LD must collaborate with the community to address how the commercial component will conform to the Public Benefit Principles set forth in Division 8 (*Public Benefit Principles*) of the Technical Requirements. The LD must develop a well thought-out, methodical, inclusive approach to refining the suggested list of uses in the commercial component based on community input.
 - a. The SFMTA conducted a text-based survey to gauge community members' preferences for the commercial component. While not a measure of community consensus given the small sample size, survey respondents' top four preferred uses were: 1) café/ food and drink; 2) local nonprofit/ social services and educational activities; 3) market or convenience retail; and 4) arts/cultural space.

2. In devising a list of potential tenants for the commercial component and in conducting lease up, the LD should work with the community to identify potential commercial component tenants who ideally have the following characteristics:
 - a. Whose services are accessible to a broad swath of the community across income, rather than just catering to middle or upper-income residents
 - b. That present branding, signage, marketing, and customer serving materials (e.g. menus for restaurants) that are culturally sensitive and cater to both English and Spanish speakers
 - c. That meet local community needs based on the feedback of a cross-section of residents and stakeholders. The commercial component should not include narrow, niche market uses that replicate other niche market uses that are already nearby
 - d. That are long-standing neighborhood businesses, non-profits, organizations, or social enterprises seeking space in the Mission or Potrero neighborhoods
 - e. That respond to the needs of SFMTA staff at Potrero Yard
 - f. That meet the needs of the HCC's future residents across all the income strata of the HCC
3. As described in the Public Benefit Principles, and being mindful of the HCC's financial feasibility, the LD must collaborate with the City, the Potrero Yard Neighborhood Working Group, and community during the PDA Term to consider a portion of the commercial component for a community-serving use or uses that would not be able to pay a market rent. These community-serving uses may include:
 - a. Uses that advance the cause of equity, community empowerment, and/or the arts. These include studio space, gallery space, services that connect residents to employment opportunities, community-based financial institutions, social service providers, and small business incubators.
 - b. Customer-serving transportation functions, such as an SFMTA customer-service kiosk, Clipper Card machine (see [Section 4.2](#) (*A Housing Component that Exemplifies Transportation Demand Management Practices*) above), or bike repair station.
 - c. Customer-serving functions provided by City agencies, such as OEWD, to advance economic opportunities for neighborhood residents and businesses.
4. As described in the Public Benefit Principles, the LD must consider incorporating into the commercial component a convenient, easily accessible public restrooms for the use of patrons of Franklin Square. The PPC would be responsible for the maintenance of the restrooms during the Housing Term and the cost shall be allocated to the HCC.

5. The LD must work with the City and community to determine the feasibility of an on-site childcare facility.
 - a. A Project variant that includes a childcare facility is currently being evaluated as part of the Project's environmental review.
 - b. During the PDA Term, determine if there is demand for on-site childcare and if it can be feasibly and safely accommodated within the commercial component, including satisfying all applicable San Francisco Municipal Code requirements.

Division 7: Asset Management Program Requirements

Introduction

The City envisions the Joint Development of the Bus Yard Component (BYC), a public infrastructure asset, and the Housing and Commercial Component (HCC), a private real-estate development, as one integrated Facility. A third and critically important component of the Facility is the Common Infrastructure, which is the physical infrastructure shared by both the BYC and the HCC.

The allocation of Facility's scope of work for the Common Infrastructure is defined in detail in Division 1 (*Cost and Scope Allocation Requirements*) of the Technical Requirements. The BYC and the Common Infrastructure together make up the Infrastructure Facility.

During the PDA Term, the LD shall develop and submit to the City an Asset Management Program (AMP) for the proper life-cycle operations and maintenance (O&M) of each Project component individually and for the Facility as a whole. During the PDA Term the Lead Developer (LD) shall work with the City to develop and finalize the AMP. The AMP shall be developed during the PDA Term on the basis of the Technical Proposal and the Financial Proposal attached to the Agreement.

Specifically, the AMP shall include (1) all facility management, engineering, repairs and maintenance, and other activities necessary to provide a best-value level of service for the Facility as a whole during its operational life-cycle, and (2) the division of responsibility between the Principal Project Company (PPC) and City for performance of those above mentioned activities under the Project Agreement.

1 Role of the Principal Parties

The principal parties involved in the AMP and their roles in relation to the AMP are described below. This initial allocation of roles may be further developed during the PDA Term.

1. **City.** The BYC is the Project's core public infrastructure. The SFMTA will perform O&M services (SFMTA O&M) throughout the lifecycle of the Project, in accordance with the description of SFMTA O&M, provided below.
2. **Lead Developer.** During the PDA Term, the LD shall work collaboratively with the City to develop an AMP that aligns with the Project's objectives as defined in Appendix D (*Project Objectives*) of the Agreement and with the Technical Requirements. The LD shall work with the SFMTA to learn the SFMTA's existing asset management program,

practices, and computer-aided facility-management system (CAFM) software (i.e., CloudSuite EAM). After Substantial Completion of the Infrastructure Facility, the LD shall deliver to the SFMTA a structured asset management data set that can be seamlessly incorporated into the SFMTA's asset management software and regime, for all O&M functions to be maintained by the SFMTA.

3. **Principal Project Company.** The PPC will be responsible for delivery of the Project under the Project Agreement and shall be the single point of contact for that delivery. The Project Agreement will specify the AMP scope allocated to the PPC. The PPC will oversee and implement all portions of the AMP scope that are its responsibility. The PPC may contract with the Infrastructure Facility Project Company and Housing Project Company to provide this AMP scope, but the PPC will remain responsible for performance of those responsibilities¹⁹.
4. **Infrastructure Facility Project Company.** The PPC will develop, implement, and oversee a program for Infrastructure Facility Maintenance (IFM), as defined below, for the Infrastructure Facility. The PPC may contract with the Infrastructure Facility Project Company to perform these responsibilities, and the Infrastructure Facility Project Company may contract with an IFM provider for them. In either case, the PPC will remain responsible for performance of these responsibilities.
5. **Housing Project Company.** The PPC will oversee and implement a program for Property Management, as defined below, for the HCC. The PPC may contract with the Housing Project Company to meet these responsibilities, and the Housing Project Company may in turn contract with a Property Management provider for them. In either case, the PPC will remain responsible for causing those responsibilities to be fully met.

2 Asset Management Program Scopes of Work

2.1 Scopes of Work

The AMP will include the following scopes of work:

1. **Infrastructure Facility Maintenance** means the facility management, engineering, repairs and maintenance, renewals and replacement, and other ancillary services required for the life-cycle O&M of the full scope of the Common Infrastructure, as defined in Section 2 (Scope Allocation) of Division 1 (Cost and Scope Allocation Requirements) of the Technical Requirements and certain elements of the BYC. The scope of the IFM is

¹⁹ In this context, commercial uses such as (but not limited to) retail stores are included in the Housing Project Company's scope of responsibility.

described in **Table 1** below and its detailed requirements are described in Section 4 (*Technical Requirements for the Infrastructure Facility Maintenance*) below.

2. **Property Management** means the HCC management, leasing, rent collection, tenant services and relations, engineering, repairs and maintenance, lifecycle/capital renewals and replacement, security, grounds maintenance, waste management, pest control, and other ancillary services required for operating and maintaining the HCC in compliance with Applicable Law and keeping it in a good operating condition. The scope of work and performance of the Property Management program will be commensurate with that of industry-standard Class A multi-family residential projects with commercial and retail space in California, and/or as required by MOHCD for affordable housing developments.
3. **SFMTA O&M** means the essential transit O&M services managed and conducted by the SFMTA within the BYC, as described in **Table 2** below. SFMTA will perform and be responsible for lifecycle/capital replacement services for the SFMTA O&M scope items identified in Table 2, which include repairs, renewals, refurbishment, and replacements.

Table 1. Summary of Infrastructure Facility Maintenance Scope of Work for the Infrastructure Facility, 24/7/365

| IFM Scope Item | Description |
|--|---|
| Building Systems | |
| Structural system | The complete structural system of the BYC and the Common Infrastructure (i.e., the Infrastructure Facility). |
| Building envelope | The complete exterior envelope of the entire Facility, as defined for the Common Infrastructure and described in <u>Section 2.1</u> (<i>Common Infrastructure</i>) of <u>Division 1</u> (<i>Cost and Scope Allocation Requirements</i>) of the Technical Requirements. |
| Demising walls separating the BYC from the HCC | If the LD's approach for the Project provides demising walls that are designed and constructed as a single wall assembly, then demising walls will be considered to be part of the Common Infrastructure as described in <u>Section 2.1</u> (<i>Common Infrastructure</i>) of <u>Division 1</u> (<i>Cost and Scope Allocation Requirements</i>) of the Technical Requirements. |
| Signage and wayfinding systems | All signage and wayfinding components for spaces allocated to the Common Infrastructure and described in <u>Section 2.1</u> (<i>Common Infrastructure</i>) of <u>Division 1</u> (<i>Cost and Scope Allocation Requirements</i>) of the Technical Requirements. |
| Building mechanical, electrical, and plumbing systems and common utility systems | The complete HVAC, plumbing, electrical, lighting, fire and life safety systems, MEP system controls, and Building Automation System (BAS) serving the Infrastructure Facility. The MEP systems include hot and chilled water physical plants, electrical distribution systems, and backup power systems. If the LD's approach for the Project includes common utility systems for the Facility as a whole, these will be considered to be |

| IFM Scope Item | Description |
|---|---|
| | <p>part of the Common Infrastructure as described in <u>Section 2.1 (Common Infrastructure)</u> of <u>Division 1 (Cost and Scope Allocation Requirements)</u> of the Technical Requirements.</p> <p>For IT, communication, and security systems, the IFM scope will be according to the scope of work allocation defined in <u>Section 2.2 (Information Technology, Communications, and Security Systems)</u> of <u>Division 1 (Cost and Scope Allocation Requirements)</u> of the Technical Requirements.</p> |
| Civil and Site utility systems | <p>For civil and site utility systems, the IFM scope will be for the full Facility according to the scope of work allocation defined in <u>Section 2.1 (Common Infrastructure)</u> of <u>Division 1 (Cost and Scope Allocation Requirements)</u> of the Technical Requirements.</p> |
| BEB systems | <p>The Charging Infrastructure, including facilities for storage and maintenance of batteries, throughout the Infrastructure Term, per the requirements defined in <u>Division 5 (Battery-Electric Bus Supplemental Criteria)</u> of the Technical Requirements.</p> <p>The Charging Equipment, from Substantial Completion of the Infrastructure Facility of the Infrastructure Facility through the end of the full conversion to a BEB fleet, per the requirements and timeframes defined in <u>Division 5 (Battery-Electric Bus Supplemental Criteria)</u> of the Technical Requirements.</p> |
| Building Spaces | |
| Building system spaces | <p>Rooms for civil and site utility systems, MEP systems, and/or common utility systems that are allocated to the Common Infrastructure as described above and as described in <u>Section 2.1 (Common Infrastructure)</u> of <u>Division 1 (Cost and Scope Allocation Requirements)</u> of the Technical Requirements. Includes the associated distribution chases, shafts, or raceways, whether vertical or horizontal.</p> |
| Vertical circulation | <p>All stairs, emergency egress, escalators, and elevators in the Facility that have shared uses for each Project component as described in <u>Section 2.1 (Common Infrastructure)</u> of <u>Division 1 (Cost and Scope Allocation Requirements)</u> of the Technical Requirements. This includes all the shared mechanical and electrical systems for vertical conveyance.</p> |
| Common-use spaces | <p>All common use enclosed or open spaces (whether public or private, including the podium roof open space), shared entrance lobbies, shared restrooms (whether public or private), and shared service areas (e.g., loading docks, storage spaces, waste handling facilities) as described in <u>Section 2.1 (Common Infrastructure)</u> of <u>Division 1 (Cost and Scope Allocation Requirements)</u> of the Technical Requirements.</p> |
| Public right-of-way improvements | |
| Elements described in Division 8 | <p>See <u>Table 1 (Public Benefits Cost Allocation Matrix)</u> in <u>Division 8 (Public Benefit Principles)</u> of the Technical Requirements for elements allocated to the Common Infrastructure.</p> |

| IFM Scope Item | Description |
|--|--|
| All other elements not otherwise described in Division 8 | All other public right-of-way improvements that are not described in <u>Division 8</u> (<i>Public Benefit Principles</i>) of the Technical Requirements and are nevertheless included in the Project to meet either regulatory requirements or the Technical Requirements are considered to be included in the scope of the Common Infrastructure. |

BAS = Building Automation System

HVAC = heating, ventilation, and air conditioning

IFM = Infrastructure Facility Maintenance

MEP = mechanical, electrical, and plumbing

Table 2 Summary of Scope of Work for the SFMTA O&M, 24/7/365

| SFMTA O&M Scope Item | Description |
|--|--|
| Transit operations and maintenance of transit vehicles | O&M and lifecycle of SFMTA buses and non-revenue vehicles. |
| Transit maintenance spaces and equipment | O&M and lifecycle of the maintenance bays, shops, and transit vehicle maintenance equipment; specifically, any space or equipment used solely in connection with the SFMTA maintenance activities. This includes SFMTA offices and work areas, workshops, break rooms, locker rooms, restrooms, storage areas, and related rooms, and includes management of replacement parts inventory. Includes O&M of the FF&E installed and used in these spaces. |
| Transit vehicle traction power systems | O&M and lifecycle of the trolley bus OCS and batteries for BEBs. The Charging Equipment after the earlier of: (1) the end of the full conversion to a BEB fleet, or (2) December 31, 2033. |
| Transit communication, security, and IT systems | For IT, communication, and security systems, the SFMTA O&M scope will be according to the scope of work allocation defined in <u>Section 2.2</u> (<i>Information Technology, Communications, and Security Systems</i>) of <u>Division 1</u> (<i>Cost and Scope Allocation Requirements</i>) of the Technical Requirements. |
| Administration and training facility spaces and FF&E | O&M and lifecycle of the interiors of the BYC support spaces such as (but not limited to) administration offices and work areas, break rooms, kitchens, restrooms, locker rooms, training facility, custodial support rooms, lactation room, exercise/fitness rooms, and other support spaces within BYC. Includes O&M of the FF&E installed and used in these spaces. |
| Ancillary facility services | O&M and lifecycle activities related to the BYC such as custodial, building security, uniforms, catering, and other such services that the SFMTA customarily performs in its existing transit maintenance and storage facilities. The SFMTA will perform building security operations only within the interior |

| SFMTA O&M Scope Item | Description |
|-----------------------|---|
| | of the BYC and the Common Infrastructure, including operation of the access card system. |
| SFMTA generated waste | Disposal management and/or recycling of lubricants and solvents utilized by the SFMTA within the BYC, and hazardous waste management generated by the SFMTA within the BYC (including disposal of tires). |

BEB = battery-electric bus

FF&E = furniture, fixtures and equipment

IFM = Infrastructure Facility Maintenance

O&M = operations and maintenance

OCS = Overhead Contact System

SFMTA = San Francisco Municipal Transportation Agency

2.2 Outline of Responsibilities

The PPC's responsibilities with respect to the Infrastructure Facility include, but are not limited to, the following:

1. Prior to Substantial Completion of the Infrastructure Facility, with respect to the AMP and its various elements, as follows:
 - a. Implementation of the AMP developed during the PDA Term
 - b. Coordination of the AMP with design and other activities, as per the provisions of the relevant interface agreements
 - c. Preparation for and implementation of the Project's commissioning activities, including the interfaces among the different elements of the AMP
 - d. Collaboration with the SFMTA's asset management team to understand their asset management system and work flow, for the purposes of delivering a structured data set and enabling the SFMTA to be ready for the SFMTA O&M scope of work
2. Following Substantial Completion of the Infrastructure Facility, with respect to the IFM scope of work described in Section 4 (*Technical Requirements for Infrastructure Facility Maintenance*), as follows:
 - a. General responsibilities – see Section 4.2
 - b. Maintenance and repair requirements – see Section 4.3
 - c. Preventive maintenance requirements – see Section 4.4
 - d. Infrastructure management (including capital replacement maintenance) – see Section 4.5
 - e. Grounds maintenance services – see Section 4.6
 - f. Pest control services – see Section 4.7
 - g. Solid waste collection, recycling, and removal – see Section 4.8

- h. Continued quality assurance – see [Section 4.9](#)
- i. Handback requirements – see [Section 4.10](#)

3 Commercial Considerations

3.1 Development of the Asset Management Program During the PDA Term

During the PDA Term, the LD will perform the work specified in [Section 2.2.2.4 \(Asset Management Program Development Plan\)](#) of [Appendix B-2 \(Project Management, Design Deliverables, Software, and Document Control Requirements\)](#) of the Agreement.

3.2 Allocation of Responsibilities

Table 3 below summarizes the allocation of responsibilities for the AMP, among the principal parties and at a conceptual level, for the different components of the Facility, based on the definitions stated above.

Table 3 Primary Responsibility Allocation Matrix for the Asset Management Program

| Party | Bus Yard Component | Common Infrastructure | Housing and Commercial Component |
|---|---|---|--|
| City | SFMTA O&M and oversight of the IFM | Oversight of the IFM | None |
| Lead Developer | Development of the AMP during the PDA Term in consultation with the City. | | |
| Principal Project Company | Following Commercial Close, implementation, monitoring, reporting, and quality assurance of the IFM and Property Management, and assistance with the implementation of the SFMTA O&M. The scope of assistance shall be defined during the PDA Term and shall be included in the Project Agreement ²⁰ . | | |
| Infrastructure Facility Project Company | IFM services | | None |
| Housing Project Company | None | Payment of the HCC's allocated share of IFM costs based on the PCIC | Property Management services for the HCC |

²⁰ The level of assistance envisaged includes, but is not limited to, additional support from the PPC regarding any desired modifications of systems controls and settings, troubleshooting issues with systems and equipment functionality, reorientation with O&M manuals and staff training, and serving as a resource for questions and answers regarding source documentation and troubleshooting.

AMP = Asset Management Program
 HCC = Housing and Commercial Component
 IFM = Infrastructure Facility Maintenance
 O&M = operations and management
 PCIC = Percentage of Common Infrastructure Cost allocated to the City
 PDA = Predevelopment Agreement
 SFMTA = San Francisco Municipal Transportation Agency

4 Technical Requirements for Infrastructure Facility Maintenance

The PPC will be responsible for the implementation, monitoring, reporting, and ongoing quality assurance of the IFM following Commercial Close. The PPC may contract separately with a Infrastructure Facility Project Company and Housing Project Company to provide those service requirements, but the PPC will remain responsible for ensuring the performance of those services.

For the purpose of defining the responsibilities and requirements relating to the IFM, the following sections of the Technical Requirements refer to the PPC as the party responsible for these service requirements as it will be contractually obligated to provide them or cause them to be provided.

4.1 Principal Project Company's Responsibilities

The Common Infrastructure provides critically important support functions to the BYC and the HCC. In recognition of this fact, the PPC will provide all personnel, equipment, tools, materials, vehicles, supervision, and other goods and services necessary to perform all services, tasks, and functions as defined herein and maintain a level of operations for the IFM scope of work that is consistent with industry standards for 24/7/365 transit O&M facilities and for Class A multi-family residential properties, as applicable for the relevant aspects of the IFM scope of work.

The PPC will provide guidance and coordination with the City to ensure effective and economical operation of all activities described herein. The PPC will be required to provide full-service professional facility management services necessary to deliver its responsibilities with respect to the AMP, as further defined in the sections that follow.

Section 4 (*Technical Requirements for the Infrastructure Facility Maintenance*) set forth the requirements for each of the PPC's nine areas of responsibility for the IFM services defined above. To streamline volume and accessibility of information, the LD will develop the required documentation defined in the following sections will be organized in consolidated sets of plans and reports associated with each of the nine areas responsibility.

4.2 General Responsibilities

4.2.1 Customer Service and Support

The PPC will be required to develop a detailed plan to address customer service and work support management, incorporating the approach to customer interface procedures and protocols, work reception, scheduling, and dispatch for all maintenance requirements.

The Infrastructure Facility's defined hours of operations are as follows:

1. **BYC:**
 - a. The BYC will have 24/7/365 operations (except for the training facility)
 - b. The BYC's training facility: from 6 a.m. to 5 p.m., Monday to Friday, except City public holidays
2. **Common Infrastructure:**
 - a. The Common Infrastructure will have 24/7/365 operations

The PPC will be expected to respond to all customer service work requests within the time indicated in the table below based on the following priority model:

1. **Priority 1 – Emergency, immediate response required.** Situations requiring immediate action to return the Infrastructure Facility to normal operations, stop accelerated deterioration, or correct a safety hazard that imminently threatens life or serious injury to public and/or City employees.
2. **Priority 2 – Urgent, necessary but not yet critical.** Situations that will imminently become critical, if not corrected expeditiously, includes intermittent interruptions and/or potential safety hazards.
3. **Priority 3 – Routine.** Conditions requiring appropriate attention to preclude deterioration or potential downtime and associated damage or higher costs if deferred further. Items representing a practical improvement to existing conditions. These items are not required for the most basic functions of the Infrastructure Facility but will improve the overall usability and accessibility and/or reduce long-term maintenance.

The PPC will respond to and complete work requests compliant with the times outlined in **Table 4** for 99% of Priority 1 and 2 events and 90% of all other events. Failure to do so will result in performance deductions to the Availability Payments.

Table 4 Work Request Response Times

| Severity: | Emergency | Urgent | Routine |
|----------------------------|-----------|--------|---------|
| Priority: | 1 | 2 | 3 |
| Defined Hours of Operation | | | |

| Severity: | Emergency | Urgent | Routine |
|---|------------------|--|-------------------|
| Response Time: | 10 minutes | 2 hours | 24 hours |
| Completion Time: | 2 hours | 8 hours | 5 business days |
| Outside Defined Hours of Operation (applies only to the BYC's training facility) | | | |
| Response Time: | 1 hour | Within 2 hours of start of next business day | Next business day |
| Completion Time: | 2 hours | End of next business day | 5 business days |

4.2.2 Human Resources

The PPC will do the following:

1. Comply with all City requirements for doing business with the City
2. Provide a minimum number of on-site qualified personnel to perform all tasks of the IFM, including for all 24/7/365 requirements, during the Infrastructure Facility Term – the roles, minimum number, and minimum qualifications of the on-site personnel will be agreed by the PPC and the City and will be specified in the Project Agreement
3. Ensure that employees have all required training, professional certifications, current and valid, before starting work
4. Prepare a human resources plan

4.2.3 Material, Equipment, and Subcontract Purchases

The PPC will do the following:

1. Purchase and manage all materials, equipment, and subcontracts to be used in the performance of these requirements
2. Maintain and manage a sufficient on-site inventory of materials and equipment readily available to support work requirements

4.2.4 Computer-aided Facilities Management System

The PPC will utilize a CAFM as the basis for development of the AMP and specifically to manage the Infrastructure Facility. The CAFM shall be developed in coordination with the Project's Building Information Model (BIM). The City will have access to the Infrastructure Facility's CAFM for auditing purposes and submission of task orders into the system.

The CAFM system, including hardware and software, should allow for the following Facility management functions:

1. Long-range and annual Infrastructure Facility planning
2. Infrastructure Facility financial forecasting
3. Work specifications, installation, and space management
4. Architectural and engineering planning and design, with floor plans, area and room numbers, doors, keys and key card access system
5. New construction and/or renovation
6. Maintenance and operations management, including both scheduled and predictive maintenance
7. Service work order execution and organization
8. Materials purchasing
9. Spare parts inventory management
10. Telecommunications integration, security, and general administrative services
11. Sustainability monitoring, reporting, and forecasting
12. Subcontracts, suppliers, and personnel management
13. Customer satisfaction auditing
14. Document management
15. Interface with Building Automation System (BAS) (described below)

The PPC will develop a separate CAFM for the SFMTA's use to manage the SFMTA O&M with respect to the BYC, and another separate CAFM for the Property Management scope of work of the HCC. Each CAFM will have a similar scope and functionality as the Infrastructure Facility's CAFM, and all three will be compatible and inter-operable to permit flexibility in the approach to facility management of the Facility.

The PPC will coordinate with the SFMTA with respect to SFMTA's established standards and procedures in its development, establish the scope of assets to be managed by it, establish inter-operability standards and procedures to ensure an efficient approach to the Facility as a whole, and will provide training in its use and in preparation for the start of operations of the Infrastructure Facility. SFMTA notes that it currently uses Infor CloudSuite Enterprise Asset Management System (EAMS), which bases its facility hierarchy of asset data on the Federal Transit Administration's standard for "state of good repair". Work orders are submitted and tracked in this system, with programs to maintain, repair, replace, upgrade, and/or rebuild facilities and assets.

The PPC will incorporate a BAS to monitor and, when applicable, automate and control the Facility's building systems such as the following:

1. Energy consumption

2. Lighting control
3. Heating, ventilation, and air conditioning
4. Security monitoring (e.g., closed-circuit television)
5. Access control
6. Fire/life safety monitoring
7. Vertical transportation
8. Plumbing monitoring

The PPC will provide the necessary resources to support data mining and developing reports as required. The PPC will also perform overall trending analysis to support the City and in determining long-term planning for equipment reliability, fault-cause analysis, and benchmarking measurements.

4.2.5 Required IFM Documentation

A summary of the required plans and reports for the IFM are shown in **Table 5** and **Table 6**, respectively.

Table 5 Summary of Required Plans for Infrastructure Facility Maintenance

| Number | Document | Requirements | Schedule | Update |
|--------|--|---|----------|----------|
| IFM-1 | Customer Service and Support Plan | Plan will include customer interface protocols, work order process and resolution, scheduling and dispatch, service coordination, emergency response, and communication protocols. | | Annually |
| IFM-2 | Human Resources Plan | Operational plan to address contingency procedures, payroll auditing, and continuity of facility management. | | Annually |
| IFM-3 | Master Facility Disaster Response and Business Continuity Plan | This plan will address major accident and disaster response management, continuity of essential services during emergencies, and building evacuation plans, each in coordination with the City. | | Annually |
| IFM-4 | Environmental, Health, and Safety Plan | Plan to establish measures to be taken to | | Annually |

| Number | Document | Requirements | Schedule | Update |
|--------|--|--|----------|----------|
| | | comply with federal, state, and local laws and regulations on environmental, health, and safety issues, including California Occupational Safety and Health Administration requirements. | | |
| IFM-5 | Hazardous Waste Management Program | Plan for handling hazardous waste, in conformance with applicable federal, state, and local ordinances. | | Annually |
| IFM-6 | Waste Analysis and Implementation Plan | Plan will specify the process to identify, sample, analyze, and report on handling of waste streams, including for reuse, recycling, composting, and trash. | | Annually |
| IFM-7 | Water Management Conservation and Reuse Plan | Plan for water management, conservation, and reuse in accordance with local, state, and federal requirements. | | Annually |

Table 6 Summary of Required Reports for Infrastructure Facility Maintenance

| Number | Document | Requirements | Schedule | Updates |
|--------|--|---|----------|---|
| IFM-8 | System Disruption Report | Report showing disruptions to the Infrastructure Facility due to PPC's activities. | | Quarterly |
| IFM-9 | Employee Certification Report | Report will demonstrate employee/subcontractor qualifications and certifications for assigned roles and responsibilities. | | Annually or with change of staffing/subcontractor |
| IFM-10 | Hazardous Waste Collection and Disposal Report | A report of hazardous waste collections and disposals. | | Monthly |
| IFM-11 | Permit Compliance Report | Report showing state, local, and federal permits associated with the Infrastructure Facility, permit | | Annually |

| Number | Document | Requirements | Schedule | Updates |
|--------|----------|--|----------|---------|
| | | numbers, last year renewal date, current renewal date, copy of permit document, copies of permit required reporting documentation, and proof of renewal. | | |

PPC = Principal Project Company

4.3 Maintenance and Repair Requirements

The PPC will do the following:

1. Maintain the Infrastructure Facility's systems to minimize breakdowns and maximize its habitability during the defined hours of operation.
 - a. All Infrastructure Facility systems will be available 24/7/365 unless specifically described to the contrary in the Project Agreement or/and authorized by the City or designated representative.
 - b. Security, fire suppression, protection, and detection systems will be fully operational 24/7/365. Any unscheduled corrective maintenance will be considered a breakdown.
 - c. If a breakdown results in the inability of the City to access any space of the Infrastructure Facility or prevent the SFMTA's normal transit operations, the breakdown will trigger Availability Payment deductions or other performance penalties.
2. Provide a quarterly report on the performance and availability of major facility systems.
3. Submit a complete IFM procedures plan that will support planning, budgeting, executing, equipping, and training, ensuring the most effective and efficient delivery of services.
4. Ensure that all equipment and technologies are replaced or upgraded before they become obsolete.

Table 7 outlines the maintenance and repair functions for the IFM.

Table 7 Summary of Maintenance and Repair Functions for the Infrastructure Facility

| # | Service | Notes |
|---|-----------------------------------|--|
| 1 | Building Automation Services | Implementing and maintaining the BAS for the Infrastructure Facility's building systems. |
| 2 | Routine and Emergency Maintenance | Corrective and planned maintenance of the Infrastructure Facility, including |

| # | Service | Notes |
|---|------------------------------------|---|
| | | routine and emergency response requirements. Work encompasses all typical trades and services customary for facility maintenance, including MEP, backup power systems, structural, lighting, communications, security, wayfinding, and fire and life safety system repair and maintenance. |
| 3 | Utilities Management | Ensuring availability of utility services to the Infrastructure Facility, as applicable, including electrical, water, gas, on-site power generation (e.g., solar), backup power, and other utility services as appropriate. |
| 4 | Common Utility System Services | Ensuring the availability and operation of common utility services to the Infrastructure Facility, as applicable. |
| 5 | Grounds Maintenance | Maintenance of common-use spaces, vertical circulation, and Common Infrastructure building system spaces, whether exterior or interior, that are part of the Infrastructure Facility. Includes provision of cleaning services for the exterior of the Facility such as (but not limited to) graffiti removal, exterior window cleaning, and waterproofing maintenance, and general cleaning services for interior spaces. Proactive management of vandalism of all exterior areas and surfaces, including removal of graffiti based on performance standards. |
| 6 | Telecommunications and IT | For the systems related to the Infrastructure Facility, provision and ongoing support for utility connections and the structured cable infrastructure installed, terminated, and tested (which includes fiber optic or copper cables, raceways, backboxes; all outlets [wall, floor, other]; distribution rooms; racks and terminations) for local or wide area network, building automation, telephone, security, and CATV systems. |
| 7 | Fire Alarm and Life Safety Systems | Provision of ongoing operations, testing, maintenance, certification, and support to fire alarm and mechanical control/release systems, emergency public communications, and smoke control and removal systems. |
| 8 | Vertical Transportation Systems | Management of vertical transportation service contracts as well as ongoing |

| # | Service | Notes |
|----|--|---|
| | | asset upgrades to maintain operational serviceability over the term. |
| 9 | Cladding, Roofing, Solar Power Systems | Provision for ongoing cladding and roofing maintenance and management, including renewal of exterior wall, solar power, and roofing systems and associated components. |
| 10 | Environmental, Health, and Safety | Develop, implement, and keep up-to-date a comprehensive program to address workplace safety and training (including waste management, pest management, indoor air quality, and mold management). Ensure that buildings meet internal and external environmental and safety standards, including all appropriate laws and regulations. |
| 11 | Life-cycle Renewal | Ensure ongoing operational serviceability of the Infrastructure Facility's equipment and systems through comprehensive replacement and renewal over time. Renewal components will be replaced in form, substance, and quality that meet or exceed the specifications. The FCI for the Infrastructure Facility will be maintained not greater than 0.15 throughout the Infrastructure Facility Term and at handback shall be as defined in <u>Section 4.10 (Handback Requirements)</u> . |
| 12 | Solid Waste and Recycling Management | Proactive solid waste and recycling program to address all relevant waste streams (landfill, compost, recycling) for the Infrastructure Facility as a whole, and to maintain compliance with LEED and regulatory programs. ²¹ |
| 13 | Asset Management | Services include inventory control for real properties and installed equipment associated with the Infrastructure Facility. |

²¹ The PPC would be responsible for conducting periodic trainings of SFMTA employees at Potrero Yard to ensure that the Infrastructure Facility is meeting waste diversion targets mandated by the City. The PPC will be responsible for ensuring full compliance with SF Department of the Environment regulation #SFE-19-01-RSO including any penalties and/or requirements associated with a failure to meet waste diversion targets. See https://sfenvironment.org/sites/default/files/fliers/files/sfe_zw_refuse_separation_ordinance_regulations_signed.pdf and https://sfenvironment.org/sites/default/files/policy/sfe_zw_sf_mandatory_recycling_composting_ordinance_100-09.pdf.

| # | Service | Notes |
|----|----------------------------------|---|
| 14 | Security Systems | For the Infrastructure Facility, provision of and maintenance for security communication and surveillance systems, intercoms, public address antennas and repeaters. |
| 15 | Access Control Systems | For the Infrastructure Facility, provision of and ongoing maintenance for access control systems. |
| 16 | Maintenance Engineering Services | For the Infrastructure Facility, civil, electrical, mechanical, life, fire and safety engineering for ongoing operations, facility modification, and other relevant special Project work. Services include master facility maintenance and repair planning/scheduling, as well as capital improvement project development and management. |

BAS = Building Automation System

CATV = Community Access Television

FCI = Facility Condition Index

LEED = Leadership in Energy and Environmental Design

MEP = mechanical, electrical, and plumbing

4.4 Preventive Maintenance Requirements

The PPC will execute the preventive maintenance program as scheduled, with documentation maintained accurately and up to date at all times. The PPC will update the preventive maintenance program as necessary to reflect any changes in equipment inventory. Specifically, for all aspects of the Infrastructure Facility, the PPC will do the following:

1. Utilize the Infrastructure Facility CAFM to schedule and maintain the equipment history on all real properties installed equipment and systems.
2. Provide effective contingency and disaster response for major accidents and natural disasters. An emergency response manager must be available 24/7/365.
3. Continue to provide essential IFM, repair, and customer service during a crisis or emergency. Provide service 24 hours a day until the crisis is over, as directed.
4. Contract for and provide utility services. The PPC will provide detailed data on energy consumption and will develop and submit a whole building energy model for the elements of the Facility served by the building systems that are part of the Infrastructure Facility.

5. Submit a monthly utility analysis report that reviews water, gas, electric, and sewer bills, and provide usage data, trend analysis, and benchmark reports.
6. Obtain LEED EBOM certification, commensurate with the LEED New Construction (LEED NC) certification obtained after the construction period, within five years of Substantial Completion of the Infrastructure Facility and maintain the certification throughout the Infrastructure Facility Term.
7. Be able to provide physical inventories and asset management of real property and real properties installed equipment. An annual audit will be conducted on all assets due no later than the anniversary date of occupancy.
8. Submit a monthly maintenance status report, which will include corrective maintenance performed, response time metrics, completion metrics, completed preventive maintenance, deferred maintenance with associated justification, and preventive maintenance plans and schedules for the next 30-day period.
9. Submit a monthly quality inspection report, which will detail the facilities O&M by the PPC, positive and negative findings, quality improvement activities, including details and explanations for service interruptions, emergency services, and other nonstandard service issues.
10. Manage refrigerants to reduce use and emissions of chlorofluorocarbons as required by law. The PPC will maintain a refrigerant management plan and submit an annual refrigerant management report.
11. Maintain electrical systems at levels recommended by manufacturers, but not less than those recommended by National Fire Protection Agency guidelines.
12. Maintain fire suppression, protection, and detection systems to comply with parameters defined in the original design and through commissioning. Inspection, testing, certification, and maintenance of installed fire suppression and detection systems will be conducted by personnel trained/qualified in the maintenance and repair of the fire protection system or subsystem.
13. Have fire suppression, protection, detection, and safety systems tested and certified in accordance to local jurisdictions requirements and the National Fire Protection Agency.
14. Develop a cladding, roof management, and solar power plan, including the types of wall cladding, solar power panels and systems, roof materials. Outline short- and long-term maintenance and replacement needs.
15. Work with the SFMTA's security personnel to ensure that security systems and supporting security requirements are properly maintained.

16. Maintain door hardware and locksmith services to maintain key card access, locks, keys, panic hardware, mechanical ciphers, and installed vaults.
17. Ensure that keys/key cards issued to the PPC by the SFMTA are not lost or misplaced and are not used by unauthorized persons.
18. Perform services to ensure support for community and/or special/media events as requested by the City.

A summary of the required plans and reports for preventive maintenance activities are shown in **Table 8** and **Table 9**, respectively.

Table 8 Summary of Required Plans for Preventive Maintenance of the Infrastructure Facility

| Doc # | Document | Requirements | Schedule | Update |
|--------|--|---|----------|----------|
| IFM-12 | Preventive Maintenance Procedures Plan | Plan that is in compliance with City requirements. | | Annually |
| IFM-13 | Whole Building Energy Model | Model will show projected utility usage individually for each Project component served by building systems of the Infrastructure Facility, for the duration of the term of the Project Agreement. | | Annually |
| IFM-14 | Refrigerant Management Plan | Plan to include on-site refrigerant inventories, usage locations, proposed plans for replacement of non-conforming equipment; also includes record keeping and copies of regulatory reports. | | Annually |
| IFM-15 | Cladding and Roofing Management Plan | Plan to manage the wall cladding, solar power and roofing systems throughout their life-cycles. | | Annually |

Table 9 Summary of Required Reports for Preventive Maintenance of the Infrastructure Facility

| Doc # | Document | Requirements | Schedule | Update |
|--------|--|--|----------|-----------|
| IFM-16 | System Availability Report | Report showing all system outages, approved outages, system failures, unapproved outages, and overall system availability metrics. | | Quarterly |
| IFM-17 | Vertical Transportation Performance Report | Detailing the performance and reliability of all vertical transportation systems of the Infrastructure Facility. Report will detail the individual unit performance relative of design and commissioning standards for the following metrics: system availability, wait time, and feet-per-minute rates. | | Quarterly |
| IFM-18 | Emergency Action Report | Report generated with 24 hours of an emergency response. Report will include description of emergency, name of responding technician, date and time of emergency, impact to City, remediation activities, current status, plan for final resolution, and future activities to mitigate future recurrences. | | As Needed |
| IFM-19 | Utility Analysis Report | Utility usage trend analysis and benchmark report. | | Monthly |
| IFM-20 | Annual Audit | Audit of all building real property and real properties installed equipment. | | Annual |
| IFM-21 | Corrective Maintenance Status Report | The report will address corrective maintenance performed, response time metrics, completion metrics, completed preventive maintenance, deferred maintenance with associated justification, and preventive maintenance plans for the next 30-day period. | | Monthly |
| IFM-22 | Quality Inspection Report | Report detailing the facilities maintenance and operations inspection by the PPC, positive and negative findings, quality improvement activities, including details and explanations for service | | Annually |

| Doc # | Document | Requirements | Schedule | Update |
|--------|-------------------------------|--|----------|----------|
| | | interruptions, emergency services, and other nonstandard service issues. | | |
| IFM-23 | Refrigerant Management Report | Report showing all refrigerated equipment, annual maintenance history per piece of equipment, usage of refrigerant products per piece of equipment, and copies of reports submitted to agencies governing refrigerant emissions. | | Annually |

PPC = Principal Project Company

4.5 Infrastructure Management

The PPC will provide the IFM services in a state and condition to provide continuous service and support Infrastructure Facility during the defined hours of operation consistent with Applicable Law and regulations.

The PPC will do the following:

1. Maintain utility and IT systems to maximize their availability. Utility systems will be available 24/7/365.
2. Provide a quarterly space temperature trending report. This report will show space temperatures for the spaces served by building systems that are part of the Infrastructure Facility during the quarterly time frame.
3. Develop and maintain a cross-connection control and backflow prevention program.
4. Maintain a master maintenance plan. The objective of the master maintenance plan is to ensure that maintenance, operations, and capital improvement planning are practiced to reduce the life-cycle costs of Infrastructure Facility ownership while maintaining standards.
5. Provide a master maintenance plan annual report to show, at a minimum, the following data: maintenance activities performed last fiscal year, planned maintenance activities for the following fiscal year, capital renewals performed last fiscal year, planned capital renewals for the following fiscal year, a five-year capital renewal Project schedule with justifications for projects listed, the current building Facility Condition Index (FCI), and the current System Condition Index (SCI). FCI will be maintained no greater than 0.15 during the Infrastructure Facility Term and at handback it shall be no greater than 0.10 as defined in Section 4.10 (Handback Requirements).
6. The annual report will also include an updated life-cycle major equipment repair and replacement schedule for the remainder of the Infrastructure Facility Term. This schedule will address all major infrastructure systems,

their current status, and their replacement schedule based on current SCI and life expectancy factors.

4.5.1 Required Documentation

A summary of the required plans and reports for Infrastructure Facility Management are shown in **Table 10** and **Table 11**, respectively.

Table 10 Summary of Required Plans for Infrastructure Facility Management

| Number | Document | Requirements | Schedule | Update |
|--------|--|--|----------|----------|
| IFM-24 | Master Maintenance Plan | Program designed to manage demand, planned, and life-cycle maintenance factors. An initial master maintenance plan will be a program for planned and life-cycle maintenance. | | Annually |
| IFM-25 | Life-Cycle – Major Equipment Repair and Replacement Schedule | This is a standalone plan designed to address major systems and their current replacement schedule based on SCI and life expectancy factors as per building design parameters. | | Annually |

SCI = System Condition Index

Table 11 Summary of Required Reports for Infrastructure Facility Management

| Number | Document | Requirements | Schedule | Update |
|--------|--|---|----------|-----------|
| IFM-26 | Utility Availability Report | Report showing overall system availability metrics, including all utility outages, approved outages, utility failures, and unapproved outages. | | Quarterly |
| IFM-27 | Space Temperature Trending Report | Report will show space temperature trend and temperature data for all dates during the quarter. | | Quarterly |
| IFM-28 | Annual Operations and Maintenance Report | Report will include planned maintenance versus actual maintenance costs; planned capital projects versus actual capital projects; explanation for variance between planned versus actuals; next 12-month planned maintenance activities; 5-year projected capital renewal projects and associated justifications; FCI and SCI | | Annually |

| Number | Document | Requirements | Schedule | Update |
|--------|----------|--|----------|--------|
| | | performance updates; and life-cycle repair and replacement schedule for major equipment. | | |

FCI = Facility Condition Index

SCI = System Condition Index

4.6 Grounds Maintenance Services

The purpose of grounds maintenance services is to ensure that exterior and interior areas within the Infrastructure Facility are clean, neat, and healthy, with a professional appearance every day.

The PPC will do the following:

1. Propose grounds service schedules
2. Provide “green” grounds maintenance service whenever possible
3. Propose grounds maintenance service schedules
4. Submit a monthly quality inspection report

4.6.1 Required Documentation

A summary of the required reports for grounds maintenance services are shown in **Table 12**.

Table 12 Summary of Required Reports for Grounds Maintenance Services of the Infrastructure Facility

| Number | Document | Requirements | Schedule | Update |
|--------|---------------------------------------|---|----------|--------------------------------------|
| IFM-29 | Grounds Maintenance Service Schedules | Report detailing the grounds maintenance service schedules to show cleaning of exterior and common use areas, including interior and exterior windows. | | Annually and per schedule change |
| IFM-30 | Safety Data Sheet Report | Report detailing all proposed chemicals for use within the Grounds Maintenance function. Chemicals must be approved by the City prior to use. | | Annually and per change in chemicals |
| FM-31 | Quality Inspection Report | Report detailing the Grounds Maintenance service inspection by the PPC, positive and negative findings, quality improvement activities, including details and explanations for service interruptions, emergency | | Annually |

| Number | Document | Requirements | Schedule | Update |
|--------|----------|---|----------|--------|
| | | services, and other nonstandard service issues. | | |

PPC = Principal Project Company

4.7 Bird and Pest Control Services

The objective of pest management is to protect public and SFMTA staff health and the Infrastructure Facility's spaces and operations by controlling birds, insects, rodents, and other pests or organisms while minimizing the use of pesticides. The PPC will use integrated pest management techniques for the Infrastructure Facility to achieve these objectives in compliance with the requirements of Applicable Law, including but not limited to San Francisco Environment Code Chapter 3.

Special attention is drawn to the aggressive application of best practices for humane and effective abatement and deterrence measures for pigeons and other birds. This has been an ongoing challenge for SFMTA at the Potrero Yard and other facilities.

The PPC will do the following:

1. Provide a quarterly bird and pest control report detailing bird and pest abatement and deterrence measures and the ongoing maintenance of the relevant measures installed in the Infrastructure Facility
2. Provide a Safety Data Sheet report detailing all proposed chemicals and devices for use within the bird and pest control function
3. Provide a quarterly chemical usage report detailing actual chemicals, volumes, and/or equipment containing chemicals and devices used
4. Submit a monthly quality inspection report

4.7.1 Required Documentation

A summary of the required reports for bird and pest control services are shown in **Table 13**.

Table 13 Summary of Required Reports for Bird and Pest Control Services of the Infrastructure Facility

| Number | Document | Requirements | Schedule | Update |
|--------|------------------------------|---|----------|-----------|
| IFM-32 | Bird and Pest Control Report | Report detailing the bird and pest abatement and deterrence measures and the ongoing maintenance of the relevant measures installed in the BYC and the Infrastructure Facility. | | Quarterly |

| Number | Document | Requirements | Schedule | Update |
|--------|-----------------------------------|---|----------|--------------------------------------|
| IFM-33 | Safety Data Sheet Report | Report detailing all proposed chemicals and devices for use within the bird and pest control function. Chemicals and devices must be approved prior to use. | | Annually and per change in chemicals |
| IFM-34 | Chemical and Devices Usage Report | Report detailing actual chemicals and/or equipment containing chemicals and devices used. | | Annually |
| IFM-35 | Quality Inspection Report | Report detailing the pest and bird service inspections by the PPC, positive and negative findings, quality improvement activities, including details and explanations for service interruptions, emergency services and other nonstandard service issues. | | Annually |

PPC = Principal Project Company

4.8 Solid Waste Collection, Recycling, and Removal

Recycling and trash removal and disposal will be the PPC's responsibility. The PPC will provide the following:

1. Waste diversion report, which will include recycling, compost, solid waste removed, volumes per type, trending data showing each activity, volumes, and trends
2. Legislated waste/recycling report

4.8.1 Required Documentation

A summary of the required reports for solid waste collection, recycling, composting, and removal are shown in **Table 14**.

Table 14 Summary of Required Reports for Solid Waste Services of the Infrastructure Facility

| Number | Document | Requirements | Schedule | Update |
|--------|------------------------|--|----------|-----------|
| IFM-36 | Waste Diversion Report | Report detailing solid waste removed, recycle and composting volumes per type, trending data showing each activity, volumes, and trends. | | Quarterly |

| Number | Document | Requirements | Schedule | Update |
|--------|-----------------------------------|--|----------|-----------|
| IFM-37 | Legislated Waste/Recycling Report | Report detailing activities for waste that is governed by legislated requirements, including composting and recycling, fluorescent lamps, batteries, kitchen grease, etc. Record to show volumes, dates, and companies used for recycling activities. Company information will include permits or licenses related to services rendered. | | Quarterly |

4.9 Continuous Quality Assurance

4.9.1 Continuous Quality Assurance Plan

The PPC will propose a continuous quality assurance plan that, at a minimum, includes the following:

1. Inspection system covering the services stated in this section, specifying areas to be inspected on a scheduled basis and an unscheduled basis
2. Method for identifying deficiencies in the quality of services performed before the level of performance becomes unacceptable
3. Key performance indicators to be used by the PPC's personnel to ensure that potential problems or deficiencies are identified before they result in unsatisfactory contract performance
4. Data that allows the City to easily verify PPC performance
5. Description of how PPC processes will be changed to continually improve performance
6. Management level metrics that verify compliance with the facilities management scope contained in this Section 4 (*Technical Requirements for the Infrastructure Facility Maintenance*) and gives trend data needed for the City measure the effectiveness of the Project management program
7. System for recording, addressing, and correcting unplanned system failures, and poor quality work with respect to the PPC's services
8. System for recording and acting on City and building occupant feedback and satisfaction with respect to the PPC's services
9. System to identify and prevent technology obsolescence
10. Methods for escalation procedures as well as publishing results of its own continuous quality assurance plan

4.9.2 Quality Surveillance

The PPC will correlate satisfaction data metrics and report to the City on a quarterly basis in a customer satisfaction report.

The City will independently solicit customer satisfaction feedback. Results of these surveys will be shared with the PPC. Where appropriate, the PPC will address any negative feedback or advise the City of building occupant complaints. The PPC will summarize the customer survey results and corresponding corrective actions taken in the customer satisfaction report.

4.9.3 Required Documentation

A summary of the required plans and reports for continuous quality assurance are shown in **Table 15** and **Table 16**, respectively.

Table 15 Summary of Required Plans for Continuous Quality Assurance of Infrastructure Facility Maintenance

| Number | Document | Requirements | Schedule | Update |
|--------|-----------------------------------|---|----------|----------|
| IFM-38 | Continuous Quality Assurance Plan | Plan addressing the requirements in this section. | | Annually |

Table 16 Summary of Required Reports for Continuous Quality Assurance of Infrastructure Facility Maintenance

| Number | Document | Requirements | Schedule | Update |
|--------|------------------------------|--|----------|-----------|
| IFM-39 | Customer Satisfaction Report | Report showing customer satisfaction combining surveys initiated by both the PPC and the City. | | Quarterly |

PPC = Principal Project Company

4.10 Handback Requirements

4.10.1 Facility Condition

At the end of the Infrastructure Facility Term, which will be specified in the Project Agreement, the PPC will, at no cost to the City, surrender the Infrastructure Facility to the City in a condition that is as follows:

1. Designed and constructed in accordance with the applicable requirements set forth in the Project's Technical Requirements
2. Managed and maintained in accordance with the applicable requirements set forth in this Section 4.10

3. Required to achieve an FCI score of 0.10 or less at the end of the Infrastructure Facility Term and as determined by the Handback Requirements defined in this Section 4.10

4.10.2 Handback Survey

In addition to the annual maintenance and service plan, beginning two years prior to the end of Infrastructure Facility Term, the PPC and City will conduct a joint inspection and survey of the Infrastructure Facility (the Handback Survey).

If either the PPC or the City determines from the Handback Survey that any element of the Infrastructure Facility will not meet the Handback Requirements through the PPC implementing the established annual maintenance and service plan over the remainder of the Infrastructure Facility Term, within 60 days of completion of the Handback Survey the PPC will submit to the City the PPC's plan (i.e., a "Handback Requirements Recovery Plan") to perform additional work needed to meet the Handback Requirements at the end of the Infrastructure Facility Term (the "Handback Requirement Recovery Work"). Such a plan will include a schedule and cost estimates for the Handback Requirements Recovery Work, which will be the sole responsibility of the PPC under the terms of the Project Agreement.

The City may review and comment on the Handback Requirements Recovery Plan. Such review includes the adequacy of the Handback Requirements Recovery Work and reasonableness of the PPC's schedule and cost for the proposed Handback Requirements Recovery Plan implementation.

4.10.3 Handback Retainage

Upon the review of the Handback Requirements Recovery Plan described above, the City may determine in good faith the amount (the "Handback Retainage") it reasonably considers necessary to execute the Handback Requirements Recovery Work.

The City may, at its sole discretion, withhold remaining payments otherwise owed to the PPC in an amount equivalent to the Handback Retainage. The PPC has the right to receive reimbursements from the withheld payments for the actual amount spent on the performance of the work necessary to meet the Handback Requirements, subject to submittal of certified requisitions to the City with all associated receipts or other proof of payments.

4.10.4 Performance of Handback Work

All Handback Requirements Recovery Work costs that exceed the Handback Retainage will be the responsibility of the PPC. At least 180 days prior to the end of the Infrastructure Facility Term, the PPC and the City will conduct a joint

inspection and survey of the Infrastructure Facility and assess the progress of the Handback Requirements Recovery Work.

4.10.5 Final Handback Assessment

On or within twenty business days of the end of the Infrastructure Facility Term, the City will do one of the following:

1. Deliver written notice to the PPC to confirm that the Handback Requirements have been met and return any remaining balance of the Handback Retainage to the PPC.
2. Deliver written notice to the PPC describing why the City believes the Handback Requirements have not been met. The City will list elements of the Infrastructure Facility that fail to meet the Handback Requirements and the City's estimate of the cost to complete the work needed to meet the Handback Requirements.

If the PPC disagrees with the City's decision, the PPC will have 30 days to object to the City's assessment in writing, supported with evidence and including the PPC's proposal to rectify the items.

4.10.6 Final Compliance

If the Infrastructure Facility does not satisfy all Handback Requirements before the Infrastructure Facility Term expires, the PPC will implement all measures necessary to cause compliance within 60 days of the Infrastructure Facility Term expiration, or will pay the City (no later than 60 days after the Infrastructure Facility Term expires) an amount equal to the cost of completing all outstanding work needed to satisfy the Handback Requirements. Such amount will be based on the City's estimate described in this section and deductions toward completed handback work activities.

Division 8: Public Benefit Principles

1 Introduction

This document is intended to clearly describe the essential principles that the Project should incorporate, to depict these principles through examples, and to allow flexibility and interpretation by developer teams to present a narrative of how these principles are achieved in their Proposals. This document provides principles that are in addition to the requirements as stated in Division 3 (*Design Criteria Document*) of the Technical Requirements.

2 Background

These public benefit principles were drafted jointly by the Potrero Yard Neighborhood Working Group (Neighborhood Working Group) and SFMTA staff to include in the Technical Requirements to guide the Development Team toward a Project that meets stakeholders' transportation, housing, placemaking, neighborhood amenities, and sustainability vision for the Project. The Neighborhood Working Group is a diverse, ad-hoc group of stakeholders engaged with the SFMTA on project considerations and broad stakeholder engagement opportunities for the Potrero Yard Modernization Project (Project). The Neighborhood Working Group was formed in October 2018, and meets approximately monthly to influence the project principles, goals, and design.

3 Public Benefit Principles

The principles are listed below in categories, and each principle includes specific examples or benchmarks that demonstrate or characterize the corresponding principle. Benchmarks are items that are otherwise included or referenced elsewhere in the Agreement or listed as requirements in Division 3 (*Design Criteria Document*) of the Technical Requirements. The proposers during the RFP phase, the Lead Developer (LD) during the PDA Term, and the PPC during the term of the Project Agreement shall incorporate each principle and consider inclusion of specific examples or include benefits of their own innovation.

3.1.1 Transportation Objectives and Examples of Potential Opportunities

1. Meet SFMTA program needs, including transit fleet plan and maintenance requirements. This is a program requirement in addition to a public benefit.

Benchmarks²² are as follows:

²² More detail is available in the Division 3 (*Design Criteria Document*) of the Technical Requirements.

- a. Build the SFMTA’s first battery-electric bus (BEB) facility and add capacity for more buses
 - b. Modernize Muni operator classroom training to create a City jobs pipeline in the Mission
 - c. Consolidate transit service operations and Muni’s “first responders”
2. Support and enhance bicycle and alternative modes for Project Site occupants. Some of these items may be required by the Project as typical right-of-way improvements, per the San Francisco Better Streets Plan.

Examples are as follows:

- a. Create a welcoming pedestrian realm that invites walking for transportation and leisure
 - b. Increase comfort and safety for cyclists through innovative street treatments, markings, and pavement
 - c. Add protected bike lanes in both directions on 17th Street
 - d. Enhance bike comfort on Hampshire Street
 - e. Provide bike supportive uses on 17th Street bike path, e.g., “bike kitchen” repair shop
 - f. Provide car-share spaces
3. Improve public access to transit customer service convenience. Some of these may be a collaborative effort between the SFMTA and the LD during the PDA Term. Lead Developer may wish to identify locations where these or similar uses could be integrated.

Examples are as follows:

- a. Include a SFMTA/Muni satellite customer service center
- b. Allow satellite payment of fees and permits, e.g., parking
- c. Integrate City jobs boards into an on-site customer service center and help residents apply for City jobs

3.1.2 Housing

Also refer to Division 6 (*Program for the Housing and Commercial Component*) of the Technical Requirements.

1. Pursue dual goals: maximize housing units and maximize affordable housing²³.

Benchmarks are as follows:

²³ Housing that is affordable to low or moderate income households

- a. Attract private and public sources of funding to increase the percentage of affordable units
- b. Directly seek funds from corporations or organizations that have contributed to gentrification impacts in the Mission (i.e., large tech corporations whose employees were attracted to the Mission's vibrant culture)

Examples are as follows:

- c. Prioritize housing affordability over other benefits when there are financial limits or tradeoffs
 - d. Collaborate with and speak directly to established Mission and Potrero neighborhood organizations to achieve this principle
2. Prioritize greatest demonstrated housing needs, including those displaced by gentrification.

Examples are as follows:

- a. Maximize the number of family housing units (maximize two- and three-bedroom as feasible)
 - b. In conformance with established MOHCD tenant preference policies as described in Chapter 47 of the San Francisco Administrative Code, strive to lease units to Mission families, recent Mission residents who were forced out by gentrification, local residents within a 1-mile radius or in Supervisor Districts 9 or 10, or homeless families
 - c. Strive to include very low income²⁴ and extremely low income²⁵ units
3. Include moderate income²⁶ housing to further increase affordable units, once the 50% affordable target is achieved.

Benchmarks are as follows:

- a. Attract innovative private funding sources for moderate income housing
- b. Work with the City to determine the feasibility of including a tenant preference for SFMTA employees in conformance with local, state, and federal law. If determined to be feasible and legally permissible, work

²⁴ Households earning 50% of AMI and below. "very low income housing" or "very low income units" denote housing that is affordable to very low income households. See <https://sfmohcd.org/ami-levels>

²⁵ Households earning 30% of AMI and below. "extremely low income housing" or "extremely low income units" denote housing that is affordable to extremely low income households. See <https://sfmohcd.org/ami-levels>

²⁶ Households earning between 81% and 120% of AMI. "moderate income housing" or "moderate income units" denote housing that is affordable to moderate income households. See <https://sfmohcd.org/ami-levels>

with the City to include such a preference for SFMTA employees, especially bus operators and front-line staff

4. Invest in and nurture on-site community building, including income integration within the development and in the general neighborhood.

Examples are as follows:

- a. Design spaces to bring residents together, e.g., shared entrances and common areas
- b. Include interactive, experiential, communicative design features or art installations that foster community building
- c. Program activities that encourage gathering (including the potential to share some spaces with SFMTA, such as meeting, training, and exhibit/display space)
- d. Include support services that address resident needs
- e. Create an ecosystem to make San Francisco more livable for families (childcare, on-site activities, transit mode options, school transportation support, etc.)

3.1.3 Placemaking

Refer also to the Design Guidelines in Division 2 (*Design Guidelines*) of the Technical Requirements for a more complete description. Proposals should include narrative supporting the design approach.

1. Create a more active and pedestrian-friendly streetscape and public realm to replace current surface parking and blank industrial facades.

Examples are as follows:

- a. Design for active uses that leverage the existing neighborhood feel and culture, especially along Bryant and 17th
 - b. Thoughtfully locate lobbies to create safe and weather-protected entrances that activate street facades
2. Incorporate the surrounding neighborhood character into a cohesive design aesthetic, to create a well-integrated mixed-use project that combines industrial (Bus Yard Component) with residential character (Housing and Commercial Component).

Examples are as follows:

- a. Make a statement with the building architecture
- b. Use materials consistent with the surrounding neighborhood character
- c. Coordinate with the KQED renovation across Mariposa

- d. Use transparent building materials to provide views of the bus maintenance function and sustainable building design features
3. Encourage an attractive roof (fifth façade) and usable podium-level open space.

Examples are as follows:

- a. Active uses such as employee break area, playground, sports courts, and active landscapes
- b. Passive uses such as pollinator garden, native plantings, interpretive exhibits illustrating sustainable features, e.g., stormwater/ greywater capture and reuse

3.1.4 Neighborhood Amenities and Public Art

1. Include local nonprofit activities and neighborhood-serving uses in the Project.

Examples are as follows:

- a. Social/educational and arts/cultural activities and services, especially those displaced—e.g., Project Artaud, Southern Exposure, HOMEY—in consultation with local organizations
 - b. Locate SFMTA classroom, meeting, and exhibit spaces flexibly to enable future community shared spaces
 - c. Foster local arts/cultural uses—e.g., affordable studio space, artist-in-residence program
 - d. Program direct connections between professional services provided on site to resident training, especially for residents of affordable units (i.e., building maintenance training for residents as part of an ongoing facility maintenance contract)
2. Support and enhance activities of Franklin Square (coordinate with the San Francisco Recreation and Park Department).

Examples are as follows:

- a. Consider shadow on Franklin Square from new development to maximize sun hours whenever possible
- b. Improve connectivity to Franklin Square through innovative streetscape design on 17th Street or original intersection treatment at 17th and Bryant
- c. Activate the corner of 17th and Bryant with outdoor seating looking toward the park
- d. Include public restrooms to support Franklin Square

- e. Locate podium open space, as included, to face Franklin Square
3. Integrate Public Art and arts/cultural activities; public art should relate to the context of the Northeast Mission Industrial District in a culturally relevant way without being “kitschy”.

Examples are as follows:

- a. Celebrate the neighborhood’s diversity and its natural and industrial history
- b. Incorporate local artists, including muralists
- c. Include themes related to the long and important transportation role of the Project Site
- d. Use signage and lighting to create a distinctive landmark
- e. Be authentic and culturally competent in design proposals that are informed by specific cultures—hire and include architects or design consultants of that background and be attentive to inclusion

3.1.5 Sustainability/Resiliency

Further detail is provided in the Division 3 (Design Criteria Document) and Division 4 (Supplementary Design Criteria) of the Technical Requirements.

1. Integrate comprehensive sustainability performance measures. The Project is also required to comply with the San Francisco Municipal Green Building Code (Environment Code Chapter 7), including LEED Gold certification.

Examples are as follows:

- a. Propose a sustainable project (e.g., concentrate housing at sites well served by transit; recognize public ownership of the Project Site; optimize use of publicly owned sites)
 - b. Focus on energy efficiency where possible and compatible
 - c. Include water conservation and stormwater measures
 - d. Materials and resources recycling/reuse
 - e. Design these features to be accessible to the public, residents, and/or employees on the Project Site through building design, educational displays, etc.
2. Incorporate resiliency measures and innovative collaborations supporting sustainable objectives.

Examples are as follows:

- a. Include on-site energy generation where possible and compatible

- b. Program an on-site community garden or demonstration farm (e.g., Alemany Farm, apprenticeships with San Francisco Unified School District students)
- c. Connect to nearby Homeless Prenatal and Horizons groups

4 Potrero Yard Neighborhood Working Group Members (February 2021)

- 1. Alexander Hirji (former San Francisco Youth Commission, local resident)
- 2. Alexandra Harker (landscape architect, local resident)
- 3. Benjamin Bidwell (Muni operator)
- 4. Claudia de Larios Moran (school principal, local resident)
- 5. J.R. Eppler (Potrero Boosters)
- 6. Kamilah Taylor (Muni operator)
- 7. Magda Freitas Melo (architect, local resident)
- 8. Mary Haywood Sheeter (Friends of Franklin Square)
- 9. Roberto Hernandez (Carnaval San Francisco, United to Save the Mission)
- 10. Scott Feeney (local resident, housing advocate)
- 11. Thor Kaslofsky (land use development consultant)
- 12. Peter Belden (local resident, transportation advocate)
- 13. Ryan Parker (local resident)

5 Cost Allocation

Cost allocation of scope items outlined in Section 3 (*Public Benefit Principles*) of Division 8 (*Public Benefit Principles*) is to be in accordance with **Table 1** below.

In the event of conflict, the requirements of Division 1 (*Cost and Scope Allocation Requirements*) of the Technical Requirements take precedence over those set forth in this section.

Table 1 Public Benefit Principles Cost Allocation Matrix

| Item | Bus Yard Component | Common Infrastructure | Housing and Commercial Component | Comments |
|--|---|--|----------------------------------|--|
| Transportation Objectives | | | | |
| 1. Meet SFMTA program needs | X | | | |
| 2. Support and enhance bicycle and alternative modes | | | X | See Division 3 (Design Criteria Document) of the Technical Requirements for program requirements |
| 3. Improve customer service convenience | | X | | As part of the proposed Transportation Demand Management program |
| Housing | | | | |
| 1. Maximize housing units and affordable housing | | | X | See Division 6 (Program for the Housing and Commercial Component) of the Technical Requirements for program requirements |
| 2. Prioritize greatest demonstrated housing needs | | | X | |
| 3. Include moderate income housing | | | X | |
| 4. Invest in and nurture on-site community-building | | | X | |
| Placemaking | | | | |
| 1. Active and pedestrian-friendly streetscape and public realm | | | X | See Division 2 (Design Guidelines) of the Technical Requirements |
| 2. Incorporate the surrounding neighborhood character | Allocate the cost to deliver this Public Benefit Principle according to (a) the Project's design and (b) to each Project component as applicable. | | | |
| 3. Encourage an attractive roof and usable podium-level open space | Open space for exclusive SFMTA use | Open Space considered as: (a) common-use space and/or (b) for | Open space for exclusive HCC use | |

| | | | | |
|---|--|----------------------------------|-----------------|--|
| | | general public use ²⁷ | | |
| Neighborhood Amenities and Public Art | | | | |
| 1. Include local nonprofit activities and neighborhood-serving uses | | | X | |
| 2. Support and enhance activities of Franklin Square | | X | | |
| 3. Integrate Public Art and arts/cultural activities | X ²⁸ | X ²⁹ | X ³⁰ | See footnotes. |
| Sustainability/Resiliency | | | | |
| 1. Integrate comprehensive sustainability performance measures | Allocate the cost to deliver this Public Benefit Principle according to (a) the Project’s design and (b) to each Project component as applicable. The cost of Sustainability/Resiliency improvements located within the public right-of-way shall be allocated to the Common Infrastructure. | | | See <u>Division 3 (Design Criteria Document)</u> and <u>Division 4 (Supplemental Design Criteria)</u> of the Technical Requirements for sustainability requirements. |
| 2. Incorporate resiliency measures and innovative collaborations | | | | |

SFMTA = San Francisco Municipal Transportation Agency

²⁷ If required as part of the Special Use District.

²⁸ Section 3.19 of the SF Administrative Code mandates that 2% of total gross estimated construction cost of civic projects be allocated for public art, subject to any adjustment through the regulatory process described in Section 3.19.

²⁹ The public art requirements for the Common Infrastructure set forth for the BYC shall apply to the PCIC portion of the Common Infrastructure’s gross construction cost and the requirements set forth for the HCC shall apply to the PCIH portion of the Common Infrastructure’s gross construction cost.

³⁰ The public art requirements set forth for the BYC apply to the HCC, unless otherwise determined during the PDA Term by the applicable regulatory entities in their sole discretion.

Division 9: SFMTA's
Communications Division's Public
Outreach and Engagement
Requirements (POER) v.1.0

Public Outreach and Engagement Requirements

v.1.0

POETS

Public Outreach
& Engagement
Team Strategy



SFMTA

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Introduction

The San Francisco Municipal Transportation Agency (SFMTA) is committed to involving the people of San Francisco in the decisions that shape the city’s transportation system. This commitment is expressed in the agency’s [Strategic Plan](#) and through our ongoing investment in the Public Outreach Engagement Team Strategy (POETS). It is based on an understanding that:

- Those who are affected by government decisions should be informed and have an opportunity to participate in the decision-making process;
- The community’s trust in the public process directly affects our ability to deliver projects; and
- Most projects must meet legal requirements related to public notification and participation.

The agency’s approach to working with the communities we serve is reflected in our core values:

RESPECT

We are courteous and constructive in our treatment of others. We recognize that our colleagues and their contributions are vital to the agency. We listen and directly engage our colleagues and the public to understand their needs and deliver effective services.

INCLUSIVITY

We seek a variety of identities, abilities, and interaction styles to promote a diverse and fair workplace. We operate from the context of teamwork and positive intent. We serve the public and address historic inequities in transportation by including all communities in the agency’s decision-making processes.

INTEGRITY

We are accountable for and take ownership of our actions. We are responsive and honor our commitments to our colleagues and stakeholders. We are transparent and honest in everything we do, from internal operations to external delivery.

To ensure consistent public communications and outreach across projects, the SFMTA established our Public Outreach and Engagement Team Strategy (POETS). The main components of POETS are:

Requirements for every project, **Resources** to support staff, **Relationships** with the community, and **Recognition** of outstanding work.

This document presents the requirements for public outreach and engagement that every SFMTA project is expected to meet. More information about the other components of the Public Outreach and Engagement Team Strategy, including supportive resources and recognition opportunities for staff, can be found on the POETS page located on the SFMTA intranet. The process of developing the SFMTA’s requirements and guidance involved extensive feedback from the community. It is strongly recommended that you review the summary of this valuable input in the [Appendix](#).

Public Outreach and Engagement Requirements

To ensure a consistent approach throughout the agency, all managers and leads responsible for SFMTA projects that impact the public must ensure that their project teams do the following:

- **PLAN** for public outreach and engagement for the project
- **IMPLEMENT** the public outreach and engagement plan
- **DOCUMENT** the implementation of the plan and the feedback received

Develop the Plan

Every SFMTA project must develop a Public Outreach and Engagement Plan at the outset of the project, and the project team must evaluate and revise the plan at each subsequent project phase. The plan should be reviewed within the division by the direct report manager and/or the POETS Division Lead. Each division is responsible for establishing a process to determine when a Public Outreach and Engagement Plan is considered complete and ready for submission to the POETS webpage. Whatever the protocol for deciding who submits the plan, the project manager/lead is ultimately accountable for ensuring that it occurs. **When the Public Outreach and Engagement Plan is considered complete according to the division's process, it must be uploaded to the POETS page on the SFMTA [intranet](#), where all Public Outreach and Engagement Plans are tracked. Keep in mind that every plan is a public document and may be reviewed at any time by SFMTA leadership and staff, city partners and members of the public.**

To help empower staff to meet these requirements, the agency provides a [Guide](#) and [Template](#) for creating a Public Outreach and Engagement Plan. These companion documents include guidance on doing a project needs assessment to identify stakeholders and impacts, writing a project brief, crafting key messages for target audiences, identifying the opportunities for public participation, selecting outreach and engagement techniques, establishing goals and measurable objectives, scheduling activities and tasks, evaluating the plan, and reporting back to the public.

At a minimum, every Public Outreach and Engagement Plan MUST include:

- Identification of who should be involved in developing the plan (staff, consultants, partners)
- Identification of project stakeholders, impacts, and decision space
- Early engagement of key stakeholders
- Use of multiple communication channels to reach audiences
- Compliance with language & accessibility requirements
- Consideration of the Racial Equity Action Plan and Toolkit
- Goals and measurable objectives for each phase of the project
- A method to document plan implementation and to collect data related to goals and objectives
- A strategy for outreach during all project phases, including detailed design and construction
- Sufficient budget to carry out the activities specified in the plan
- Coordination with other SFMTA projects that affect the project
- Coordination with other city partners who will be involved with the project

- A report submitted to the POETS webpage after each project phase

It is important to emphasize that the development of the Public Outreach and Engagement Plan should be a team effort. Those staff members who will be directly involved in the implementation of the plan should have input in the creation of the plan. Several aspects of the plan require careful consideration and judgement without hard and fast rules (e.g., stakeholder identification, impact analysis, budget). Involvement of key team members (including any consultants and partners) allows for a thoughtful and collaborative process and lays the groundwork for better understanding and successful implementation of the plan. In the case of projects with significant impacts on the community, it is also advisable to consult key stakeholders for their input as the plan is being developed (e.g., for advice on the most effective ways to keep particular communities informed).

Note that it is not mandatory to use the specific planning [Template](#) offered by POETS, but any Public Outreach and Engagement Plan must include comparable content regardless of the format, and any document used to satisfy these requirements must be uploaded to the POETS page on the SFMTA [intranet](#). The [Guide](#) and [Template](#) provide detailed instructions for the content of any Public Outreach and Engagement Plan.

Programmatic Public Outreach and Engagement Plans

Every SFMTA project that impacts the public must implement its Public Outreach and Engagement Plan. Larger, more complex projects require their own detailed plans. In addition to large projects, the SFMTA routinely implements many smaller, similar projects (e.g., stop signs, signal changes) that can rely on a single, programmatic Public Outreach and Engagement Plan. Divisions that deliver such projects should develop programmatic outreach and engagement strategies that apply to typical projects in each category. Every small project must still consider community impacts, but the programmatic plan can be used as a template by each project. Only the programmatic plan that will serve as the template for projects in a given category must be uploaded to the POETS page on the SFMTA [intranet](#), not the plans for each project. However, every project that falls within a program category must have a plan based on the programmatic template. While project teams are not required to upload each plan to the POETS webpage, they are responsible for implementing the plan and can be held accountable. Project teams should also report to POETS Division Leads any lessons learned from individual projects that suggest changes needed to the programmatic plan template going forward.

What is a “Project”?

For the purpose of these requirements, the SFMTA defines a project as, “A one-time effort to construct, acquire, replace, improve, expand, or rehabilitate the transportation system in the City and County of San Francisco.” The Public Outreach and Engagement Requirements apply to all capital projects, as well as one-time policy initiatives that are not capital in nature (including those that occur in multiple phases). Smaller, routine “projects” are sometimes classified as “operations.” Regardless of terminology, any action that impacts the public is subject to compliance with the Public Outreach and Engagement Requirements. As discussed below, there are specific guidelines for smaller, routine projects.

Review the Public Outreach and Engagement Plan between Phases

The initial Public Outreach and Engagement Plan should describe the plan for public outreach and engagement for each phase of the project, with the assumption that the strategy for later phases will be adapted based on what is learned during implementation of earlier phases. The Public Outreach and Engagement Plan should be reviewed and updated at the end of each phase of the project. In cases where projects transition from SFMTA to another agency between phases, it is essential to coordinate with those city partners to maintain a consistent standard of outreach and engagement, even if the SFMTA is not the lead agency during a particular phase of the project. In order to achieve a successful transition for larger projects, POETS recommends funding for a Public Information Officer to work with the city partner(s) throughout the transition and until project completion.

There are good reasons to review the Public Outreach and Engagement Plan between phases. First, it gives the project team an opportunity to think about lessons learned at the completion of each phase and to incorporate those lessons into the next phase. Second, there is understandable uncertainty at the beginning of a project about the kind of public outreach and engagement that will be necessary during later phases (especially if the project will take years to complete).

Internal Coordination

In planning for public outreach and engagement for a single project, it is important to know which other teams and projects within the SFMTA (including those in different divisions) might connect with, intersect or impact your project. Brief related staff and teams on your Public Outreach and Engagement Plan as early in the process as possible.

Challenging Phases: Detailed Design and Construction

For projects that take years to complete, it is impossible to anticipate all aspects of outreach and engagement that will be needed to complete the project. The most challenging phases to include in the initial plan are detailed design and construction. While decision space is typically less during these phases (plans have been made, the project is legislated), it is essential to keep stakeholders informed and to continue to engage the community beyond the planning phase.

During the detailed design phase, it can feel to the community like the project is inactive. It is not uncommon for this phase to continue for several years, during which the community itself changes (there are new residents and merchants who never heard of the project and were not part of the planning phase). During the construction phase, project impacts are felt most acutely by the community and there may be new stakeholders affected who were not involved during project planning. Because these phases present unique challenges, the project team should closely review the original Public Outreach and Engagement Plan before detailed design and construction to create a more detailed and updated strategy. The [Appendix](#) provides examples of plans for the detailed design phase.

The City and County of San Francisco Construction Mitigation Program defines the measures that are required for construction mitigation for various kinds of projects (low, moderate and major impact). Construction Mitigation Plans should be created in advance of construction, developed in collaboration

with merchants and residents, and budgeted separately from the initial Public Outreach and Engagement Plan. The [Appendix](#) includes a summary of the program, along with a presentation and example plans.

Submit the Plan

Every Plan must be uploaded to the POETS webpage upon completion and prior to implementation. The process of approving and submitting the plan is left to the discretion of each Division. Each division must determine its own protocol for deciding when a Plan is complete and ready to be submitted. Regardless of the division's process, project managers/leads are accountable for compliance at the project level.

Implement the Plan

Once your Public Outreach and Engagement Plan is submitted to the POETS webpage, the project team is responsible for carrying it out. As noted above, the project manager/lead is ultimately accountable for implementation of the plan. The Public Outreach and Engagement [Guide](#) and [Template](#) provide advice and tools designed to help schedule and track activities. In addition, the SFMTA Public Outreach and Engagement Manager, the [POETS web page](#), Division Leads and [District Liaisons](#) can offer information and contacts to project teams as they implement their plans. The role of the POETS Division Leads is to ensure compliance with these requirements within each division and to provide support to project managers/leads and their teams, including referrals to appropriate resources. District Liaisons are designated staff members within the SFMTA who can provide geographically specific information and contacts to project teams.

Compliance with Language Assistance Requirements

As a city department that receives federal funding, the SFMTA must follow both local rules (San Francisco's Language Access Ordinance) and federal rules (Title VI of the Civil Rights Act of 1964 and supporting guidance) regarding accessibility to our programs and services to ensure that all customers, regardless of their ability to read, speak, write and understand English ("limited-English proficient" or "LEP"), are informed and able to participate in our agency's decision-making processes. The SFMTA's 2016 Language Assistance Plan (LAP) details the agency's policies about providing both written (translations) and verbal (via interpreters or bilingual employees) language assistance for our limited-English proficient customers and other stakeholders.

The Language Assistance Plan includes maps detailing concentrations of limited-English proficient communities by language, which can be used as a resource when determining the language needs of those who are affected by the project. In general, and at a minimum, most public information pieces should be translated into Chinese, Spanish and Filipino (Tagalog), and all public communications and meeting notices must include the 311 "Free Language Assistance" tagline (included in the Public Outreach and Engagement Plan Guide). Public meeting and hearing notices and agendas, including those posted at SFMTA.com, must include the four-language 48 hours' notice and a staff person's phone number for requesting language assistance; LanguageLine telephonic interpretation services can be used to process requests from limited-English proficient customers via phone. The [Appendix](#) provides a LanguageLine

reference sheet and includes all language assistance taglines. Depending on content, transit related public information pieces might require additional translation support.

When considering language accessibility, the agency provides resources and training to assist with implementation. Guidelines and tips to providing language assistance can be found in the [Appendix](#). Specific language assistance questions and requests for individual consultation or staff training should be directed to SFMTA Regulatory Affairs Manager Kathleen Sakelaris at Kathleen.Sakelaris@sfmta.com or 415.701.4339.

Planning for Equity

Regardless of the specific activities outlined in your Public Outreach and Engagement Plan, its implementation must be inclusive and equitable. The plan should include methods for soliciting feedback that engage and are accessible to those who have historically been underrepresented in the public process, including low-income households, people of color, youth, seniors, and people with disabilities.

The core principle that informs the practice of public outreach and engagement is that those who are affected or have been historically disenfranchised by government decisions have a right to be included in the decision-making process.

The SFMTA has worked with the Local and Regional Government Alliance on Race and Equity (GARE) to develop a Racial Equity Action Plan and Toolkit that promotes diversity and inclusion internally and with the communities we serve. This signals the agency's intention both to apply a racial equity lens to project-level planning and implementation, and to build the organization's capacity and skills to achieve greater equity as an overall outcome of our work.

While it may be more difficult and require more resources to reach and engage members of underrepresented communities, it is essential to make a deliberate effort to do so. Equity should be a primary consideration in establishing goals and objectives for the plan, and project teams should measure success with appropriate data. Teams should also seek to partner with stakeholders in developing and implementing the plan in order to achieve results that are meaningful to the community.

Required Notification

When implementing any plan, the legal minimum distance for notification about the project should be treated as a starting point. In some cases, those neighborhoods and stakeholders who are affected by the project will extend beyond the minimum required distance, warranting broader notification. All Public Outreach and Engagement Plans — including programmatic plans for smaller projects — require an assessment of the project's impacts. The expectation is that every project team will plan for notification based on a thoughtful consideration of the anticipated impacts of the project and those community members who will actually be affected.

Online Presence

Every SFMTA project is required to have an online presence, either a page on the agency website or an equally accessible and comparable alternative. At a minimum, the information posted online should include a project description, project history and current phase, opportunities for public input, and contact information for the project manager/lead and anyone else who is responsible for answering

questions about the project. If the website is designed to receive written questions or comments, it must be monitored regularly so that staff can reply in a timely manner if a response is appropriate.

SFMTA Calendar

Every public meeting associated with the project must be posted on the SFMTA master [calendar](#) at least as early as the meeting is announced through other channels.

Document the Plan

Project teams must track key indicators related to outreach and engagement by documenting:

- How the Public Outreach and Engagement Plan was implemented (and any changes in implementation from the original plan)
- Any input received from the public
- How public input influenced the project (and the reasons why or why not)
- How public input was presented to decision makers
- The indicators established for the plan's goals and objectives

At the end of each project phase the team must complete a brief summary of lessons learned and recommendations for the next project phase. When you complete this brief report ("Plan Evaluation" on page 11 of the [Template](#)), submit an updated version of your plan (including answers to the evaluation questions and any revisions to the plan itself) to the [POETS web page](#). Add a date to the file name to distinguish it from previous versions.

Close the Feedback Loop

From the community standpoint, documentation of public input is essential to closing the "feedback loop." If the plan calls for public consultation, the stakeholders who participate should know how their input was conveyed to decision makers and whether it had any influence on the outcome. This can only happen if the project team documents public input and the process by which they took it into account. For this reason, the Public Outreach and Engagement Plan should always include a plan to report back to stakeholders at the end of each project phase.

From an internal perspective, planning for public outreach and engagement is an ongoing process, and each project team is expected to review and revise previous plans as the project moves through each phase. To make informed decisions, the team needs to know what was learned from public participation in earlier phases. Documentation at the project level also supports an accumulation of lessons throughout the agency that can inform future practice on other projects. It also provides elected and appointed officials with essential information to inform their decision-making.

Accountability

All SFMTA projects that impact the public are subject to the Public Outreach and Engagement Requirements. Project managers are accountable for meeting the requirements, and failure to adequately plan for and implement public outreach and engagement can jeopardize project funding and delivery at any phase.

A [General Notice](#) from the Project Management Office specifies procedures to ensure compliance with these requirements. It states that the needs assessment should be conducted at project inception, and the expected cost of outreach and engagement should be included in the original project budget. The Public Outreach and Engagement Plan must be integrated into the project's pre-development report, ensuring that it will be completed no later than the end of the planning phase.

Throughout all phases of the project, there are multiple opportunities for review of the Public Outreach and Engagement Plan. These include:

- Review of funding requests for planning and preliminary engineering through the Project Integration Committee and the Transportation Capital Committee;
- Review of phase milestones by the Project Management Office before approval of funding for subsequent project phases;
- Review of project implementation by the Project Delivery Technical Advisory Committee;
- Interdepartmental reviews of proposed street changes by the Transportation Advisory Staff Committee (TASC) and related internal reviews by the Pre-TASC Engineering public hearings;
- Development of a Construction Mitigation Plan, which is explicitly required to comply with the Public Outreach and Engagement Requirements.

In addition to these structured opportunities for review, every plan is subject to random audit by agency leadership. The POETS team is available to provide support in developing strategies and budgets for outreach and engagement to ensure that projects comply with the requirements.

Conclusion

These requirements are meant to hold the SFMTA to a high standard of practice for public outreach and engagement. At the same time, the POETS program is designed to give staff members the support they need to meet the requirements. The Public Outreach and Engagement Plan [Guide](#) and Public Outreach and Engagement Plan [Template](#), companion documents to these requirements, provide a blueprint for how to develop, implement and document an appropriate strategy for each project. In addition, the POETS team and Division Leads are available to offer guidance on an ongoing basis as project teams create and revise their plans. As part of that support, the POETS webpage includes a wealth of resources and training opportunities available to staff members who work with the public.

The purpose of the Public Outreach and Engagement Requirements is to ensure that those who are affected by the SFMTA's decisions and actions are included in the decision-making process, and that the



interests of the community are carefully considered as the agency carries out its mission of maintaining and improving San Francisco's transportation system. A related goal of these requirements is to give every SFMTA project the best possible chance to be delivered smoothly, anticipating challenges and avoiding extreme course corrections. Thoughtful planning is the key, and the needs and concerns of the community must be an integral part of that process. In the end, the POETS approach of establishing high standards and providing the necessary support to meet them is intended to strengthen the position of staff who are responsible for working with the public. By taking the time up front to plan for meaningful public outreach and engagement, project teams are more likely to have a positive experience in the community and will be more confident and better prepared to deliver their projects with outstanding results.

Division 10: SFPW Div 01 General Requirements for Construction

SFPW DIVISION 01 GENERAL REQUIREMENTS FOR CONSTRUCTION

This document consolidates the City's standard General Requirements that are applicable during the construction phase of projects, which shall be used by the Proposer:

1. For the purpose of developing its Financial Proposal (specifically, the development of the cost proposal for the Fixed Budget Limit)
2. To provide the Proposers with a companion document to the PDA that describes in basic terms the expected General Requirements during Construction.

Additionally, the Proposer must satisfy the following requirements:

- a. Standard as-built and record documentation, processes, and requirements including but not limited to ongoing production of complete building and site as-built drawings, delivery of complete building and site as-built record drawings, and delivery of all Project record documents reflecting the final built condition of all Project work. Delivery of as-built record drawings and all Project record documents shall include at a minimum 2D drawings, the 3D building model, and a separate structured asset data framework that allows seamless integration of building systems and assets into the SFMTA's asset management program, practices, and computer-aided facility management system (CAFM) software (i.e., CloudSuite EAM). Additionally, and throughout construction, as-built and record drawing documentation shall be made available to the City upon request.
- b. Standard project coordination, project meetings, and reporting with the City. Proposer shall participate in meetings with City's personnel and other City Agencies as required for resolution of design, construction, and/or operations and maintenance issues. Meetings may include design workshops, dispute review board meetings, permit agency coordination, local government agency coordination, kick-off meetings, weekly progress meetings and other coordination meetings, utility meetings, Incident management meetings, commissioning, and transition meetings. Developer shall be available to meet with the City and other stakeholders when requested by the City.
- c. Field offices for the Owner's on-site representatives
- d. An executive-level partnering program (at minimum, from PDA phase through final completion of construction) that would normally be included in a project of comparable scope and size as the Project, based on the general principles and procedures established by the City for its projects, as set forth in <https://avanan.url-protection.com/v1/url?o=http%3A/www.sfpartnering.com/&g=NDQxZjk5N2MzNzNjYmM0Ng==&h=NTc0NjA3YTM3ODFIOGMwNWZhZWVjYjc5MDhhYTlmZDI4MTcxNzJlNTMzZTAzYzcyMzlhZDEzZGU4YjJhYTQ4Zg==&p=YXAzOnNmZHQyOmF2YW5hbGpvcOmNINjFlOTc3Njg4MTRmNDA3NTBmZWRIZmZkYWJhNjA5OnYx>

The term "City Representative" in these standard City specifications is understood to be the developers' management team who will be leading the management and coordination of the design-build construction scope of work.

These General Requirements will be part of the Project's development process during the PDA Term and shall be incorporated into the terms of the Design Build Agreement which will be further developed during the PDA Term.

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SECTION 01 14 00

ARTWORK COORDINATION

PART 1 - GENERAL

1.1 DEFINITIONS

- A. Contractor shall mean the entity the City has an executed agreement for completing project work in accordance with drawings and specifications.
- B. Artist shall mean the person fabricating Artwork through a separate contract with the City and County of San Francisco, under the supervision of the San Francisco Arts Commission.
- C. The Art Installer shall mean the person installing Artwork through a separate contract with the City and County of San Francisco, under the supervision of the San Francisco Arts Commission.
- D. City Representative shall mean the person overseeing construction activity for the City and County of San Francisco.
- E. Public Art Project Manager shall mean the person representing the San Francisco Arts Commission Public Art Program.

1.2 RELATED REQUIREMENTS

- A. Section 01 32 33 – Construction Photographs
- B. Section 00 71 33 – Protection of Adjacent Construction

1.3 SCHEDULING

- A. The schedule shall include:
 - 1. Date of delivery for Artwork on site and in building:
 - 2. Date for Pre-Art Installation Conference
 - 3. Dates for Artwork installation: Refer to paragraph 1.5.
 - 4. Date for Artwork acceptance: Upon completion of installation, the Contractor shall schedule an inspection with the Artist, Art Installer, and Public Art Project Manager for final acceptance of the Artwork. In the event that repairs are required to the Artwork, the Artist and Art Installer shall be responsible for completing punch list items prior to the Contractor assuming responsibility.
 - 5. NOTE: The schedule shall allow for float time and postponement of Artwork installation due to inclement weather.

1.4 PRE-ART INSTALLATION CONFERENCE

- A. The Contractor shall provide no less than a 14-calendar day advance notice and confirm with the City Representative required attendance by the Public Art Project Manager, the Art Installer, and the Artist.

1.5 REQUIREMENT BY THE CITY (REQUIRED COORDINATION BY ARTIST AND ARTS COMMISSION)

- A. Prior to the pre-art installation conference, the City will submit three copies of the following:
 - 1. A sketch indicating length and width of each piece delivered to the site, approximate weight, and type of equipment, as furnished by the Art Installer, required to deliver art piece to installation location.
 - 2. A plan view to scale indicating requirements for the art “staging area”, Artwork installation set up, and areas to receive protection board for review and approval by City.
 - 3. A timeline indicating days Art Installer shall be on site.
 - 4. A description of the material to be used to be used for protecting Artwork, after acceptance by the Contractor, to be supplied by the Contractor.

1.6 REQUIREMENTS BY THE CONTRACTOR

- A. The Contractor shall provide the following:
 - 1. A plan view to scale indicating requirements for the art “staging area”, Artwork installation set up and areas to receive protection board.
 - 2. Schedule updates for Artwork coordination.
 - 3. A written notice to the City Representative for all Artwork coordination meetings, no less than 14 days prior to the meeting to include:
 - a. The pre-art installation conference
 - b. Artwork coordination meetings
 - c. Final inspection/acceptance of Artwork.
 - 4. A description of the material to be used to be used for protecting improvements adjacent the art installation to be supplied by the art installer.
 - 5. Provide for a minimum of 2 traffic control persons to allow for a safe delivery of artwork.

1.7 JOINT SURVEY TO ESTABLISH AUTHENTICITY OF POSSIBLE CLAIMS

- A. The Contractor shall use such methods and shall take adequate precautions to prevent damage to Artwork.
- B. The survey shall be made using still photographs. The survey shall be considered incidental work and no separate payment will be made therefore and shall include:
 - 1. A preconstruction examination and, if necessary, post-construction survey of all nearby structures within the delivery route and Artwork installation area.
 - 2. A preconstruction examination of Artwork as delivered to the site.
 - 3. A survey of Artwork installation set up.
 - 4. A post art installation survey of Artwork prior to final acceptance.

5. A survey of the protection material used between final installation and substantial completion.
6. The Contractor shall retain an experienced photographer to perform this survey in accordance with Specification Section 01 71 33.

1.8 USE OF SITE AND TEMPORARY CONSTRUCTION FACILITIES

- A. The Contractor shall provide site access for the Art Installer, the Artist and Public Art Project Manager, to include use of:
 1. Site and field office facilities
 2. Restrooms
 3. Water and electricity

1.9 PROTECTION OF ARTWORK BY CONTRACTOR

- A. During the Artwork installation, the Contractor shall provide for storage of Artwork not installed.
- B. Upon completion of the Artwork installation, the Contractor shall assume responsibility for protecting the Artwork from any damage through substantial completion of the project.
- C. In the event the Artwork is damaged, only the Artist and Art Installer shall be allowed to make such repairs and shall be fully compensated by the Contractor for time and materials required to make such repairs.
- D. The Contractor shall provide insurance with its Builder's Risk Policy for the full value of Artwork, in the event of any damage caused during construction. Refer to Section 00 73 16 - Insurance Requirements.
- E. Prior to the opening of the facility, the Contractor shall remove protective coverings under the direction of the Artist and Art Installer.

1.10 ACCEPTANCE OF ARTWORK BY CITY

- A. The City shall inspect and document Artwork at the completion of the Artwork installation.
- B. The City shall approve or reject the condition of the Artwork upon notice of substantial completion of the project as part of project closeout procedures.

1.11 ACCEPTANCE OF ARTWORK BY CONTRACTOR

- A. The Contractor shall provide insurance for the art work.
- B. Upon acceptance by the City and Contractor, the Contractor shall protect Artwork in accordance with approved submittals.
- C. The Contractor shall be responsible for costs associated with the correction of any damage to the Artwork caused during construction. Only the Artist and/or Art Installer shall make repairs to Artwork to the satisfaction of the Arts Commission and the Artist. The Artist through the Contractor shall be fully reimbursed for this work.

END OF SECTION

SECTION 01 32 33

PHOTOGRAPHIC DOCUMENTATION

PART 1 - PART 1 - GENERAL

1.1 SUMMARY

- A. General: This Section specifies administrative and procedural requirements for construction photographs.

1.2 SUBMITTALS

- A. General: Refer to Division-1 Section "Submittals" for general requirements for submitting photographs. Binders and photos shall be kept by the City and are non-returnable.
 - 1. Pre-construction photographs: Submit pre-construction photographs in digital format no later than 5 working days after receipt of Notice to Proceed and prior to the start of Work. Photos shall survey the site with sufficient detail to depict the site and building (exterior and interior) condition prior to start of Work. Contractor shall provide photographs from both the exterior of the building as well as the interior spaces.
 - a. Photographs shall be delineated by the use of numbering or lettering indicating the location on a site plan and floor plans as well as a roof plan, see additional requirements below.
 - 2. Construction Photographs: Submit construction photographs as described herein.
- B. Format: Unless otherwise directed by City Representative, photographs shall be submitted in digital format as high resolution images showing the date and time photographs were taken, transmitted on a CD, DVD, USB drive, or other medium as acceptable to the City Representative.

PART 2 - PRODUCTS

2.1 PHOTOGRAPHIC MEDIA

- A. Digital Images: Provide images in uncompressed TIFF or JPEG format, produced by a digital camera with a minimum sensor size of 10.0 megapixels and at an image resolution of not less than 3072 by 2304 pixels. The City shall have all rights as owners of photographs to include use of and publishing images.

PART 3 - EXECUTION

3.1 PHOTOGRAPHIC REQUIREMENTS

- A. General: Take photographs using the maximum range of depth of field and that are in focus to clearly show the Work. Photographs with blurry or out of focus areas will not be accepted.
 - 1. Maintain a key plan with each set of construction photographs that identifies each photographic location.
- B. Construction Photographs

1. Frequency: Take photographs as necessary to show progress of work, as a minimum coinciding with the 1st and fifteenth of every month and/or mid-point and cutoff date associated with each Application for Payment.
2. The Contractor shall take photos, including those for each bid item, showing different areas of work in progress. Photographs shall be taken such that the item or location being photographed shall be determinable from within the set of photographs.
3. Contractor shall provide a location plan indicating the viewpoint from which the above photographs were taken and what they were taken of for each photograph. It is preferred when possible to take the photographs from the same location to provide a history of work progression.

C. Completion Photographs

1. Take photographs of each major phase or component of Work, as requested by the City and as a minimum at both Substantial Completion and Final Completion. Each major phase shall be established once the CPM Schedule has been approved by the City.

D. Additional Photographs: The City Representative may issue requests for additional photographs, in addition to periodic photographs specified. Additional photographs will be paid for by Change Order, and are not included in the Contract Sum or an Allowance.

1. The City Representative will give the Contractor 3 days' notice, where feasible.
2. Circumstances that could require additional photographs include, but are not limited to:
 - a. The City request for special publicity photographs.
 - b. Special events planned at project site.
 - c. Immediate follow-up when on-site events result in construction damage or losses.
 - d. Extra record photographs after time of final acceptance.

END OF SECTION

SECTION 01 35 44

HAZARDOUS BUILDING MATERIALS – SCOPE OF WORK

PART 1 - GENERAL

1.1 SUMMARY

- A. As part of this contract, the Contractor qualified in hazardous materials abatement, removal and remediation shall conduct such work prior to the demolition or renovation or disturbance activity.
- B. This Section includes scope of work for the abatement and/or removal of hazardous and toxic materials, environmental training requirements, minimum qualifications, regulatory requirements, project requirements, and handling procedures as required to the work and existing conditions of the project.
- C. Many of the materials and items of equipment used to construct the improvements and facilities at the Project Site contain materials known to the State of California to be either carcinogenic or reproductive toxins. Such hazardous, contaminated, and non-hazardous environments include, and are not limited to, hazardous and non-hazardous materials, soils, heavy metals, asbestos; serpentine rock (which may contain natural asbestos); soils with naturally-occurring asbestos; lead-containing paints and coatings; lead sheeting; mercury; debris, mold and fungi; bacterial/biological contamination; . Materials to be encountered may include PCB ballasts, mercury containing lamps; asbestos; lead and other hazardous materials.
- D. The Contractor shall not conduct any environmental or hazardous materials sampling or analysis without written permission from the City Representative. This does not include the Contractor’s obligation for any personnel air monitoring of its employees.
- E. **ENVIRONMENTAL TRAINING REQUIREMENTS:** At no cost to the City, the Contractor shall ensure that its workers and that of its subcontractors have the following appropriate environmental training. It is the Contractors responsibility (and not that of the City) to ensure that its workers and its subcontractors have the necessary training certifications, and personal protective equipment (PPE) as required by federal, state and local laws and regulations. The Contractor shall submit certifications or proof of such training as a submittal as per Section 02 80 13 Hazardous Building Materials Remediation.
 - 1. Health and Safety training
 - 2. HAZWOPER training
 - 3. Cal/OSHA Competent Person training for the field supervisor overseeing activities that disturb asbestos, or Naturally Occurring Asbestos (NOA) as per Title 8 CCR 1529.
 - 4. Cal/OSHA Asbestos training (for all trades who will come in contact and disturb asbestos or Naturally Occurring Asbestos (NOA).
 - 5. Lead training (for all trades who will come in contact and disturb lead containing paints as per Cal/OSHA 1532.1 Lead in Construction standard)
 - 6. Medical examination and blood tests (as warranted)
 - 7. Respiratory protection (including current respirator fit test records)

8. Storm water pollution prevention awareness training to enable the Contractor's personnel to comply with Section 01 57 13.

9. Other training pertaining to the work being conducted.

F. In the event the Contractor discovers hazardous material not found in above-mentioned reports refer to Section 01 11 00.

1.2 RELATED DOCUMENTS AND SECTIONS

A. Section 01 41 00 Regulatory Requirements

B. Section 02 80 13 Hazardous Building Materials Remediation

1.3 SCOPE OF WORK – HAZARDOUS BUILDING MATERIALS

A. The Contractor is hereby notified that hazardous waste and/or contaminated material is present on the site. It will be the contractor's responsibility to perform a complete Hazmat survey for the purposes of demolition and is part of the scope of the work of the Contract.

B. If estimated quantities of hazardous materials are identified in the *survey*, it is provided for general quantification use and sampling purposes. For bidding purposes, the Contractor is responsible for verifying existing conditions and quantities as per site conditions and follow regulatory requirements when handling these materials.

C. Abatement, removal and remediation of all materials shall be performed by a licensed abatement contractor under proper Cal-OSHA work procedures. The waste stream generated by the abatement work shall be classified, handled, containerized, labeled, manifested, transported, and disposed in full compliance with all applicable federal, states and local regulatory requirements.

D. In conducting its work, the Contractor shall verify if its work will involve the disturbance, removal, abatement, remediation, clean up, transportation and disposal of the following environmentally-regulated materials which are shown in the above identified or otherwise implied in these Contract Documents. If it does, the Contractor is responsible for the removal, abatement, remediation, clean up, transportation and disposal of such environmentally-regulated materials.

E. The Contractor is responsible for verifying existing site conditions and quantities of hazardous materials identified in the survey. The Contractor shall follow regulatory requirements when handling these materials.

F. Lead-Related Removal: Lead-Containing and Lead-Based paint are present throughout the building on interior and exterior finishes. All such painted surfaces affected by the scope of renovations shall be removed in accordance with Cal/OSHA 1532.1 Lead in Construction standard. The lead-related construction work shall be coordinated with the drawings.

G. The City has not verified that any paints, coatings, dusts, or other materials are not lead containing, therefore all "trigger 1" construction activities, such as demolition of painted surfaces, manual scraping or sanding of painted surfaces, or renovations impacting painted surfaces and primed structural steel shall be completed using dust controls and personal protective measures in compliance with the Cal/OSHA Construction Lead Standard, 8 CCR 1532.1. All settled dust within ductwork, ceiling plenums, crawl spaces, attics, chases and non-regular housekeeping areas shall be treated as having measurable lead content requiring compliance with Cal OSHA 1532.1.

H. Other Regulated Materials: Remove or recycle the following materials:

1. PCB-containing Light Ballasts: Fluorescent fixtures and High Intensity Discharge lamps shall be treated as having a mix of PCB and non-PCB ballasts, requiring disposal of impacted suspect units as hazardous waste.
2. PCB Containing Building Materials
3. Mercury, Cadmium, and/or Sodium-Containing Fluorescent Light Tubes/Bulbs: Fluorescent and mercury vapor lamps on-site shall be treated as having mercury content requiring removal and recycling of quantities greater than 25 fixtures per day impacted by the project's demolition or renovation requirements.
4. Mercury-containing materials: All mercury-containing thermometers, thermostats, and all mercoid switches shall be treated as mercury-containing, requiring removal, disposal as hazardous waste or recycling, as noted in the Contract Documents.
5. Tritium Exit Signs/emergency lighting: Tritium exit signs/emergency lighting require proper recycling or disposal.
6. Sewage, Sludge, and Bacterial Hazards associated from untreated Sewage: Pigeon wastes and leaking sewage lines shall be treated as a biohazard with Contractor's complying with Cal/OSHA blood borne pathogen safety requirements.
7. Mold: Surfaces affected by mold growth shall be removed or treated as recommended in guidance documents, such as "Guidelines on Assessment and Remediation of Fungi in Indoor Environments" (New York City Department of Health, April 2000), guidelines established in Bio aerosols Assessment and Control (J. Macher, Editor, ACGIH, 1999) and "Mold Remediation in Schools and Commercial Buildings" (U.S. Environmental Protection Agency, March 2001) and as otherwise noted in the Contract Documents.
8. Lead Sheeting:
9. Arsenic: In view of site-specific data, assume the following conditions exist:
 - a. Treated timbers:
 - 1) Contain up to 3.9% of arsenic;
 - 2) Have a surface density measured at about 2,000 microgram/cm² of arsenic;
 - 3) Show 4 - 25 microgram/cm² loose arsenic based on wipe samples.
 - 4) Are considered "hazardous waste."

1.4 ABATEMENT CONTRACTOR'S QUALIFICATIONS

- A. The Contractor may self-perform abatement work if it is qualified and licensed or it may subcontract the Work. If the Contractor uses a hazardous materials abatement subcontractor, then the abatement subcontractor shall meet the following requirements.
- B. The Contractor or its hazardous materials abatement subcontractor shall submit current licenses and certifications for the specific type of abatement work to be performed and a letter of confirming compliance to regulations, both current and as described in the specifications listed in paragraph below.
- C. The Contractor or its hazardous materials abatement subcontractor shall submit copies of any notice of safety and environmental violations received from the regulatory agencies notifications that they may have received in the last 20 years.

1. Minimum Qualifications (MQ's)

The Contractor or its hazardous materials abatement subcontractor shall meet the following requirement:

- a. The Contractor or its hazardous materials abatement subcontractor must be a legal entity to enter into contract and licensed in good standing with the State of California and the City of San Francisco, including compliance with City contracting requirements, and be qualified to do business in San Francisco.
- b. The Contractor or its hazardous materials abatement subcontractor partner must possess a valid State of California Contractors State License Board (CSLB), **Class "B"**, General Building Contractor's license. <http://www.cslb.ca.gov>
- c. The Contractor or its hazardous materials abatement subcontractor a valid State of California Contractors State License Board (CSLB), **Class C-22**, Asbestos Abatement Contractor license per Title 16, Division 8, Article 3. Classifications of the Business and Professions Code.
- d. The Contractor or its hazardous materials abatement subcontractor must possess a valid State of California Contractors State License Board (CSLB) Certification **ASB (Asbestos Certification)** in accordance with the provisions of Division 3, Chapter 9 of the Business and Professions Code.
- e. The Contractor or its hazardous materials abatement subcontractor must be a current **Asbestos Registrant** with the California Department of Industrial Relations, Division of Occupational Safety and Health (DOSH), as required by Title 8 of the California Code of Regulations, Article 2.5.
- f. The Contractor or its hazardous materials abatement subcontractor must possess a valid **USEPA Lead Safe** Certificate to conduct lead-based paint renovation, repair and painting activities pursuant to 40 CFR Part 745.89 and fulfilling the requirements of the Toxic Substance Control Act (TSCA) Section 402.
- g. Workers documentation, medical records, and training required to perform the hazardous materials abatement work from either Contractor or its hazardous materials abatement subcontractor.
- h. The Contractor or its hazardous materials abatement subcontractor shall have five (5) years of hazardous materials abatement and/or removal experience

D. Other Abatement Contractor's Qualifications

- 1. Before commencing any abatement Work, the Contractor or its hazardous materials abatement subcontractor shall submit to the City Representative a Hazardous Materials

Management Plan in accordance to the requirements of this Section, and Section 02 80 13 Building Related Hazardous Materials Remediation.

2. The Contractor or its hazardous materials abatement subcontractor shall submit current licenses and certifications for the specific type of abatement Work to be performed; copies of regulatory agencies notifications, abatement work plans, workers and competent person's documentation, waste disposal plan and documentation as required for the removal of the hazardous materials.
- E. Project Safety Representative (PSR): In accordance to the requirements specific to this Section listed below and with those in Section 01 35 45- Health and Safety Criteria, the Contractor shall assign a qualified person directly responsible under the Contractor's Superintendent trained and knowledgeable in the identification, control, and management of the hazardous materials and conditions on-Site. The PSR is responsible for the following:
1. Enforcing safe work and hygiene practices in compliance with the Contractor's Health and Safety Program and Hazardous Materials Management Plan (HMMP)
 2. Advising subcontractors, vendors, and visitors to the Site of potential hazards and minimum general requirements of the Contractor's Health and Safety Program
 3. Coordinating subcontractor's Work regarding hazardous material procedures and controls.
 4. Establishing and maintaining restricted Work Areas.
 5. Enforcing proper use of personal protective equipment.
 6. Communicating approved modified safety requirements to Site personnel as well as visitors to the site.
 7. Notifying to and coordinating with the City Representative for the immediate assessment and remediation Work for unforeseen hazardous materials conditions discovered in the course of the Work.
 8. Notifying and coordinating signing of waste manifests with the City Representative in a timely manner
 9. Ensuring Contractor's personnel have proper training to perform the work
- F. Hazardous Materials Handlers: Only qualified persons shall engage in hazardous material-related Work. Contractor and subcontractor personnel, who come into contact with, are exposed to, disturb, operate equipment or otherwise handle hazardous or contaminated material, or debris shall have appropriate hazard communication and required training, personal and medical monitoring, and shall be certified to wear appropriate personal protective equipment as required by the applicable laws and regulations. Special qualifications may be required depending on the Contractor's means and methods.
- G. For Asbestos-Related Work Involving Asbestos-Containing Materials equal to or greater than 100 square feet or 100 linear feet or affecting friable asbestos surfacing materials, Thermal System Insulation (TSI) and Regulated Asbestos Containing Materials (RACM), the Contractor or its hazardous materials abatement subcontractor shall:
1. Possess a valid asbestos handling license issued by the California State Contractors Licensing Board (SCLB) and a valid current Certificate of Registration for Asbestos-Related Work as issued by the California Department of Industrial Relations – Division of Occupational Safety and Health (Cal/OSHA).

2. Work shall be completed under the on-Site supervision of a Competent Person as defined by Federal OSHA under Regulation 29 CFR Part 1926.1101 and Cal/OSHA under 8 CCR 1529.
 3. All abatement workers shall have AHERA training with current annual 8-hour refresher training, annual medical exams for the use of respiratory protection, and a fit test of appropriate respirators every 6 months.
- H. Lead Hazard Control Work: Only qualified persons with California Department of Public Health (CDPH) approved Lead Workers training, annual medical examinations and approval for the use of respiratory protection, and semi-annual fit testing of respirators under the direct supervision of a CDHS approved Lead Supervisor shall engage in work defined under Cal/OSHA regulation 8 CCR 1532.1 affecting lead-based paints and lead construction hazards, including but not limited to:
1. Working in an environment where lead exposures exceed 30 micrograms per cubic meter (mg/m^3).
 2. Controlling lead hazards, but not limited to, removal of loose and peeling lead-based paints, demolition and disposal of concrete-encased primed structural steel, removal of lead jacketed telephone cables and stripping of lead coatings from structural steel prior to torching or welding.
- I. As defined under Title 17, California Code of Regulations (CCR), Division 1, Chapter 8 "Accreditation, Certification and Work Practices in Lead-Related Construction," Article 1, Sections 35001 et al, and Article 16, Sections 36000 and 36100. Lead Hazard Work: All affected workers shall have lead awareness training, current medical examinations and approval for the use of respiratory protection, and current fit testing of respirators complying with Cal/OSHA regulation 8 CCR 1532.1 when affecting lead paints and lead construction hazards including, but not limited to:
1. Demolishing or salvaging structural items where lead or materials containing lead are present.
 2. Removing or encapsulating materials containing lead.
 3. Constructing, altering, repairing or renovating structures, substrates, or portions thereof, that contain lead or materials containing lead.
 4. Installing of products containing lead.
 5. Cleaning-up of lead contamination.
 6. Transporting, disposing, storing, or containing lead or lead-containing materials on the site or other locations where construction and renovation activities are performed.
- J. Polychlorinated Biphenyls (PCBs) Related Work: Removal of non-leaking Polychlorinated Biphenyls (PCBs)-containing ballasts and transformers shall be completed by workers with PCBs hazard awareness training as verified by the Contractor's Project Safety Representative (PSR). Removal of leaking or damaged PCBs-containing ballasts, transformers, and oils shall be only completed by trained workers, wearing protective gloves and following safety procedures as outlined in the HMMP. Hazardous waste shall be handled according to the U.S. Environmental Protection Agency's Standards 40 CFR 761.60 and 761.65, and 22 CCR Section 66699(b).

- K. Mercury-Containing-Lamp-Related Work: May be completed by workers with mercury hazard awareness training as verified by the Contractor's Health and Safety Officer or Superintendent.
- L. Other Hazardous Materials-Related Work: May be completed by workers with specific hazard awareness training of the material in question as verified by the Contractor's Project Safety Representative (PSR) or Superintendent.
- M. Contaminated Soils-Related Work including Underground Storage Tanks and CCA treated Wood: workers shall have current 40-hour HAZWOPER training and 8-hour annual refresher training per regulation 29 CFR 1910.120, and 8 CCR 5192. The Contractor shall comply with the health and safety requirements, and the approved Site-Specific Hazardous Materials Management Plan (HMMP).
- N. Bio-hazard Work: Work areas contaminated with fecal matter and human excretions, along with needles and syringes and other materials potentially contaminated with infectious blood borne pathogens or other biohazards shall comply with the health and safety requirements and the approved in a Site-Specific Hazardous Materials Management Plan.
- O. Mold and Fungi Remediation Work: May be completed by workers with mold hazard awareness training as verified by the Project Safety Representative (PSR) or Superintendent.
- P. Hazardous Materials Haulers shall:
 - 1. Possess during the hauling of hazardous material, applicable federal, state, and local vehicle insurance requirements, valid driver's license, vehicle registration and licenses, and a current Class 1 Certification of Compliance from the California Highway Patrol affixed to each vehicle or container.
 - 2. Possess a Hazardous Substance Removal Certification granted by the State of California Department of Toxic Substances Control (510-540-3802) and other required certifications and insurance.
 - 3. Contractor shall be responsible for informing drivers of hauling vehicles about:
 - a. The nature of the material hauled.
 - b. Any recommended or required routes to and from the site.
 - c. Applicable city street use regulations and requirements, and State of California Department of Transportation (Caltrans) codes, regulations and requirements.
 - d. The City's requirements for proper handling and transportation of hazardous waste including mitigation controls and manifesting procedures.
 - e. The legal maximum loads for each vehicle.

1.5 REGULATORY REQUIREMENTS

- A. The Contractor shall comply with the procedures of this Section, and all applicable laws and regulations regarding the generation, management, characterization, removal, abatement, remediation, transportation and disposal of hazardous building materials. The Contractor is solely responsible for identifying which apply. Examples of regulations that may apply include but are not limited to:
 - 1. Resources Conservation and Recovery Act, 42 U.S.C. Section 6901 et seq.
 - 2. Regulations 40 CFR Part 260 et seq.
 - 3. California Health and Safety Code, Division 20.

4. Regulations, and 22 CCR Section 66000 et seq.
- B. For asbestos (building materials) hazards, comply with the applicable requirements of the following federal, state and local regulations and requirements:
1. For asbestos hazards: Comply with the applicable requirements of:
 - a. Cal/OSHA Construction Asbestos Standard, 8 CCR Section 1529.
 - b. BAAQMD Regulation 11, Rule 2 and Regulation 11 Rule 14.
 - c. Environmental Protection Agency NESHAP and AHERA regulations (40 CFR Part 763, as applicable).
 - d. Occupational Safety and Health Administration (inclusive of OSHA 29 CFR 1926.1101).
 - e. California Environmental Protection Agency (Cal/EPA) Title 22.
 - f. Other applicable federal, state, and local governmental regulations pertaining to asbestos-containing materials (ACM) and asbestos waste.
 - g. The Final Regulation Order of the California Code of Regulations (CCR) Title 17, Public Health, Section 93105, on Asbestos Airborne Toxic Control Measure for Construction, Grading, Quarrying, and Surface Mining Operations.
 - h. All other applicable regulations, rules, ordinances, guidance documents and regulatory clarification letters and memos related to asbestos, Asbestos-Containing Materials (ACM), Asbestos Containing Building Materials (ACBM), Asbestos Containing construction Materials (ACCM), and asbestos-containing waste.
 2. For Naturally Occurring Asbestos (NOA) in on-site soil and fill, refer to Section 02 81 10 – Management of Excavated Materials, and comply with the applicable requirements of:
 - a. Cal/OSHA Construction Asbestos Standard, 8 CCR Section 1529.
 - b. Asbestos Airborne Toxic Control Measure for Construction, Grading, Quarrying, and Surface Mining Operations (CCR 17, Section 93105).
 - c. Bay Area Air Quality Management District (BAAQMD) rules, permits, notification forms, and regulatory information regarding Naturally Occurring Asbestos (NOA). (<http://www.baaqmd.gov/permits/asbestos/naturally-occurring-asbestos>)
 - d. Guidelines for Geologic Investigations of Naturally Occurring Asbestos in California, Special Publication 124, California Geologic Survey (<http://www.capcoa.org/Docs/noa/%5B24%5D%20CA%20Geol%20Survey%20Asbestos%20Guidelines.pdf>).
 - e. Determination of Asbestos Content of Serpentine Aggregate, Method 435", California Air Resources Board (<https://www.arb.ca.gov/toxics/asbestos/tm435/workshops/m435-asbestosguidance-appacd2017.pdf>).
 - f. Implementation Guidance Document, Air Resource Board Test Method 435, Determination of asbestos Content of Serpentine Aggregate- Field and Laboratory Practices: ARB Monitoring and Laboratory Division, Quality Management Branch, Quality Management Section (<https://www.arb.ca.gov/toxics/asbestos/tm435/guidancedocument.pdf>).
 - g. Asbestos and Other Fibers by Phase Contrast Microscopy (PCM), NIOSH Method 7400 (<https://www.cdc.gov/niosh/docs/2003-154/pdfs/7400.pdf>).
 - h. Asbestos by Transmission Electron Microscopy (TEM), NIOSH Method 7402 (<https://www.cdc.gov/niosh/docs/2003-154/pdfs/7402.pdf>).

- i. All other applicable regulations, rules, ordinances, guidance documents and regulatory clarification letters and memos related to Naturally Occurring Asbestos, asbestos, and Asbestos-Containing Materials (ACM), and asbestos-containing waste.
- C. For lead hazards, comply with the applicable requirements of the following federal, state and local regulations:
 - 1. Cal/OSHA Lead in Construction Standard, 8 CCR Section 1532.1 (https://www.dir.ca.gov/title8/1532_1.html), and Cal/OSHA Lead in Construction Standard (Fact Sheet) (https://www.dir.ca.gov/dosh/dosh_publications/lead-fct-sheet-rev.pdf).
 - 2. Cal/EPA Regulation 22 CCR Section 66000 (<https://www.dtsc.ca.gov/LawsRegsPolicies/Title22/>).
 - 3. Federal Lead Standard for the Construction Industry, 29 Code of Federal Regulations (CFR) part 1926.62
 - 4. California Department of Health Services (17 CCR Sections 35001 -35099).
 - 5. Title 17, California Code of Regulations, Division 1, Chapter 8 Accreditation, Certification and Work Practices in Lead Related Construction.
 - 6. Lead as a water pollutant:
 - a. Federal Clean Water Act (CWA), 40 CFR part 427.
 - b. California's Porter Cologne Water Quality Control Act.
 - 7. Federal Safe Drinking Water Act (SDWA), 40 CFR parts 141-143.
 - 8. Lead as a hazard to children: California's Childhood Poisoning Prevention Act, 17 CCR section 33001 et seq.
 - 9. Lead as a waste:
 - a. Federal Resource Conservation and Recovery Act (RCRA) of 1976, 40 CFR part 240 et seq.
 - b. California's Hazardous Waste Control Law (HWCL), 22 CCR section 66260.1 et seq.
 - 10. San Francisco Building Code (SFBC), Chapter 34, as required where there is disturbance to painted surfaces on the exterior of buildings or structures within the City and County of San Francisco.
 - 11. Society for Protective Coatings Paintings Contractors' Certification Program (SSPC/PCCP) for the QP1 and QP2 Certifications.
- D. Respiratory Protection: The Contractor shall assess potential exposures to hazardous materials and conditions and comply with Cal/OSHA Regulations included in 8 CCR Sections 1529, 1532.1, and 5144, ANSI Standard Z88.2 - "Practices for Respiratory Protection", and 29 CFR 1926.62 (f). Workers shall wear appropriate respiratory protection during lead, asbestos and any other hazards work, unless negative exposure assessment testing verifies that employee exposures are below the PEL or Action levels.
- E. For PCB work: The Contractor shall comply with Cal/EPA Regulation 22 CCR Sections 66268.110 and 66508, and 40 CFR 761.

<https://www.epa.gov/pcbs/polychlorinated-biphenyls-pcbs-building-materials#Information-Contractors>

- F. For Universal Waste the Contractor shall comply with Cal/EPA Regulation 22 CCR Sections 66261.50 and 66273.8 (CCR Title 22, Division 4.5, Chapter 34) Examples of universal waste: batteries, fluorescent tubes (lamps), electronic devices (cell phones, computers, televisions), cathode ray tubes (CRTs), mercury wastes (thermometers and toys), and non-empty aerosol cans.
- G. For wood treated with chemical preservatives such as Chromate Copper Arsenate (CCA) treated wood: The Contractor shall comply with the Federal Insecticide, Fungicide, Rodenticide Act (FIFRA) and by the California Department of Pesticide Regulation (DPR) and Department of Toxic Substances Controls (DTSC) Regulations or for the treated wood waste as per the Health and Safety Code (HSC) 25150.7 and 25150.

1.6 DEFINITIONS

- A. Lead Abatement: as defined by the Department of Public Health for lead hazard work, includes any set of measures designed to reduce or eliminate lead hazards or lead-based paint, but excludes containment or cleanup. Abatement for Lead is designed to permanently reduce or eliminate lead hazards for public (non-industrial) buildings or to last more than twenty (20) years.
- B. Asbestos-Containing Material (ACM) for the purpose of Cal/OSHA compliance: Any material which contains more than one percent (>1%) asbestos by weight for the purposes of abatement, waste disposal and fiber controls specified under this Contract.
- C. Asbestos-Containing Material (ACM) for the purposes of CARB compliance under the ATCM: Any material that has an asbestos content of 0.25% or greater.
- D. Asbestos Containing Construction Materials (ACCM): Defined by Cal OSHA 8CCR§341.6 as any manufactured construction material which contains more than one tenth of one percent (0.10 %) asbestos by weight.
- E. Asbestos Regulated Area: An area established where asbestos disturbance work is conducted and any adjoining area where disturbed material, debris and waste from such asbestos work occurs or is accumulated; and a work area within which airborne concentrations of asbestos exceed, or there is reasonable possibility that may exceed the permissible exposure limit (PEL).
- F. Asbestos-Related Construction Work: Defined by Cal OSHA 8CCR§1529 as construction work that includes but is not limited to the following:
 - 1. Demolition or salvage of structures where asbestos is present;
 - 2. Removal or encapsulation of materials containing asbestos;
 - 3. Construction, alteration, repair, maintenance, or renovation of structures, substrates, or portions thereof, that contain asbestos;
 - 4. Installation of products containing asbestos;
 - 5. Asbestos spill/emergency cleanup;
 - 6. Transportation, disposal, storage, containment of and housekeeping activities involving asbestos or products containing asbestos, on the site or location where construction activities are performed;

7. Excavation and any disturbance of rock, soil, alluvium, or fill that may involve exposure to asbestos as a natural constituent that is not related to asbestos mining and milling activities;
 8. Erection of new electric transmission and distribution lines and equipment, and alteration, conversion and improvement of the existing transmission and distribution lines and equipment; and
 9. Routine facility maintenance.
- G. BAAQMD: Bay Area Air Quality Management District (Air District) is a regional agency with jurisdiction over the demolition and renovation of buildings and structures that may contain asbestos, and the manufacture of materials known to contain asbestos. BAAQMD regulations must always be followed when removing asbestos or demolishing buildings. The Air District has been delegated the authority to enforce federal asbestos regulation. The Air District developed its own asbestos rule in 1976 that is more stringent than the federal rule.
- H. Cumulative Renovations: A series of small (less than 30.8 m [100 feet] linear, 9.4 m² [100 ft²] or 1 m³ [35 ft³]) renovations or removals of RACM performed during a calendar year at a single plant or facility which, taken together, would add up to a reportable amount under the provisions of BAAQMD Regulation 11, Rule 2.
- I. Demolition: Defined by BAAQMD as wrecking, intentional burning, moving or dismantling of any load supporting structural member, or portion thereof, of a building, facility or ship. This includes, but is not limited to, any related cutting, disjoining, stripping or removal of structural elements.
- J. Deteriorated Lead-Based Paint Hazard: painted areas with any of the following characteristics:
1. More than two square feet of deteriorated lead paint on interior components with large surfaces such as walls, ceilings, floors, and doors.
 2. More than ten square feet of deteriorated lead paint on exterior components with large surfaces such as outside walls.
 3. Deteriorated lead paint on more than ten percent of the total surface area of interior or exterior components with small surface areas such as windowsills, baseboards, trim, etc.
- K. Lead Activities: Lead hazard evaluation, lead-related construction work, or any activity which disturbs lead-based paint, presumed lead-based paint, or creates a lead hazard
- L. Lead Action Level: 30 micrograms per cubic meter based on an eight-hour time-weighted average (8 hr. TWA).
- M. Lead-Based Paint (LBP): LBP is defined in Title 17, CCR Division1, Chapter 8, Section 35033 as any paint, varnish, shellac, or other surface coating that contains lead equal to or greater than 1.0 mg/cm² as measured by X-ray Fluorescence (XRF) or laboratory analysis, or 0.5 percent by weight (5,000 µg/g, 5,000 ppm, or 5,000 mg/kg) as measured by laboratory analysis.
- N. Lead-Based Paint Activities: EPA's Title IV of the Toxic Substances Control Act defines Lead-Based Paint Activities as the following, among others:
In any public building constructed before 1978, commercial building, bridge, or other structure or superstructure:
1. Identification of lead-based paint and materials containing lead-based paint
 2. De-leading

3. Demolition

- O. Lead-Based Paint Debris: Any component, fixture, or portion of a building coated wholly or partly with LBP. LBP debris can also be any solid material coated wholly or partly with LBP resulting from a demolition. Examples among many others include ceilings, crown molding, walls, chair rails, doors, door trim, floors, fireplaces, shelves, and radiators, jacketed telephone cables and other heating units.
- P. Lead-Based Paint Hazard: A condition in which exposure to lead from lead-contaminated dust, lead-contaminated soil, or deteriorated lead-based paint would have an adverse effect on human health (as established by the EPA Administrator under Title IV of the Toxic Substances Control Act). Lead-Based paint hazards include for example, deteriorated lead-based paint, leaded dust levels above applicable standards, and bare leaded soil above applicable standards.
- In Title 17, California Code of Regulations (CCR), Division 1, Chapter 8, Section 35037, the California Department of Public Health (CDPH) adds to this definition by stating “disturbing lead-based paint or presumed lead-based paint without containment, or any other nuisance which may result in persistent and quantifiable lead exposure.”
- Q. Lead-Based Paint Hazard Abatement: Any set of measures designed to permanently eliminate lead-based paint hazards according to standards established by the appropriate federal agencies. Abatement measures include the following activities:
1. Removal of lead-based paint and lead-contaminated dust,
 2. Permanent containment or encapsulation of lead-based paint,
 3. Replacement of lead-painted surfaces or fixtures, and
 4. Removal or covering of lead-contaminated soil.
 5. Removal also includes all associated preparation, cleanup, disposal, and post-abatement clearance testing activities, record keeping, and monitoring.
- R. Lead-Based Paint Hazard Control: Activities to control and eliminate lead-based paint hazards, including interim controls, abatement, and complete abatement.
- S. Lead-Contaminated Dust: Surface dust containing an area or mass concentration of lead in excess of the standard established by the EPA Administrator, pursuant to Title IV of the Toxic Substances Control Act. CDPH’s threshold limits are as follows: 10 µg/ft² on interior floors, 100 µg/ft² on interior horizontal window surfaces, and 100 µg/ft² on exterior floors and exterior horizontal window surfaces. The most stringent criteria set forth by CDPH and/or the EPA will apply to the work on this project
- T. Lead-Containing Material: Any material, coating, substrate or product, which contains any measurable amount of lead, with the definition of lead being in accordance to OSHA’s definition.
- U. Lead Hazard: Title 17, California Code of Regulations (CCR), Division 1, Chapter 8, sections 35000 -36100, the California Department of Public Health (CDPH) defines: lead hazard as deteriorated lead-based paint, lead contaminated dust, lead contaminated soil, disturbing lead-based paint or presumed lead based paint without containment, or any other nuisance which may result in persistent and quantifiable lead exposure.
- V. Lead Permissible Exposure Limit (PEL): 50 micrograms per cubic meter based on an eight-hour time-weighted average (8hr. TWA).

- W. Lead Related Construction Work: Any construction, alteration, painting, demolition, salvage, renovation, repair, or maintenance of any residential or public building, including preparation and cleanup that, by using or disturbing lead-containing materials or soil, may result in significant exposure of adults and children to lead.
- X. Presumed Asbestos Containing Material (PACM) is thermal system insulation and surfacing material found in buildings constructed no later than 1980. PACM can be sampled to confirm whether it is ACM or not.
- Y. Project Safety Representative (PSR): Qualified person directly responsible under the Contractor's Superintendent having the necessary training to be knowledgeable in the identification, control, and management of the hazardous materials/waste on site, and health and safety.

1.7 PROJECT REQUIREMENTS

- A. The Contractor shall ensure that all Project personnel, including Subcontractors' personnel, receive appropriate and required awareness training and orientation that will prevent inadvertent or unauthorized disturbance of hazardous materials that are present at the Site.
- B. In the event that hazardous/contaminated material or Naturally Occurring Asbestos (NOA) not identified on the survey report is discovered, the Contractor shall immediately notify the City Representative both verbally and in writing. Upon receipt of such notification, the City, at its sole option, may either (a) perform the abatement work using its own forces or using an outside contractor specializing in abatement work or (b) direct the Contractor to perform all or any part of the abatement and hazardous materials removal work.
- C. If the City Representative directs the Contractor to perform the removal of the hazardous materials not identified on the survey report, the City Representative will do so by change order. The Contractor must promptly provide a properly licensed and insured subcontractor (with CSLB hazardous substance removal certification) to perform abatement work. Refer to Section 00 73 16 for a description of the Contractor's required insurance.
- D. If unforeseen hazardous/contaminated material is discovered, then all work in the affected area will stop pending further direction from the City Representative. The City Representative shall determine whether the abatement and removal process require suspension of all, none or any part of the work under this Contract.
- E. Lead Hazards: All construction work that disturbs or affects intact paint and materials containing any detectable level of lead will be performed by the Contractor or its subcontractors under the Cal/OSHA Lead in Construction Standard 8 CCR 1532.1, Federal/OSHA's Lead Standard for the Construction Industry, Title 29 Code of Federal Regulations 1926.62, as well as all applicable Federal, State, and Local regulations. OSHA Lead in Construction Standard (29 C.F.R. part 1926.62 and title 8 CCR section 1532.1) requires awareness training and compliance on the part of an employer when there is any possibility that an employee could be exposed to lead as a result of his or her activities.
- F. The Contractor is prohibited from starting hazardous material removal work without Hazardous Materials Submittals as described on Section 02 80 13 approved. The Contractor shall not conduct any sampling or analysis of suspected building materials without prior permission from the City Representative. Only qualified AHERA certified building inspectors for asbestos sampling and the California Department of Public Health (CDPH) certified Project monitors for lead assessment will be allowed to conduct the sampling.
- G. Pursuant to 29 CFR 1926.1101, the Contractor shall be deemed to exercise general supervisory authority over the work covered by the standard, even though the General Contractor is not qualified to serve as the asbestos "Competent Person," as defined by the standard. As

supervisor of the entire Project, the General Contractor shall ascertain whether any subcontractor is in compliance with the standard and shall require such contractor to come into compliance with the standard when necessary. The Contractor shall provide competent supervision by a designated Project Safety Representative (PSR) who can identify potential hazards at the Site and oversee implementation of appropriate protective measures to comply with all Cal/OSHA requirements applicable for hazardous building materials.

- H. The Contractor is responsible for the general supervisory authority over all hazardous materials activities, both incidental and primary, for the demolition, renovation and construction work of this Contract. The Contractor shall pay all costs associated with the compliance with applicable hazardous materials regulations or requirements incurred by the Contractor or its subcontractors for this Project.
- I. The Contractor shall coordinate the activities that may have the potential to directly or indirectly impact hazardous materials. Work that may typically impact hazardous materials includes, as applicable and is not limited to:
 - 1. Demolition.
 - 2. Disturbance to any paints or coatings.
 - 3. Torch cutting.
 - 4. Welding.
 - 5. Excavation.
 - 6. Dewatering.
 - 7. Shoring and Underpinning Work.
- J. The Contractor shall retain, and the City will not indemnify against, any liability of Contractor resulting from the activities or duties which are the responsibility of Contractor under the terms of this contract, including but not limited to, liability arising from the arrangement of transportation or disposal of any hazardous material or hazardous waste, whether on or off-site. Therefore, the City will not assume liability, present or future, incurred by the Contractor by reason of these activities.
- K. The Contractor shall not create any condition that may endanger the health and safety of City employee's and its representatives, facility staff, construction workers, site visitors, outside consultants, and the general public, including exposure to hazardous materials. If the City Representative observes such conditions, then the City Representative has the authority to suspend work until the Contractor corrects the condition as provided.
- L. The Contractor and its personnel shall have all the applicable hazard determination, exposure assessment, medical surveillance, engineering and work practice controls, respiratory protection, protective clothing and equipment, employee information and training, certifications, and monitoring program necessary to perform the Work and as required by Codes. Compliance with Codes is Incidental Work.
- M. Clean up, remediation and disposal of any hazardous building materials disturbed during this Work will be the responsibility of the Contractor. The level of engineering control and medical monitoring required should be based on the governing regulations of Cal/OSHA that are effective for the Project duration for the level and extent of hazards exposure at the site.

- N. The Contractor shall maintain all work areas within and outside the project boundaries free from environmental pollution, which would be in violation of any federal, state or local regulations. Conduct construction activities in strict compliance in this Section and other related Sections.
- O. Minimize migration and prevent contamination or further contamination of any material or area by hazardous or contaminated material, waste, dust, fumes or debris. The Contractor shall schedule and coordinate construction activities with the City to time limitations indicated in the Contract Documents, allowing work shifts for asbestos, lead-based paint, PCB ballast, PCB Building Materials, and other abatement as indicated.
- P. As per Health and Safety requirements specified under Section 01 35 45, the Contractor is responsible for monitoring its employees and Sub-Contractors employees for exposure to hazardous materials, either used in construction or otherwise uncovered or intrinsically present at the Site.
- Q. If hazardous materials are disturbed or uncontrolled asbestos or lead based paint release occurs, notify the City Representative immediately. The City retains the right to clean up the spill or to remove hazardous materials using other Contractors. The Contractor shall not be allowed to resume work in the contaminated area until directed by the City Representative. The City will not compensate delays and cleanup costs incurred due to the result of Contractor's negligence.
- R. If removal of asbestos pipe insulation, treated wood, metal structures containing hazardous coatings or other building materials identified as hazardous require accessing areas or where torching, cutting and welding will be needed for, notify the City Representative immediately. The Contractor shall not remove hazardous materials unless properly trained and certified for the handling of the hazardous materials encountered. (For example: workers trained and certified for Class I Asbestos Work with accordance to Title 8 CCR Section 1529).

1.8 WASTE HANDLING AND CHARACTERIZATION

- A. The Contractor shall submit to the City Representative a Waste Management Plan (WMP) as specified under Section 02 80 13 Building Related Hazardous Materials Remediation.
- B. At its cost, the Contractor shall characterize and profile the waste to ensure proper handling, transportation and disposal. The Contractor shall be responsible for the handling, transportation and disposal of the waste.
- C. The Contractor shall segregate all waste streams. The Contractor shall accurately identify waste in accordance with all applicable Codes. Individual waste containers must be labeled in accordance with Cal/OSHA labeling requirements.
- D. The Contractor shall obtain and pay for all sampling and profiling analyses required for waste disposal. California CDPH-accredited laboratories shall perform analyses. Submit results to the City prior to scheduling the waste off haul.
- E. All waste shall remain stored on Site in a secured and designated waste storage area until results of waste characterization tests are available. Due to the time required to perform some analytical tests, this may require storage for up to 10 Working Days or more.
- F. All contaminated and non-friable waste shall be hauled off the site using a bill of lading approved by the City, to an approved treatment/disposal facility, in accordance with all applicable Federal, State and local regulations.
- G. The Contractor shall provide and prepare a bill of lading and the non-hazardous waste manifest form for each shipment of material from the site. The bill of lading shall describe the contents of each truck carrying materials to the waste disposal site, including the name, address and phone

number of the ultimate disposal site, the weight or yardage of the waste materials (as applicable), original location of the material, and an emergency phone number. The hauler shall sign and date the bill of lading indicating that he/she has accepted the load described in the manifest on that day. The City will sign the bill of lading before off haul and retain the Generator's copy. Copies of bills of lading accepted by the treatment/disposal sites shall be provided to the City Representative. The Contractor shall follow manifesting procedures for the transportation and disposal of Class II material or lesser as specified this Section.

- H. The Contractor shall provide and prepare a hazardous waste manifest for each shipment of hazardous waste determined from the site. The manifest shall describe the contents of each truck carrying materials to the waste disposal site, including the name, address, and phone number of the ultimate disposal site, the weight or yardage of the waste materials (as applicable), original location of the material, and an emergency phone number. The hauler shall sign and date the manifest indicating that it has accepted the load described in the manifest on that day. The City will sign the manifest before off haul and retain the Generator's copy. Copies of manifests accepted by the treatment/disposal sites shall be provided to the City Representative. The Contractor shall follow hazardous waste manifesting procedures for the transportation and disposal of Class I hazardous waste.
- I. The City is the generator, as defined in 22 CCR Section 66260.10 and 40 CFR Part 261, of any hazardous waste, and will be responsible for that hazardous waste to the extent required by law. Only a City employee (and not the Contractor) will sign the waste manifests.
- J. The Contractor shall package, label, transport, and dispose of hazardous waste in accordance with applicable Cal/EPA regulations under Title 22 CCR and the California Health and Safety Code, including completion of the Uniform Hazardous Waste Manifest (UHWM). Information on the UHWM must include the quantity of waste in cubic yards and the name and address of the BAAQMD to comply with EPA Waste Shipment Record requirements. The Contractor shall follow the waste disposal; and manifesting requirements as specified this Section.
- K. The Contractor shall provide and prepare the Bill of Lading, the non-hazardous waste manifest form, and the hazardous waste manifests forms by typing in a neat, correct, and legible fashion for signing by the generator. The Contractor shall notify the City Representative at least 48 hours in advance of the time at which the manifest is ready to be signed.
- L. All lead-containing waste or debris, including, but not limited to, painted building components, ceramic tile glazes, jacketed telephone cables, respirator cartridges, disposable suits, and other associated debris generated during this work, shall be packaged for disposal as hazardous waste until waste characterization has been completed and analytical results are available. Waste shall be segregated into distinct waste streams according to the waste categories suggested in the Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing, (a.k.a. "the HUD Guidelines"), dated June 1995 (Revised July 2012), which include the following:
 - 1. Category I: Low Lead Waste – typically non-hazardous construction materials, filtered wash water, cleaned plastic sheeting, and other items that test as non-hazardous;
 - 2. Category II: Architectural components such as painted finished items like siding, doors, windows, trim, etc. which demonstrate intact or stabilized surface coatings;
 - 3. Category III: Concentrated Lead Waste - typically hazardous materials such as paint sludge, paint chips vacuum debris, vacuum filters, and any waste testing hazardous; and
 - 4. Category IV: Other lead-containing waste requiring characterization testing.

- M. Disposal of intact lead-coated architectural or structural elements may occur as non-hazardous waste in accordance with Cal/EPA's and the Department of Toxic Substance Control's requirements.
- N. Waste characterization for lead hazard content shall be performed in accordance with 22 CCR §66262, ET. seq., including using one or more of the following testing procedures, as required, and shall be manifested and properly disposed:
 - 1. Total Threshold Limit Concentration (TTLC)
 - 2. Waste Extraction Test (WET)
 - 3. Toxicity Characteristic Leaching Procedure (TCLP)
 - 4. SW 846
- O. Miscellaneous Hazardous Waste Disposal
 - 1. Disposing of PCB-containing ballasts in landfills is prohibited by Federal and state law. Drums containing PCB ballasts and other PCB-contaminated materials must be disposed of, or otherwise treated, at an EPA-approved facility.
 - 2. Ballasts with "Non-PCB" fluids, must be disposed of at a legally permitted disposal/recycling facility as assumed DEHP-containing ballasts.
 - 3. Fluorescent lamps must be stored in packaging or containers that are designed to minimize breakage/damage during both storage and shipping. Containers shall be labeled as "Universal Waste – Spent Fluorescent Lamps" or "Universal Waste," as appropriate, and each container shall be marked with the date on which storage of said waste began.
 - 4. The Contractor shall use a bill of lading or non-hazardous waste form that contains the following information when shipping fluorescent lamps to a recycler: name and address of generator, transporter, and recycler; number of lamps shipped; date of shipment and date of receipt by recycler; and obtain a dated signature of the receiving recycler. A copy of the bill of lading shall be submitted to the City Representative at abatement completion.
- P. Universal Waste Disposal
 - 1. The following universal wastes are subject to specific disposal procedures under 22 CCR 66273.10 through 66273.21:
 - a. Batteries, as described in section 66273.2, subsection (a);
 - b. Electronic devices, as described in section 66273.3, subsection (a);
 - c. Mercury-containing equipment, as described in section 66273.4, subsection (a);
 - d. Lamps, as described in section 66273.5, subsection (a) (including, but not limited to, M003 wastes);
 - e. Cathode ray tubes, as described in section 66273.6, subsection (a);
 - f. Cathode ray tube glass, as described in section 66273.7, subsection (a); and
 - g. Aerosol cans, as specified in Health and Safety Code section 25201.16.
 - 2. Universal Wastes shall be segregated and shipped for disposal following DOT shipping requirements in 49 CFR 171 through 180.

3. Universal Wastes can be shipped using a bill of lading to a Universal Waste Handler licensed under the requirements of 22 CCR 66273.

Q. Asbestos Waste Disposal

1. A waste that is friable and contains asbestos over 1 percent is regulated as a California (Non-RCRA) hazardous waste under 22 CCR 66261.24. The Contractor shall characterize and profile asbestos-containing waste to determine its correct waste disposal classification.
2. The following requirements apply to transportation and disposal of asbestos hazardous waste:
 - a. Packaging in sealed, leak-tight, non-returnable containers from which the fibers cannot escape following 40 CFR 61.150 or, in order to prevent breakage of larger items, in bulk containers lined with plastic sheeting and covered it with a tarp following 22 CCR 66263.23.
 - b. Labeling of the asbestos hazardous wastes will follow 29 C.F.R. 1910.1001, 29 CFR 1926.1101, and 8 CCR 5208.
 - c. Asbestos hazardous wastes shall be shipped using a registered hazardous waste hauler to landfills permitted to accept asbestos wastes.
 - d. Contractor shall provide, prepare and submit to the City Representative a Uniform Hazardous Waste Manifest Form for asbestos hazardous waste shipments.

1.9 USE OF NON-HAZARDOUS WASTE MANIFEST FOR CLASS II MATERIAL OR LESSER For the profiling of each waste stream, the Contractor shall fill out the waste acceptance profile form, set up an account, and obtain the waste profile number from the landfill provider. The City Representative will assist the Contractor in filling out the waste acceptance form. The City is the Generator. Only a City employee (and not the Contractor) will sign the waste acceptance profile form.

B. For transportation and disposal of the waste, the Contractor shall provide and prepare for the City Representative's signature, a Non-Hazardous Waste Manifest form obtained from the landfill provider. The Non-Hazardous Waste Manifest form shall be completed for each vehicle carrying excavated material classified as California Class II non-RCRA waste, or of a lesser waste classification. The Contractor shall submit the Non-Hazardous Waste Manifest form to the City Representative for the Generator's signature at least 72 hours in advance of the day of the off-haul with an estimate of the number of loads scheduled for off-haul. The Non-Hazardous Waste Manifest form shall contain the following information before providing the final copy for the City Representative to sign

1. Name, address and phone number of the Generator, Project name, and Specification Section number.
2. The Contractor's billing information
3. Name, address and phone number of the transport company.
4. The Name, address, and telephone number of the receiving facility i.e., disposal facility.

C. The City will not be responsible for off haul delays if the Contractor does not notify the City Representative in a timely manner to sign the Non-Hazardous Waste Manifest forms.

D. Within 30 days of the off haul, the Contractor shall submit to the City Representative with copies of each completed Non-Hazardous Waste Manifest Form (with the landfills signature).

- E. The Contractor shall furnish all labor, materials, equipment, and incidentals required to transport those materials identified as non-hazardous waste for the purpose of disposal.
- F. The Contractor shall prepare and submit waste characterization and profiling information documenting the non-hazardous nature of this category of waste
- G. By the end of the workday, the Contractor shall provide and prepare for the City Representative, bills of lading for each vehicle, for all excavated material loads classified as non-hazardous waste (California Class II or lesser), for the purpose of off-site transportation and disposal purposes. The bill of lading shall be designed to contain the following information:
 - 1. Name, address and phone number of the transport company
 - 2. Name of the driver, a dated signature from the driver, vehicle license number, trip number.
 - 3. Weight as recorded at the landfill of waste excavated material.
 - 4. Date of transport.
 - 5. Name, address and phone number of the receiving facility i.e., disposal facility. A dated signature from the receiving facility.
 - 6. Name, address and phone number of the generator, along with the Contract No. and Project name.
- H. A copy of each bill of lading and a certified weight ticket is an indication of the weight of the shipment, which has been received at the disposal facility. The Contractor shall furnish such information to the City Representative, so payment can be made as per specification.
- I. The transporter shall sign and date the bill of lading indicating that they accepted the load described in the bill of lading on that day for that particular trip.

1.10 HAZARDOUS WASTE MANIFESTING PROCEDURES FOR CLASS I MATERIAL

- A. The Contractor shall furnish all labor, materials, equipment, and incidentals required to transport those materials identified as hazardous waste for the purpose of disposal.
- B. The Contractor shall comply with all applicable regulatory requirements listed as well as other applicable federal, State, or local laws, codes, and ordinances, which govern or regulate transportation of wastes (including but not limited to DOT-HM 181 in accordance with 49 CFR 172).
- C. Packing, labeling, transporting, and disposing of hazardous waste shall comply with regulations under 22 CCR, including providing and completing the Uniform Hazardous Waste Manifest Form.
- D. Follow applicable regulations under 40 CFR Part 263, and 22 CCR Section 66263, "Standards Applicable to Transporters of Hazardous Waste," including licensing, manifest system, record keeping, and discharges.

- E. All material classified as hazardous waste (Federal Class1 RCRA and California Class1 non-RCRA wastes only) shall be hauled off using a licensed hazardous waste transporter and the uniform hazardous waste manifest form (DTSC Form 8022A and/or EPA Form 8700-22 a.k.a. the manifest).
- F. Preparation and handling of waste manifests
 - 1. The Contractor shall provide and prepare the waste manifests and landfill profiles for each shipment of hazardous wastes from the site. The Contractor is hereby notified that hazardous waste manifest, waste profiling, and landfill service agreements have to be prepared and have to be approved by the landfill in advance of the off-haul. The Contractor shall consult with the City Representative for local requirements in filling out the forms.
 - a. The manifest shall describe the contents of each truck carrying materials to the waste disposal site, including the weight of the waste materials.
 - b. The City Representative will provide a hazardous waste generator identification number for use on the manifest. The Contractor shall provide the State Transporter identification number and telephone number.
 - c. The licensed transporter shall also sign and date the manifest indicating that it has accepted the load described in the manifest on that particular day.
 - d. Only a DOT Certified City employee (and not the Contractor) will sign the manifest for the "generator" of the waste.
 - 2. The Contractor shall notify the City Representative 72 hours prior to off-haul of all excavated material. Off-haul shall occur between the hours of 8:00 a.m. and 4:30 p.m. Monday through Friday (excluding City holidays). If the manifest and other forms above are to be signed by the City Representative during periods other than the hours stipulated above, the Contractor shall give an additional 72-hour advance notice to the City Representative.
 - 3. The City Representative will sign and keep the Generator's copy of the manifest and give the remaining copies to the licensed transporter.
 - 4. The licensed transporter shall carry the hazardous waste manifest with each truckload using the traffic control approved routes for off haul.
 - 5. Within 2 days of its return, the Contractor shall provide the City Representative with the completed waste manifest. The completed waste manifest shall be certified by the receiver of the waste shipment, confirming that the shipment was received at the waste treatment or disposal facility designated in the Contractor's bid, and certifying the weight of the shipment.
 - 6. Should any waste manifest not be returned within 35 days of shipment, the Contractor shall initiate follow-up, shall document such follow-up effort in writing with an Exception Report in accordance with 40 CFR 262.42 and/or 22 CFR 66262.42, and shall provide a copy to the City Representative.
- G. Mandatory City Information for the Manifest
 - 1. Manifest Item 1: Generator's US EPA ID Number for Project: CAD982008120
 - 2. Manifest Item 3: Emergency response Phone: # 24 hours line to be provided by the Contractor

3. Manifest Item 5:
Generator's Name and Mailing Address:
City and County of San Francisco
Department of Public Health/BEHM
1390 Market St., Suite 210
San Francisco, CA. 94102
Generator's Site Address:
City and County of San Francisco
To be provided by the City Representative

4. Manifest Item 14: The following information is mandatory:
 - a. Name of Project
 - b. Project Manager
 - c. Project Manager Phone Number #

PART 2 - PRODUCTS
(NOT USED)

PART 3 - EXECUTION
(NOT USED)

END OF SECTION

SECTION 01 35 45

HEALTH AND SAFETY CRITERIA

PART 1 - GENERAL

1.1 SUMMARY

- A. The Contractor shall be solely and fully responsible for compliance with regulatory requirements applicable to the health and safety of persons during the performance of the Work. In any action arising from a Site or Work safety claim, violation of law, or other action, Contractor shall fully assume the defense of, indemnify and hold harmless the City and its representatives.
- B. **The Contractor shall not start site work without the acceptance by the City Representative of its Health and Safety Plan (HASP).**
- C. The Contractor shall comply with the Best Practices COVID-19 Construction Field Safety Guidelines (April 1, 2020), ORDER OF THE HEALTH OFFICER No. C19-07i Sept 14, 2020, and subsequent update to the health order and subsequent related memos.
- D. Contractor shall bear all costs of implementing, maintaining, and enforcing safe Work and Site safety programs and plan, and all costs associated with compliance with federal, State, and local safety requirements, including but not limited to the impacts of meeting Site and Work safety requirements on the efficient production of the Work. All costs arising from Site and Work safety are Incidental Costs that are included Contractor's Bid (Contract Amount).
- E. Contractor's Responsibility: The Contractor and not the City, shall be solely and fully responsible for:
 - 1. Complying with the terms of this Section.
 - 2. Developing, submitting, implementing, maintaining, and enforcing a site-specific Health and Safety Plan (HASP).
 - 3. Posting all OSHA-required notices and establishing a safety program for the Work.
 - 4. Complying with all applicable Cal/OSHA training, safety device, reporting, Work performance requirements.
 - 5. Determining and complying with all applicable health and safety requirements, in accordance with applicable laws, rules, and regulations.
 - 6. The defense of, indemnity of and holding harmless the City and its representatives.
 - 7. Determination and implementation of construction means, methods, techniques, sequences, and procedures (except as otherwise specified in approved design documents), including all safety precautions, training and programs taken in connection with the Work, as well as coordinating all portions of the Work.
 - 8. The health and safety of Contractor's employees, Subcontractors, and visitors as set forth in applicable statutes, laws, and regulations
 - 9. Implementing, maintaining, and enforcing all safety precautions and programs concerning the Work.

10. Conducting air monitoring at the Site for its personnel and subcontractors' personnel, as required by federal, State and local laws. The City will conduct ambient air monitoring as it deems necessary.
 11. Any and all fines, penalties or damages which result from the Contractor's failure to so comply with applicable health and safety laws and regulations during performance of the Work.
- F. The health and safety requirements set forth in this Section is not a comprehensive or an all-inclusive list of safety requirements that may apply to Work under this Contract. In addition, some of the specified requirements may not apply to the Work under this Contract, depending on the type and scope of the Work.
- G. The City will neither assume the administration of nor direct, control or otherwise assume any responsibility for the implementation and enforcement of the Contractor's health and safety program.
- H. The Contractor shall be solely responsible and shall assume all liability for compliance with the safety orders, regulations, and requirements of:
1. Best Practices COVID-19 Construction Field Safety Guidelines ORDER OF THE HEALTH OFFICER No. C19-07i, Sep 14, 2020 and subsequent update to the health order and subsequent related memos.
 2. Work Hours and Safety Standards Act (40 U.S.C. 327 et seq.)
 3. Construction Safety Orders (8 CCR, subchapter 4 et seq.)
 4. Federal OSHA.
 5. Cal/OSHA.
 6. California Public Utilities Commission (CPUC).
 7. State of California Public Utilities Commission, General Order No. 172, Rules and Regulations Governing the Use of Personal Electronic Devices by Employees of Rail Transit Agencies and Fixed Guideway Systems.
 8. The State of California Wireless Communications Device Law (effective January 1, 2009) makes it an infraction to write, send, or read text-based communication on an electronic wireless communications device, such as a cell phone, while driving a motor vehicle.
 9. California Vehicle Code.
 10. Local regulations pertaining to Work practices, protection of workers and visitors to the site.
- I. Nothing contained in this Contract shall relieve Contractor, or any Subcontractor or Supplier, from the obligations set forth above and obligations as required by applicable laws, rules, or regulations. If a provision of this Document conflicts with any applicable provision of this Contract or any federal, state, or local safety regulations, the more stringent requirements that maintain a greater level of safety shall apply.
- J. The Contractor shall ensure that all tiers of its field personnel, employees, agents, visitors and subcontractors:

1. Are provided the proper notifications, training, and procedures as required by the Contractor's Health & Safety plan and procedures, including but not limited to the handling of unidentified hazardous waste.
 2. Follow safe practices and minimize their exposure when dealing with unanticipated and unidentified hazardous wastes and contamination.
 3. Minimize potential risks during Project construction by having all construction personnel follow its Health & Safety procedures.
 4. Provide and maintain personnel safety training and medical examinations in accordance with all applicable Federal, State, and local safety and health standards, rules, regulations, and orders.
- K. The Contractor is obligated to conduct any required personal air monitoring of its workers, at its own expense. The Contractor shall be responsible for providing its employees and visitors with all levels of personal protective equipment (PPE). The Contractor shall be responsible, and the City will not pay any additional compensation to the Contractor for providing its employees and visitors with all levels of training and personal protective equipment (PPE), including personal air monitoring if required. This includes areas where hazardous and contaminated soils and waste is encountered.
- L. For Work in this Contract, the Contractor shall have considered the productivity losses, if any, arising from the use of respirators and PPE.

1.2 JOB CONDITIONS

- A. The Contractor is alerted to the fact and include in its bid that the work of this Contract will involve working in environments that may be hazardous, contaminated, and non-hazardous. Serpentinite and other ultramafic rocks that contain Naturally Occurring Asbestos may be present within on-site earthen materials. All work that disturbs on-site rock and soil will be performed under Cal/OSHA Class II procedures, as required by Cal/OSHA regulations (CCR Title 8 § 1529, asbestos in construction).
- B. Such hazardous, contaminated, and non-hazardous environments include, but are not limited to; hazardous and non-hazardous materials, soils, groundwater and storm water, heavy metals (including lead), asbestos, serpentinite and other ultramafic rock that contains naturally occurring asbestos (NOA), respirable crystalline silica, lead containing paint and building materials, petroleum hydrocarbons, polynuclear aromatic hydrocarbons, organic compounds, railroad ties, sewage, sludge, debris, grit, sewer gases, oxygen deficiency, bacterial/biological contamination, odors from petroleum hydrocarbons and other volatile/semi-volatile organic compounds and confined spaces.
- C. The Contractor shall construct/finish, and at all times maintain satisfactory and substantial ramping, guard rails, warning flags and signs at appropriate heights, temporary chain link fencing, solid fencing, railings, barricades, steel plates or bridging as applicable at all openings, obstructions, or other hazards in streets, sidewalks, pedestrian pathways affected by construction, and the like. All such barriers shall have adequate warning lights as necessary or required for public safety. The Contractor shall divert traffic by use of traffic cones, barriers, flagmen, flags, and signs adequate to the Site conditions and task at hand. All temporary and permanent safety features shall be installed before beginning commencing Work in the area.
- D. Lead Hazards: All work that affects intact paint with any level of lead will at a minimum be performed by the General Contractor or its subcontractors under the Cal/OSHA Lead in Construction Standard 8 CCR 1532.1 as well as all Federal, State, and Local regulations at no additional cost to the City.

- E. The Contractor is advised that Work in this Contract may include, but is not limited to, the following activities that may pose safety and health hazards to Contractor and subcontractor personnel:
 - 1. Working around live, high voltage lines and wires, switches, moving vehicles and other potential hazards specific to a City yard, facility, or operating rail line.
 - 2. Working around live utilities.
 - 3. Entering or working in confined spaces.
 - 4. Working around and inside shafts.
 - 5. Working within an underground excavation and construction environment using mechanized equipment and structural temporary shoring support equipment.
 - 6. Working within an underground tunnel environment using mechanized equipment.
 - 7. Working with soils that may be hazardous or contaminated, or both.
 - 8. Working around and in open trenches.
 - 9. Working in spaces or areas where employees may be exposed to asbestos and lead.
 - 10. Welding, painting, or other potentially hazardous Work, or working in the vicinity of such activities.
 - 11. Working in a public right-of-way with vehicular traffic moving around or through the Site.
 - 12. Working in rail right of way with light rail vehicles moving around and through the Site.
- F. The Contractor shall protect the public from hazards including surface irregularities, un-ramped grade changes in pedestrian sidewalks or walkways, and trenches or excavation in roadways. The Contractor shall ensure safe routing of vehicular and pedestrian traffic around the Site, in compliance with American's with Disabilities Act (ADA) requirements.

1.3 SUBMITTALS

- A. The Contractor shall submit the following Submittals as required by the Contract and no case later than ten (10) working days prior to commencement of Work at the Site. No construction Work shall start prior to Contractor's submission to the City's Representative and City's Representative acceptance of submittals listed below. Each Submittal listed below shall be a separate document and shall not combined within one another.
 - 1. Site-specific Health and Safety Plan (HASP) prepared, signed and stamped by a Certified Industrial Hygienist (CIH).
 - 2. Contractor and all subcontractor's Injury and Illness Prevention Programs (IIPP) and Code of Safe Practices (CSP), in accordance with the California Code of Regulations (CCR), Title 8.
 - 3. Templates for all safety forms and reports:
 - a. The Project Safety Representative's (PSR) daily inspection form shall accommodate twice daily inspections of their field work area(s) covering date, work area checked, employees present in the work area, PPE, work equipment being used in each area,

- workplace conditions, physical facility safety, and employee work practices. The form shall also accommodate any deficiencies and corrective actions.
- b. The Safety Meeting Attendance sheet of the “toolbox” safety meetings conducted per CAL/OSHA standards.
 - c. Activity Hazard Analysis (AHA) or Job Hazard Analysis (JHA).
 - d. Incident or Near-Miss Incident Investigation Reports.
 - e. Corrective Actions Report.
 - f. Construction Site Visitor Policy Form
4. Completed Activity Hazard Analysis (AHA) or Job Hazard Analysis (JHA) submitted with the HASP using the AHA/JHA template for all significant activities and tasks with a high-risk potential, describing the job steps, hazards associated with each job step, and the controls used to remove or minimize the associated hazards
 5. SDS (Safety Data Sheet) for all chemicals and other hazardous materials used in the Work.
 6. If Serpentine is present Contractor shall have Cal/OSHA 40-hour asbestos training for the Competent Person overseeing Serpentine/ Naturally Occurring Asbestos (NOA) disturbance activities and managing personal air monitoring for asbestos.
- B. Experience Statement. The preferred bidder so requested shall submit to the Contract Administration Division within **seven (7) working days** after the date of the City's notification of the lowest Bidder sufficient information on completed Experience Statement forms (Section 00 49 12), and additional sheets as necessary, to demonstrate to the satisfaction of the City the qualifications and experience of the it's Project Safety Representative (PSR) as specified in this Section 01 35 45 – Health and Safety Criteria.
1. Documentation and Certification (current and valid) of the Project Safety Representative (PSR):
 - a. The name of the designated Project Safety Representative (PSR).
 - b. OSHA Certified 30-Hour Construction Training.
 - c. The 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) Training Program.
 - d. First Aid/CPR certification/training within the past two years
 - e. Cal/OSHA 40-hour asbestos training for the Competent Person overseeing NOA disturbance activities and managing personal air monitoring for asbestos.
 - f. Documentation demonstrating a minimum of three (3) years recent experience in conducting and supervising safety and health programs on construction projects similar to the Work of this Contract.
- C. The Contractor shall submit the following throughout the course of construction as per specification.
1. Daily inspection reports (as per Part 1.7 of this Section) signed by the PSR documenting twice daily inspections of their field work area(s) covering date, time visited, work area checked, employees present in the work area, PPE, work equipment being used in each area, workplace conditions, physical facility safety, and employee work practices. Any deficiencies and corrective actions shall also be documented. The daily inspection reports shall be submitted by transmittal to the City Representative on a daily basis by the next day. If the daily inspection reports are not kept current, or are not furnished as specified

above, then progress payments, and if necessary, final payment will be withheld. Furnishing of daily inspection reports shall be done as incidental work.

2. Records of topics and Safety Meeting Attendance sheet of the “toolbox” safety meetings conducted per CAL/OSHA standards.
 3. Incident or Near-Miss Incident Investigation Reports and Corrective Action Reports – Submitted to the City Representative within 24 hours of the Project Incident or Near-Miss Incident.
 4. Final Incident or Near-Miss Incident Investigation Reports and Final Corrective Action Reports – Submitted to the City Representative within 48 hours of the Project Incident or Near-Miss Incident.
 5. HASP modification requests, and approved modifications to the appended HASP – Submitted to the City Representative for review (if applicable).
 6. Respiratory Protection Program, records and documentation (if applicable to the Work).
 7. Hot Work permit (if applicable to the Work).
 8. IIPP and CSP modification requests and approved modifications to the appended IIPP and CSP.
 9. OSHA’s Form 300A “Summary of Work-Related Injuries and Illnesses” annual form. (Contractor shall submit the Form 300A each year and whenever it is updated).
- D. Upon receiving a written request from the City Representative, the Contractor shall submit to the City any document relating to health and safety within five (5) Days from the date of such request.

1.4 REFERENCES

Work performed shall be consistent with the following guidelines and references and in compliance with all applicable regulations and standards, including those listed below. In the case that these requirements are conflicting, the one which offers the greatest level of safety shall be followed.

- A. California Code of Regulations (CCR), Title 8
 1. Industrials Relations
 2. Construction Safety Orders
 3. General Industry Safety Orders
- B. Cal/OSHA Occupational Safety and Health Administration (OSHA) Regulations.
 1. CCR Title 8 Standards (All)
 2. CCR Title 8 Tunnel Safety Orders (8403-8552)
- C. National Institute for Occupational Safety and Health (NIOSH) Publications.
- D. U.S. Environmental Protection Agency (USEPA) Publications.
- E. American Conference of Governmental Industrial Hygienists (ACGIH) Publications.

- F. Work Hours and Safety Standards Act (40 U.S.C. 327 et seq.).
- G. Code of Federal Regulations (CFR), Title 29 – Labor.
- H. Federal Railroad Administration Roadway Protection Rule (49 CFR Part 214C).
- I. State of California, Health and Safety Code.
- J. California Department of Industrial Relations, DOSH Mining and Tunneling Unit, Underground Classification dated March 16, 2009.
- K. State of California, Public Utilities Commission, General Order No. 95, “Rules for Electric Line Construction”.
- L. State of California, Public Utilities Commission, General Order No. 128, “Construction of Underground Electric Supply and Communication System”.
- M. State of California, Public Utilities Commission, General Order No. 172, “Rules and Regulations Governing the Use of Personal Electronic Devices by Employees of Rail Transit Agencies and Fixed Guideway Systems”.
- N. State of California, Public Utilities Commission, General Order No. 175-A, “Rules and Regulations Governing Roadway Worker Protection Provided by Rail Transit Agencies and Fixed Guideway Systems”.
- O. Bay Area Air Quality Management District (BAAQMD) Regulations.
- P. California Air Quality Board (CARB) Regulations.
- Q. San Francisco Health Code.

1.5 HEALTH AND SAFETY PLAN (HASP)

- A. The Contractor shall submit a Site-specific Health and Safety Plan (HASP) in accordance with this Specification, CFR Title 29, CCR Title 8 and other applicable regulations, which shall cover all aspects and scope of Work. The HASP shall remain in effect for the term of the Contract and a copy of the HASP must always be on-Site.
- B. The Contractor’s Site-specific HASP shall set forth the policies and procedures to be followed by all Contractor personnel at the Site. The HASP shall describe the safety requirements for the Work, and the means and methods by which the Contractor will implement and enforce those safety requirements. The HASP shall describe, in detail, the protocols necessary for the identification, evaluation, mitigation and control of all hazards associated with the Work and each task performed by the Contractor and all subcontractors. The HASP shall identify the Contractor’ Project Safety Representative (PSR) responsible for Site safety and enforcing safe practices in performing the Work. The Contractor’s site-specific HASP shall describe the responsibility for employee and public safety of the Contractor’s representatives who control each phase of the operations and shall set forth in writing the policies and procedures to be followed by all Contractor personnel. The Contractor HASP shall establish, in detail, the protocols necessary for the recognition, evaluation, and control of all hazards associated with each task performed by the Contractor and lower tier subcontractors.
- C. The HASP shall be prepared, signed, and stamped by a Certified Industrial Hygienist (CIH). The HASP shall also be reviewed and signed by the Project Safety Representative (PSR), whose review will be limited to general scope and completeness. The Contractor shall always be solely and entirely responsible for the safety of the Site and its personnel, subcontractors’ personnel, persons working at or visiting the Site (including City representatives, employees and consultants), and persons passing through the Construction Area. The Contractor shall be

solely responsible for the content, implementation and enforcement of its HASP. The Contractor shall not perform any Work at the Site until the HASP has been submitted to and accepted by the City.

- D. The City will not review the HASP for its content, nor will the City be liable for the Contractor's failure to have an adequate HASP or implement it. Submission to and receipt of the HASP to the City and regulatory agencies neither constitutes to the legality of the HASP nor does it incur liability. Submission, acceptance, and receipt of the HASP to the City, or any review of the HASP by the City, shall not be construed as approval of the adequacy of the Contractor's PSR, the Contractor's HASP or any safety measures taken in or near the construction site.
- E. Any changes or modifications to the Contractor's HASP must be signed by the Contractor's PSR and submitted to the City Representative. The modification shall be appended to the Contractor HASP. All personnel working on the Site shall be fully informed of the modifications of the HASP and any required actions arising from those HASP modifications before performing any of the Work that may be impacted by those modifications.
- F. The HASP shall be divided into two parts. Part One shall address the Environmental Health aspect of safety. Part Two shall address Construction Safety.

Part One of HASP - Environmental Health:

- 1. Identification and description of the responsibility of those individuals who control each phase of operations and are responsible for employee and public safety. The HASP shall set forth in writing the policies and procedures to be followed by all personnel. The HASP shall include the designation and resume of an overall Project Safety Representative (also referenced as health/safety officer). The PSR shall have full authority to correct any unsafe conditions at the Site or unsafe means or methods of performing the Work. The PSR shall have the authority to stop any construction activity or modify Work practices, means or methods that do not accord with the HASP or that are necessary to protect workers, property, and the surrounding community. This requirement shall apply throughout the term of the Contract and is not limited to working hours.
- 2. Hazard Communication Plan: Information identifying and delineating all workplace hazards that has been identified or is generally associated with the proposed Work phases and how this information is communicated to employees (e.g., tailgate/toolbox safety meetings, monthly safety meetings, and daily job briefings). Hazardous material communication standards can be found in 29 CFR 1910.120 & 8 CCR 5194. Hazardous waste information can be found in 29 CFR 1910.1200 & 8 CCR 5192. Local hazardous material/waste information can be found in Articles 21, 21A, 22 and 22A of the San Francisco Health Code.
- 3. Mitigation measures to identify, monitor, and control worker and general public exposure to any identified hazard. The Contractor shall determine the need to conduct and monitor its personnel for contaminant exposure to maintain the proper level of personal protection, including the action level.
- 4. Personnel: Provision of enough personnel properly trained to handle, remove, excavate and dispose of hazardous waste and contaminated waste that may be encountered or generated by the Work. The HASP shall specify the general training required for all Contractor personnel, and any specialized training required for personnel identified to manage and/or handle hazardous materials, including but not limited to:
 - a. Asbestos training that meets the Cal/OSHA Work Activity Level for naturally occurring asbestos (NOA) as per the Cal/OSHA Construction Asbestos Standard, 8 CCR 1529, all applicable Sections and Section 1529.

- b. Lead, petroleum hydrocarbons, volatile and semi-volatile organic compounds (VOC's and SVOC's) awareness training.
- c. The 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) Training Program.
- d. It's associated 8-hour refresher training in accordance with 29 CFR 1910.120, and 8 CCR 5192.
- e. Respiratory program in accordance with 29 CFR 1910.134 and 8 CCR 5144.
- f. Respirable Crystalline Silica OSHA Regulation in accordance with 29 CFR 1926.1153
- g. Other Site-specific or Project specific hazards requiring safety training.

This training shall be required for all Contractor and subcontractor personnel who will encounter or operate equipment that handles contaminated materials. The HASP shall include records establishing the subject matter, dates, times, and attendees of all safety trainings. The Contractor shall maintain training records as required by Cal-OSHA and applicable regulations.

5. NOTE: Cal/OSHA regulations are triggered when asbestos is present in any amount. The Contractor shall meet its obligations under CCR Title 8, Section 1529. The regulation requires monitoring to determine exposure levels, wet methods, respirators and protective clothing, controlled access to the work area, and similar precautions associated with asbestos work regardless of the origin of the asbestos. Use of a competent person to oversee the work may also be necessary. The Contractor shall utilize an experienced Certified Industrial Hygienist (CIH) and a Professional Geologist (PG) to assist it with this work.
6. Requirements of the Contractor and subcontractors for implementing the following:
 - a. Medical surveillance programs. The Contractor is responsible for providing medical examinations and maintaining medical records of personnel.
 - b. Code of Safe Practices and Injury and Illness Prevention Programs (IIPP), i.e., SB 198, 8 CCR and CAL/OSHA, GISO 3203, Section 5192 and 1509.
 - c. Personnel air monitoring according to 29 CFR and 8 CCR.
 - d. The Construction Standard (29 CFR 1926).
 - e. Federal and California Lead Standards for the Construction Industry (29 CFR, Part 1926.62 and 8 CCR, Section 1532.1, respectively)
 - f. Asbestos OSHA Regulation 29 CFR Part 1926.1101 & 8 CCR 1529.
 - g. Workers' Right to Know (29 CFR 1910.120).
 - h. Section 6360-99 of the California Labor Code (Hazard Communication).
 - i. The American with Disabilities Act (ADA).
7. Engineering controls, specific Work practices, air monitoring for contaminants (e.g., dust, natural occurring asbestos (NOA), serpentine, lead, volatile organic, and hydrocarbons), and personal protective equipment (8 CCR 5144) to protect Contractor personnel, City personnel on the Site, and the public impacted by the Work.
8. Methods to be used to decontaminate equipment and personnel.
9. Sanitation facilities to be provided for personal hygiene. Portable toilets and discharge of their waste products into sanitary sewers shall comply with local codes.

10. Contingency /Emergency Response Plan procedures for emergencies including fire, spillage of hazardous/toxic wastes and liquids (with special emphasis to clean up of spillage due to fuel/oil from Contractor's equipment), traffic accident, personal accident, power failure, or any event that may require modification or abridgment of site control and decontamination procedures.

Part Two of HASP—Construction Safety:

1. The Contractor shall include an organizational structure in the HASP that sets forth lines of authority, responsibility, and communication, including a description of Contractor's organization and Project responsibilities of key personnel.
2. The Contractor shall inform its employees, supervisory personnel and visitors (invitees) to the Site of known Site hazards.
3. The Contractor shall take necessary precautions and implement mitigation measures to prevent or reduce the release of pollutants in the form of dust, fume, mists, excessive noise and vibration into the air and surrounding environments.
4. Contractor shall ensure at least one individual on each job site always has current CPR/First Aid/AED training.
5. The Contractor shall employ a Project-specific hard hat insignia (sticker) program which identifies workers that have successfully completed the Project safety training.
6. Information identifying and delineating all workplace safety hazards and how this information is communicated to employees (e.g., tailgate/toolbox safety meetings, monthly safety meetings, daily job briefing).
7. The Contractor shall at all time be responsible for providing its employees and visitors with the proper level of personal protective equipment (PPE), that shall be appropriate to the type of work being performed by the individual employee. At a minimum, the Contractor, subcontractor's personnel and visitor shall wear hardhats, ANSI class 2 vests, and safety glasses with side shields at the work site. Hardhats shall show company name.
8. Safety Action Measures: For Work requiring Cal/OSHA permits, special training and/or use of designated competent persons to oversee the Work, the Contractor shall prepare Safety Action Measures, to address these Work activities. The Safety Action Measures shall include detail information needed to perform the activity safely, verify that the persons involved in the Work are properly trained or certified, the equipment used is inspected and suitable for the Work, the proper permits have been obtained.
9. The format for all safety forms and reports shall be developed by the Contractor and submitted as part of the Contractor HASP.
10. Periodic safety performance reviews and procedures on safety inspections. A sample daily inspection form shall be provided in Contractor's HASP and shall include date, Work area checked, employees present in the Work area, PPE, Work equipment being used in each area, safety and health issues, notes.
11. Procedures in handling non-compliance/violations of safety requirements, e.g. deficiency correction reports, stop Work orders, disciplinary actions, etc.
12. Communication and reporting requirements, including the immediate reporting of injury accidents and submittal of corrective action reports.

13. Requirements concerning, distribution, and maintenance of personal protective equipment and safety tools.
14. Measures and procedures to be used to report, monitor and control exposure of Contractor personnel and public to any identified safety hazards. Contractor shall monitor Site personnel for contaminant exposure and ensure appropriate PPE is used.
15. Provision for all personnel to be properly and regularly trained in construction safety and emergency response. The level of training required for all or specified Contractor or Subcontractor personnel, including, but not limited to the following:
 - a. Heat stress
 - b. Fire prevention and protection plan
 - c. Fall protection and prevention program
 - d. Confined Space Entry
 - e. Special Equipment
 - f. Ergonomics
 - g. Contingency Plan for emergency including fire, earthquake, etc.
16. Site Access Control Plan covering Contractor and City Site personnel, consultants, representatives, the public, and Site visitors (see relevant subparagraph 1.14 CONSTRUCTION SITE VISITORS).
17. Construction site visitor guidelines, including the site-specific orientation and Construction Site Visitor Policy form (see relevant subparagraph 1.14 CONSTRUCTION SITE VISITORS).
18. The Contractor's alcohol and substance abuse program shall describe the measures that Contractor will implement to ensure that all Contractor personnel working on the Project comply with the drug and alcohol restrictions stated in the Contract and in the Contractor's Corporate Policy and Program. Contractor's and subcontractor's personnel shall not use any alcohol or controlled substance when performing the Work, and Contractor shall not allow any person on the Site who is under the influence of any alcohol or controlled substance, including any prescription the negatively affects alertness or performance.
19. Completed Activity Hazard Analysis (AHA) or Job Hazard Analysis (JHA) submitted with the HASP using the AHA/JHA template for all significant activities and tasks with a high-risk potential, describing the job steps, hazards associated with each job step, and the controls used to remove or minimize the associated hazards.

Activity Hazard Analysis (AHA):

https://www.navfac.navy.mil/content/dam/navfac/NAVFAC%20Atlantic/NAVFAC%20Southeast/PDFs/Safety/se_sf_activity_hw_trn.pdf

Job Hazard Analysis (JHA) Form: <https://www.osha.gov/Publications/osha3071.pdf>

- G. Furnish copies of all records of all health and safety audits, inspections, and reviews to the City Representative
- H. The City reserves the right to require that Contractor modify the HASP to address Site safety issues. However, the City's action or lack thereof on the HASP shall not be construed to mean approval, or acceptance of Contractor's responsibility for compliance with the applicable laws and regulations.

1.6 INJURY AND ILLNES PREVENTION PROGRAM (IIPP) AND CODE OF SAFE PRACTICES (CSP)

- A. The Contractor shall submit an Injury and Illness Prevention Programs (IIPP) and Code of Safe Practices (CSP) in accordance with this specification, CCR Title 8 and other applicable regulations. A copy of all applicable IIPP and CSPs must always be on-Site.
- B. The City will not review IIPPs or CSPs for their content, nor will the City be liable for the Contractor's failure to have adequate IIPPs/CSPs or implement them. Submission to and receipt of IIPPs/CSPs to the City and regulatory agencies neither constitutes to the legality of the IIPPs/CSPs nor does it incur liability. Submission and receipt of IIPPs/CSPs to the City, or any review of the IIPPs/CSPs by the City, shall not be construed as approval of the Contractor's IIPPs/CSPs or any safety measures taken in or near the construction site.
- C. Any changes or modifications to the Contractor's IIPP/CSP must be submitted to the City Representative. The modification shall be appended to the appropriate IIPP/CSP. All on-site personnel shall be fully informed of the modifications, changes, and required actions prior to conducting any additional work activities.

1.7 REQUIREMENTS OF THE CONTRACTOR'S PROJECT SAFETY REPRESENTATIVE

- A. The Contractor shall designate in writing a responsible competent person at the Site as Project Safety Representative (PSR) whose principal duties shall be the prevention of accidents and the maintenance and supervision of safety precautions and programs in accordance with the requirements of applicable laws and regulations. The PSR is also a qualified person having the necessary training to be knowledgeable in the identification, control, and management of the hazardous materials encountered onsite.
- B. The Contractor's Project Safety Representative (PSR) shall:
 - 1. Be readily available (within 30 minutes of City request) to consult with the City Representative at the site during all Project working hours and shall be available 24 hours a day, 7 days a week by telephone or other approved means. The PSR shall meet with the City Representative at least once per week.
 - 2. Have completed a 30-hour OSHA Certified Construction Safety training session and must submit documentation of such training to the City Representative.
 - 3. Have completed the 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) Training Program
 - 4. If more than one Project site working shift is initiated, the Contractor will have to ensure that provisions are made to have a qualified PSR to cover all Work shifts
 - 5. Be knowledgeable with the safety provisions of Federal OSHA, Cal/OSHA and the requirements of this section.
 - 6. Be currently certified in First Aid/CPR and be able to use an automatic external defibrillator (AED).
 - 7. Possess qualifications, which include a minimum of three (3) years recent experience in conducting and supervising safety and health programs on construction projects like this Contract.
 - 8. Be capable of performing safety inspections and accident investigations.

9. Perform twice daily inspections of their active field Work area(s) covering workplace conditions, physical facility safety, and employee Work practices. Any deficiencies and corrective actions shall be documented. The daily inspection reports shall be submitted by transmittal to the City Representative daily, by the next day. If daily inspection reports are not kept current, or are not furnished as specified above, then progress payments, and if necessary, final payment will be withheld. Furnishing of daily inspection reports shall be done as incidental work. The PSR shall meet on-site with the City Representative at least once per week.
10. Administer and enforce the site-specific Health and Safety Plan, Injury and Illness Prevention Plan (IIPP), and Code of Safe Practices (CSP).
11. Administer and enforce the visitor site-specific safety orientation, the Construction Site Visitor Policy and its guidelines.
12. Advise subcontractors, vendors, and visitors to the job site of potential hazards and the requirements of Health and Safety practices and rules.
13. Coordinate subcontractor's Work regarding hazardous material procedures and controls (as required).
14. Establish and maintain restricted Work Areas.
15. Enforce proper use of personal protective equipment.
16. Communicate approved modified safety requirements to Site personnel as well as visitors to the site.
17. Notify to and coordinate with the City Representative for the immediate assessment and remediation Work for unforeseen hazardous materials conditions discovered in the course of the Work.
18. Have "Stop Work Authority" – the ability to stop Work without any adverse consequences when unsafe conditions are present.

1.8 REQUIREMENTS OF THE CONTRACTOR'S ASBESTOS COMPETENT PERSON

- A. The Contractor shall designate in writing a responsible asbestos Competent Person (ACP) at the Site whose principal duties shall be overseeing asbestos soil disturbing activities, implementing engineering and administrative controls to prevent asbestos from becoming airborne, and general compliance with Cal/OSHA, CARB, and EPA regulations related to asbestos and naturally occurring asbestos (NOA) when impacted as part of the project. The asbestos CP is also a qualified person having the necessary training and experience to be knowledgeable in the identification, control, and management of asbestos and naturally occurring asbestos encountered onsite. The PSR and ACP may be the same person if all training and experience requirements for both positions are met.
- B. The Contractor's Asbestos Competent Person (ACP) shall:
 1. Communicate all NOA-related issues to the PSR daily and as needed as required for the PSR to fully execute its duties.
 2. Have completed 40-hour Cal/OSHA-required asbestos Contractor Supervisor training and must submit documentation of such training to the City Representative.

3. Possess qualifications, which include a minimum of three (3) years recent experience as an ACP on construction projects similar to this Contract.
4. Implement the elements of Cal/OSHA asbestos in construction standard 8 CCR §1529 and other applicable regulations and standards, including but not limited to:
 - a. Demarcate the Regulated Areas and control the points of ingress and egress,
 - b. Conduct asbestos worker training to all workers in Cal/OSHA Regulated Areas, and NOA awareness training to all workers and visitors who enter the site and are outside of the Regulated Areas,
 - c. Assure that wet methods and other engineering controls are implemented to minimize asbestos emissions,
 - d. Conduct the Initial Exposure Assessment and select respiratory protection accordingly, as required,
 - e. Conduct daily personal monitoring and communicate exposure results to workers,
 - f. Based on monitoring results, continuously re-evaluate PPE requirements select the appropriate respiratory protection to prevent exposure above the PEL,
 - g. Assure that personal decontamination stations are adequate and located to allow workers to decon thoroughly prior to exiting the Regulated Areas. The decon stations shall include water and boot scrubs, HEPA-vacuums, cleaning wipes for respirators, and facilities to dispose of used Tyvek.
5. Perform twice daily inspections of asbestos and NOA field work area(s) for compliance with all asbestos and NOA regulations and standards. Any deficiencies and corrective actions shall be documented. The daily inspection reports shall be submitted by transmittal to the City Representative on a daily basis.
6. Have “Stop Work Authority” – the ability to stop work without any adverse consequences when unsafe conditions are present.

1.9 TRENCHING AND SHORING

- A. Trench Safety: Contractor shall comply with all shoring and excavation requirements set out in Federal OSHA (29 CFR 1926.650-652), Cal/OSHA (Construction Safety Order 1539-1544), the California Labor Code, and the Contract Documents.
- B. Federal and State Safety regulations requires
 1. Safe Exits: A stairway, ladder, ramp or other safe means of egress shall be in trench excavations that are 4 feet or more in depth to require no more than 25 feet of lateral travel for employees.
 2. Shoring is required for trenches at 5 feet depth or greater, and must be designed to prevent cave-ins. Shoring may be required for trenches less than 5 feet in depth unless excavations are made entirely in stable rock or examination of the ground by a competent person provides no indication of a potential cave-in.
 3. Keep excavated materials at least 2 feet or greater from the side of the excavation.

1.10 CONFINED SPACE ENTRY

- A. Contractor shall provide all equipment and assistance to make the confined space safe for entry by Contractor's personnel, the City representatives, and its consultants in accordance with the California Code of Regulations, Title 8, General Industry Safety Orders, "Confined Spaces."
- B. If any activities associated with confined space entry become necessary, the Contractor shall be required to consult the City for guidance and prepare an appropriate Permit-Required Confined Space Entry Plan.

1.11 ELECTRICAL LOCKOUT/TAGOUT PROCEDURES

- A. Training of Contractor's employees in procedures for locking out and tagging out of electrical equipment that must be de-energized to accommodate the Work.
 - 1. The lockout/tag out of electrical energy sources shall occur at the circuit disconnect switch in all cases.
 - 2. The Contractor shall furnish locks used for this purpose.
 - 3. Contractor shall furnish tags, locks, and lock box(s) that are compatible with electrical distribution equipment to be de-energized.
- B. Contractor shall attach white "DANGER" tags to locked switches to indicate that the circuit must not be energized.
- C. Red "DANGER" tags shall be used to indicate that Contractor personnel are actively working on equipment or lines connected to the locked switch. If the task that requires locking the switch has not been completed at the end of a shift or workday, the Contractor shall leave the switch lock in place, remove its Red Tag, but leave the White Tag in place on the locked circuit. When Contractor resumes that Work, the Contractor will again attach a Red Danger tag to the locked switch

1.12 CONSTRUCTION EQUIPMENT AND TOOLS

- A. Contractor shall only use construction equipment and tools designed and intended by the manufacturer for the Work. All Contractor equipment shall conform to Cal/OSHA requirements.
- B. Contractor shall not use and remove from the Site at its expenses any equipment that the City determines is unsafe, not intended for the Work, or that does not meet Cal-OSHA requirements.

1.13 PERSONAL PROTECTIVE EQUIPMENT (PPE)

- A. Contractor shall define task-specific PPE requirements for all personnel and visitors in compliance with applicable laws, rules, and regulations. PPE shall always be worn on the Site, including travel within the Site when starting or ending shifts. Minimum requirements include:
 - 1. Hard hats are always required at the Site. Hardhats shall show company name.
 - 2. Appropriate eye and face protection that complies with ANSI Z87 shall always be worn.
 - 3. Safety glasses with side shields are required at the Site.
 - 4. Sensible and safe Work clothing and closed-toe shoes must be worn at the Site.
 - 5. No canvas/leather sneakers or sandals will be worn in the project work areas.

6. Appropriate hearing protection shall be worn at the Site where sound levels exceed Cal/OSHA standards.
 7. Suitable gloves must be worn to protect the hands from injury as required by Cal/OSHA.
 8. High visibility warning vests (ANSI class 2 vests) or other suitable garments marked with or made of reflection or high-visibility material must always be worn at the Site.
 9. Within a Cal/OSHA asbestos Regulated Areas, suitable protective clothing and respiratory protection in accordance with 8 CCR § 1529 as prescribed by the Asbestos Competent Person (ACP).
- B. The Contractor's PSR and/or ACP shall establish additional appropriate levels of protection for each Work task in accordance with Cal/OSHA standards.
- C. If respiratory protection is utilized, the Contractor shall implement a Respiratory Protection Program in accordance with Cal/OSHA requirements. The Contractor will also provide the following to the City Representative prior to beginning any portion of Work that requires respiratory protections:
1. Copies of the Respiratory Program
 2. Respirator training records
 3. Fit-testing and medical approval documentation
 4. Annual documentation for training, fit testing and medical evaluations
- D. Contractor shall provide appropriate respiratory equipment to its personnel and visitors. Contractor shall inspect and maintain equipment in accordance with Cal-OSHA regulations.
- E. Where "Hot Work" is involved, a Hot Work permit must be submitted to the City Representative prior to commencing that Work. Personnel performing Hot Work must wear clothing that provides thermal protection. Contractor shall erect welding screens where welding operations may expose its personnel or the public to welding sparks, light and other hazards.
- F. Safety harnesses must be worn by personnel in manlifts and when working at heights, in accordance with OSHA requirements in manlifts.
- G. Workers must wear a safety harness with their safety lanyard secured to a separate lifeline while working from swing scaffolds, boatswain's chairs, or other suspended Work platforms that present a fall hazard.

1.14 CONSTRUCTION SITE VISITORS

- A. All construction site visitors upon arrival must check in with the Contractor's Project Safety Representative (PSR). Visitors are defined as persons who are not assigned as direct staff or employees of the Contract. The PSR will coordinate a site-specific safety orientation prior to jobsite entry. The site-specific safety orientation shall provide visitors with a review and understanding of safe jobsite procedures and practices, including any safety trainings if required. The Contractor's site-specific safety orientation, at a minimum, shall include discussion of:
1. Required personal protective equipment (PPE)
 2. Site access/egress routes (Site Access Control Plan)

3. Emergency contacts and procedures
 4. First-aid locations
 5. Potential known hazards
 6. Required safety trainings and procedures
 7. Construction site operations and conditions
- B. Following the site-specific safety orientation, visitors must complete and sign a Construction Site Visitor Policy form provided by the Contractor. Failure to acknowledge and agree to all requirements of the Construction Site Visitor Policy form shall result in denied access to the construction work zone. The Visitors' Policy form, at a minimum, shall require visitors to accept and acknowledge that they:
1. Have received and understand the site-specific safety orientation
 2. Must not handle or utilize any job equipment, tools, or materials at any time
 3. Must always wear proper PPE (Contractor is responsible for providing any missing PPE to visitors)
 4. Must attend any required safety trainings
 5. Must observe and comply with construction signage, barricades, and operations
- C. All visitors re-visiting jobsites shall be identified with a visitor sticker provided by the Contractor. Contractor shall be responsible for providing and maintaining legible stickers. Visitor stickers shall indicate the visitor's name, the date of the site-specific safety orientation, and the project number. The Contractor's PSR is responsible for determining if any additional re-training is required to account for changing site conditions and procedures.
- D. The City Representative and Contractor shall reserve the right to remove any visitor from the jobsite at any time, if he or she feels that the visitor is failing to adhere with the on-site safety requirements. Areas open to public access (e.g. sidewalks/designated paths of travel) are exempt from the Construction Site Visitor Policy.

1.15 EMERGENCY EQUIPMENT

- A. The Contractor shall provide emergency and first aid equipment required by Cal-OSHA and other applicable regulations and necessary for the Project. The following items, at a minimum, shall be maintained at the Site and available for immediate use:
1. First aid equipment and supplies, including first aid kits and eyewash station per Cal/OSHA standards
 2. Spill control materials and equipment, including multi-purpose absorbent materials, poly bags, brooms and shovels and drums (if applicable)
 3. Fire extinguishers with a minimum rating of 2A-10B:C and as required by Cal/OSHA standards for scope of Work requirements
 4. Emergency rescue equipment including SCBA and tripod/extraction equipment for confined space rescue; backboard/basket for transport of injured personnel, air horns/bull horns for emergency signaling and communications (as applicable to the Work).

- 5. All Contractor's boats and vessels used on the project shall comply with the U.S. Coast Guard and Cal/OSHA and all applicable regulations for working in/around water and waterways.

1.16 HAZARDOUS MATERIALS ENCOUNTERED AT THE SITE

- A. Proposition 66 Warning: Many of the materials and items at the Site contain materials known to the State of California to be either carcinogenic, reproductive toxins, or that may be otherwise toxic or hazardous.
- B. The Contractor shall ensure that all personnel, including subcontractors' personnel, receive appropriate training and orientation concerning toxic and hazardous materials that will prevent inadvertent or unauthorized disturbance of hazardous materials present at the Site.
- C. The Contractor shall comply with all applicable requirements of the California Code of Regulations, Title 8, Section 1532.1, "Lead in Construction".
- D. The Contractor shall take necessary precautions to prevent the release of lead and/or asbestos in the form of dust, fumes or mists from lead-containing and asbestos-containing materials into the air or into surrounding environments.
- E. The Contractor shall inform all workers, supervisory personnel and authorized visitors to the Site of the potential hazards of lead and asbestos and of necessary precautions and housekeeping procedures to reduce the potential for exposure in areas where lead or asbestos is known to be present.

1.17 HAZARDOUS MATERIALS THAT MAY BE INCORPORATED INTO THE WORK

- A. The Contractor shall maintain copies of Safety Data Sheets (SDS) for all substances used at the Site or incorporated into the Work.
- B. The Contractor shall be responsible for coordinating the exchange of SDS or other hazard communication information that is required to be made available to or exchanged between subcontractors at the site.
- C. The Contractor shall notify the City if a specified product or piece of equipment, or the intended use of such product or equipment is unsafe, prior to ordering such items or incorporating such items into the Work.
- D. The Contractor shall be responsible for complying with all BAAQMD regulations regarding the use, documentation and notification procedures related to asbestos-related construction Work, use of aerosol products and products that are with the limits for Volatile Organic Compounds (VOC's) and other limits for compounds regulated by BAAQMD.

1.18 MEETINGS

- A. The Contractor shall conduct regular trainings for its personnel, including but not limited to "toolbox/tailgate" safety meetings, in accordance with Cal/OSHA requirements. Contractor shall document the date, time, subject addresses, and names of persons who attended any training meetings using the Safety Meeting Attendance sheet, which Contractor shall submit to the City Representative.
- B. The Contractor's Project Manager, Superintendent(s), and PSR shall attend City Representative meetings (as required) to review the project's Immediately Dangerous to Life and Health (IDLH) activities, stop Work activities, incidents, and incident investigations.

1.19 LOGS, REPORTS, AND RECORDKEEPING

- A. Contractor shall maintain Project safety audits, employee training records and certifications, equipment safety inspection logs, incident reports, visitor logs and all reports covering the implementation of Contractor HASP at the Site for review upon request by the City Representative.
- B. Contractor shall submit Monthly project safety statistical report to City Representative, which shall include Project safety inspections, hours worked by Contractor, OSHA Recordable Incidents, Incident Rates, Lost Work Day Cases, Total Project Lost Work Days, Days Away from Work Rate, First Aid Cases, and Property Damage Incidents.
- C. Contractor shall provide the Engineer access to the Site, and to all logs and records concerning the Work. The City's review of Contractor's logs and records documenting its safety performance shall not be construed as approval or waiver of the adequacy of any safety measures taken in, on, or near the Site or Construction Area. The City's review of Contractor's logs and records shall not relieve the Contractor of its responsibilities of performing and enforcing health and safety inspections/audits, monitoring, or any other components of the Project safety requirements or Contractor's HASP, and any liability that may arise from Contractor's performance or failure to perform safety Work.

1.20 REMEDIAL ACTION

- A. The City Representative will issue a notice of non-compliance if City personnel observe any condition at the Site that poses an immediate and serious risk to the life or health of persons at the Site, or if City personnel observe that Contractor has failed to timely correct violations of health or safety standards. The notice will document the facts and circumstances of non-compliance and will require the Contractor to immediately remedy and correct the non-compliance and confirm in writing within 24 hours of receipt of the notice that the non-compliant conditions described in the notice have been corrected.
- B. If Contractor repeatedly fails to comply with applicable health and safety laws, rules, regulations, and orders, the City reserves the authority to have the necessary Work performed by others and deduct corresponding costs from Contractor's progress payment(s); suspend progress payments; or terminate the contract for cause.
- C. The Contractor's non-compliance with applicable health and safety laws, rules, regulations, orders, and contract safety requirements may be deemed breach of contract, for which the City Representative may suspend the Work, and dismiss from the Work any employee of the Contractor, Subcontractor, or Supplier responsible for the non-compliance, as provided in the General Provisions. The Contractor shall bear all costs arising from such suspension of Work or dismissal of employee(s).
- D. The Contractor shall not create any condition that endangers the safety of any person on the Site or in the Construction Area, including City employees, City subcontractors, City consultants, and the public. If City personnel observe such a condition, the Engineer is authorized to suspend the Work until the condition is corrected. Such order to suspend the Work shall not impose on the City any obligation, penalty, additional costs or assumption of liability of any kind. Contract Time shall not be extended by such suspension, and the Contractor shall be solely responsible for and the City shall not compensate Contractor for any delay caused by a suspension of the Work due to unsafe conditions. Any suspension of Work due to unsafe conditions shall not relieve the Contractor of its control of the Site or responsibility for safety on the Site during the period the Work is suspended.

1.21 INCIDENT REPORTING AND INVESTIGATION

- A. Contractor personnel who are involved in or witness an unsafe condition at the Site or a Reportable Incident (as defined by Cal-OSHA) shall immediately report the condition or incident to the Contractor's Site supervisor or foreman, who in turn shall immediately notify the City Representative.
- B. Contractor personnel who are involved in or witness a near-miss incident must report it to the responsible Site supervisor or foreman within a reasonable time frame, not to exceed 24 hours, who in turn shall immediately notify the City Representative.
- C. Contractor will allow City Representative to participate and review all Project incident or near-miss investigations.
- D. Contractor's foremen, superintendents, and managers shall not decline to accept or relay a report of injury or significant near-miss incident from any person.
- E. All incidents and significant near-miss incidents shall be investigated immediately by the Contractor's designated Project Safety Representative (PSR).
- F. For all incidents and near miss incidents ("near miss"), Contractor shall submit to the City Representative a Preliminary Incident/Near Miss Investigation Report (PIR) within 24 hours of the incident or near miss. Contractor shall submit a Final Incident/Near Miss Investigation Report (FIR) as soon as possible (generally within 48 hours) after incident or near miss. The Contractor shall not perform Work in the area or of a type that poses risks similar to those of the incident or near miss until a Corrective Action Report (CAR) is complete and submitted to the City Representative.
- G. The PIR and the FIR shall include at a minimum the following:
 - 1. What happened? This should include interviews with injured workers and witnesses as well as examination of the workplace for factors associated with the incident or near miss.
 - 2. Why did the incident or near miss happen? The investigation must identify the root causes of the incident or near miss. Root causes are the underlying or systemic, rather than the generalized or immediate, causes of an incident/near miss. To identify root causes, the investigation must obtain all the facts surrounding the occurrence and then ask why. For example, what caused the situation to occur; who was involved; was/were the employee(s) qualified to perform the functions involved in the incident or near miss; were they properly trained; were proper operating procedures established for the task involved; were procedures followed, and if not, why not; where else this or a similar situation might exist, and how it can be corrected.
 - 3. What should be done? The investigation must determine all corrective actions required to eliminate the cause(s) of the incident or near miss.
 - 4. What action has been taken and what remains to be taken? Action already taken to reduce or eliminate the exposures being investigated should be noted. Any interim or temporary precautions should also be noted. Any pending corrective action and reason for delaying its implementation should be identified.
 - 5. The Contractor shall submit to the City Representative a Corrective Action Report (CAR) that documents that all corrective actions have been completed and fully implemented and all job site hazards and behaviors that caused the incident or near-miss incident have been corrected. The CAR shall include certification signed by an authorized Officer of the Contractor as to the completeness and accuracy of the FIR and the CAR.

1.22 ACCIDENT DOCUMENTATION AND REPORTING

- A. If an accident causes death, serious injury, or serious property damage, Contractor shall immediately report the accident to the City Representative by telephone, text message or email and to appropriate authorities (for example, Cal-OSHA).
- B. In addition, the Contractor shall promptly report in writing to the City Representative all accidents or near-miss incidents whatsoever arising out of or in connection with, the performance of the Work whether on occurring on or adjacent to the Site or the Construction Area. The Contractor shall give full details of the facts and circumstances of the cause and nature of the incident including statements of witnesses.
- C. Contractor shall make positive contact with City representative. Voicemail does not constitute "positive contact." Contractor shall escalate from inspector, to Assistant Resident Engineer (ARE), to Resident Engineer (RE), to Construction Manage (CM), to Section Manager, to Deputy Bureau Manager until positive contact is made immediately following an incident.
- D. The Contractor shall provide to the City Representative within five working days of an incident or accident or near-miss incident or accident, a written incident or accident; or near-miss incident or a near-miss accident report. A significant accident is defined to include events where personal injury is sustained, or property loss of substance is sustained, or where the event posed a significant threat of loss or personal injury.
- E. If any person lodges a claim against the Contractor or any subcontractor alleging injury or property damage arising from the Work, the Contractor shall promptly report the claim and all relevant facts concerning the claim in writing to the City Representative.
- F. The Contractor is responsible for all documentation and reporting obligations of any accident and near-miss incidents in accordance with as per federal, State and local laws and regulations.

1.23 CITY SAFETY REPRESENTATIVE

- A. The City may at any time and without notice enter the Site and inspect the Site and the Work, observe Contractor's means and methods of performing the Work and maintenance of the Site, and review Contractor's compliance with applicable safety requirements, regulations and laws, including but not limited to the requirements of this Contract and Cal-OSHA regulations. The purpose of the City's inspections and observations is to confirm that Contractor is to safeguard City personnel and property.
- B. If the City's Representative observes an unsafe Site condition or unsafe means or methods of performing Work, the City's representative will so inform the Contractor's Site superintendent of safety manager, who shall take whatever actions Contractor deems necessary to immediately remedy the unsafe Site condition or unsafe work practice, or unsafe means or methods in which the Work is performed. Contractor shall within 24 hours of taking such remedial action submit a report to the Engineer describing the unsafe Site condition or work practice, and how Contractor remedied that unsafe condition, unsafe work practice, or unsafe means and methods of performing the Work.
- C. The City's inspection of the Site and the Work, the City's observation of Contractor's means and methods, and the City's requiring the Contractor remedy an unsafe Site condition, unsafe work practice, or unsafe means and methods of Work shall not in any way relieve Contractor of control of and responsibility for the Site, and does not relieve Contractor of its responsibility for the safety of all persons on the Site.

1.24 THE SAN FRANCISCO MUNICIPAL TRANSPORTATION AGENCY (SFMTA) HEALTH AND SAFETY REQUIREMENTS:

- A. The Contractor shall comply with the following requirements as applicable and at no additional cost to the City, if any part of the work for this job is under the jurisdiction of the San Francisco Municipal Transportation Agency (SFMTA) and is on one of its facilities and/or affects its bus/train routes.
- B. The Contractor shall obtain all the necessary City and SFMTA permits, trainings, clearances, and shall schedule any necessary SFMTA support at least two weeks prior to mobilization.
- C. The Contractor, its employees and its subcontractors who will perform Work within 72 inches (measured transversely) of MUNI rail tracks shall first receive "Roadway Worker Protection" training and certification from the SFMTA, at least two weeks prior to mobilization. The Contractor shall schedule "Roadway Worker Protection" training by contacting Charles D. Kesecker from the SFMTA at (415) 646-2506 or charles.kesecker@sfmta.com. Contractor shall sign a Hold Harmless Agreement with SFMTA with respect to the safety training.
- D. In addition, and at least two weeks prior to mobilization, the Contractor shall obtain a "Track Access Clearance Permit" from the Muni's Operations Control Center (OCC) before working within 72 inches of the rail tracks. The Track Access Clearance meeting is held every Tuesday at 10:00am at 1 South Van Ness, San Francisco, Conference Room 8104, where the permit application process may be discussed. The Contractor shall schedule the "Track Access Clearance Permit" training by contacting SFMTA.
- E. All Contractor personnel performing Work along a trackway or adjacent to a trackway shall comply with any instruction given by SFMTA Operations Control Center (OCC).
- F. The Contractor is alerted to the presence of the Overhead Contact System (OCS). The overhead contact system is above each trolley coach route and track, and adjacent to each platform. This is a HIGH VOLTAGE SYSTEM operating in excess of 600 volts DC. The Contractor's attention is directed to Article 37 of the California Public Utilities Commission General Order 95. Cal/OSHA regulations require that any boom type equipment that moves vertically must maintain 10 feet radial clearance and any other equipment must maintain a 6 feet clearance from OCS. The Contractor shall use only fiberglass ladders when working around the OCS. The Contractor shall obtain "clearance to start work" from the SFMTA facility's supervisor when working within 10 feet of the OCS, at least two weeks prior to performing that Work.
- G. Contractor shall comply with California Public Utilities Commission's General Order 175-A and the SFMTA "Roadway Worker Protection" training when performing any work on or near Muni trackways.
- H. The Contractor shall provide proof of health and safety training required by CCR, Title 8, Subsection 3203 (a)(7) and Muni Procedures SY.PR.034 – Contractor Safety Program and SY.PL.003 – Roadway Worker Protection (RWP) Plan, for each employee, including employee name or other identifiers, training dates, type(s) of training and training provider. These documents are available for review and inspection at One South Van Ness Ave., 3rd Floor, San Francisco, CA 94103. Please call Mr. Shahnam Farhangi at (415) 701-4284 to schedule an appointment to view these documents.
- I. The Contractor shall during the course of the Work regularly provide tail-gate trainings to all employees working in and around tracks, track switches, overhead catenary system, train signal system, and other Project specific hazards, as required by Cal-OSHA regulations and other applicable laws and as topics related to safe performance of the Work and maintenance of Site safety come to the attention of the Contractor.

- J. The Contractor shall ensure that its employees, agents, and subcontractors provide and maintain personnel safety training and medical examinations in accordance with all applicable Federal, State, and local safety and health standards, rules, regulations, and orders.
- K. The Contractor shall acquire all the proper permits, trainings, clearances, and schedule any SFMTA support as necessary, at least two weeks prior to mobilization.
- L. The Contractor shall sign an Assumption of Risk/Waiver of Claims/Hold Harmless Agreement with SFMTA with respect to the operational and safety training.
- M. Cost for all the above requirements, permits, training, and clearances is incidental and inclusive of the base bid.

PART 2 - PRODUCTS

(NOT USED)

PART 3 - EXECUTION

(NOT USED)

END OF SECTION

SECTION 01 35 49

MINIMUM ENVIRONMENTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes minimum provisions for compliance with City, state, and federal laws and regulations for environmental protection, and notes to which Standard Construction Measure (SCM) the section refers.
- B. Any provisions for pollution control, temporary facilities and controls, and provisions relating to existing conditions specified elsewhere under Divisions 01 and 02, that exceed the minimum provisions established by this section, supersede this section.
 - 1. Geotechnical Considerations (SCM-1): For projects involving excavation in the public right-of-way, Contractor is directed to Article 2.4 of the San Francisco Public Works Code, "Excavation in the Public Right-of-Way" and San Francisco Public Works Order No. 187,005, "Regulations for Excavating and Restoring Streets in San Francisco." It is unlawful for any person to make or to cause or permit to be made any excavation in any public right-of-way that is under the jurisdiction of the Public Works without first obtaining from Public Works a permit authorizing such excavation.
 - 2. Air Quality (SCM-2): For execution, see 3.1 of this section.
 - 3. Water Quality (SCM-3). For execution, see 3.2 of this section.
 - 4. Traffic (SCM-4): For execution, see 3.3 of this section.
 - 5. Noise (SCM-5): For execution, see 3.4 of this section.
 - 6. Hazardous Materials (SCM-6)
 - a. Refer to applicable Divisions 01 and 02 Hazardous Materials-related specifications.
 - 7. Bird Protection (SCM-7): For execution, see 3.5 of this section.
 - 8. Tree Conservation (SCM-7): For execution, see 3.6 of this section.
 - 9. Environmentally Sensitive Area (SCM 7, SCM-9): For execution, see 3.7 of this section.
 - 10. Construction Staging (SCM-8): For execution, see 3.8 of this section.
 - 11. Archaeological and Paleontological Discovery (SCM-9): For execution, see 3.9 of this section.
- C. Related Sections:
 - 1. Section 01 41 00 Regulatory Requirements
 - 2. Section 02 81 10 Environmental Management of Excavated Materials

1.2 REFERENCES

A. Refer to the following references:

1. American National Standards Institute (ANSI). 2008. American National Standard for tree care operations – Tree Shrub and Other Woody Plant Maintenance – Standard Practices (A300 Part 1): Pruning. New York, NY
2. American National Standards Institute (ANSI). 2006. Safety Requirements for arboricultural Operations (Z133). New York, NY
3. Asbestos Airborne Toxic Control Measure For Construction, Grading, Quarrying, And Surface Mining Operations (California Code Of Regulations Title 17, Section 93105)
4. Bald and Golden Eagle Protection Act, 16 USC § 668
5. Bay Area Air Quality Management District, California Environmental Quality Act Air Quality Guidelines. May 2017. Available at <http://www.baaqmd.gov/plans-and-climate/california-environmental-quality-act-ceqa>
6. Bay Area Air Quality Management District, "Current Rules". Available at <http://www.baaqmd.gov/rules-and-compliance/current-rules>
7. Berglund, B. Guidelines for Community Noise - A complete, authoritative guide on the effects of noise pollution on health. World Health Organization, Geneva, 1999
8. California Code of Regulations, Title 8 Sec. 1592
9. California Department of Food and Agriculture, 2014. Plant Quarantine Manual, 3700. Oak Mortality Disease Control.
10. California Department of Transportation, Storm Water Quality Handbooks Construction site Best Management Practices Manual. Available at <http://www.dot.ca.gov/hq/construc/stormwater/manuals.htm>
11. California Fish and Game Code §§ 3503, 3513, and 3800
12. California State Water Resources Control Board, Construction General Permit Order
13. California Stormwater Quality Association, Construction Best Management Practice Online Handbook. Available at <https://www.casqa.org/resources/bmp-handbooks>
14. City and County of San Francisco Municipal Transportation Agency, 2012. Regulations for Working in San Francisco Streets, 8th ed.
15. City of San Francisco, June 27, 2006. "Pruning Standards for Trees". Available at http://sfdpw.org/sites/default/files/FileCenter/Documents/234-SF_Pruning_Std_6.27approved.pdf
16. Federal Migratory Bird Treaty Act (16 USC § 703–711, 50 CFR 10)
17. Geological Features & Special Permits (California Public Resources Code Section 4307 and Section 4309)
18. National Historic Preservation Act of 1966, (16 U.S.C. 470)

19. Native American Historic Resource Protection Act; Archaeological, Paleontological, and Historical sites; Native American Historical, Cultural, and Sacred sites (California Public Resources Code Section 5097-5097.993)
20. Nuru, M. "Standard Construction Measures for all Public Works Projects". San Francisco Public Works, July 1, 2017
21. San Francisco Department of Public Health, "Monitoring Guidelines for SFHC Article 22B"
22. San Francisco Industrial Waste Ordinance #19-92
23. San Francisco Planning Department, "Consultant & Sponsor Resources". <http://sf-planning.org/consultant-sponsor-resources>
24. San Francisco Police Code, Article 29, Ordinance #274-72 ("Noise Ordinance")
25. San Francisco Public Health Code, Article 22B
26. San Francisco Public Utilities Commission, Construction Best Management Practices Handbook. Available at <http://sfwater.org/index.aspx?page=235>
27. San Francisco Public Utilities Commission, "Re: Application of the Stormwater Design Guidelines Requirements to the Public Right-of-Way", Rev. September 2013. Available at <http://www.sfwater.org/modules/showdocument.aspx?documentid=4228>.
28. San Francisco Public Works Code, Article 4.1 Sewer Use Ordinance
29. San Francisco Public Works Code, Article 4.2 Sewer System Management Ordinance
30. San Francisco Public Works Code, Ordinance No. 260-13, Construction site Runoff Ordinance
31. San Francisco Public Works Order No. 158,170, "Wastewater discharges into the City sewerage system"
32. San Francisco Public Works Dust Control Order (DPW Order No. 171,378)
33. San Francisco Public Works Order No. 172,596, "Guidelines for Processing and Issuance of Special Sidewalk Permits within the Downtown Streetscape Areas."
34. San Francisco Public Works Order No. 178,940, "Regulations for Excavating and Restoring Streets in San Francisco"
35. San Francisco Public Works Order No. 201,954, "Recycling Cobblestones and Granite Curb"

1.3 DEFINITIONS

A. For the purposes of this Section, the following definitions apply:

1. Air Pollutant Exposure Zone: A zone having a substantially greater than average concentration of air pollutants as defined in Health Code Section 3804.

2. "ALERT" sheet: Single-page flyer produced by the San Francisco Planning Department containing a notification that the project site may be located in an archaeologically sensitive area.
3. Alternative Fuels: Any transportation fuel that is less polluting than gasoline or petroleum diesel fuel, as determined by the California Air Resource Board and that is shown to have lower lifecycle carbon emissions than gasoline or petroleum diesel. Alternative Fuels may include, but are not limited to: natural gas; propane; biofuels from low carbon, sustainable and preferably local sources; hydrogen produced from low carbon and/or renewable sources; and electricity.
4. Alternative Sources of Power: Utility-based electric power or other power sources other than diesel engines.
5. ARB: The California Air Resources Board.
6. Archaeological resources: Remains of past human activity, including historic and prehistoric material such as tools and tool fragments, hearth and food remains, structural remains, and human remains.
7. Bridge: A structure that carries a utility or railroad or vehicle, pedestrian, or other traffic over, under, or around obstructions or waterways.
8. Building: A building as defined in the San Francisco Planning Code Section 102, "Definitions".
9. Clean Construction: The performance of all work required to be performed under a Public Works contract meeting the requirements in Sections 2504, 2505 and 2506 of the Environment Code, as applicable.
10. Construction Activities means the performance of all work involved in or required for Construction, except for the issuance or obtaining of a site permit for a project.
11. Construction means building, demolition, excavation, grading or foundation work, whether or not the work requires a City permit.
12. Construction Phase: A particular construction activity over a certain period of time. Construction phases may include, but are not limited to, demolition, site preparation, grading, building construction, architectural coatings, and paving. Multiple Construction Phases of a single project may take place at the same time.
13. DPH: The San Francisco Department of Public Health.
14. Environmentally sensitive area: Area within or near construction limits where access is prohibited or limited in order to protect environmental resources.
15. Equipment Type: A category of off-road equipment. Types of off-road equipment include bore/drill rigs, cranes, crawler tractors, excavators, graders, off-highway tractors, off-highway trucks, other construction equipment, pavers, paving equipment, rollers, rough terrain forklifts, rubber-tired dozers, rubber-tired loaders, scrapers, skid steer loaders, surfacing equipment, tractors/loaders/backhoes, and trenchers.
16. Feasible: When applied to an action required of the Contractor, that action, in the opinion of the City Representative, can be accomplished without resorting to extraordinary means and measures.

17. Inactive nests: Nests that do not contain eggs, chicks, or raptors displaying reproductive behavior.
18. Land disturbance: Any movement of earth or a change in the existing natural soil cover or existing topography that may result in soil erosion from wind, or water, and the moving of sediments into or upon waters, lands or public rights-of-way within the City of County of San Francisco, including, but not limited to building demolition, clearing, grading, grubbing, filling, stockpiling, excavating and transporting over land.
19. Major Construction Project: A public work to be performed within the geographic limits of the City that uses off-road equipment and that is estimated to require 20 or more cumulative days of work, including non-consecutive days, to complete.
20. Most Effective Verified Diesel Emission Control Strategy: a device, system or strategy that is verified, pursuant to Division 3, Chapter 14, of Title 13 of the California Code of Regulations, to achieve the highest level of pollution control from an off-road vehicle.
21. Nesting Season: The City anticipates nesting or attempted nesting by migratory and non-game birds from February 15 to August 31.
22. Off-Road Engine: A non-road engine as defined in Title 40 of the Code of Federal Regulations, Section 89.2.
23. Off-Road Equipment: Equipment with an off-road engine having greater than 25 horsepower and operating for more than 20 total hours over the entire duration of Construction Activities.
24. On-Road Equipment: A heavy-duty vehicle as defined in Title 40 of the Code of Federal Regulations, Section 86.1803-01.
25. Paleontological resources: Fossils and the deposits in which they are found. Fossils are evidence of ancient life preserved in sediments and rock. Examples of paleontological resources are the remains of (1) animals, (2) animal tracks, (3) plants, and (4) other organisms. Archaeological resources are not paleontological resources. Fossils found within an archaeological resource are generally considered archaeological not paleontological resources.
26. Plant species that may harbor Phytophthora: The City considers host species to include: Coast Live Oak (*Quercus agrifolia*), Canyon Live Oak (*Quercus chrysolepis*), California Black Oak (*Quercus kelloggii*), Shreve's Oak (*Quercus parvula* var. *shrevei*), Tanoak (*Notholithocarpus densiflorus*), California bay laurel (*Umbellularia californica*), Rhododendron (*Rhododendron* species), and Camellia (*Camellia* species).
27. Portable Diesel Engine: A diesel engine that is portable as defined in 71 California Code of Regulations, Section 93116.2(bb).
28. Rain event: A rain event is a forecast for the project area by the National Weather Service of a 50 percent chance of occurrence within the following 72 hours of an amount of precipitation of 0.50 inch or greater.
29. Rainy season: Please refer to General Conditions, Section 00 72 00 of the Project Manual for the dates of the rainy season.
30. Sensitive receptor (air quality): Means residence, school, childcare center, hospital or other health-care facility or group living quarters.

31. Sensitive receptor (noise): Any environment listed in *Guidelines for Community Noise - A complete, authoritative guide on the effects of noise pollution on health* (World Health Organization, Geneva, 1999). Table 4.1, for which the recommended noise levels are low, as low as possible, or a maximum $LA_{eq}[dB] < 70$. These include:
 - a. Outdoor living areas
 - b. Dwellings, indoors
 - c. Inside bedrooms
 - d. Outside bedrooms (window open)
 - e. School class rooms and pre-schools, indoors
 - f. Pre-school bedrooms, indoors
 - g. School, playground outdoor
 - h. Hospital, ward rooms, indoors
 - i. Hospitals, treatment rooms, indoors
 - j. Outdoors in parkland and conservation areas
32. Sensitive Use: A category of building use identified as a Sensitive Use in Health Code Section 3804.
33. Soil: Native fill, or introduced earthen fill. It does not include materials that were previously introduced as part of roadway pavement section (including asphalt concrete wearing surface, roadway base, and subbase).
34. Standard Construction Measures (SCMs): The City has established Standard Construction Measures that are contained in the project's Categorical Exemption Determination. As applicable, Contractor-related measures are included in this section.
35. Take: Legal definition regarding harm to protected species as defined in 16 USC § 1532 and California Fish & Game Code § 86.
36. Tier 2 Off-Road Emission Standards: The Tier 2 new engine emission standards in Title 13, California Code of Regulations, Section 2423(b)(1)(A) and/or Title 40, Code of Federal Regulations, Part 89.112(a).
37. VDECS: A verified diesel emission control strategy, designed primarily for the reduction of diesel particulate matter emissions, which has been verified by ARB pursuant to Verification Procedures, Warranty and In-Use Strategies to Control Emissions from Diesel Engines, Title 13, California Code of Regulations, Sections 2700-2710. VDECS can be verified to achieve Level 1 diesel particulate matter reductions (at least 25 percent), Level 2 diesel particulate matter reductions (at least 50 percent), or Level 3 diesel particulate matter reductions (at least 85 percent).
38. Visible dust: Dust comprising visible emissions as defined in Bay Area Air Quality Management Board Regulation 6 – Particulate Matter.

1.4 SUBMITTALS

- A. Submittals listed are only required where the project meets the conditions specified in Part 3, Execution.
- B. Dust control plan shall conform to the following:

1. The site-specific dust control plan shall address all provisions of Section 106A.3.2.6.3 of the Building Code and Public Works Order No. 171,378.
2. The site-specific dust control plan shall contain mapping identifying locations of sensitive receptors.
3. The site-specific dust control plan shall contain site-specific dust monitoring and control measures that will apply to the project. These site-specific measures may include the following or equivalent measures, which accomplish the goal of minimizing visible dust:
 - a. Wetting down areas around soil improvement operations, visibly dry disturbed soil surface areas, and visibly dry disturbed unpaved driveways at least three times per shift per day.
 - b. Analysis of the wind direction.
 - c. Placement of upwind and downwind particulate dust monitors.
 - d. Recordkeeping for particulate monitoring results.
 - e. Hiring of an independent third party to conduct inspections for visible dust and keeping records of those inspections.
 - f. Requirements for when dust generating operations have to be shut down due to dust crossing the property boundary or if dust is contained within the property boundary but not controlled after a specified number of minutes.
 - g. Establishing a hotline for surrounding community members to call and report visible dust problems so that the Applicant can promptly fix those problem; posting signs around the site with the hotline number and making sure that the number is given to adjacent residents, schools and businesses.
 - h. Limiting the area subject to excavation, grading, and other demolition or construction activities at any one time.
 - i. Minimizing the amount of excavated material or waste materials stored at the site.
 - j. Installing dust curtains, plastic tarps or windbreaks, or planting tree windbreaks on the property line on windward and down windward sides of construction areas, as necessary.
 - k. Paving, applying water three times daily, or applying non-toxic soil stabilizers on all unpaved access roads, parking areas and staging areas at the construction site. Reclaimed water must be used if required by Article 21, Section 1100 et seq. of the San Francisco Public Works Code, Article 22. If not required, reclaimed water should be used whenever possible.
 - l. Establishing speed limits so that vehicles entering or exiting construction areas shall travel at a speed that minimizes dust emissions. This speed shall be no more than the speed specified in paragraph 3.1B.
 - m. Installing wheel washers to clean all trucks and equipment leaving the construction site. If wheel washers cannot be installed, tires or tracks and spoil trucks shall be brushed off before they reenter City streets to minimize deposition of dust-causing materials.
 - n. Terminating excavation, grading, and other construction activities when winds speeds exceed 25 miles per hour.
 - o. Hydroseeding inactive construction areas, including previously graded areas inactive for at least 10 calendar days, or applying non-toxic soil stabilizers.

- p. Sweeping of surrounding streets during demolition, excavation and construction at least once per day to reduce particulate emissions.

C. Construction Emissions Minimization Plan:

1. Contractor shall submit its initial Construction Emissions Minimization Plan no less than 28 days prior to mobilization.
2. Contractor shall submit an updated Construction Emissions Minimization Plan on a quarterly basis, and submit each quarterly report within seven business days of the end of each quarter.
3. Contractor shall submit a final Construction Emissions Minimization Plan report summarizing construction activities within two weeks of achieving Substantial Completion.
4. Clean Construction Emissions Plan Certification Statement: Contractor shall submit this statement with its Construction Emissions Minimization Plan.
5. Waiver Request: Contractor shall submit a waiver request to the DPH Head no less than two weeks prior to the planned use of a specific piece of off-road equipment.
6. The Emissions Plan shall include estimates of the construction timeline by phase, with a description of each piece of off-road equipment required for each Construction Phase.
 - a. The description may include, but is not limited to: equipment type, equipment manufacturer, equipment identification number, engine model year, engine certification (Tier rating), horsepower, engine serial number, and expected fuel usage and hours of operation.
 - b. For the VDECS installed, the description may include, but is not limited to: technology type, serial number, make, model, manufacturer, ARB verification number level, and installation date and hour meter reading on installation date.
 - c. For off-road equipment using alternative fuels, the description shall also specify the type of alternative fuel.
 - d. Contractor may use the Clean Construction Equipment Inventory Template to satisfy the Emissions Plan requirements. Refer to the following link for that template: <https://www.sfdph.org/dph/EH/Air/CleanConstruction.asp>
7. The Contractor agrees to comply fully with the Emissions Plan and acknowledges that a significant violation of the Emissions Plan shall constitute a material breach of the Agreement. Contractor must submit a signed Clean Construction Emissions Plan Certification Statement to the City Representative. Refer to the following link for the Emissions Plan Certification Statement Template: <https://www.sfdph.org/dph/EH/Air/CleanConstruction.asp>
8. After City review and approval, the Contractor shall make the Emissions Plan available to the public for review onsite during working hours.
 - a. The Contractor shall post at the construction site a legible and visible sign summarizing the Emissions Plan. Refer to the following link for the Clean Construction Sign Template: <https://www.sfdph.org/dph/EH/Air/CleanConstruction.asp>
 - b. The sign shall also state that the public may ask to inspect the Emissions Plan for the project at any time during working hours, and shall explain how to request to inspect the Emissions Plan.

- c. The Contractor shall post at least one copy of the sign in a visible location on each side of the construction site facing a public right-of-way.

9. Reporting:

- a. After Construction Activities begin, the Contractor shall update the Emissions Plan on a quarterly basis documenting changes from the original plan and demonstrating compliance with the Emissions Plan. The report shall be submitted to the City Representative quarterly and a copy shall also be maintained at the construction site.
- b. Prior to receiving a Notice of Final Completion, or within six months of completion of Construction Activities if a final certificate of acceptance is not required, the Contractor shall submit to the City Representative a final report summarizing Construction Activities, including the start and end dates and duration of each Construction Phase, and the specific information required in the Emissions Plan.

D. Construction Erosion Control Submittals:

- 1. Contractor must submit documentation of the approval of the Erosion and Sediment Control Plan (ESCP) or Stormwater Pollution Prevention Plan (SWPPP) by the San Francisco Public Utilities Commission to the City Representative before the beginning of Construction.
- 2. Contractor shall as applicable provide details in the ESCP or SWPPP on site-specific implementation of the Best Management Practices (BMPs) to be applied.
 - a. Descriptions of BMPs and their implementation may be found at:
 - 1) SFPUC's Construction Best Management Practices Handbook, available for download at: <http://sfwater.org/>
 - 2) California Stormwater Quality Association's Construction Best Management Practice Handbook, available for download at: <https://www.casqa.org/>
 - 3) Caltrans Storm Water Quality Handbooks Construction site Best Management Practices Manual available for download at: <http://www.dot.ca.gov/hq/construc/stormwater>

E. Qualification Data: For firms and persons specified in subsection 1.5 "Quality Assurance" of this Section to demonstrate their capabilities and experience.

F. Contractor shall provide City Representative with documentation of disposal of plant materials potentially harboring the *Phytophthora ramorum* pathogen.

G. Written and/or photographic documentation of methods for avoidance of Environmentally Sensitive Areas, where Environmentally Sensitive Areas are shown on project plans.

1.5 QUALITY ASSURANCE

A. Qualifications

- 1. Qualified Acoustical Consultant: A Board Certified Institute of Noise Control Engineering (INCE) member or other qualified consultant or engineer approved by the City Representative.
- 2. Qualified Arborist: The Qualified Arborist is one provided by Contractor who possesses a professional certification from the International Society of Arboriculture, and/or possesses a valid C-27 and/or a C-61/D-49 license in the State of California.

3. Qualified Biologist: The Qualified Biologist is one provided by Contractor whose activities must be approved by a state or federal agency as provided in applicable permit, license, agreement, certification, or any combination of these. In the event that none of these apply, the biologist must possess at a minimum a bachelor's degree in Wildlife Biology or a closely related discipline, as approved by the City Representative.
4. Qualified Historic Architect or Historic Preservation Professional: Any consultant within the "Historic Resource Consultant Pool" as established by the San Francisco Planning Department.
5. Qualified SWPPP Practitioner (QSP): Individual who is authorized by the State Water Resources Control Board (SWRCB) to develop and revise Stormwater Pollution Prevention Plans.

B. Regulatory Requirements

1. All work shall comply with the following:
 - a. Bald and Golden Eagle Protection Act, 16 USC § 668.
 - b. Bay Area Air Quality Management District (BAAQMD), Current Rules.
 - c. BAAQMD Regulation 6-305, Particulate Matter and Visible Emissions, (<http://www.baaqmd.gov/regs/rg0600.pdf>)
 - d. California Fish and Game Code §§ 3503, 3513, and 3800
 - e. California State Water Resources Control Board, Construction General Permit Order
 - f. City and County of San Francisco Municipal Transportation Agency, *Regulations for Working in San Francisco Streets*, 8th ed., 2012.
 - g. Federal Migratory Bird Treaty Act (16 USC § 703–711, 50 CFR 10)
 - h. Geological Features & Special Permits (California Public Resources Code Section 4307 and Section 4309)
 - i. National Historic Preservation Act of 1966, (16 U.S.C. 470)
 - j. Native American Historic Resource Protection Act; Archaeological, Paleontological, and Historical sites; Native American Historical, Cultural, and Sacred sites (California Public Resources Code Section 5097-5097.993)
 - k. San Francisco Building Code Section 106.3.2.6, Ordinance 176-08 ("Construction Dust Control")
 - l. San Francisco Environment Code Section 2504-2405
 - m. San Francisco Health Code Article 22B – Construction Dust Control Requirements
 - n. San Francisco Police Code, Article 29, Ordinance #274-72 ("Noise Ordinance")
 - o. San Francisco Public Works Code, Article 2.4 ("Excavation in the Public Right-of-Way")
 - p. San Francisco Public Works Code, Article 4.1 ("Sewer Use Ordinance")
 - q. San Francisco Public Works Code, Article 4.2 ("Sewer System Management Ordinance")
 - r. San Francisco Public Works Code, Ordinance #19-92 ("San Francisco Industrial Waste Ordinance").
 - s. San Francisco Public Works Code Ordinance #175-91, Sections 1100-1107

- t. San Francisco Public Works Code, Ordinance No. 260-13, (“Construction site Runoff Ordinance”)
 - u. San Francisco Public Works Dust Control Order (DPW Order No. 171,378)
 - v. San Francisco Public Works Order No. 158170, (“Wastewater discharges into the City sewerage system”).
- C. The City will inspect and monitor Contractor's adherence to the requirements specified herein and will report on Contractor's compliance.
- 1. Said inspection, monitoring, and reporting activities may include, but are not limited to, qualitative, quantitative and photographic observations and data collection on the impacts of noise, vibration, air quality, traffic, street pavement damage, water quality, cultural resources, biological resources, and hazardous materials.
 - 2. Contractor shall cooperate with such inspection and monitoring activities, provide access to the Work site to establish and secure monitoring stations, and make its facilities and records available to the City for performing such monitoring.
 - 3. The City will issue a Non-Compliance Notice to Contractor for any detected non-compliance with the provisions herein or of any environmentally objectionable acts and the corrective action to be taken.
- D. Accountability and Remedial Action
- 1. Contractor shall be held responsible for any damage resulting from Contractor operations, to natural vegetation, wildlife, cultural resources, waters of the State and of the United States and water quality, and any other environmental resources located either:
 - a. Outside the Work areas permitted in the Contract Documents or
 - b. Inside the Work areas but clearly marked by City on the Drawings or in the field to indicate that avoidance of that sensitive resource is required.
 - 2. Damage to such resources can result in monetary fines, requirements for restoration of or compensation for damage, additional environmental training, and/or stoppage of Work. Any costs or fines shall be paid by Contractor.

1.6 PROJECT CONDITIONS

A. Project Environmental Requirements

- 1. Contractor shall monitor the National Weather Service forecast daily for forecasts of a rain event.

1.7 SEQUENCING

- A. Preconstruction survey: When applicable, the preconstruction surveys to inspect for the presence of nesting birds shall be done 3 days before the commencement of construction activities.
- B. When applicable, prior to start of construction, Contractor shall conduct a meeting with the City Representative to review the results of nesting surveys and determine protective measures. Notify the City Representative at least 10 working days before convening meeting.
 - 1. Conduct meeting at Project site to comply with requirements in Section 01 31 19 "Project Meetings."

- C. In advance of construction, Contractor shall photograph all catch basins within the limits of work. Each catch basin shall have at least two photos, one from the top view and one from the side view along the flow line.
- D. When applicable, in advance of construction, Contractor shall submit construction erosion-control submittals.
- E. When applicable, in advance of construction, Contractor shall distribute "ALERT" sheet.

1.8 DAMAGES FOR FAILURE TO MEET ENVIRONMENTAL REQUIREMENTS

- A. The Contractor shall be liable for all fines, penalties, liquidated damages and costs arising from any failure to implement mitigation measures to control environmental impacts that are subject to Federal, State, and local regulatory fines.
- B. The Contractor shall be liable for all fines, penalties, liquidated damages and costs arising from any violation of the environmental mitigation measures, and City Ordinances, and this specification, as related to or concerning environmental mitigation measures; the control of dust and airborne particles; the control, removal, transport, and disposal of excavated materials; control of wastewater and sediment; housekeeping, maintenance of the work area; debris control; the clean construction ordinance; and noise. The Contractor shall pay particular attention to:
 - 1. The prevention of accumulation and prompt clean-up of spills of excavated materials onto streets, sidewalks, and roadways;
 - 2. Sediment control, the protection of catch basins, and prevention of soil and sediment from falling or washing into storm drains and sewers;
 - 3. The prevention and control of dust created by its work;
 - 4. Proper treatment and disposal of storm water and ground water prior to discharge;
 - 5. Adherence to noise restrictions;
 - 6. Adherence to equipment emissions requirements and restrictions; and
 - 7. Daily housekeeping and site maintenance to keep each Project work location in clean and orderly condition.
- C. Liquidated Damages: In addition to any regulatory fines, should the Contractor fail to adhere to the DPW Dust Control Order 171,378, liquidated damages shall be assessed in the amount of \$1,000.00 per day for each day any violation is not corrected.
- D. Liquidated Damages: In addition to any regulatory fines, should the Contractor fail to implement the mitigation measures as per this Section, or promptly take all required remedial actions to the City's satisfaction herein, the City Representative reserves the right to issue environmental non-compliance notices, have the necessary work performed by others, assess fines of one thousand dollars (\$1,000.00) per non-compliance occurrence or per event, or to deduct or withhold all monies required therefore as permitted under the Contract Documents.
- E. For Clean Construction
 - 1. Liquidated Damages: By entering into the Agreement, Contractor and City agree that if Contractor uses off-road equipment and/or off-road engines in violation of the Clean Construction requirements set forth in Administrative Code Section 6.25 and Chapter 25 of the Environment Code, the City will suffer actual damages that will be impractical or

extremely difficult to determine. Accordingly, Contractor and the City agree that Contractor shall pay the City the amount of \$100 per day per each piece of off-road equipment and each off-road engine used to complete Work on the Project in violation of the Ordinance. Such amount shall not be considered a penalty, but rather agreed monetary damages sustained by City because of Contractor's failure to comply with the Clean Construction requirements.

2. False Representations: False representations by the Contractor, in connection with the bidding, execution or performance of any City contract, regarding the nature or character of the off-road equipment and/or off-road engines to be utilized, on the contract, or to the City about the nature or character of the off-road equipment and/or off-road engines actually used may subject the Contractor to the consequences of noncompliance specified in Section 2510 of the Environment Code, including but not limited to the penalties prescribed therein. The assessment of penalties for noncompliance shall not preclude the City from exercising any other rights or remedies to which it is entitled.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Materials necessary to prevent construction debris from entering the sewer system.
- B. For projects with a SWPPP or an ESCP, materials necessary for the implementation of construction-stormwater BMPs as specified in the SWPPP or ESCP.
- C. For projects doing work affecting trees or bridges during nesting season, bird-exclusion netting, or other exclusion devices.
- D. Materials necessary for compliance with the Noise Control Program.
- E. Materials required for compliance with all measures under this Section.
- F. Signage as required.
- G. For projects with Environmentally Sensitive Areas indicated on the project plans, materials to be used for protection of Environmentally Sensitive Areas.

PART 3 - EXECUTION

3.1 AIR QUALITY

- A. Emissions Controls
 1. Contractor shall ensure that all equipment is tuned and maintained in accordance with the manufacturer's specifications.
 2. Contractor shall prohibiting idling of motors when equipment is not in use or when truck are waiting in queues. The idling time of all construction equipment used at the site shall not exceed 5 minutes.
 3. Contractor shall limit the hours of operation of heavy-duty equipment and/or amount of equipment in use to what is needed.
 4. When feasible, alternative fuel or electrical construction equipment shall be used at the project site.

B. Dust Control

1. Contractor shall clean up spillage on City streets, whether directly or indirectly caused by Contractor's operations. All visible mud or dirt track-out from areas of land disturbance onto adjacent City streets shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
2. Minimize to the extent feasible the amount of excavated material or demolition wastes stored at the site. Remove demolition debris from the site no later than the end of each workday.
3. Contractor shall keep the site and adjacent areas clean and perform wet sweeping at the end of each shift.
4. Contractor shall perform continuous water spraying during dust generating activities. Mist or spraying shall be conducted in such a way as to prevent puddling or generation of runoff. Contractor shall mist any immediate area of demolition with a water spray to prevent airborne dust particles.
5. Wet all exposed soil surfaces at least three times daily during dry weather or more frequently if dust is blowing or if required by the City. .
6. Whenever feasible, Contractor shall use reclaimed water for dust control activities as described in City Ordinance # 175-91, Article 21, and Section 1100 to 1107 of the San Francisco Municipal Code (Public Works Code).
7. Contractor shall use dust enclosures, curtains, and dust collectors as necessary to control dust.
8. Contractor shall load haul trucks, hauling debris, soils, sand or other such materials so that the material does not extend above the walls or back of the truck bed. Wet before covering and tightly cover the surface of each load before the haul truck leaves the loading area.
9. Contractor shall limit vehicle speed limit on unpaved roads to 15 miles per hour (mph).
10. Contractor shall cover any inactive (no disturbance for more than seven days) stockpiles greater than ten cubic yards or 500 square feet of excavated materials, backfill material, import material, gravel, sand, road base, and soil with a 10 mil (0.01 inch) polyethylene plastic or equivalent tarp and brace it down or use other equivalent soil stabilization techniques.
11. For management of dust related to hazardous materials and/or suspected hazardous materials, including serpentine soils, refer to applicable Divisions 01 and 02 Hazardous Materials related specifications.

C. If the project grades or excavates more than one-half acre surface area at any given time, and the project is within 1,000 feet of a sensitive receptor as defined above, Contractor shall submit a site-specific dust control plan for the review and approval by the San Francisco Health Department as set forth in Article 22B of the San Francisco Health Code. Construction, demolition, excavation, grading, foundation work, or other permitted activities may not commence until Contractor has submitted to the City Representative a copy of the Department of Public Health's (DPH) written approval of the dust control plan.

D. In the event that monitoring is required as part of the dust-control plan, Contractor's attention is directed to the Department of Public Health's handout "Monitoring Guidelines for SFHC Article 22B".

- E. The Contractor shall observe and adhere strictly to all of the specific dust control measures so as to achieve a goal of "NO VISIBLE DUST EMISSIONS." This means that the Contractor shall not emit particles from any operation in sufficient number to cause annoyance to any other person, which particles are large enough to be visible as individual particles at the emission point or of such size and nature as to be visible individually as incandescent particles.
- F. For all Major Construction Projects that meet the requirements of Environment Code Section 2504(a) and which are located in the Air Pollutant Exposure Zone and within 1,000 feet of a Sensitive Use, the following requirements apply:
1. All off-road equipment shall be fueled by biodiesel fuel grade B20, and have engines that (a) meet or exceed either United States Environmental Protection Agency or ARB Tier 2 off-road emission standards, and (b) have been retrofitted with an ARB Level 3 VDECS. Equipment with engines meeting Tier 4 Interim or Tier 4 Final off- road emission standards automatically meet this requirement. See paragraph 3.1G below regarding the waiver procedure for this requirement.
 2. Where access to alternative sources of power is available, use of portable diesel engines to perform work on the project shall be prohibited. See paragraph 3.1G regarding the waiver procedure for this requirement.
 3. Diesel engines, whether for off-road or on-road equipment, shall not be left idling for more than two minutes at any location, except as allowed for in applicable state regulations regarding idling for off-road and on-road equipment (e.g., traffic conditions, safe operating conditions). If within 100 feet of a school zone idling times shall be limited to 30 consecutive seconds. The Contractor shall post legible and visible signs, in English, Spanish, and Chinese, in designated queuing areas and at the construction site to remind operators of the idling limit. Refer to the following link for the Clean Construction Sign Template: <https://www.sfdph.org/dph/EH/Air/CleanConstruction.asp>.
 4. The Contractor shall instruct construction workers and equipment operators on the maintenance and tuning of construction equipment, and require that such workers and operators properly maintain and tune equipment in accordance with manufacturer specifications.
- G. Construction Emissions Minimization Plan: All Major Construction Projects that meet the requirements of Environment Code Section 2504(a), which are located in the Air Pollutant Exposure Zone and are within 1,000 feet of a Sensitive Use, also must comply with the following requirements:
1. Before starting on-site Construction Activities, the Contractor shall submit a Construction Emissions Minimization Plan ("Emissions Plan") to the City Representative for review and approval. (See paragraph 1.4B of this section.) The Emissions Plan shall state, in reasonable detail, how the Contractor will meet the requirements of Section 2505 of the Environment Code.
 2. Waivers
 - a. Waivers for off-road equipment:
 - 1) The Contractor may request to waive the equipment requirements if: (a) a particular piece of off-road equipment with an ARB Level 3 VDECS is technically not feasible; (b) the equipment would not produce desired emissions reduction due to expected operating modes; (c) installation of the equipment would create a safety hazard or impaired visibility for the operator; or, (d) there is a compelling emergency need to use off-road equipment that is not retrofitted with an ARB Level 3 VDECS.

- 2) Contractor shall submit a waiver request to the DPH Head, or designee, no less than two weeks prior to the planned use of a specific piece of off-road equipment.
- 3) If the DPH Head, or designee, grants the waiver the Contractor must use the next cleanest piece of off-road equipment, according to the table directly below:

| Off-Road Equipment Compliance Step Down Schedule* | | |
|--|--------------------------|--------------------|
| Compliance Alternative | Engine Emission Standard | Emissions Control |
| 1 | Tier 2 | ARB Level 2 VDECS |
| 2 | Tier 2 | ARB Level 1 VDECS |
| 3 | Tier 2 | Alternative Fuel** |
| <p>* If the City determines that the equipment requirements cannot be met, the Contractor must meet Compliance Alternative 1. If the City determines that the Contractor cannot supply off-road equipment meeting Compliance Alternative 1, then the Contractor must meet Compliance Alternative 2. If the City determines that the Contractor cannot supply off-road equipment meeting Compliance Alternative 2, then the Contractor must meet Compliance Alternative 3.</p> <p>** Alternative fuels are not a VDECS.</p> | | |

b. Waivers for portable diesel engines:

- 1) The DPH Head, or designee, may waive the alternative source of power requirement if an alternative source of power is limited or infeasible at the project site. If the City grants the waiver, the Contractor must submit documentation that the equipment used for onsite power generation meets the requirements of this subsection.
- 2) All Other Waivers: The DPH Head or designee also may waive the requirements of the Ordinance on the grounds set forth in Section 2507 of the Environment Code.
- 3) For any waiver granted, the City Representative will within two business days prepare a written notice of the waiver and a written memorandum explaining the basis for the waiver and the steps that will be taken to safeguard public and City employee health during the noncomplying work. The memorandum will also state the steps that the City and the Contractor will take to minimize the use of noncomplying equipment or engines during the noncomplying work.

3.2 WATER QUALITY

- A. If the project includes construction or demolition activity disturbing 5,000 square feet or more of the ground surface, measured cumulatively, including any land-disturbing activities, Contractor shall obtain a Construction Site Runoff Control Permit obtained from the San Francisco Public Utilities Commission (SFPUC), which requires the submittal to the SFPUC of an Erosion and Sediment Control Plan (ESCP).
- B. If the project falls within the Separate (MS4) sewer area as mapped by the San Francisco Public Utilities Commission, and includes land disturbance of one or more acres of soil, either as a single project or as part of a larger common plan of development as determined by the City Representative, the Contractor must provide a Storm Water Pollution Prevention Plan (SWPPP)

prepared by a certified Qualified SWPPP Developer (QSD) that must be approved by the City Representative before the start of construction.

- C. For work in areas under the jurisdiction of the Port of San Francisco, Contractor shall adhere to the provisions of the State General Permit for Discharges of Storm Water Associated with Construction Activity (Construction General Permit Order 2009-0009-DWQ), and the Port of San Francisco's Stormwater requirements.
- D. For all projects, all measures specified below shall apply:
 - 1. Contractor shall apply construction-stormwater Best Management Practices (BMPs).
 - 2. Drainage Protection
 - a. Contractor shall be responsible for protecting and keeping in operation all storm water inlets and catch basins throughout the entire project site for the duration of the project until final acceptance.
 - b. In advance of construction, Contractor shall photograph all catch basins within the limits of work. Each catch basin shall have at least two photos, one from the top view and one from the side view along the flow line.
 - c. Contractor shall provide labor and materials necessary to prevent debris from entering the sewer system.
 - d. Contractor shall prevent construction material, pavement, concrete, earth, paints, thinner, solvents and other debris or toxic material from entering the sewer structure, including surface flow collection systems such as catch basins and culverts.
 - e. Prior to the final inspection for acceptance, Contractor shall remove the catch basin and inlet protection and clean the catch basins and inlets.
 - 3. Wastewater Discharges and Disposal
 - a. Discharges to the sewer system shall meet the following statutory requirements:
 - 1) The City's Industrial Waste Ordinance No. 116-97 (Chapter X (Public Works Code), Part II, San Francisco Municipal Code, Article 4.1 and Article 4.2).
 - 2) DPW Order No. 158170 for wastewater discharges in to the City's sewerage system.
 - 3) Requirements for Batch Wastewater Discharges from the San Francisco Public Utilities Commission, Wastewater Enterprise (SFPUC-WWE).
 - 4) The construction dewatering site discharge limits of the local Water Pollution Control Plant.
 - b. Contractor is permitted to discharge runoff and dewater into the City's combined sewer system after Contractor submits and obtains approval of a sewer discharge permit and meets the above regulatory requirements.
 - c. Approved non-stormwater discharges to the sewer system include incidental discharges of potable water from irrigation of vegetative erosion control measures, and water from dust control applications. Non-storm water discharges requiring a batch discharge permit include groundwater from excavations, water from truck washing activities, and water from the cleaning or testing of pipes or tanks.
 - d. Contractor shall be responsible for obtaining and paying for all water discharge permits and for paying all sewer service charges, penalties and other incidental fees and expenses resulting from discharging wastewater into the City's sewerage system by Contractor's operations in a timely manner. The City shall not honor any claims from Contractor arising from delays in obtaining the sewer discharge permit.

- e. Wastewater which is transferred from the site during this Project shall meet the pre-treatment standards of the San Francisco Municipal Code, section 123, Industrial Waste Ordinance #19-92 and DPW Order No. 158,170 prior to discharge into the City's sewage system.
4. Wastewater Contamination
- a. Should the existing wastewater be uncontaminated, and subsequently become contaminated due to Contractor's operations, all costs related to satisfactory cleanup and disposal shall be the responsibility of Contractor. Such costs shall include, but not be limited to, re-design, re-construction, pretreatment and, sewer service permit and usage fees costs necessary to satisfy requirements of Industrial Waste Ordinance #19-92, and DPW Order No. 158,170.
 - b. Should the existing wastewater be contaminated, or should it be uncontaminated but subsequently become contaminated due to conditions other than Contractor's operations, a Change Order shall be issued as provided in Article 6 of the General Conditions for additional costs or time extension shall be granted as provided in Article 7 of the General Conditions to pretreat the contaminated water prior to routing the flow into the sewer system or other approved disposal at the direction of the City.
5. Spill Prevention and Control
- a. Contractor shall assign and train spill-response personnel, who shall address spills and leaks immediately.
 - b. Provide spill cleanup material on site to adsorb, remove and contain any spill or releases from leaving the active work area and entering into any storm drain or sewer inlet.
 - 1) Spill cleanup equipment shall include absorbent socks, over pack drums, personal protective equipment, shovel, labels, valves, valve charts, valve wrenches to shut off water supply, etc.
 - c. On-site vehicles must be monitored for leaks; inactive equipment must be stored with drip pans to contain any fluid leaks. Drip pans containing oil must be drained into waste oil drums on a regular basis.
 - d. Place all equipment or vehicles, which are to be fueled, maintained or stored in a designated area fitted with functional leak-containment measures.
 - e. Dispose of spent cleanup materials at a California-permitted waste-disposal facility. Leaked materials that constitute hazardous waste shall be disposed of in accordance with applicable hazardous materials specifications.
 - f. Containers must remain closed at all times except when transferring contents. Heavy containers (in excess of 60 lb.) of oil or hazardous material shall not be moved by a single unassisted worker unless the worker employs a drum dolly.
 - g. Funnels: pumps with closed hose systems, or other means shall be used to prevent spills while transferring material from large containers to small ones. Pumps in operation shall not be left unattended.
 - h. Contractor's designated Project Safety Officer shall immediately be alerted to of any spill occurring in the work area. It is the responsibility of Project Safety Officer direct the cleanup activities and contact the City Representative immediately.
 - i. Contractor is responsible for recording all steps taken to control spills in the field notes/daily log.

3.3 TRAFFIC

- A. Where traffic and/or pedestrian circulation may be affected by project construction, Contractor shall implement traffic control measures to maintain traffic and pedestrian circulation on streets affected by construction of the project.
 - 1. The measures shall, at a minimum, be consistent with the Requirements of San Francisco Municipal Transportation Agency (SFMTA)'s Regulations for Working in San Francisco Streets ("Blue Book").
 - 2. Control measures may include, but not be limited to, flaggers and/or construction warning signage of work ahead; scheduling truck trips during non-peak hours to the extent feasible; and maintaining access to driveways, private roads, and off-street commercial loading facilities by using steel trench plates or other such method.
 - 3. Any traffic-management plans accepted by Public Works for this project take precedence over the traffic provisions of the Standard Construction Measures (SCM-4).
- B. Contractor shall ensure provision for parking management and spaces for all construction workers to ensure construction workers do not park in on-street spaces.

3.4 NOISE CONTROL

- A. Contractor shall ensure that noise levels specified in San Francisco Police Code Section 2907(a) are not exceeded during construction activities.
- B. Contractor shall use best available controls techniques including mufflers, intake silencers, ducts, engine enclosures and acoustic attenuating shields or shrouds for all construction-noise equipment and trucks; and use electric-powered rather than diesel-powered construction equipment, as feasible to ensure compliance with the construction noise levels allowed.
- C. Contractor shall coordinate and schedule Contractor's construction operations to conform to City and County of San Francisco Police Code, Article 29.
- D. Contractor shall pay all fines for Contractor's violations of the San Francisco Noise Ordinance, at no additional cost to the City.
- E. Monitoring
 - 1. The City, at its own discretion, may monitor construction noise as part of the environmental monitoring process. When noise levels exceed the noise limits pursuant to article 29 of the San Francisco Police Code, Contractor shall stop work or place restrictions on construction operations to further limit the noise as directed by the City.
 - 2. Contractor shall not resume the work before correcting the conditions that cause excessive noise as deemed acceptable by the City Representative.
- F. Night Noise
 - 1. Contractor shall not perform work between the hours of 8:00 p.m. and 7:00 a.m. of the following day if the noise level created thereby is in excess of the ambient noise level by 5 dBA at the nearest property line, unless approved by the City Representative and unless a noise permit for such work has been obtained pursuant to the Police Code Section 2908.
 - 2. The use of vehicles for night work that are legally required to be equipped with backing warning alarms shall be reduced to the extent feasible for night work, and administrative

controls as defined in the California Code of Regulations, Title 8 Sec. 1592 shall be used for worker protection for backing movements by other vehicles.

3. If Contractor is directed in the Contract Documents or by special written notice from the City Representative to perform any part of the work between the hours of 8 p.m. and 7 a.m. or on weekends or holidays, Contractor must obtain and comply with a City noise permit prior to starting any work. Contractor must apply for City noise permits through the City Representative at least fifteen (15) working days in advance of night (i.e., between 8:00 p.m. and 7:00 a.m.), weekend, and holiday work. The requirements of the Contract Documents, including safety requirements, shall apply for all night, weekend, and holiday work performed. The noise permit shall be obtained from and approved by Bureau of Street Use and Mapping, 49 South Van Ness Avenue, Suite 300, San Francisco, CA 94103.

3.5 BIRD PROTECTION

- A. This subsection applies only to projects that include the removal or pruning of trees, and/or exterior work on buildings, and/or construction on bridges.
- B. Inspection for bird/nests during bird nesting season:
 1. If work shall be performed during nesting season (February 15 through August 31), a Qualified Biologist must be obtained by Contractor to provide a pre-construction survey for the trees to be affected during construction work.
- C. If active nests are identified by the Qualified Biologist, no work may occur at that tree or bridge and in the surrounding area:
 1. For active nests found in trees, a 100-foot exclusion buffer of temporary fencing shall be erected around the tree with the active nest,
 2. For active nests found on bridges, a 100-foot exclusion buffer shall be established around the nest site, and no work may occur within the 100-foot buffer until the Certified Biologist has verified that young birds have left the nest and that active nesting has been completed.
 3. For any active nests containing raptor or owl species, the exclusion buffer shall be 300-feet.
- D. If Contractor finds an injured or dead bird or discover migratory or nongame bird nests that may be adversely affected by construction activities, immediately:
 1. Stop all work within a 100-foot radius of the discovery.
 2. Notify the City Representative.
- E. Contractor shall perform one or a combination of the following protection measures as required to prevent further nesting by birds in trees or structures during project construction:
 1. Install exclusion devices
 2. Use nesting-prevention measures
 3. Remove and dispose of partially constructed and unoccupied nests of migratory or nongame birds on a regular basis to prevent their occupation.

3.6 TREE CONSERVATION

- A. If trimming of roots greater than 2-inches in diameter is necessary during the course of construction, a Qualified Arborist provided by the contractor shall supervise the trimming of such roots.
- B. Pruning of trees shall be performed in conformance with the City of San Francisco Pruning Standards for Trees (June 27, 2006) (available at http://sfdpw.org/sites/default/files/FileCenter/Documents/234-SF_Pruning_Std_6.27approved.pdf), in coordination with the City's Bureau of Urban Forestry, and under the supervision of the qualified arborist.
- C. For trees to be retained on site or adjacent to the site, Contractor shall exclude grading, trenching, or placement of heavy equipment within the drip line of trees, unless approved by the City Representative. If approved by the City Representative, Contractor's arborist shall recommend and Contractor shall implement measures to protect the tree (e.g., protecting the roots from compaction). Contractor shall be responsible for replacing any damaged trees as directed by the City Representative.
- D. Disposal of Plant Material That Potentially Harbors Phytophthora
 - 1. This paragraph applies only to projects that involve grubbing or removal of trees and/or other vegetation.
 - 2. Contractor shall identify whether during the course of work plant species that may harbor Phytophthora shall be pruned or removed.
 - 3. Plants of species that may harbor Phytophthora shall be chipped on site and the chips spread at the location of the same trees and/or shrubs that produced the debris. This plant debris may not be used for any purpose at any other location.
 - 4. If spreading on site is not possible, materials shall be disposed of in landfill or at an industrial-scale composting facility. Contractor shall provide documentation of such disposal to the City Representative.
 - 5. For sites identified as potentially harboring Phytophthora, Contractor shall ensure that the following actions are performed:
 - a. All workers scrape, brush, and/or hose off accumulated soil and mud from clothing, gloves, boots, and shoes before leaving the site.
 - b. Mud and plant debris is removed by blowing out or power washing chipper trucks, chippers, bucket trucks, fertilization and soil aeration equipment, cranes, and other vehicles before leaving the site.
 - c. Soil and mud is removed or washed off from on vehicle tires, boots, shovels, stump grinders, trenchers, etc., before use at another site.
 - d. Tools used in tree removal/pruning are disinfected with Lysol® spray, a 70% or greater solution of alcohol, or a solution consisting of 1 part household bleach to 9 parts water before leaving the site.

3.7 ENVIRONMENTALLY SENSITIVE AREA (ESA)

- A. Contractor shall avoid areas shown on construction plans as being within an above-ground ESA. Contractor shall coordinate methods for avoidance intrusion into ESAs with the City Representative and provide written and/or photographic documentation of these methods on request of the City Representative.

- B. Where the project is within the boundaries of an area of particular archaeological sensitivity, as determined by the San Francisco Planning Department and noted and/or depicted on project plans, potential below-ground archaeological resources shall be protected by a conceptual ESA boundary at two feet below the top of existing soil, depicted on the construction plans. If this ESA boundary is breached, immediately:
 - 1. Stop all work within 50 feet of the ESA or action-plan boundary
 - 2. Secure the area
 - 3. Notify the City's Representative

3.8 CONSTRUCTION STAGING

- A. Contractor shall locate site construction staging areas away from public view and on paved or previously disturbed areas to the extent feasible.
- B. For night work, Contractor shall ensure that construction lighting shall be directed away from residential areas and have shields to prevent light spillover effects.
 - 1. Lighting systems with flood, spot, or stadium type luminaires shall be aimed downward at the work and rotated outward no greater than 30 degrees from nadir (straight down).
 - 2. When, in the opinion of the City Representative, the lighting is disturbing adjoining property, Contractor shall modify the lighting arrangement or add hardware to shield the light trespass.

3.9 ARCHAEOLOGICAL AND PALEONTOLOGICAL DISCOVERY

- A. If potential archaeological resources are discovered at the site, the following procedures shall be instituted:
 - 1. Promptly report all subsurface archaeological finds to the City Representative.
 - 2. The City Representative shall issue a written order to suspend work in accordance with Paragraph 14.02 of the General Conditions directing Contractor to cease all construction operations only at the location of such potential cultural resources find.
 - 3. The City's archaeologist shall assess the significance of the find, and immediately report to the City Environmental Review Officer (ERO), who shall recommend specific additional avoidance and minimization measures as necessary to minimize potential effects on cultural resources, which may include additional site security, with which Contractor shall comply.
 - 4. If human remains are encountered, all work in the area must halt and the San Francisco County Coroner must be contacted, pursuant to California Public Resources Code Sections 5097.98, and 5097.99.
- B. Any soil disturbing activities below a depth of two feet below grade surface shall be preceded by the distribution by Contractor of the San Francisco Planning Department archeological resource "ALERT" sheet to any project subcontractor (including demolition, excavation, grading, foundation, pile driving, etc. firms); or utilities firm involved in soil disturbing activities within the project site, and all field personnel, including machine operators, field crew, pile drivers, supervisory personnel, etc.
 - a. "ALERT" sheet will be provided to Contractor by City Representative before the beginning of construction.

- b. Following the distribution of the "ALERT" sheet, Contractor will provide City representative with a signed affidavit confirming that all field personnel have received copies of the "ALERT" sheet.
- C. If unanticipated paleontological resources are discovered at the job site, do not disturb the resources and immediately:
 - 1. Stop all work within a 50-foot radius of the discovery.
 - 2. Secure the area.
 - 3. Notify the City Representative. The City Representative shall investigate the discovery and modify the dimensions of the secured area if needed. The Contractor shall not move paleontological resources or take them from the job site. The Contractor shall not resume work within the radius of discovery until authorized.
- D. For Work suspensions there shall be no compensation to Contractor for any delays up to a total of 20 working days due to the City's order to suspend Work. Cost or time impacts as a result of a suspension under this subsection longer than a total of 20 hours, or for additional avoidance and minimization measures, shall be resolved as provided in the General Conditions. Refer to Article 6 for Changes and Article 13 for Claims.

END OF SECTION

APPENDIX A: ALERT SHEET AFFIDAVIT

We the undersigned, as representatives of the contracting firm of

offer testimony to the fact that the San Francisco Planning Department archaeological resource "ALERT" sheet was distributed to all construction field personnel prior to the start of work on

_____ Date, and again during construction on _____ Date.

Name of Contractor's Representative: _____

Signature of Contractor's Representative: _____

Date: _____

APPENDIX B: ALERT SHEET & CULTURAL BRIEFING

What to do if you Discover Cultural Resources in the Project Area

- If potential cultural resources are identified in the project area, immediately HALT all ground disturbing activities in the vicinity of the discovery.
- Contact the SFPUC Environmental Construction Compliance Manager immediately at one of the telephone numbers listed below and on your ALERT sheet. The SFPUC Environmental Construction Compliance Manager will in turn notify the Environmental Review Officer or his/her designee.
- The Environmental Review Officer or his/her designee or a qualified specialist will evaluate the discovery and ensure proper treatment of the resource.
- DO NOT resume ground disturbing activities in the vicinity of the discovery until the Environmental Review Officer or his/her designee has evaluated the discovery and authorizes work to resume.

Upon discovery of suspected human remains:

- All work in the vicinity of the remains must cease immediately.
- The area will be protected with flagging or by posting a monitor or construction worker to assure no additional disturbance occurs; if the find occurs at the end of the work day, the area must be secured by plating, or covering with other impervious material to prevent vandalism.
- Notify SFPUC Environmental Construction Compliance Manager immediately at one of the telephone numbers listed below and on you ALERT sheet. The SFPUC Environmental Construction Compliance Manager will in turn notify the Environmental Review Officer or his/her designee.
- The SFPUC Environmental Construction Compliance Manager may request that you notify the appropriate County Coroner of the discovery. Telephone numbers are listed below.
- If the County Coroner determines that the remains are Native American, the Native American Heritage Commission will be notified, a Most Likely Descendent will be named, and the treatment of the remains will be agreed upon by all parties.

Remember:

- Cultural Resources are nonrenewable resources. Once destroyed, they are gone forever. What is lost is not just a physical object, but a piece of the story of our past.
- Cultural resources and human remains are protected under state and Federal law. The unauthorized removal or intentional disturbance of these resources can result in up to \$100,000 in fines and 5 years imprisonment.
- SFPUC and its contractors are required under state and county law to ensure that cultural resources encountered during the project are treated appropriately.
- All workers must comply with the procedures outlined above in order to treat cultural resources appropriately and ensure that SFPUC and YOU are in compliance with all local and state laws.

In the event of the discovery of cultural resources or human remains, contact the SFPUC Environmental Construction Compliance Manager at the number below. The SFPUC Environmental Construction Compliance Manager will in turn notify the Environmental Review Officer or his/her designee.

(415) 554-2472 (office)

(415) 601-8578 (cell)

If human remains are encountered, contact the appropriate County Coroner

ALERT !

This is to notify you that this project site may be located in an **archaeologically sensitive area**. If you notice anything that indicates the presence of an archaeological resource within the project site, the SFPUC Environmental Construction Compliance Manager (ECCM) must be contacted **immediately**. The SFPUC ECCM will in turn promptly notify the Environmental Review Officer or his/her designee. If you see anything that appears like archaeological remains call: (415) 554-2472 (office) or (415) 601-8578 (cell). All work within the vicinity of the discovery must stop until the Environmental Review Officer has evaluated the discovery. You should be on the lookout for both prehistoric and historical archaeological sites. It is not always easy to identify archaeological sites when they are encountered. Below are some things that may indicate the presence of an archaeological site.

PREHISTORIC ARCHAEOLOGICAL SITE

- Concentrations of shellfish remains
- Evidence of fire (ashes, charcoal, burnt earth, fire-cracked rocks)
- Concentrations of bones
- Recognizable Native American artifacts (arrowheads, shell beads, stone mortars (bowls), humanly shaped rock)

HISTORICAL ARCHAEOLOGICAL SITE

- Building foundation remains
- Trash pits
- Privies (outhouse holes)
- Floor remains
- Wells
- Concentration of bottles, broken dishes, shoes, buttons, cut animal bones, hardware, household items, barrels, etc.
- Debris from the Great 1906 Earthquake and Fire (thick layers of burned building debris, charcoal, nails, fused glass, burned plaster, burned dishes, etc.)
- Wood structural remains (building, ship, wharf, etc.)
- Clay roof/floor tiles
- Stone walls or footings
- Gravestones

APPENDIX C: ALERT SHEET & CULTURAL BRIEFING (SPANISH)**Qué hacer si descubre Recursos Culturales en el Área del Proyecto**

- Si el potencial de recursos culturales se identifica en el área del proyecto, inmediatamente DETENER todas actividades en las inmediaciones del descubrimiento.
- Contactar al Gerente de Construcción de Cumplimiento Ambiental de SFPUC de inmediato a uno de los números de teléfono que aparecen abajo y en su hoja de ALERTA. El Gerente de Construcción de Cumplimiento Ambiental se encargará de notificar a el/la Oficial de Revisión Ambiental o a su representate.
- El/La Oficial de Revisión Ambiental, su representate o un técnico calificado evaluará el descubrimiento y asegurará un tratamiento adecuado de los recursos.
- NO reanudar actividades perturbadoras de tierra en las cercanías del descubrimiento hasta que el Oficial de Revisión Ambiental o su representante haya evaluado el descubrimiento y autorize continuar el trabajo.

En caso de descubrimiento de presuntos restos humanos:

- Todo trabajo en las proximidades de los restos deben cesar de inmediato
- El área debe ser protegida con banderines o mediante la vigilancia de un cuidador o un obrero de construcción para asegurar que no se produzca perturbación adicional. Si el hallazgo se produce al final de la jornada laboral, el área debe ser cubierta con placas de acero, o con otro material similar para evitar vandalismo.
- Notificar al Gerente de Construcción de Cumplimiento Ambiental de SFPUC de inmediato a uno de los números de teléfono que aparece abajo y en su hoja de ALERTA. El Gerente de Construcción de Cumplimiento Ambiental se encargará de notificar a el/la Oficial de Revisión Ambiental o a su representate
- El Gerente de Construcción de Cumplimiento Ambiental de SFPUC pudiera solicitar que usted notifique del descubrimiento al Forense correspondiente del Condado. Los números de teléfono se encuentran abajo.
- Si el médico forense del condado determina que los restos son Nativos Americanos, la Comisión de Patrimonio de Nativos Americanos será notificada, un descendiente más probable será nombrado, y el tratamiento de los restos será acordado por todas las partes.

Recuerde:

- Recursos culturales son recursos no renovables. Una vez destruidos, se van para siempre. Lo que se pierde no es sólo un objeto físico, si no un pedazo de la historia de nuestro pasado.
- Los recursos culturales y restos humanos están protegidos por las leyes estatales y federales. Remover sin autorización o perturbar intencionalmente estos recursos puede resultar en hasta \$100,000 dólares en multas y 5 años de prisión.
- SFPUC y sus contratistas están obligados, por virtud de las leyes estatales y del condado, de garantizar que los recursos culturales encontrados durante el proyecto sean tratados adecuadamente.
- Todos los trabajadores deben cumplir con los procedimientos mencionados anteriormente para el tratamiento de los recursos culturales de manera adecuada y para garantizar que SFPUC y USTED están cumpliendo con todas las leyes locales y estatales.

En caso de descubrimiento de recursos culturales o de restos humanos, contactar al Oficial de Revisión Ambiental de SFPUC a los siguientes numeros de teléfono. El Gerente de Construcción de Cumplimiento Ambiental de SFPUC se encargará de notificar a el/la Oficial de Revisión Ambiental o a su representate.

(415) 554-2472 (Oficina) - (415) 601-8578 (Celular)

Si se encuentran restos humanos, contactar a el Forense apropiado del Condado

ALERTA !

La presente es para notificarle que este sitio del proyecto pudiera estar situado en un área arqueológicamente sensitiva. Si usted nota cualquier cosa que indica la presencia de un recurso arqueológico en el sitio del proyecto, **el Gerente de Construcción de Cumplimiento Ambiental de SFPUC** debe ser contactado **inmediatamente**. El Gerente de Construcción de Cumplimiento Ambiental de SFPUC se encargará de notificar a el/la Oficial de Revisión Ambiental o a su representante. Si ve algo que tiene apariencia de restos arqueológicos llame al: **(415) 554-2472 (oficina) o (415) 601-8578 (celular)**. Todo trabajo en las cercanías del descubrimiento debe de detenerse hasta que el Oficial de Revisión Ambiental haya evaluado el descubrimiento. Usted debe estar en búsqueda de yacimientos arqueológicos prehistóricos e históricos. No siempre es fácil identificar los sitios arqueológicos cuando se encuentran. A continuación se encuentra una lista de algunas cosas que pueden indicar la presencia de un yacimiento arqueológico.

SITIO ARQUEOLÓGICO PREHISTORICO

- Concentraciones de restos de mariscos
- Evidencia de fuego (cenizas, carbón, tierra quemada, rocas rotas por fuego)
- Concentraciones de huesos
- Artefactos reconocidos como nativos americanos (puntas de flecha, morteros de piedra, roca con forma humana)

SITIO ARQUEOLÓGICO HISTÓRICO

- Restos de fundación de edificio
- Pozos de basura
- Letrinas
- Restos de suelo
- Pozos
- Concentración de botellas, platos rotos, zapatos, botones, huesos de animales, herramientas, artículos para el hogar, barriles, etc
- Restos de el Gran Terremoto y Fuego de 1906 (capas gruesas de escombros de edificio quemado, carbón, clavos, vidrio fundido, yeso quemado, platos quemados, etc)
- Restos estructurales de madera (edificio, barco, muelle, etc)
- Techo de arcilla o baldosas
- Muros de piedra o cimientos
- Lápidas

SECTION 01 35 50

ADDITIONAL ENVIRONMENTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes additional environmental procedures and environmental mitigation measures that the Contractor shall follow during construction.
- B. This Section (along with the Sections 01 35 49 Minimum Environmental Procedures, 01 41 00 - Regulatory Requirements, 01-35-45 Health and Safety Criteria, 01 57 13 - Temporary Erosion and Sediment Controls (ESCP), and 02 81 10 – Environmental Management of Excavated Materials) fulfills the Environmental Site Mitigation Plan (SMP) of Article 22A of the San Francisco Health Code.

1.2 DAMAGES FOR FAILURE TO MEET ENVIRONMENTAL REQUIREMENTS

- A. The Contractor shall be liable for all fines, penalties, liquidated damages and costs arising from any failure to implement mitigation measures to control environmental impacts are subject to Federal, State, and local regulatory fines.
- B. The Contractor shall be liable for all fines, penalties, liquidated damages and costs arising from any violation of the environmental mitigation measures, and City Ordinances, and this specification, as related to or concerning environmental mitigation measures; the control of dust and airborne particles; exposure to workers or the public by dust or asbestos; the control, removal, transport, and disposal of excavated materials; control of wastewater and sediment; housekeeping, maintenance of the work area; debris control; the clean construction ordinance; and noise. The Contractor shall pay particular attention to:
 - 1. The prevention of accumulation and prompt clean-up of spills of excavated materials onto streets, sidewalks, and roadways.
 - 2. Sediment control, the protection of catch basins, and prevention of soil and sediment from falling or washing into storm drains and sewers.
 - 3. The prevention and control of dust created by its work.
 - 4. Proper treatment and disposal of stormwater and ground water prior to discharge.
 - 5. Adherence to noise restrictions; and
 - 6. Adherence to equipment emissions requirements and restrictions
 - 7. Daily housekeeping and site maintenance to keep each Project work location in clean and orderly condition.
- C. Liquidated Damages: In addition to any regulatory fines, should the Contractor fail to adhere to the DPW Dust Control Order 171,378, liquidated damages shall be assessed in the amount of \$1000.00 per day for each day any violation is not corrected.
- D. Liquidated Damages: In addition to any regulatory fines, should the Contractor fail to implement the mitigation measures as per this Section, or promptly take all required remedial actions to

the City's satisfaction herein, the City Representative reserves the right to issue environmental non-compliance notices, have the necessary work performed by others, assess liquidated damages of one thousand dollars (\$1000.00) per non-compliance occurrence or per event, or to deduct or withhold all monies required therefore as permitted under the Contract Documents.

- E. Liquidated Damages: By entering into the Agreement, Contractor and City agree that if Contractor uses off-road equipment and/or off-road engines in violation of the Clean Construction requirements set forth in Section 6.25 and Chapter 25, the City will suffer actual damages that will be impractical or extremely difficult to determine. Accordingly, Contractor and the City agree that Contractor shall pay the City the amount of \$100 per day per each piece of off-road equipment and each off-road engine used to complete Work on the Project in violation of the Clean Construction requirements. Such amount shall not be considered a penalty, but rather agreed monetary damages sustained by City because of Contractor's failure to comply with the Clean Construction requirements.

1.3 RELATED SECTIONS

- A. 01 35 49 Minimum Environmental Procedures
- B. 01 35 51 Additional Clean Construction Requirements
- C. 01 41 00 Regulatory Requirements
- D. 02 81 10 Environmental Management of Excavated Materials

1.4 PROJECT CONDITIONS

- A. The Contractor shall be responsible for all costs incurred or necessary to ensure compliance of its operations and its performance of the Work with all applicable Codes and contract requirements.
- B. The Contractor shall make provisions to ensure that environmental mitigation controls are consistently implemented for the project duration.
- C. Pursuant to California Assembly Bill 3180 (chapter 1232), the City at its own discretion will monitor Contractor's compliance with Code and Contract requirements, including required mitigation actions for construction impacts and will report on Contractor's compliance with required mitigation controls. Said monitoring and reporting activities may include, but are not limited to, qualitative, quantitative and video observations and data collection on the impacts of noise, vibration air quality, traffic, street pavement damage, water quality, cultural resources, biological resources and hazardous materials.
- D. The Contractor shall cooperate with such monitoring activities, provide access to the Work Site to establish and secure monitoring stations, and make its facilities and records available to the City for performing such monitoring.
- E. The City will issue a Non-Compliance Notice to the Contractor for any detected non-compliance with the provisions herein or of any environmentally objectionable acts and the corrective action to be taken. Failure to comply will result in an assessment of liquidated damages.
- F. Any fines imposed on the City by the regulatory agencies as a result of the Contractor's negligence shall be passed on to the Contractor.

1.5 SUBMITTALS

- A. The Contractor shall submit a Site-Specific Dust Control Plan (DCP) in accordance with this Section for the review and approval of the San Francisco Department of Public Health, and the

City Representative. This DCP shall be submitted at least 15 working days before start of any excavation.

1.6 MAINTENANCE OF THE WORK AREA AND DEBRIS/SPILL CONTROL

- A. The Contractor shall maintain the Site and Work areas under its control and adjacent public right-of-ways in a clean and orderly state, a safe condition, and remove all accumulations of debris and surplus materials at the end of each workday. At completion of the project the Contractor shall leave the Site in clean and orderly condition.
- B. Cleaning during Construction: The Contractor shall control the accumulation of waste materials and debris. The Contractor shall collect waste from construction areas and the site daily. The Contractor shall also:
1. Comply with requirements of NFPA 241 for removal of combustible waste material and debris.
 2. Maintain the Site and construction areas free of dust and accumulation of dirt during earthwork and other contaminants during construction as needed daily.
 3. Maintain hazardous, dangerous, or unsanitary waste materials separately from other waste by containerizing properly and dispose those types of materials in a lawful manner.
 4. Maintain the construction site, staging and storage areas daily in clean and orderly condition. Maintain the site, equipment, fences and signs free of graffiti. As warranted, remove all graffiti daily, using methods, which cause no damage to the work and existing facilities.
 5. Damp-sweep all pedestrian walkways and dispose of debris around the site perimeter on a daily basis and as often as determined by the City Representative.
 6. Keep all debris, hazardous/contaminated material, surplus concrete and excavated materials off the roadway, sidewalks and sewers at all times.
 7. Remove trash (waste oil and oil rags) and debris from the Site and Construction areas daily or at frequent intervals or as directed by the City Representative, so that its presence will not delay the progress of the work or cause a nuisance.
 8. On a daily basis, remove all debris from the Site and Construction areas, including haul routes, caused directly or indirectly by the Contractor's operations.
 9. Dispose of all food-related trash items (e.g., wrappers, cans, bottles, food scraps) in closed garbage containers and removed daily from work areas. Garbage shall be removed regularly from the project site. Construction personnel shall not feed or otherwise attract wildlife to the project area.
 10. Storage areas: Ensure that Materials to be used for construction are stored in designated structures or areas by the appropriate trades. Maintain such areas or structures in a clean condition daily for the term of the Contract.
 11. Provide and maintain proper storage with secondary containment for lubrication oil, hydraulic fluids, waste oils, fuels, solvents and other hazardous or toxic materials and wastes.
 12. Contractor shall establish procedures to respond to a spill of any kind, especially hazardous materials.

- a. Contractor shall maintain a fully stocked spill kit(s) at the project site for immediate deployment.
 - b. When feasible, Contractor shall immediately contain spills and properly dispose of contaminated soils and associated clean-up materials.
 - c. Reporting: In the event of a reportable spill, the Contractor shall notify the City Representative and provide information such as but not limited to source of spill, type of material(s) spilled, any sampling implemented, and clean-up measures. City Representative will notify any other applicable agencies in accordance with the California Office of Emergency Services (<http://www.calema.ca.gov/HazardousMaterials/Pages/Spill-ReleaseReporting.aspx>) and U.S. Environmental Protection Agency (<http://www.epa.gov/superfund/policy/release/rq/>).
13. Supervision: Oversee all cleaning of areas by trades using them and ensure that resulting accumulations are deposited in appropriate containers.
14. Burying or burning of trash and debris on the Site is not permitted.
15. Materials, trash, and debris are the property of the Contractor and shall be removed from the Site and Construction areas and disposed of in a legal manner.
16. Maintain the site, equipment, fences and signs free of graffiti.
- C. Initiate and maintain a specific daily program to prevent the accumulation of debris at the Site storage, parking areas, and along streets, roads, and haul routes in the Construction areas. The Contractor shall:
- 1. Provide and maintain containers for the deposit of debris and keep them covered.
 - 2. Prohibit overloading of trucks to prevent spillage and track out.
 - 3. Inspect traffic areas and haul routes to enforce debris and clean up requirements.
- D. Construction Limits: Contractor shall confine all construction equipment to designated work zones.
- E. Contractor shall dispose of all food-related trash items (e.g., wrappers, cans, bottles, food scraps) in closed garbage containers. Garbage shall be removed regularly from the project site. Construction personnel shall not feed or otherwise attract wildlife to the project area.
- F. No pets or firearms shall be allowed in the construction limits.

1.7 ADDITIONAL DUST CONTROL REQUIREMENTS

- A. The Contractor shall comply with the requirements of the San Francisco Department of Public Health (SFDPH) Dust Control Ordinance - Article 22B, the San Francisco Building Code Section 106.3.2.6 (Ordinance #176-08), the DPW Dust Control Order 171,378, and the California Code of Regulations, Title 17, Section 93105 - Asbestos Airborne Toxic Control Measure for Construction, Grading, Quarrying, and Surface Mining Operations www.arb.ca.gov/toxics/atcm/asb2atcm.htm.
- B. The Contractor shall be responsible for paying the fees charged by the above listed agencies to defray the costs of document processing and review, consultation with applicants, and administration of the regulation.

- C. The San Francisco Department of Building Inspection requires dust control measures for all building, demolition, excavation, grading, foundation, and general construction projects.
- D. The Contractor shall comply with specified dust control measures specified in the San Francisco Building Code Section 106.3.2.6 for all site preparation work, demolition, or other construction activities within the City and County of San Francisco that may create dust or will expose or disturb more than 10 cubic yards or 500 square feet of soil. Work for such an activity must also comply with the specified dust control measures of this section.
- E. The Contractor shall prepare a Site-Specific Dust Control Plan (DCP) along with prepare associated application and pay the associated fees to the San Francisco Department of Public Health for its cost of processing, review and approval of its Site-Specific Dust Control Plan, and administration of the Dust Control Ordinance - Article 22B.
- F. The Contractor's Site-Specific Dust Control Plan shall include the following (in addition to all provisions specified for the Air Pollution Controls listed in this Section):
 - 1. Map showing the project location, and all surrounding sensitive receptors within 1000 feet of the project.
 - 2. Name and phone number for the Contractor's designated person to implement the Site-specific Dust Control Plan.
 - 3. Mitigation methods to comply with the BAAQMD goal of "NO VISIBLE DUST EMISSIONS", the DPH Dust Control Ordinance and the ATCM Mandatory mitigation requirements as specified in this Section.
 - 4. Watering plans for wetting down areas around soil improvement operations, and visibly dry disturbed soil surface areas, at least three times per shift per day.
 - 5. The protocols and daily record-keeping procedures for conducting site inspections for visible dust.
 - 6. Methods of enforcement of speed limits on the construction site. Establish speed limits so that vehicles entering or exiting construction areas shall travel at a speed that minimizes dust emissions. This speed shall be no more than 15 miles per hour.
 - 7. Copy of the wet vacuum sweeper specifications.
 - 8. Description/specification of the wheel washing station that will be employed at the project access points or description of other alternative methods to control track out on public streets.
 - 9. Safety Data Sheet (SDS) of the biodegradable, non-polluting, non-toxic dust control chemical or soil stabilizer (preferably EPA approved) that will be applied as warranted.
 - 10. Mitigation measures to comply with the Construction Dust Control Requirements of this Section.
 - 11. Contingency plan with step up mitigation controls in the event that monitoring readings exceed the SFHC Article 22B ambient air quality guidelines, Real Time Dust Monitoring levels.
 - 12. Requirements for when dust generating operations have to be shut down due to dust crossing the property boundary or if dust is contained within the property boundary but not controlled after a specified number of minutes.

- G. The Contractor is responsible to take all reasonable measures to furnish all labor, equipment, and means required to carry out effective measures whenever and as often as necessary to prevent its operation from producing dust in amounts damaging to surrounding properties, or causing a nuisance to businesses and local residents.
- H. Air Quality Project Action Level (AQPAL): As per Air Quality Monitoring Guidelines for SFHC Article 22B, Real Time Dust Monitoring and Reporting, the Contractor in its construction activity shall adhere to the criteria below. The Contractor shall implement step up mitigation controls if monitoring readings exceed the AQPAL.

PM10 Action Levels (AQPAL)

| PM10 Concentration/Standard | Contractor's Required Actions for exceeding PM10 Concentration/Standard |
|--|---|
| 50 ug/m ³ Daily Average | Review work procedures for conformity with best management practices (BMPs). Implement additional dust control measures as needed to prevent future exceedances of the 50ug/m3 level. |
| 250 ug/m ³ 10 min. Average | Particulate monitor goes into alarm. Stop work and apply more aggressive dust control measures until the 10-minute average concentration drops below 250ug/m3. |

- I. The Contractor shall not engage in any construction or grading operation on property unless all the following dust mitigation measures are initiated at the start and maintained throughout the duration of the construction or grading activity.
 - 1. Plan and execute the work in such manner as to minimize the area of grinding, asphalt replacement, excavation, grading, and other dirt disturbing construction activities to less than one half acre at any one time. Minimize the amount of excavated materials stored at the site.
 - 2. All water for dust control shall be treated and amended with biodegradable, non-polluting, non-toxic dust control agent. Water or water-miscible binders shall be continuously used to control dust during dust generating activities, including demolition, excavation, and earthmoving, among others.
 - 3. Keep the entire site of the work and adjacent areas (including sidewalks, 500 consecutive feet in all directions of intersections, walkways and roadways) continuously free of dirt and dust by wet sweeping at least three times per shift including at the end of the workday. Always maintain a regenerative air or high efficiency vacuum sweeper-vehicle on the Site. The City Representative will evaluate the effectiveness of the Contractor's vacuum sweeper-vehicle and, if necessary, will require the Contractor to provide a more powerful and effective sweeper.
 - 4. Visible track-out on the paved public road must be cleaned using wet sweeping or a HEPA filter equipped vacuum device within twenty-four (24) hours.
 - 5. Localized dust controls such as water hoses shall be pre-connected to a water source or water canisters to immediately control visible dust emissions at each active work area. Wet areas shall be barricaded to prevent slipping hazards.

6. A water truck and/or water buffalo shall always be readily available at the work site. Water truck shall be equipped with hand-held hoses. Hoses shall be equipped with micro-misters and micro-foggers.
 7. Vehicle moving around the work site and entering or exiting construction areas shall travel at a speed of fifteen (15) miles per hour or less, to minimize dust emissions.
 8. Prior to any ground disturbance, enough water shall be applied to the area to be disturbed to prevent visible emissions from crossing the site boundaries.
 9. Areas to be graded or excavated shall be kept adequately wetted to prevent visible emissions from crossing the work site and property line.
 10. Storage/Stockpiles must be kept adequately wetted, treated with a chemical dust suppressant, or covered when material is not being added to or removed from the pile.
 11. Equipment must be washed down before moving from the property onto a paved public road; and
 12. Surface excavation and grading activities shall be terminated when wind speeds exceed 25 miles per hour.
 13. Control for disturbed surface areas, and storage piles that will remain inactive for more than seven (7) days, shall include one or more of the following:
 - a. a. Keep the surface adequately wetted.
 - b. b. Establishment and maintenance of surface crusting.
 - c. c. Application of chemical dust suppressants or chemical stabilizers according to the manufacturers' recommendations as needed.
 - d. d. Covering with tarp(s) or vegetative cover.
 - e. e. Installation of wind barriers of fifty (50) percent porosity around three (3) sides of a storage pile.
 - f. f. Installation of wind barriers across open areas,
 - g. g. Any other measure as effective as the measures listed above.
 14. The Contractor shall install and maintain a dust curtain along the perimeter of the project site for the duration of the project.
- J. The Contractor cannot perform screening or crushing operations without the appropriate BAAQMD, and Cal-EPA/DTSC permits.
- K. Track-out prevention and control measures shall include:
1. The Contractor shall immediately remove any visible track-out of asphalt, soil, gravel, debris and dirt from a paved public road at any location where vehicles enter and exit the Site; use a wet sweeping or a HEPA filter equipped vacuum device on at all entry and exit points as often as needed.
 2. Equipment, trucks and tires shall be washed down before moving from the active areas on to a paved public road to minimize deposition of dust-causing materials.

- a. Installation of one or more of the following track-out prevention measures at all entry and exit points. These track-out controls are to be cleaned, maintained and replaced to keep their use effective for the project duration.
- b. A gravel pad designed using good engineering practices to clean the tires of exiting vehicles.
- c. A metal griddle (rumble plate) tire shaker.
- d. A wheel wash system.
- e. Pavement extending for not less than fifty (50) consecutive feet from the intersection with the paved public road; or
- f. Any other measure as effective as the measures listed above.

1.8 ASBESTOS AIRBORNE TOXIC CONTROL MEASURES FOR CONSTRUCTION

- A. Serpentine, serpentinite, or other ultramafic rocks containing Naturally Occurring Asbestos (NOA) shall be encountered along the alignment as known through USGS map, soil assessment, soil sampling or other information indicating that the project shall be disturbing NOA. The Contractor shall comply with the California Code of Regulations, Title 17, Section 93105 - Asbestos Airborne Toxic Control Measure (ATCM) for Construction, Grading, Quarrying, and Surface Mining Operations www.arb.ca.gov/toxics/atcm/asb2atcm.htm and the regulations of the Bay Area Quality Management District (BAAQMD).
- B. At no cost to the City, the Contractor shall hire an experienced Certified Industrial Hygienist (CIH) to assist it with the following:
 - 1. Cal/OSHA Asbestos Class II asbestos operations and Asbestos Competent Person (ACP): The Contractor shall meet its obligations under CCR Title 8, Section 1529 when Serpentine, serpentinite, or other ultramafic rocks containing Naturally Occurring Asbestos (NOA) is present.
 - a. The Contractor and its subcontractors shall have its workers, trades people and Competent Person that will come in contact with serpentine, serpentinite, or other ultramafic rocks containing Naturally Occurring Asbestos (NOA) be trained for the Class II work activity level as per the Cal/OSHA standard 8 CCR § 1529.
 - b. The Contractor shall have a Cal/OSHA asbestos Competent Person as it pertains to requirements specified in the Cal/OSHA standard 8 CCR § 1529, and when serpentine, serpentinite, or other ultramafic rocks containing Naturally Occurring Asbestos (NOA) is present.
- C. The following indicated control, administrative, reporting submittal requirements shall apply:
 - 1. Prior to commencement of any grading, and excavation activities, the Contractor shall implement the Asbestos Dust Mitigation Plan (ADMP), throughout the construction or grading activity.
 - 2. The Contractor shall take into account and incorporate in its schedule the time it will take for the BAAMQD to review the storage and staging locations for the final approval of the ADMP.
 - 3. The Contractor, at no cost to the City, shall perform perimeter air monitoring for asbestos at the project site during its soil disturbance activities for the duration of the project. This shall be in accordance to the approved ADMP. All record keeping and reporting shall be submitted to the BAAQMD on a weekly basis or as per a reporting schedule requested by BAAQMD.

4. The Contractor at its own cost shall furnish all labor, equipment, recordkeeping and reporting and means required to implement the ADMP as required by the BAAQMD's terms and California Code of Regulations, Title 17, Section 93105.
5. The Contractor shall limit and control the disturbance of soils as necessary to perform its work.
6. Any fines imposed on the City by the BAAQMD as a result of the Contractor's negligence shall be passed on to the Contractor.

D. For Construction and Grading Operations that will disturb more than one acre of NOA:

If the Contractor by its means and methods disturbs, grades or excavates more than one acre (43560 sq. ft.) and the site is known through USGS map assessment, soil sampling or other information indicating that the project will be disturbing NOA, the following indicated control, administrative, reporting and submittal requirements shall apply:

1. Sixty days (60) days before commencement of grading, and excavation activities, the Contractor shall submit to the City Representative an Asbestos Dust Mitigation Plan (ADMP) for the City Representative's review. Thereafter, the Contractor shall submit the ADMP, the ADMP application, and the BAAQMD Regulation 3 Fees to the APCO for its review and approval. The Contractor shall not be reimbursed for the BAAQMD Regulation 3 Fees.
2. The Contractor shall incorporate in its schedule the time it will take for the BAAMQD to review and approve the ADMP application and the ADMP. The Contractor shall provide information like start date of soil disturbance, soil storage and staging areas, schedule and other information requested by the BAAQMD to amend and finalize the ADMP. No soil disturbance, construction or grading shall commence unless the ADMP and its amendments is approved by the BAAQMD. The Contractor shall implement the ADMP at the beginning and maintained throughout the duration of the project construction throughout the entire site.
3. The Contractor shall not engage in any construction or grading operation on the property where the area to be disturbed is greater than one acre of known serpentinite without the ADMP approved by the District. The ADMP Application can be found on this link: http://hank.baaqmd.gov/enf/compliance_assistance/asbestos_atcm/index.htm.
4. The ADMP must specify how the operation will minimize emissions and must address specific emission sources;
5. Prevent visible emissions from crossing the project boundaries regardless of the size of the disturbance.
6. The Contractor at its own cost shall furnish all labor, equipment, and means required to prepare and implement the ADMP, conduct the ambient and perimeter air monitoring as required by the BAAQMD's terms of approval of the ADMP and California Code of Regulations, Title 17, Section 93105.
7. The provisions of the approved asbestos dust mitigation plan must be implemented within fourteen (14) days of district approval of the plan and maintained throughout the remainder of the construction or grading activity.

E. For Construction and Grading Operations that will disturb less than one acre of NOA:

If the Contractor by its means and methods disturbs, grades or excavates less than one acre

(43560 sq. ft.) and the site is known through USGS map, soil assessment, soil sampling or other information indicating that the project will be disturbing NOA, no ADMP application is required. *In such a case, the City shall file a courtesy notification with the BAAQMD.* The Contractor shall adhere to the mandatory mitigation measures listed below and the California Code of Regulations, Title 17, Section 93105 - Asbestos Airborne Toxic Control Measure (ATCM) for Construction, Grading, Quarrying, and Surface Mining Operations.

F. Mandatory Mitigation Requirements while disturbing serpentine, serpentinite, ultramafic rocks, or NOA:

Regardless of the project size for construction and grading operations the following dust mitigation measures are mandatory for projects disturbing serpentine or ultramafic rock:

1. Construction vehicle speed at the work site must be limited to fifteen (15) miles per hour or less.
2. Prior to any ground disturbance, sufficient water must be applied to the area to be disturbed to prevent visible emissions from crossing the property line.
3. Areas to be graded or excavated must be kept adequately wetted to prevent visible emissions from crossing the property line.
4. Storage piles must be kept adequately wetted, treated with a chemical dust suppressant, or covered with tarp when material is not being added to or removed from the pile.
5. Equipment must be washed down before moving from the property onto a paved public road; and
6. Visible track-out on the paved public road must be cleaned using wet sweeping or a HEPA filter equipped vacuum device within twenty-four (24) hours.
7. All Mitigation Requirements for Dust Control as specified under Construction Dust Control Requirements shall apply.
8. The Contractor shall cover and line the truck bed ("burrito wrap") with 10mil HDPE for all truckloads of soils containing asbestos, regardless if the material is wet, hazardous, or non-hazardous.

G. Unanticipated Discovery of Naturally Occurring Asbestos (NOA):

1. If NOA is unexpectedly encountered after the project has started, the Contractor shall immediately notify the City Representative.
2. The City shall also submit a notification to the BAAQMD no later than the next business day using the ADMP Discovery Notification Form found at the link below:
3. http://www.baaqmd.gov/~media/Files/Compliance%20and%20Enforcement/Asbestos/admp_discovery_application.ashx?la=en, and followed by email to Eliza Kane at ekane@baaqmd.gov, and the City Representative with the project details.
4. The Contractor's shall immediately be limited to disturbing, grading or excavating to less than one acre at any given time and/or shall be directed to stop work in the serpentine, serpentinite, ultramafic rock, or NOA areas by the City Representative.
5. With the City Representative's approval, the Contractor may continue work as long as the mandatory mitigation measures for projects disturbing serpentine, serpentinite, ultramafic

rock, or NOA as stated above are implemented. These measures must be implemented within 24-hours of encountering serpentine and until the ADMP (if required) is approved by the BAAQMD.

1.9 STORMWATER BEST MANAGEMENT PRACTICES (BMPS) REQUIREMENTS

A. Management of Construction Materials

1. Cover and berm loose stockpiled construction materials that are not actively being used. Locate stockpiles at minimum 50 yards away from concentrated flows of storm water, drainage courses and inlets. All stockpiles should be completely covered and secured.
2. Stockpiles should be protected with a temporary linear sediment barrier berm prior to the onset of precipitation. During the rainy season, all stockpiles shall always be protected from storm water runoff by completely covering them and keeping the perimeter barriers around.
3. Store chemicals in watertight containers (with appropriate secondary containment to prevent any spillage or leakage) or in a storage shed (completely enclosed).
4. Minimize exposure of construction materials to precipitation. This does not include materials and equipment that are designed to be outdoors and exposed to environmental conditions (i.e. poles, equipment pads, cabinets, conductors, insulators, bricks, etc.)
5. Implement BMPs to prevent the off-site tracking of loose construction and landscape materials.
6. Provide for the continuous misting of water using hoses on the project, and on roads and other areas immediately adjacent to the project limits, wherever traffic or buildings that are occupied or in use, are affected by such dust caused by his hauling or other operations. The materials and methods used for water laying shall be subject to the approval of the City Representative.
7. Provide for prompt and daily proper removal from existing roadways of all dirt and other materials that have been spilled, washed, tracked, or otherwise deposited thereon by Contractor's hauling and other operations.

B. Rainstorm BMPs

1. During the rainy season, all paved areas are to be kept clear of earth material and debris. The site is to be maintained so as to minimize sediment runoff to any storm drain system.
2. During periods when storms are forecast:
 - a. Excavated soils should not be placed in streets or on paved area.
 - b. Any excavated soils should be removed from the site by the end of the day if feasible.
 - c. Where stockpiling is necessary, use a tarpaulin or surround the stockpile material with fiber rolls, gravel sediment barrier, silt fence or other runoff controls.
 - d. Use inlet controls as needed (E.G. block gravel sediment barrier from storm drain adjacent to the project or stockpiled soil.)
3. Stand-by crews shall be alerted by the permit applicant or contractor for emergency work during rainstorms.

4. After October 1st to April 15th, all erosion control measures will be inspected daily and after each storm. BMP will be repaired at the close of each day and whenever rain is forecast.
5. Sandbags shall be stockpiled on site and placed at intervals shown on erosion control plans when the rain forecast is 40% or greater or when directed by the inspector.
6. After rainstorms contractor shall check for and remove sediment trapped by sandbags at staging area. Replace sandbags if deterioration is evident.

C. Waste Management BMPs

1. Prevent disposal of any rinse or wash waters or materials on impervious or pervious site surfaces or into the combined sewer system.
2. Sediment and trash accumulated in drainages or detention basins shall be removed as soon as possible. In addition, oil and material floating on water surface must be skimmed weekly and the debris properly disposed of.
3. Ensure the containment of sanitation facilities (e.g., portable toilets) to prevent discharges of pollutants to the combined sewer system. Licensed waste material handlers must service portable sanitary facilities and trash dumpsters regularly.
4. Clean or replace sanitation facilities and inspecting them regularly for leaks and spills.
5. Cover waste disposal containers at the end of every business day and during a precipitation event.
6. Prevent discharges from waste disposal containers to the combined sewer system.
7. Always contain and securely protect stockpiled waste material from wind and rain unless actively being used.
8. Implement procedures that effectively address hazardous and non-hazardous spills.
9. Utilize spill response procedures that include providing equipment and materials for cleanup of spills on site, so that spills and leaks may be cleaned up immediately and properly disposed and assigning and training appropriate spill response personnel.
10. Ensure the containment of concrete washout areas and other washout areas that may contain additional pollutants so there is no discharge into the underlying soils, onto the surrounding areas and into the sewerage system.

D. Vehicle Storage and Maintenance BMPs

1. Prevent oil, grease, or fuel from leaking into the ground, storm drains, and catch basins.
2. All vehicles and equipment shall not be fueled or maintained on-site.
3. Place all equipment or vehicles, which are to be fueled, maintained and stored in a designated area fitted with appropriate BMPs.
4. On-site vehicles must be monitored for leaks; inactive equipment must be stored with drip pans to contain any fluid leaks. Drip pans containing oil must be drained into waste oil drums on a regular basis.

5. Contractor shall be responsible for ensuring safety of vehicles operating in roadway adjacent to erosion control facilities.

E. Erosion and Sediment Control BMPs

1. Temporary sediment barriers such as silt fences, berms, dikes, fiber rolls, sandbags, gravel bags or straw bale barriers. These barriers shall be installed at the locations with potential erosion and to the limits shown on the approved ESCP and as otherwise directed by the City Representative. They shall be relocated as necessary for construction operations, with prior approval from the City Representative. Remove the temporary barriers at the end of the project.
2. Dust Control: Employ construction methods and means that will keep airborne dust to the minimum.
3. Silt dams shall be installed and maintained on public streets to prevent sediments from flowing into storm drain inlets and public streets. Storm drain inlets shall be protected surrounding the inlets with BMPs such as fiber rolls or filters media appropriate to type of traffic and as approved by the City Representative.
4. Erosion Control Blankets shall be used to control to stabilize disturbed and exposed soil, if weather warrants such blankets.
5. Silt fencing shall be installed at the foot of the slope around the entire perimeter of the stockpiled soil.
6. V-ditches and silt traps/sediment traps shall be installed at the perimeter of the stockpile to collect runoff where necessary to allow flow to continue to storm drain inlets.
7. Soil stabilization measures, placement of hay bales, and sediment basins shall be constructed to reduce erosion of exposed soils.
8. As part of the erosion control measures, underground storm drain facilities shall be installed complete as show on the improvement plans.
9. Borrow areas and temporary stockpiles shall be protected with appropriate erosion control measures to the satisfaction of the city engineer.
10. If existing driveway is removed during construction, the contractor shall place drain rock as a gravel roadway (8" minimum thickness for the full width and length of site egress area as defined in these plans) at the entrance of the site.
11. Hot works, welding, and cutting is prohibited.
12. Concrete, asphalt, or aggregate crushing is prohibited.
13. Application of paint or coatings is prohibited.
14. Saw cutting operations are prohibited.
15. Sweep: Use dry cleaning methods rather than pressure washing surfaces.
16. End of Day Clean-Up: At the end of the day or when activities are over, conduct a general clean-up to remove debris, trash, and inspect for leaks, spills or other discharges.

F. Generator Re-Fueling BMPs

1. Clean Area: Maintain clean fuel-dispensing area using dry cleanup methods such as sweeping for removal of litter and debris or use of rags and absorbents for leaks and spills.
2. Drip Pans: Place drip pans or other containment beneath each connection point to capture all spills and drips.
3. Cover Drains: Cover storm drains in the vicinity during transfer.
4. Spill Kit: Maintain ample spill clean-up equipment adjacent to the fueling area.
5. Emergency Information: Maintain emergency response and contact information.
6. Training: Train staff on response to a fueling emergency.

1.10 REQUIREMENTS FOR USING WATER FOR CONSTRUCTION

- A. The Contractor shall comply with Article 21 of the San Francisco Public Works Code, which restricts the use of potable water for soil compaction and dust control activities to the extent not directly in conflict with any applicable federal, state, or local law.
- B. The Contractor shall apply to the San Francisco Public Utilities Commission (SFPUC) Wastewater Enterprise (WWE) for a permit to use recycled water for soil compaction and dust control activities.

1. At least five days prior to the date that recycled water is required, the Contractor shall submit a completed permit application as directed on the SFPUC Recycled Water Fill Station website: <http://sfwater.org/index.aspx?page=953>. If SFPUC WWE approves the application, the Contractor will be issued a permit and provided instruction for use of the Recycled Water Fill Station.
2. The Contractor will be responsible for the handling and transportation of recycled water in accordance with the approved permit. The Contractor will also be responsible for any permit and discharge fees.
3. If the SFPUC denies the permit application because the use of recycled water falls within one or more of the restrictions of Title 22, Division 4, Chapter 3 of the California Code of Regulations, and the applicable General Order under which the SFPUC is bound at the time the application is processed, the permit application will be redirected for approval of potable water for these activities as directed below.

C. Potable Water:

1. The Contractor will be directed to the SFPUC, Customer Service Bureau (CSB), at 525 Golden Gate Avenue, San Francisco, to complete a potable hydrant meter application. Once the application has been completed and approved, CSB will provide the Contractor with a receipt.
2. The Contractor shall pay the costs of permit fees, connection fees, meters, and all water usage furnished by the SFPUC under the established water service account. The City will not reimburse these costs.
3. The Contractor shall bring the receipt as proof of payment to the City Distribution Division (CDD) at 1990 Newcomb Street, San Francisco, to collect the hydrant meter. The Contractor shall bring the meter to CDD monthly for readings and payments.

1.11 INTEGRATED PEST MANAGEMENT PROGRAM

- A. The Contractor shall comply with the SF Environment Code, Chapter 3: Integrated Pest Management Program, and City Ordinance # 7-11. [http://www.amlegal.com/nxt/gateway.dll/California/environment/chapter3integratedpestmanagementprogram?f=templates\\$fn=default.htm\\$3.0\\$vid=amlegal:sanfrancisco_ca](http://www.amlegal.com/nxt/gateway.dll/California/environment/chapter3integratedpestmanagementprogram?f=templates$fn=default.htm$3.0$vid=amlegal:sanfrancisco_ca)
- B. <http://www.sfbos.org/ftp/uploadedfiles/bdsupvrs/ordinances11/o0007-11.pdf>
- C. This Chapter 3 and Ordinance concerns the application of pesticides to property owned by the City and County of San Francisco only.

1.12 RODENT AND INSECT CONTROL

- A. Inspection of the premises shall be made by the permittee at least once a week for rodent burrows, droppings or other evidence of rodents, and evidence of insect breeding. Any infestation shall be effectively controlled by the use of such poisons, gas traps, or insecticidal sprays as meet the approval of the Director of Public Health (San Francisco Public Works Code, Article 17: Control of Dumps Disposing of Materials from Construction or Demolition, Section 858: Rodent and Insect Control). Refer to link below:
- B. [http://library.amlegal.com/nxt/gateway.dll/California/publicworks/article17controlofdumpsdisposingofmateri?f=templates\\$fn=default.htm\\$3.0\\$vid=amlegal:sanfrancisco_ca\\$sanc=JD_Article17](http://library.amlegal.com/nxt/gateway.dll/California/publicworks/article17controlofdumpsdisposingofmateri?f=templates$fn=default.htm$3.0$vid=amlegal:sanfrancisco_ca$sanc=JD_Article17):

1.13 FIRE PREVENTION

- A. Take all necessary precautions to prevent fires while performing the work.
- B. Be responsible for all damage from fire caused directly or indirectly by his own activities or those of his employees or subcontractors.
- C. Provide spark arresters for all internal combustion engines employed at the site.
- D. Maintain temporary fire protection equipment in accordance with Cal/OSHA Section 1910 and 1933, including but not limited to:
 - 1. Portable fire extinguishers within three (3) meters of welding and cutting operations.
 - 2. Portable fire extinguishers within three (3) meters of locations where flammable or combustible liquids are stored.
- E. Perform all work in compliance with the San Francisco Public Works Code, Article 17: Control of Dumps Disposing of Materials from Construction or Demolition, Section 855: Fire Prevention). Refer to link below:
- F. [http://library.amlegal.com/nxt/gateway.dll/California/publicworks/article17controlofdumpsdisposingofmateri?f=templates\\$fn=default.htm\\$3.0\\$vid=amlegal:sanfrancisco_ca\\$sanc=JD_Article17](http://library.amlegal.com/nxt/gateway.dll/California/publicworks/article17controlofdumpsdisposingofmateri?f=templates$fn=default.htm$3.0$vid=amlegal:sanfrancisco_ca$sanc=JD_Article17):
- G. Perform all work in compliance with City and State fire safety laws and regulations.

1.14 NON-PVC PLASTICS.

- A. The Contractor shall comply with the SF Ordinance 171-03 and the SF Environment Code, Chapter 5 Resource Conservation Ordinance, Section 509 – Non PVC Plastics. <http://www.amlegal.com/library/ca/sfrancisco.shtml>

- B. The Contractor shall obtain non-PVC plastics where appropriate alternative products composed of non-chlorinated materials are available. The Contractor shall procure non-chlorinated products in any of the following circumstances: (i) the product is not available in a reasonable period of time; (ii) the product would fail to meet reasonable performance standards; or (iii) the product is only available at an unreasonable price.
- C. The Contractor shall use alternative plastics such as high-density polyethylene (HDPE), and ABS (acrylonitrile-butadiene styrene).

1.15 HAZARDOUS MATERIALS USED IN THE WORK

- A. General: Minimize the use of hazardous materials in performing the work. When materials containing hazardous substances or mixtures are necessary to perform the work, then material usage shall be:
 - 1. In strict adherence to Cal/OSHA's safety requirements.
 - 2. The manufacturer's warnings and application instructions shall be listed on the Material Safety Data Sheet (MSDS) provided by the product manufacturer.
- B. The contractor is responsible for coordinating the exchange of MSDS or other hazard communication information between the Engineer, its employees and subcontractors at the site as per federal, state and local regulations.
- C. The Contractor shall notify the Engineer when a specific product or equipment, or their intended usage, may be unsafe prior to ordering the project or equipment or prior to the product or equipment being incorporated in the work.
- D. Known carcinogenic materials in any form or application shall not be used in the construction of this project.
- E. Should hazardous substances be used, provide the Engineer with its information and clearly indicating:
 - 1. Area or areas where the hazardous substances are to be stored and to be used.
 - 2. The Contractor's preventative measures, means, and facilities to prevent spillage and contamination of soil, water and atmosphere by the discharge of noxious substance.
- F. The City and County of San Francisco is not responsible for any such material brought to the site by the Contractor, subcontractor, suppliers, or anyone else for whom the Contractor is responsible.
- G. Hazardous Materials Certificate of Registration: The Contractor shall obtain, pay and keep current a hazardous materials certificate of registration application, as per Articles 21, 21A, and 22 of the San Francisco Public Health Code. Contact the SFDPH/HMUPA at 415-252-3900. The Hazardous Material Certificate of Registration includes and is not limited to:
 - 1. A chemical inventory.
 - 2. An emergency response plan.
 - 3. A training program for employees in safety procedures in the event of a release or a threatened release of hazardous materials.
 - 4. A site map showing where the hazardous materials are located.

- H. The Contractor shall obtain, pay for, and keep current a Flammable/combustible material storage permit from SFFD.
- I. The Contractor shall not use any building materials that contain Asbestos Containing Construction Materials (ACCM). ACCM is defined by Cal/OSHA, 8 CCR 1529 (q) and (r), as any manufactured construction material that contains more than one-tenth of one percent (0.1%) asbestos by weight.
- J. The Contractor shall not use any building materials that contain lead-based paint (LBP) LBP is defined by Title 17, CCR, Division 1, Chapter 8, Section 35033, as pain or other surface coating that contain any amount of lead equal to, or in excess of 0.00204816 lb./ft² or more than half of one percent (0.5%) by weight.
- K. Should the City tests of the building material results in the concentration above those mentioned above for asbestos and lead, the Contractor shall be Responsible and liable for the damages the cost incurred by the City, and for the cost of the removal abatement, and replacement of the building material.

1.16 CONTRACTOR'S ENVIRONMENTAL COMMITMENT OBLIGATIONS

- A. Contractor shall preserve granite, cobblestones and brick of the existing curb and gutter in the Public Right of Way and will be salvaged or salvaged and re-set where it can be.
- B. Contractor shall preserve historic materials in the Public Right of Way.
- C. Requirements as specified in the ECR

1.17 VIBRATION CONTROL

- A. For the vibration protocols, the Contractor shall develop and implement protocols to monitor vibration at the Site and the Construction Area, using equipment and methods as deemed appropriate by the City to measure potential building damage and effect on occupants, property and sensitive equipment. The protocols shall specify the type of vibration monitoring equipment to be used, monitoring procedures (i.e., monitoring horizontal, transverse and vertical vibration directions), monitoring locations, and monitoring frequency.
- B. The Contractor shall prepare and submit a Vibration Control Plan (VCP) to the City for review and approval at least 15 days prior to commencing construction. The Vibration Control Plan shall be prepared and implemented by a qualified acoustical consultant to include identification of vibration control measures, monitoring protocol, notification procedures, and other information. A qualified acoustical consultant is defined as a Board Certified Institute of Noise Control Engineering (INCE) member or another qualified consultant or engineer approved by the City Representative; The VCP shall include but not be limited to:
 - 1. The method(s) of construction that will minimize vibration
 - 2. Alternate methods to be used to minimize vibration impacts.
 - 3. Administrative and engineering controls in the event that vibration exceed the vibration criteria
 - 4. Construction vibration monitoring protocol to be implemented that will include, but not be limited to:
 - a. Type of instrument employed to record data.
 - b. Sample copy of the vibration report showing instrument set up for histograms and velocity data.

- c. Monitoring methodology, (with weather considerations) Monitoring on three vibration directions,
 - d. Monitoring locations,
 - e. Exposure times duration, monitoring frequency at least weekly or more often if needed, in response to complaints.
 - f. Criteria for compliance,
 - g. Reporting procedures for vibration concerns when complaints are received and documentation of corrective actions.
 - h. Recordkeeping and instrument maintenance
- C. Vibration Project Action Levels (VPAL): Unless otherwise directed by the City Representative, vibration during construction shall not exceed the following thresholds:
- 0.2 inches per second, peak particle velocity (in/sec PPV) for continuous vibration (e.g., vibratory equipment and impact pile drivers) at the closest receptors to ensure that cosmetic or structural damage does not occur; and
- 0.12 in/sec PPV (vibration perception threshold) at adjacent properties (or in accordance to local ordinances) to the extent possible for nighttime construction activities. If vibration complaints are received during facility construction, operational adjustments shall be made (e.g., restricting use of equipment causing vibration disturbance during nighttime hours or slowing the pace of its operation), as necessary, to reduce vibration annoyance effects.
- D. The Contractor would be responsible for the protection of vibration sensitive historic buildings structures that are within 200 feet of any construction activity. The maximum peak particle velocity level in any direction at any of these historic structures should not exceed 0.12 inches/second PPV for any length of time.
- E. The Contractor shall suspend operations that cause excessive vibrations or exceed the above Vibration Project Action Levels (VPAL). The Contractor shall implement better engineering or mitigation controls when:
- 1. Vibration complaints are received.
 - 2. Vibration exceeds the above-specified VPAL limits.
 - 3. The Contractor fails to comply with vibration mitigation controls specified herein or fails to follow its own Vibration Control Plan; or
 - 4. Damage or disturbance to adjoining property or occupants has been reported.
- F. If at any time during construction vibration activities exceed the Vibration project levels, the activity will be immediately halted until such time where alternative methods that would result in lower vibration levels are implemented. The Contractor shall not resume operations before correcting conditions that cause excessive vibration and shall not be entitled to additional compensation or extension of Contract Time for delays arising from suspension of Work due to Contractor's failure to perform vibration controls as specified.
- G. Vibration Mitigation Measures: The Contractor shall implement the following mitigation measures to reduce vibration from construction-related equipment:
- 1. Limiting the use of construction techniques that create high vibration levels. Pile driving will be prohibited at distances less than 250 feet from buildings and residences. If piles

- must be set near residential areas, the Contractor shall use pre-drilled piles or other measures that minimize the impact of pile driving.
2. Using alternative procedures in vibration-sensitive areas by using techniques with lower vibration levels.
 3. If feasible, restricting the hours of vibration intensive activities, such as pile driving, to weekdays during daytime hours.
 4. Pile holes shall be pre-drilled wherever feasible to reduce potential noise and vibration impacts. If feasible, use sonic or vibratory pile drivers instead of impact pile drivers.
 5. Restricting the use of equipment causing vibration disturbance during nighttime hours or rescheduling slowing the pace of operation to reduce vibration annoyance effects at nighttime.
- H. The Contractor shall perform pre- and post-construction video or photographic documentation/surveys of structures and evaluation of the facades of buildings on all sides of the project alignment to ensure structural damage does not result from construction activities that could cause ground vibration. The post-construction survey and monitoring results will be evaluated to determine whether the new structural and/or architectural damage was caused by vibration due to the Contractor's performance of this Work.
- I. Vibration levels equal to or exceeding 0.2 inches/second, peak particle velocity (in/sec PPV) for continuous vibration could result in architectural damage. If, following completion of construction, changes in the architectural or structural conditions of residential and/or commercial building has occurred, the Contractor shall restore the buildings to pre-construction conditions, and to the satisfaction of the City Representative.
- J. Vibration Control For Historic Buildings or Structures
1. This subsection 1.17J. only applies when historic buildings or structures are shown on the project plans and are labeled as requiring a vibration-monitoring program.
 2. Where the project includes or is directly adjacent to historic buildings or structures susceptible to vibration, as shown on project plans, the Contractor shall institute a vibration-monitoring program to protect such properties from excess vibration during demolition and construction activities associated with the project.
 3. The Contractor shall submit a Vibration Control Plan to the City for review and approval, to be fully implemented upon approval (see 1.17 B).
 - a. Contractor's vibration-monitoring personnel shall include a Qualified Vibration Instrumentation Engineer. The Qualified Vibration Instrumentation Engineer may be on the staff of the Contractor or may be on the staff of a specialist subcontractor; however, the Qualified Vibration Instrumentation Engineer shall not be employed nor compensated by subcontractors, or by persons or entities hired by subcontractors, who will provide others services or material for the project. The Qualified Vibration Instrumentation Engineer shall:
 - 1) Be on site and supervise the initial installation of each vibration-monitoring instrument.
 - 2) Supervise interpretations of vibration-monitoring data.
 - b. Contractor's vibration-monitoring personnel shall be subject to the review of the City Representative.

- c. Contractor shall collect seismograph data prior to any vibration-producing demolition or construction activities to document background vibrations at each monitoring location. The background monitoring shall be performed for a minimum of two non-consecutive workdays, spanning the hours during which demolition and construction activities will take place. Monitoring shall consist of a continuous recording of the maximum single-component peak particle velocities for one-minute intervals, which shall be printed on a strip chart.
- d. Contractor shall have seismographs in place and functioning at least 24 hours prior to any such activity as described in (c) within 200 feet of the monitoring locations. No significant vibration-producing activity shall occur within this zone unless the monitoring equipment is functioning properly, as determined by the City Representative.
- e. Contractor shall monitor vibration during demolition and other significant vibration-producing construction activities as determined by the City Representative. This monitoring shall consist of a continuous recording of the maximum single-component peak particle velocities for one-minute intervals, which shall be printed on a strip chart. During the monitoring, Contractor shall document all events that are responsible for the measured vibration levels and submit the documentation to the City Representative with the data.
- f. The Contractor shall monitor vibration during demolition and other significant vibration-producing construction activities as determined by the City Representative. This monitoring shall consist of a continuous recording of the maximum single-component peak particle velocities for one-minute intervals, which shall be printed on a strip chart. During the monitoring, the Contractor shall document all events that are responsible for the measured vibration levels, and submit the documentation to the City Representative with the data
- g. All vibration monitoring data shall be recorded contemporaneously and plotted continuously on a graph by the data acquisition equipment. Each graph shall show time-domain wave traces (particle velocity versus time) for each transducer with the same vertical and horizontal axes scale
- h. The Contractor shall interpret the data collected, including making correlations between seismograph data and specific construction activities. The data shall be evaluated to determine whether the measured vibrations can be reasonably attributed to construction activities
- i. The equipment shall be set up in a manner such that an immediate warning is given when the peak particle velocity in any direction exceeds the Threshold Value in the previously submitted Vibration Monitoring Plan. The warning emitted by the vibration-monitoring equipment shall be instantaneously transmitted to the responsible person designated by Contractor by means of warning lights, audible sounds or electronic transmission.
- j. If the Threshold Value is reached, Contractor shall:
 - 1) Immediately notify the City Representative.
 - 2) Meet with the City Representative to discuss the need for response action(s).
 - 3) If directed by the City Representative during the above meeting that a response action is needed, submit within 24 hours a detailed specific plan of action based as appropriate on the generalized plan of action submitted previously as part of the vibration-monitoring plan.
 - 4) If directed by the City Representative, implement response action(s) within 24 hours of submitting a detailed specific plan of action, so that the Limiting Value is not exceeded.

- k. If a Limiting Value is reached, the Contractor shall:
 - 1) Immediately notify the City Representative and suspend activities in the affected area, with the exception of those actions necessary to avoid exceeding the Limiting Value.
 - 2) Meet with the City Representative to discuss the need for response action(s).
 - 3) If directed by the City Representative during the above meeting that a response action is needed, submit within 24 hours a detailed specific plan of action based as appropriate on the generalized plan of action submitted previously as part of the vibration-monitoring plan specified in Article 1.17B.
 - 4) If directed by the City Representative, implement response action(s) within 24 hours of submitting a detailed specific plan of action, so that the Limiting Value is not exceeded.

- l. The Contractor shall engage a Qualified Historic Architect or Historic Preservation Professional to document and photograph the properties that are the subject of the Vibration Monitoring Plan to ensure structural damage does not result from construction activities that could cause ground vibration.
 - 1) The post-construction survey and monitoring results will be evaluated to determine whether the new structural and/or architectural damage was caused by vibration due to Contractor's performance of this Work.
 - 2) If, following completion of construction, changes in the architectural or structural conditions the properties that are the subject of the Vibration Monitoring Plan have occurred, Contractor shall restore the buildings to pre-construction conditions, and to the satisfaction of the City Representative.

PART 2 - PRODUCTS
(NOT USED)

PART 3 - EXECUTION
(NOT USED)

END OF SECTION

SECTION 01 35 51

ADDITIONAL CLEAN CONSTRUCTION REQUIREMENTS ON MAJOR CONSTRUCTION PROJECTS

PART 1 - GENERAL

1.1 SUMMARY

- A. This project is located within the Air Pollutant Exposure Zone (APEZ) in San Francisco and is within 1,000 feet of a Sensitive Use, as set forth in Chapter 25 of the Environment Code and Section 6.25 of the Administrative Code. Therefore, Section 01 35 51 incorporates additional requirements of the San Francisco Clean Construction Ordinance ("Ordinance") for projects that meet the requirements of Environment Code Section 2504(a), which are located in the Air Pollutant Exposure Zone (APEZ) and which are within 1,000 feet of a Sensitive Use, as set forth in Chapter 25 of the Environment Code and Section 6.25 of the Administrative Code.
- B. The Department of the Environment is responsible for administering the Ordinance. For more information about the Ordinance and its implementation, please visit the Department of Public Health website at: <https://www.sfdph.org/dph/EH/Air/CleanConstruction.asp> and [https://www.sfdph.org/dph/files/EHSdocs/AirQuality/San Francisco Clean Construction Ordinance 2015.pdf](https://www.sfdph.org/dph/files/EHSdocs/AirQuality/San_Francisco_Clean_Construction_Ordinance_2015.pdf).

1.2 DEFINITIONS

- A. "Air Pollutant Exposure Zone" means a zone having a substantially greater than average concentration of air pollutants as defined in Health Code Section 3804.
- B. "Alternative Fuels" means any transportation fuel that is less polluting than gasoline or petroleum diesel fuel, as determined by the California Air Resource Board and that is shown to have lower lifecycle carbon emissions than gasoline or petroleum diesel. Alternative Fuels may include, but are not limited to: natural gas; propane; biofuels from low carbon, sustainable and preferably local sources; hydrogen produced from low carbon and/or renewable sources; and electricity.
- C. "Alternative Sources of Power" means utility-based electric power or other power sources other than diesel engines.
- D. "ARB" means the California Air Resources Board.
- E. "Clean Construction" means the performance of all work required to be performed under a Public Works contract meeting the requirements in Sections 2504, 2505 and 2506 of the Environment Code, as applicable.
- F. "Construction" means building, demolition, excavation, grading or foundation work, whether or not the work requires a City permit.
- G. "Construction Activities" means the performance of all work involved in or required for Construction, except for the issuance or obtaining of a site permit for a project.
- H. "Construction Phase" means a particular construction activity over a certain period of time. Construction phases may include, but are not limited to, demolition, site preparation, grading, building construction, architectural coatings, and paving. Multiple Construction Phases of a single project may take place at the same time.
- I. "Equipment" means off-road and on-road equipment.

- J. "Equipment Type" means a category of off-road equipment. Types of off-road equipment include bore/drill rigs, cranes, crawler tractors, excavators, graders, off-highway tractors, off-highway trucks, other construction equipment, pavers, paving equipment, rollers, rough terrain forklifts, rubber-tired dozers, rubber-tired loaders, scrapers, skid steer loaders, surfacing equipment, tractors/loaders/backhoes, and trenchers.
- K. "Major Construction Project" means a public work to be performed within the geographic limits of the City that uses off-road equipment and that is estimated to require 20 or more cumulative days of work, including non-consecutive days, to complete.
- L. "Most Effective Verified Diesel Emission Control Strategy" means a device, system or strategy that is verified, pursuant to Division 3, Chapter 14, of Title 13 of the California Code of Regulations, to achieve the highest level of pollution control from an off-road vehicle.
- M. "Off-Road Engine" means a non-road engine as defined in Title 40 of the Code of Federal Regulations, Section 89.2.
- N. "Off-Road Equipment" means equipment with an off-road engine having greater than 25 horsepower and operating for more than 20 total hours over the entire duration of Construction Activities.
- O. "On-Road Equipment" means a heavy-duty vehicle as defined in Title 40 of the Code of Federal Regulations, Section 86.1803-01.
- P. "Portable Diesel Engine" means a diesel engine that is portable as defined in 71 California Code of Regulations, Section 93116.2(bb).
- Q. "Sensitive Use" means a category of building use identified as a "Sensitive Use" in Health Code Section 3804.
- R. "Tier 2 Off-Road Emission Standards" means the Tier 2 new engine emission standards in Title 13, California Code of Regulations, Section 2423(b)(1)(A) and/or Title 40, Code of Federal Regulations, Part 89.112(a).
- S. "VDECS" means a verified diesel emission control strategy, designed primarily for the reduction of diesel particulate matter emissions, which has been verified by ARB pursuant to "Verification Procedures, Warranty and In-Use Strategies to Control Emissions from Diesel Engines," Title 13, California Code of Regulations, Sections 2700-2710. VDECS can be verified to achieve Level 1 diesel particulate matter reductions (at least 25 percent), Level 2 diesel particulate matter reductions (at least 50 percent), or Level 3 diesel particulate matter reductions (at least 85 percent).

1.3 SUBMITTALS

A. Construction Emissions Minimization Plan:

1. Contractor shall submit its initial Construction Emissions Minimization Plan no less than 28 days prior to mobilization. (See Subsection 1.04B.)
2. Contractor shall submit an updated Construction Emissions Plan on a quarterly basis in compliance with Subsection 1.04B.5.a and submit each quarterly report within seven business days of the end of each quarter.
3. Contractor shall submit a final Construction Emissions Minimization Plan report summarizing construction activities within two weeks of achieving Substantial Completion in compliance with Subsection 1.04B.5.b.

4. Clean Construction Emissions Plan Certification Statement: Contractor shall submit this statement with its Construction Emissions Minimization Plan. (See Subsection 1.04B.3.)
5. Waiver Request: Contractor shall submit a waiver request to the Department Head no less than two weeks prior to the planned use of a specific piece of off-road equipment. (See Subsection 1.05A.).

1.4 REQUIREMENTS FOR MAJOR CONSTRUCTION PROJECTS WITHIN THE AIR POLLUTANT EXPOSURE ZONE

A. For all Major Construction Projects that meet the requirements of Environment Code Section 2504(a) and which are located in the Air Pollutant Exposure Zone and within 1,000 feet of a Sensitive Use, the following requirements apply:

1. All off-road equipment shall be fueled by biodiesel fuel grade B20, and have engines that (a) meet or exceed either United States Environmental Protection Agency or ARB Tier 2 off-road emission standards, and (b) have been retrofitted with an ARB Level 3 VDECS. Equipment with engines meeting Tier 4 Interim or Tier 4 Final off-road emission standards automatically meet this requirement. See Section 1.05A regarding the procedure for requesting a waiver to this requirement.
2. Where access to alternative sources of power is available, use of portable diesel engines to perform work on the project shall be prohibited. See Section 1.05B regarding the waiver procedure for this requirement.
3. Diesel engines, whether for off-road or on-road equipment, shall not be left idling for more than two minutes at any location, except as allowed for in applicable state regulations regarding idling for off-road and on-road equipment (e.g., traffic conditions, safe operating conditions). If within 100 feet of a school zone idling times shall be limited to 30 consecutive seconds. The Contractor shall post legible and visible signs, in English, Spanish, and Chinese, in designated queuing areas and at the construction site to remind operators of the idling limit. Refer to the following link for the Clean Construction Sign Template: <https://www.sfdph.org/dph/EH/Air/CleanConstruction.asp>.
4. The Contractor shall instruct construction workers and equipment operators on the maintenance and tuning of construction equipment, and require that such workers and operators properly maintain and tune equipment in accordance with manufacturer specifications.

B. Construction Emissions Minimization Plan: All Major Construction Projects that meet the requirements of Environment Code Section 2504(a), which are located in the Air Pollutant Exposure Zone and are within 1,000 feet of a Sensitive Use, also must comply with the following requirements:

1. Before starting on-site Construction Activities, the Contractor shall submit a Construction Emissions Minimization Plan ("Emissions Plan") to the City Representative for review and approval. The Emissions Plan shall state, in reasonable detail, how the Contractor will meet the requirements of Section 2505 of the Environment Code.
2. The Emissions Plan shall include estimates of the construction timeline by phase, with a description of each piece of off-road equipment required for each Construction Phase.
 - a. The description may include, but is not limited to: equipment type, equipment manufacturer, equipment identification number, engine model year, engine certification (Tier rating), horsepower, engine serial number, and expected fuel usage and hours of operation.

- b. For the VDECS installed, the description may include, but is not limited to: technology type, serial number, make, model, manufacturer, ARB verification number level, and installation date and hour meter reading on installation date.
 - c. For off-road equipment using alternative fuels, the description shall also specify the type of alternative fuel.
 - d. Contractor may use the Clean Construction Equipment Inventory Template to satisfy the Emissions Plan requirements. Refer to the following link for that template: <https://www.sfdph.org/dph/EH/Air/CleanConstruction.asp>.
3. The Contractor agrees to comply fully with the Emissions Plan and acknowledges that a significant violation of the Emissions Plan shall constitute a material breach of the Agreement. Contractor must submit a signed Clean Construction Emissions Plan Certification Statement to the City Representative. Refer to the following link for the Emissions Plan Certification Statement Template: <https://www.sfdph.org/dph/EH/Air/CleanConstruction.asp>.
4. After City review and approval, the Contractor shall make the Emissions Plan available to the public for review onsite during working hours.
- a. The Contractor shall post at the construction site a legible and visible sign summarizing the Emissions Plan. Refer to the following link for the Clean Construction Sign Template: <https://www.sfdph.org/dph/EH/Air/CleanConstruction.asp>.
 - b. The sign shall also state that the public may ask to inspect the Emissions Plan for the project at any time during working hours, and shall explain how to request to inspect the Emissions Plan.
 - c. The Contractor shall post at least one copy of the sign in a visible location on each side of the construction site facing a public right-of-way.
5. Reporting:
- a. After Construction Activities begin, the Contractor shall update the Emissions Plan on a quarterly basis documenting changes from the original plan and demonstrating compliance with the Emissions Plan. The report shall be submitted to the City Representative quarterly and a copy shall also be maintained at the construction site.
 - b. Prior to receiving a Notice of Final Completion, or within six months of completion of Construction Activities if a final certificate of acceptance is not required, the Contractor shall submit to the City Representative a final report summarizing Construction Activities, including the start and end dates and duration of each Construction Phase, and the specific information required in the Emissions Plan.

1.5 WAIVERS

A. Waivers Under Subsection 1.04A.

- 1. The Contractor may request to waive the equipment requirements of Paragraph 1.04A.1 if: (a) a particular piece of off-road equipment with an ARB Level 3 VDECS is technically not feasible; (b) the equipment would not produce desired emissions reduction due to expected operating modes; (c) installation of the equipment would create a safety hazard or impaired visibility for the operator; or, (d) there is a compelling emergency need to use off-road equipment that is not retrofitted with an ARB Level 3 VDECS.
- 2. Contractor shall submit a waiver request to the Department Head, or designee, no less than two weeks prior to the planned use of a specific piece of off-road equipment.

- 3. If the Department Head, or designee, grants the waiver specified in Section 1.05A.1, the Contractor must use the next cleanest piece of off-road equipment, according to Table 1, below.

| Table 1 Off-Road Equipment Compliance Step Down Schedule* | | |
|--|--------------------------|--------------------|
| Compliance Alternative | Engine Emission Standard | Emissions Control |
| 1 | Tier 2 | ARB Level 2 VDECS |
| 2 | Tier 2 | ARB Level 1 VDECS |
| 3 | Tier 2 | Alternative Fuel** |
| * If the City determines that the equipment requirements cannot be met, the Contractor must meet Compliance Alternative 1. If the City determines that the Contractor cannot supply off-road equipment meeting Compliance Alternative 1, then the Contractor must meet Compliance Alternative 2. If the City determines that the Contractor cannot supply off-road equipment meeting Compliance Alternative 2, then the Contractor must meet Compliance Alternative 3. | | |
| ** Alternative fuels are not a VDECS | | |

B. Waivers Under Subsection 1.04A.2.

- 1. The Department Head, or designee, may waive the alternative source of power requirement set forth in Subsection 1.04A.2 if an alternative source of power is limited or infeasible at the project site. If the City grants the waiver, the Contractor must submit documentation that the equipment used for onsite power generation meets the requirements of Subsection 1.04A.1, above.

C. All Other Waivers: The Department Head or designee also may waive the requirements of the Ordinance on the grounds set forth in Section 2507 of the Environment Code.

- D. For any waiver granted in this Subsection 1.05, the City Representative will within two business days prepare a written notice of the waiver and a written memorandum explaining the basis for the waiver and the steps that will be taken to safeguard public and City employee health during the noncomplying work. The memorandum will also state the steps that the City and the Contractor will take to minimize the use of noncomplying equipment or engines during the noncomplying work.

1.6 NONCOMPLIANCE AND PENALTIES

- A. Liquidated Damages: By entering into the Agreement, Contractor and City agree that if Contractor uses off-road equipment and/or off-road engines in violation of the Clean Construction requirements set forth in Administrative Code Section 6.25 and Chapter 25 of the Environment Code, the City will suffer actual damages that will be impractical or extremely difficult to determine. Accordingly, Contractor and the City agree that Contractor shall pay the City the amount of \$100 per day per each piece of off-road equipment and each off-road engine used to complete Work on the Project in violation of the Ordinance. Such amount shall not be considered a penalty, but rather agreed monetary damages sustained by City because of Contractor's failure to comply with the Clean Construction requirements.

- B. False Representations: False representations by the Contractor, in connection with the bidding, execution or performance of any City contract, regarding the nature or character of the off-road equipment and/or off-road engines to be utilized, on the contract, or to the City about the nature or character of the off-road equipment and/or off-road engines actually used may subject the Contractor to the consequences of noncompliance specified in Section 2510 of the Environment Code, including but not limited to the penalties prescribed therein. The assessment of penalties for noncompliance shall not preclude the City from exercising any other rights or remedies to which it is entitled.

PART 2 - PRODUCTS

(NOT USED)

PART 3 - EXECUTION

(NOT USED)

END OF SECTION

SECTION 01 41 00
REGULATORY REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes requirements for: Codes, Safety Rules, Regulations and Permit Provisions that the Contractor shall comply with.
- B. Related Documents and Sections include:
 - 1. Section 01 35 49 - Minimum Environmental Procedures
 - 2. Section 01 35 50 - Additional Environmental Procedures
- C. Compliance with the applicable provisions of Federal, State, and local laws, codes, safety rules, and regulations is incidental to the work it pertains to.

1.2 DESCRIPTION

- A. All materials, installation, and construction shall comply with the applicable provisions of current laws, regulations, codes, safety rules, and permits of the City and County of San Francisco, the State of California, the Federal Government, governing utility districts, and any other applicable authorities having jurisdiction over construction and completion of the Work, including but not limited to, the State Fire Marshall, Cal/OSHA and the State Construction Safety Orders, and the California Labor Code.
- B. Except where noted, the most recent editions of Codes, Standards, and Regulations at the time of the Contract shall apply to the Contract throughout, and it shall be deemed to be incorporated by reference.
- C. The Contractor shall obtain and comply with the conditions of all permits required for the Work or for temporary facilities, including indemnification and insurance requirements, and shall pay all fees and furnish any deposits and bonds required for such permits.
- D. Contractor shall provide sufficient time in its Baseline Schedule to obtain permits. Contractor's failure to provide reasonable estimate of time for permitting agencies to review and approve permit application shall preclude Contractor's claim for demand for additional time or compensation for delay arising from its failure to provide adequate time for permit processing.
- E. Codes referenced in the Contract Documents shall have full force and effect as though set out in full in these Specifications. Nothing in the Contract shall be construed to permit Work not conforming to applicable Code requirements.
- F. The Codes and other authorities referenced in the Contract Documents are not a comprehensive list of all Codes applicable to the Work; the Codes listed in the Contract Documents are referenced for the information and convenience of the Contractor only. The City does not represent that the all Codes applicable to the Work have been cited or adequately described in the Contract Documents. Contractor is solely responsible for compliance with all Codes applicable to the Work and relevant to the Contractor's means and methods of performing said Work.

- G. Whenever reference is made to “Caltrans Standard Specifications,” it shall be understood to be the most recent edition of the State of California, Department of Transportation, Standard Specifications.
- H. Contractor is responsible to comply with all permit requirements, for payment fines, penalties, and all other costs of permit violations within the Contractor’s control or responsibility.
- I. The Contractor shall obtain and pay for (unless otherwise noted) all permits, inspections, and service requests to start and complete Work. Permit costs shall include all associated costs for notifications, walk-through, in-progress inspections, final inspections, oversight, and approvals.

1.3 CITED CODES AND AUTHORITIES

- A. Nothing contained in this Contract shall relieve Contractor, or any Subcontractor or Supplier, from the obligations set forth above and obligations as required by applicable laws, rules, or regulations. If a provision of this Document conflicts with any applicable provision of this Contract or any federal, state, or local safety regulations, the more stringent requirements that maintain a greater level of safety shall apply.
- B. Contractor shall conform all work of the Contract to meet or exceed the applicable requirements of the latest editions of the applicable codes, laws, ordinances, standards, rules and regulations referenced in the General Provisions including, but are not limited to the following:
 - 1. San Francisco Municipal Codes, including but not limited to the San Francisco Administrative Code, San Francisco Building Code, San Francisco Electrical Code, San Francisco Environment Code, San Francisco Health Code, San Francisco Mechanical Code, San Francisco Plumbing Code, San Francisco Police Code, San Francisco Public Works Code, San Francisco Transportation Code, San Francisco Fire Code, and all department orders adopted pursuant thereto.
 - a. SFMTA Regulations for Working in San Francisco Streets.
 - b. SFMTA Health & Safety Requirements, “Roadway Worker Protection” training, “Track Access Clearance Permit”, and overhead contact system rules.
 - c. CCR, Title 8, Subsection 3203 (a)(7) and Muni Procedures SY.PR.034 – Contractor Safety Program and SY.PL.03 – Roadway Worker Protection (RWP) Plan.
 - d. DPW Order 178,940, Regulations for Excavating and Restoring Streets in San Francisco.
 - e. DPW Order 174,878, Regulations and Slip Resistant Standards for Any Manhole, Vault, or Sub-Sidewalk Basement Cover, Grille, Grate on the Public Sidewalk.
 - f. DPW Order 172,596, Guidelines for Processing and Issuance of Special Sidewalk Permits within the Downtown Streetscape Areas.
 - g. DPW Order 171,442 Regulation for Excavating and Restoring Streets in San Francisco.
 - h. DPW Order 171,378, Dust Control Order.
 - i. DPW Order 171,333, Dust Generation and Control Regulations.
 - j. DPW Order 167,840, Placement of Barricades at Construction Site.
 - k. DPW Order 135,595, Street Opening and Pavement Restoration Regulations for Non Moratorium City Streets.
 - l. Article 4.1 and 4.2 San Francisco Public Works Code; Industrial Waste Ordinance.
 - m. Article 2.4, San Francisco Public Works Code, Excavation in the Public Right-of-Way.

- n. Article 29, San Francisco Police Code, Regulation of Noise.
 - o. The San Francisco Building Code Section 106.3.2.6.
2. San Francisco Health Code
 - a. Article 21 – Hazardous Materials.
 - b. Article 21A – Risk Management Program.
 - c. Article 22 – Hazardous Waste Management.
 - d. Article 22A – Analyzing Soils for Hazardous Waste (Maher Ordinance).
 - e. Article 22B – Construction Dust Control Ordinance #176-08.
 3. San Francisco Department of Building Inspection (SFDBI) Central Permit Bureau – Major Plan Check Division.
 4. San Francisco Department of Public Health (SFDPH).
 5. Regulations and Policies of the San Francisco Municipal Railway.
 6. Clean Construction Ordinance under the SF Administrative Code. Clean Construction Ordinance under the SF Administrative Code, Chapter 6, Section 6.25 and Section 6.67, SF Environment Code, Chapter 4: Section 426 Clean Construction Assistance and Reporting, City Ordinance # 70-07, and City Ordinance # 28-15. <http://www.sfbos.org/ftp/uploadedfiles/bdsupvrs/ordinances15/o0028-15.pdf>
 7. California Code of Regulations (CCR) or California Administrative Code, Title 8 - Industrial Relations, Part 1 - Department of Industrial Relations, Chapter 4 - Division of Industrial Safety:
 - a. Subchapter 4 - Construction Safety Orders (CSO).
 - b. Subchapter 5 - Electric Safety Orders (ESO).
 - c. Subchapter 7 - General Industry Safety Orders (GISO).
 - d. The Contractor's attention is directed to sections of above Safety Orders, which cover some of the most frequently encountered safety concerns, as follows:
 - 1) CSO #1540 – Excavations.
 - 2) CSO #1541 - Shoring, Sloping and Benching Systems.
 - 3) CSO #1598 - Traffic Control for Public Streets and Highways.
 - 4) CSO #1599 – Flaggers.
 - 5) GISO #3380 - Personal Protective Devices.
 - 6) GISO #3381 - Head Protection.
 - 7) GISO #3395 –Heat Illness Prevention Standards.
 - 8) GISO #3646 - Operating Instructions (Elevated Work Platforms).
 - 9) GISO #3648 - Operating Instructions (Aerial Devices).
 - 10) GISO #5003, #5006, #5021, #5022, #5024, #5025 – Cranes.
 - 11) ESO #2940.2 – Clearances.
 - 12) ESO #2940.7 - Mechanical Equipment.
 - 13) ESO #2941 - Work On or In Proximity of Overhead High Voltage Lines.

- 14) ESO #2946 - Provisions for Preventing Accidents due to Proximity of Overhead Lines.
8. CCR Title 17, Public Health, including the Final Regulation Order of 07/22/2002, in Section 93105, on Asbestos Airborne Toxic Control Measure for Construction, Grading, Quarrying, and Surface Mining Operations (<http://www.arb.ca.gov/toxics/atcm/asb2atcm.htm>).
9. Cal/OSHA Construction Asbestos Standard, 8 CCR all applicable Sections and Section 1529, including those for naturally occurring asbestos.
10. Respirable Crystalline Silica OSHA Regulation 29 CFR 1926.1153, and California Code of Regulations, [Title 8, section 1532.3](#), 1530.1, and 5155.
11. Cal/OSHA Lead in Construction Standard 8 CCR 1532.1.
12. USEPA's Lead Renovation, Repair and Painting Rule (RRP Rule, <https://www.epa.gov/lead/fqs-rrp-rule>), and Lead-Safe Work Practices to work safely with lead-based paints.
13. The San Francisco Department of Building Inspection, Work Practices for Disturbance and Removal of Lead-Based Paint on Pre-1979 Buildings and Steel Structures.
14. CCR Title 19, Public Safety.
15. CCR Title 22, Social Security, Division 4, Environmental Health, and Division 4.5, Environmental Health Standards for the Management of Hazardous Waste.
16. CCR Title 24, California Building Standards Code – 2016
 - a. Part 1, California Building Standards Administrative Code.
 - b. Part 2, California Building Code.
 - c. Part 3, California Electrical Code.
 - d. Part 4, California Mechanical Code.
 - e. Part 5, California Plumbing Code.
 - f. Part 6, California Energy Code.
 - g. Part 7, NOT USED.
 - h. Part 8, California Historic Building Code.
 - i. Part 9, California Fire Code.
 - j. Part 10, California Existing Building Code.
 - k. Part 11, California Green Building Standard Code.
 - l. Part 12, California Reference Standards Code.
17. CCR Title 24, Americans with Disabilities Act – Accessibility Guidelines for Buildings and Facilities.
18. CCR Title 26, Toxics.
19. CCR Article 4.8 Section 2449 General Requirements for In-Use off Road Diesel fueled fleets, ARB AB 1085. (<http://www.arb.ca.gov/msprog/ordiesel/knowcenter.htm>)

20. California Division of Industrial Safety.
21. California Department of Transportation – Right-Of-Way Cooperative Agreement Procedures and California Manual on Uniform Traffic Control Devices (MUTCD).
22. California Labor Code.
23. California State Vehicle Code.
24. California Public Utilities Code Section 29037.
25. State of California Public Utilities Commission.
 - a. General Order No. 26D, Regulations Governing Clearances on Railroads and Street Railroads with Reference to Side and Overhead Structures, Parallel Tracks, Crossings of Public Roads, Highways and Streets.
 - b. General Order No. 95, Rules for Overhead Line Construction.
 - c. General Order No. 128, Rules for Construction of Underground Electric Supply and Communication Systems.
 - d. General Order No. 143B, Safety Rules and Regulations governing Light Rail Transit.
 - e. State of California Public Utilities Commission, General Order No. 172, Rules and Regulations Governing the Use of Personal Electronic Devices by Employees of Rail Transit Agencies and Fixed Guideway Systems.
 - f. The State of California Wireless Communications Device Law (effective January 1, 2009) makes it an infraction to write, send, or read text-based communication on an electronic wireless communications device, such as a cell phone, while driving a motor vehicle.
26. California Health and Safety Code.
27. California Occupational Safety and Health Administration (CAL/OSHA).
28. California Storm Water Municipal and Construction Activity BMP Handbooks.
29. California Regional Water Quality Control Board (RWQCB).
30. State Water Resources Control Board.
31. California Air Resources Board (CARB) regulations.
32. Bay Area Air Quality Management District (BAAQMD) regulations.
33. Construction General Permit (CGP).
 - a. Order 2009-0009 DWQ of the Clean Water Act.
 - b. Order 2010-0014 DWQ Adopted Order that amends Order 2009-0009 DQQ of the Clean Water Act.
34. Code of Federal Regulations (CFR):
 - a. CFR Title 29, Labor - Labor Environmental Health and Safety Plan (EHASP).
 - b. CFR Title 40, Protection of Environment.
 - c. CFR Title 49, Transportation.

35. Federal Transit Administration (FTA) Regulations and Best Practices Manual.
36. Federal Clean Air Act.
37. Federal Clean Water Act.
38. Federal Railroad Administration (FRA)
 - a. Roadway Protection Rule (49 CFR Part 214C).
39. Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities.
40. National Fire Protection Association (NFPA) code:
 - a. NFPA 70, National Electrical Code.
 - b. NFPA 92B, Standard for Smoke Management Systems in Malls, Atria, and Large Spaces.
 - c. NFPA 130 - 2007, Standard for Fixed Guideway Transit and Passenger Rail Systems.
41. National Electric Code (NEC).
42. Uniform Fire Code.
43. The Work Hours and Safety Standards Act (40 U.S.C. 327 et seq.).
44. Americans with Disabilities Act Guidelines.
45. AWWA C651-92, Standard for Disinfecting Water Mains.
46. Department of Toxic Substances Control (DTSC) Advisory Note for Clean Imported Material.
47. Regional Water Quality Control Board (RWQCB)'s Environmental Screening Levels (ESLs), Tier 1 levels.
48. Caltrans Standard Specification Manual and all revisions as published by the State of California, Department of Transportation.

1.4 PERMITS TO BE OBTAINED BY CONTRACTOR

- A. At no cost to the City, the Contractor shall obtain the following permits as applicable but not limited to, and as needed:
 1. State, County, and City Transportation vehicle permits for construction related vehicles that are over width, over length, overweight, overload.
 2. State Industrial Safety Orders/Construction Safety Orders: Training and Certification of Workers – Confined Spaces (Confined Space Entry Plan and Permit as per CCR Title 8, and local requirements), Welding, High Voltage Electrical.
 3. CAL/OSHA permits:
 - a. Construction permits:
 - 1) Trenches/Excavations five feet and deeper.
 - 2) Building, structure, scaffolding or false work 36 feet and higher.

- 3) Demolition of building, structure 36 feet and higher.
 - 4) Erection, dismantling of vertical shoring 36 feet and higher.
 - 5) Tower cranes: fixed and mobile.
 - b. Tunneling permits that include usage of diesel engines in the station caverns.
 - c. Elevator permits for temporary hoisting and lifting equipment.
4. The Contractor shall obtain all Bay Area Air Quality Management District (BAAQMD) and the California Air Resources Board (CARB) applications, permits, and notifications, and pay for the BAAQMD Regulation 3 Fees as required. For information on the permit requirements and application forms check the web page at www.baaqmd.gov, or http://www.baaqmd.gov/enf/compliance_assistance/index, or call the compliance assistance hotline at (415) 749-4999. For asbestos <http://www.baaqmd.gov/enf/asbestos/index.htm> or call the district's Asbestos Program at (415) 749-4762.
- a. The following BAAQMD permits forms shall be completed for work involving screening, crushing or grinding, and use of abatement devices:
 - 1) Form P-201: General information.
 - 2) Form P-101B: General information.
 - 3) Form G: Emission Source (crusher or grinder).
 - 4) Form A: Abatement Devices: Wet Spray System.
 - b. Contractor is hereby notified that screening or crushing operations of excavated materials cannot proceed without the appropriate BAAQMD, and Cal-EPA/DTSC permits.
 - c. Contractor is hereby notified that diesel exhaust pollutants requirements under ARB 1085 for In-use off- road diesel fueled fleet are in effect to minimize diesel exhaust emissions. Contractor shall register and obtain an Equipment Identification Number (EIN) per vehicle/equipment over 25 horsepower with the Air Resources Board (<http://www.arb.ca.gov/msprog/ordiesel/knowcenter.htm>).
 - d. Prior to start of any asbestos abatement work, the Contractor shall file the Bay Area Air Quality Management District (BAAQMD) Notification Form (under Demolition Regulation 11, Rule 2) and obtain a J#.
5. Cal/EPA, Department of Toxic Substances Control (DTSC) permits and notifications, including but not limited to permit-by-rule, hazardous waste facilities permit, transportable treatment unit (TTU), and treatment storage and disposal facility (TSDF) permits.
6. The Regional Water Quality Control Board (RWQCB), San Francisco Bay Region, and the California State Water Resource Control Board (SWRCB) permits and notifications, and not limited to:
- a. National Pollutant Discharge Elimination System (NPDES) Permit – for sewer connections direct to Bay during construction.
7. San Francisco Department of Public Health (SFDPH) – Hazardous Materials Unified Program Agency permits:
- a. Hazardous Materials Certificate of Registration: As deemed necessary, the Contractor shall obtain and keep current a hazardous materials certificate of registration and implement the hazardous materials plan submitted with the registration application, in accordance with Articles 21, 21A, and 22 of the San Francisco Public Health Code.

Contact the SFDPH/HMUPA at (415) 252-3900. The Hazardous Materials Certificate of Registration includes and is not limited to:

- 1) A chemical inventory
 - 2) An emergency response plan
 - 3) A training program for employees in safety procedures in the event of a release or a threatened release of hazardous materials.
 - 4) A site map showing where the hazardous materials are located
- b. Well Construction/Decommissioning or Soil Borings Permit: As deemed necessary, a permit is required to construct or operate an environmental or geotechnical well or soil boring. These wells include, but are not limited to, cone penetrometers, inclinometers, piezometers, cathodic wells, exploratory wells, extraction wells, recovery wells, monitoring wells, temporary wells, irrigation wells, industrial wells, dewatering wells, wick drains, hydropunch soil borings, and soil borings drilled for geotechnical or environmental purposes (whether or not groundwater is encountered). This information is not intended as a substitute for familiarity with applicable laws and regulations. The Contractor shall use a driller with a C-57 state license. Contact the SFDPH, Monitoring Well Section at least 15 Working Days in advance of drilling at (415) 252-3947.
- c. Underground Storage Tank (UST) Permit: As deemed necessary, all modifications, repairs, removals and installation of USTs shall require approval of the SFDPH, compliance with Articles 21, 21A and 22 of the San Francisco Public Health Code, and its implementing regulations, compliance with applicable provisions of Chapters 6.7 and 6.75 of the California Health and Safety Code, Section 25280 et al. Contact the SFDPH/HMUPA at (415) 252-3900.
8. SFDPW permits:
- a. Encroachment (minor and major) permits for sidewalks.
 - b. Street Excavation Permit.
 - c. Street Improvement Permit.
 - d. Utility Excavation Permit.
 - e. Street Space Permit.
 - f. Temporary Occupancy Permit.
 - g. Sidewalk Legislation Permit – Temporary by Contractor.
 - h. Sidewalk Permit – Temporary by Contractor.
 - i. Surface Mounted Facility Permit – Temporary by Contractor.
 - j. Parking Legislation Permit – Temporary by Contractor.
 - k. Debris Box Permit.
 - l. Removal of City Survey Benchmarks Permit needed for removal of existing survey benchmarks.
 - m. Pipe Barrier Permit.
 - n. Personal Wireless Permit.
 - o. Side sewer connection Permit.
 - p. Boring/Monitoring Wells Permit.
 - q. Underground Storage Tank Removal Permit.

9. Excavation, street space, side sewer, and street improvements permits from San Francisco Public Works, Bureau of Street Use and Mapping (BSM), 49 South Van Ness, San Francisco.
 - a. Contractor shall contact DPW/BSM at (415) 558-4400 for all requirements for applying for the permit and the cost of the fees. City Representative will not allow any Work on the street without an Excavation Permit.
 - b. Contractor shall be the applicant of the permit, comply with all permit requirements, pay all costs, and be responsible for fines resulting from non-compliance to the permit requirements.
 - c. Contractor shall pay all permit fees requested by DPW/BSM.
 - d. It is the responsibility of the Contractor to determine the number of calendar days to complete the Work in the permit application.
 - e. It is the responsibility of the Contractor to keep permits valid for the entire period of construction including periods of extension or delay. All work and costs incurred to apply for and obtain the excavation permit, and keeping a valid permit shall be Incidental Work, and no separate payment shall be made to the Contractor, except as provided below.
10. Rockwheel Permit.
11. Electrical permits.
12. Permits as required by the SFMTA, 1 South Van Ness Avenue, 7th floor, San Francisco, telephone (415) 701 4500
13. San Francisco Public Utilities Commission (SFPUC) Permits. Waste Water Enterprise, Collection System Division (WWE-CSD), 3rd Street, Suite 600, San Francisco, or the San Francisco Permit Center 1660 Mission Street, San Francisco.
 - a. Batch wastewater discharge permit. Telephone (415) 695-7321
 - b. Construction Site Runoff Control Permit, Telephone (415) 695 7339
14. San Francisco PUC/WWE-CSD use of reclaimed water permit. Contact WWE-CSD at (415) 648-6882 x1378.
15. San Francisco PUC/Water Department/City Distribution Division permits and service requests for water and meters.
16. San Francisco PUC/Bureau of Light, Heat, and Power (BLHP) permit and notification for removal of all street lighting.
17. San Francisco PUC/ Hetch Hetchy Water & Power (HHWP) application and notification for electrical service connection to PG&E. Contact HHWP at (415) 554-1596.
18. Other than the San Francisco Department of Building Inspection (DBI) Building Permit), the Contractor shall obtain and pay for other DBI permits to start and complete the Work.
 - a. For other DBI permits (including but not limited to Demolition, Electrical, Mechanical, and Plumbing):
 - 1) Contractor shall obtain all other required permits from DBI, and shall pay for any additional costs related to the permits that were not covered by the Building Permits, prior to the start of permitted work.

- 2) Contractor shall not start Work Site without the appropriate and valid DBI Job Cards (to record sign-offs by building inspectors upon satisfactory in-progress inspections and final inspection) on site.
 - 3) Contractor shall be responsible for obtaining the appropriate and valid DBI Job Cards and DBI approved sets of Contract Drawings and Specifications, prior to the planned or actual start of permitted work.
 - 4) Contractor shall be responsible for arranging and coordinating periodic and final inspections by DBI, and satisfying all other requirements of DBI, including securing for City Temporary Certificates of Occupancy, if requested by City, and the Certificates of Final Completion and Occupancy from the DBI as required.
19. San Francisco Fire Department permits, including but not limited to:
- a. The flammable or combustible material storage permit. Contact the SFFD, Bureau of Fire Prevention at (415) 558-3300.
 - b. Permit and notification for AWSS relocation.
 - c. Permit and notification for removal and installation of fuel or chemical storage tanks.
20. San Francisco Police Department permits, including noise permits.
21. San Francisco City Planning permits and approvals.
22. San Francisco Recreation and Parks Department permits
23. San Francisco Municipal Transportation Agency (SFMTA) permits.
24. Utility Service Alert (USA) permits and clearance at 1- (800) 642-2444.
25. Any other permit required to perform the Work not listed in Paragraph 1.4, above.

1.5 SUBMITTALS

- A. copy of each permit that the Contractor obtains shall be provided to the City Representative for information prior to commencing Work covered by such permit.

1.6 RESOLUTION OF CONFLICTS

- A. If the Contractor is aware that the Specifications or Drawings are at variance with permits, laws, or regulations, the Contractor shall give the City Representative prompt written notice thereof and the City Representative will resolve the conflict in accordance with the General Conditions. If the Contractor performs Work knowing or having reasons to know that it is contrary to such permits, Codes and safety rules, and without such notice to the City Representative, the Contractor shall bear all responsibility and costs arising there from including all costs of demolition correction and completing the nonconforming Work.

1.7 SEISMIC LOADING DESIGN PROVISIONS

- A. Contractor shall be responsible for the design of all supports and anchorages for all nonstructural components including mechanical and electrical equipment, pumps, and piping to be constructed or installed by Contractor.
- B. The Contractor shall provide the services of a civil or structural engineer registered in the State of California for preparing such designs, which shall be in accordance with the seismic loading provisions of the current edition of the San Francisco Building Code, using an importance factor of 1.0 or greater.

- C. Shop drawings and supporting calculations of all supports and anchorages shall bear the seal, signature and license expiration date of the engineer hired by the Contractor.

PART 2 - PRODUCTS

(NOT USED)

PART 3 - EXECUTION

(NOT USED)

END OF SECTION

SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Provide and maintain construction facilities and temporary controls as required to perform the Work; relocate as required by the progress of the Work.
2. Unless otherwise required by the City, materials for construction facilities and temporary controls may be new or used, and shall be suitable for the purposes intended.
3. Materials, installation and maintenance of construction facilities and temporary controls shall be in compliance with applicable regulatory requirements.
4. Maintain construction facilities in sound, neat and clean condition. Remove any graffiti and repair any vandalism to the satisfaction of the City.
5. Remove construction facilities and controls, including associated utilities and equipment, when their use is no longer required.

B. Related Sections:

1. Section 01 77 00 - Closeout Procedures.

1.2 OPERATION HOURS FOR TEMPORARY CONTROLS

- A. Provide and maintain temporary pumping, piping, power, lighting, controls, instrumentation, alarms, security devices, and all required safety devices at all times. Such items shall be made available for immediate use when Contractor's operations impact existing systems.

1.3 TEMPORARY ELECTRICITY

- A. Provide and pay for electrical service and weatherproof, grounded distribution system of sufficient size, capacity, and power characteristics during the construction period. Existing on-site City electrical facilities are not available for contractor's use.

1.4 TEMPORARY LIGHTING

- A. Provide and maintain lighting for construction operations, including power to distribution boxes. Required illumination may be provided by approved cord sets with lamp guards. Provide and maintain temporary lighting whenever new permanent lighting fixtures are switched over from existing lighting.

1.5 TELEPHONE SERVICE

- A. The Contractor shall provide, maintain and pay for telephone service to Contractor's field office from the time of project mobilization.

1.6 TEMPORARY WATER SERVICE

- A. Potable Water: Arrange with the San Francisco Water Department to provide potable water obtained by connecting to City water systems.
1. Contact the Water Department at 415-923-2400 for arranging such water service.
 2. Water is available from fire hydrants located in the streets. Obtain permission from the San Francisco Fire Department to use hydrants.
 3. Pay the costs of connection fees, meters, and all water furnished by the San Francisco Water Department under the water service account established above.
- B. The Contractor is advised that Ordinance # 175-91, Article 21, Section 1100 to 1107 of the San Francisco Municipal Code (Public Works Code), restricts the use of potable water for soil compaction or dust control activities, to the extent not directly in conflict with any applicable federal, state and local law.
1. In consideration for potential health concerns, an exemption may be allowed for the use of potable water for soil compaction or dust control activities when human contact and exposure exists. Such exemption will be considered and may be granted on a case by case basis.
 2. Should the Contractor seek to use potable water for soil compaction or dust control activities, the Contractor, shall apply for, and obtain an exemption pursuant to Ordinance #175-91, Article 21, prior to its use. The application for such use of potable water is to be sent to the Department of Public Health, Environmental Health Section, 1390 Market St., Room 910, San Francisco, CA 94102, Telephone 415-252-3945. Permission for such use may be granted by the General Manager of the Water Department, pursuant to Ordinance #175-91, Article 21.
- C. Reclaimed Water: Arrange with the SEWPCP to provide reclaimed water for soil compaction and dust control which is available at no cost to Contractor at the SEWPCP from 8:00 A.M. to 5:00 P.M. on weekdays and Saturdays.
1. Arrangements can be made for access to reclaimed water at other times.
 2. A permit is required to obtain reclaimed water from the City. Contact mfisher@sfgwater.org and/or (415) 695-7378 at least three (3) days prior to the date that reclaimed water is required. See <http://sfgwater.org/modules/showdocument.aspx?documentid=7234> for more information.
- D. The Contractor shall be required to provide his own water tanker and hoses. Contractor's hoses crossing traveled roadways shall be buried beneath the roadway or ramped over.
- E. Provide and maintain distribution piping, water tankers, hoses, and all appurtenances necessary to supply water at the job site.
1. Bury pipe crossing traveled roadways beneath the roadway. Use hose or ramp over temporary piping on roadway surfaces.

1.7 TEMPORARY SANITARY FACILITIES

- A. Provide and maintain required toilet facilities and enclosures. Location of facilities shall be a minimum of 50 feet away from City Representative's Field Office or approved by the City Representative in the field.

- B. The Contractor shall be responsible to provide and maintain all construction facilities, temporary controls, and temporary utilities as required to perform the work of this Contract. The Contractor shall arrange with the utility agencies to provide and pay for such utility services required, including furnishing, installing and removing on completion of all work all temporary connections to said utilities.
- C. The Contractor shall provide and maintain temporary toilet facilities and enclosures as required at no cost to the City.

1.8 TEMPORARY CONSTRUCTION FENCE

- A. The Contractor shall furnish and install a temporary 6'-0" chain link construction fence with lockable gates at the limit of work and at areas to isolate and protect the public from hazardous conditions during construction.
- B. Provide fencing as needed to prevent unsafe entry to construction areas and to protect existing facilities and adjacent properties from damage from construction operations.
 - C. Protect vehicular traffic, stored materials, site and structures from damage.

- A. Provide temporary enclosure for protection of construction in progress and completed, from exposure, foul weather, other construction operations and similar activities.
 - 1. Where heat is needed and the permanent building enclosure is not complete, provide temporary enclosures where there is no other provision for containment of heat. Coordinate enclosure with ventilating and material drying or curing requirements to avoid dangerous conditions and effects.
 - 2. Install tarpaulins securely, with incombustible wood framing and other materials. Close openings of 25 square feet or less with plywood or similar materials.
 - 3. Close openings through floor or roof decks and horizontal surfaces with load-bearing wood-framed construction.

1.10 MAINTENANCE OF THE WORK AREA

- A. Maintain the work areas in a safe condition, remove all accumulations of rubbish (Contractor's waste and public refuse) and surplus materials at the end of each working day, restore them to a condition equal to that which existed prior to the start of work, and leave them at completion of the contract in a clean, orderly fashion.
- B. Demolished concrete, deteriorated masonry, cleared vegetation, and excavated material not indicated for reuse shall be removed from the site at the end of each working day without delay and disposed of in a legal manner.
- C. Cleaning During Construction: Control accumulation of waste materials and rubbish; collect waste from construction areas and elsewhere daily. Comply with requirements of NFPA 241 for removal of combustible waste material and debris. Enforce requirements strictly.
 - 1. Clean interior spaces prior to the start of finish work; maintain areas free of dust and other contaminants during finishing operations.
 - 2. Handle hazardous, dangerous, or unsanitary waste materials separately from other waste by containerizing properly. Dispose of material off-site in a lawful manner.

3. Maintain the site and all adjacent public areas in a clean and orderly condition. Maintain the site, equipment, fences and signs free of graffiti. Remove all graffiti daily using methods which cause no damage to the work or existing facilities.
4. Sweep all pedestrian walkways and dispose of debris around the site perimeter on a daily basis.

1.11 DRAINAGE CONTROL

- A. Grade site to drain. Maintain excavations free of standing water.\
- B. Provide, operate, and maintain pumping equipment as needed to control water at the site.
- C. Protect site from erosion caused by flowing water.

1.12 CONFINED SPACE ENTRY

- A. It is the responsibility of the Contractor to provide all equipment or assistance to make the confined space safe for entry by the Engineer or his representative per The California Administration Code, Title 8, and General Industry Safety Orders Entitled "Confined Spaces".

1.13 TEMPORARY PROJECT SIGN

- A. Project sign image and layout shall conform to the graphical layout and color approved by the City. The City will provide the final graphical image of the project sign in digital format to the Contractor prior to Notice to Proceed.
- B. The Contractor shall obtain the City Representative's approval of the proposed locations, height, and mounting details for each project sign. The project signs may be mounted on construction fence, face of wall, or on posts.
- C. ONESF Project Sign Fabrication:
 1. Size: Project sign shall be 4-feet by 6-feet.
 2. Digital File: Project sign shall match the final graphical layout provided by the City, including the colors and fonts. For more information, refer to the latest Sign Guidelines available from the following website: <http://onesanfrancisco.org/> (Click on "Data + Resources > Signage and Style Guide")
 - a. The design of the Contractor furnished project signs shall be in strict accordance with the 'ONESF' Guidelines established by the City.
 3. Mounting Material: Project sign shall be mounted on Medium Density Overlay board (MDO), at least 3/4-inch thick.
 4. Printing: Project sign shall be printed on a 4-color CMYK printer.
 5. Coating: Use UV and Anti-Graffiti coatings.
 6. Quality: Project sign shall last the entire construction duration.
- D. Contractor shall submit a mock-up of the project sign in color, on bond paper, 11x17 size, to the City Representative for approval prior to fabrication.
- E. After approval of the mock-up sign by the City, the Contractor shall install the required project sign(s) within 14 days, or as directed by the City Representative.

- F. The Contractor shall maintain project sign(s) in good condition for the duration of the contract.
- G. After substantial completion, Contractor shall remove each project sign from the site as its property, and restore area per plans or as directed by the City Representative at no additional cost to the City.
- H. Damaged project sign that cannot be repaired on site shall be replaced at no additional cost to the City.

1.14 TEMPORARY TOW AWAY/NO-PARKING SIGNAGE

- A. On January 1, 2017, temporary occupancy permits and all other permits that include tow-away signage, aside from excavation permits activated through 311, will not be activated and permittees will not have tow away rights unless and until time and date stamped photos evidencing that signage was posted in the correct location a minimum of 72 hours prior to the time at which the parking restrictions are to become effective under the permit have been uploaded to the San Francisco Public Works, Bureau of Street Use and Mapping (SFPW/BSM) Tow-Away Sign Database. See Appendix B – Tow-Away Sign Activation and Photo Upload Process.
- B. The Contractor is advised that Sign Ordinance PWC Article 15, Section 724 which will require the applicant (Contractor) to input the amount of right of way they will occupy during construction activities for a specific permit, to be issued by SFPW/BSM for all work in the Public Right-of-Way. The Contractor shall enter times of operation during construction with the proposed start and end times and specific calendar days. This information will be printed on the tow-away signs. Refer to Tow Away Manual at <http://www.sfpwpublicworks.org/sites/default/files/4506-Tow-Away%20User%20Guide.pdf>.
 - 1. The location of the Construction Zone will be entered as part of the excavation permit, which will include the length of occupancy (distance in linear feet). This information and date. Once a permit has been approved, the applicant is informed off the approval via email and will be provided a hyperlink to create/modify the tow/away signs prior to printing.
 - 2. The information required at time of permit will update the database and will validate that the total linear footage of construction occupancy does not exceed 1,200 linear feet. Upon completion of any adjustment to the tow-away signs, the applicant can determine which street segment to print out and may choose to either print one of two general tow-away sign template or request the Department of Public Works to print the tow-away signs. The Contractor shall pay for the printing of each sign.
 - 3. Size: Tow-Away/No-Parking Signs shall be 11' wide x 17' tall.
 - 4. Digital File: Project sign shall match the final graphical layout provided by the City, including the colors and fonts. The design of the Contractor furnished project signs shall be in strict accordance with the DPW Order for Towaway Signs located at: <http://sfpwpublicworks.org/sites/default/files/4508-TowAway-2015-Template.pdf>.
 - a. Contract shall use only paper types which shall be waterproof durable; tear resistant' with laser paper labels type and templates: 11 x 17 10 PT CV, 215 grams/m₂
 - 5. Printing: Project sign can be printed on a Xerox Phaser 7800, or equivalent that can print 11x17 120-130 lb paper. All Tow-Away/No-Parking Signs shall be secured and paid for by the Contractor.
 - 6. The Contractor shall maintain Tow-Away/No-Parking Sign (s) in good condition as needed throughout the duration of the Contract.

7. After substantial completion, Contractor shall remove each Tow-Away/No-Parking Sign from the site as its property.
8. Damaged Tow-Away/No-Parking Sign that cannot be repaired on site shall be replaced at no additional cost to the City.

1.15 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

- A. Remove temporary above grade or buried utilities, construction equipment, temporary structures and facilities, unused materials, rubbish and debris prior to Final Inspection. Restore facilities to conditions prior to construction, to the satisfaction of the City.
- B. Clean and repair damage caused by installation or use of temporary work.
- C. Restore existing facilities used during construction to original condition. Restore permanent facilities used during construction to specified condition.
- D. Remove field offices and temporary utility services from the Site.

1.16 STORAGE AND STOCKPILING

- A. The Contractor shall make its own arrangements for off-site storage or shop areas and off-site construction parking facilities. On-site storage shall be limited to materials and equipment currently being installed or utilized.
- B. If necessary, the Contractor shall arrange for temporary off-site storage of equipment and materials at his discretion. No additional compensation shall be provided from the City.

PART 2 - PRODUCTS

(NOT USED)

PART 3 - EXECUTION

(NOT USED)

END OF SECTION

APPENDIX B: TOW-AWAY SIGN ACTIVATION AND PHOTO UPLOAD PROCESS

Tow-Away Sign Activation and Photo Upload Process



www.sfpublishworks.org



San Francisco Public Works

1155 Market Street, 3rd Floor
San Francisco CA, 94103
Phone: (415) 554-5810
Fax: (415) 554-6161

Processing Hours: 7:30 AM-4:00 PM
Monday through Friday, except official holidays



Contact 311 for complaints

Printed on 30% post-consumer recycled stock

Beginning on January 1, 2017, temporary occupancy permits and all other permits that include tow-away signage, aside from excavation permits activated through 311, will not be activated and permittees will not have tow-away rights unless and until time and date stamped photos evidencing that signage was posted in the correct location a minimum of 72-hours prior to the time at which the parking restrictions are to become effective under the permit have been uploaded to the Bureau of Street-Use and Mapping Tow-Away Sign Database.

Public Works Tow-Away Sign Activation and Photo Upload Process

EFFECTIVE DATE: January 1, 2017

- PERMITS AFFECTED:** The tow-away sign activation and photo upload process change is applicable to all temporary occupancy permits and all other permits that include tow-away signage. **Excavation permits activated through 311 will not be impacted.**
- ACTIVATION AND PHOTO UPLOAD PROCESS:**
 - STEP 1:** Request a street space permit from Public Works.
 - STEP 2:** Once permit is approved a link for tow-away signs will be provided via email along with a link to the Bureau of Street-Use and Mapping tow-away sign database.
 - STEP 3:** Print signs and post them at the permitted location every 20 feet no less than 72 hours in advance of the time the parking restrictions are to become effective.
 - STEP 4:** Click on the link provided in the confirmation email and take photos showing the placement of the signs.
 - STEP 5:** Click submit and the photos will be submitted to Bureau of Street-Use and Mapping for review.
 - STEP 6:** A confirmation email will be sent stating the photos were accepted, the permit is active, and tow-away rights are reserved.
- NOTE:** If photos are inadequate, you will receive a rejection email identifying the deficiencies to be corrected.

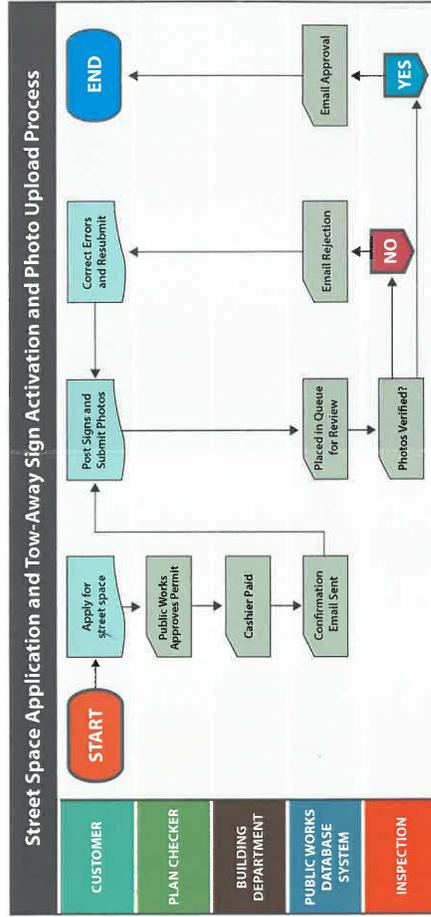


PHOTO REQUIREMENT 1:

A scene-setting photo clearly showing the signs are posted in the permitted location every 20 feet.



PHOTO REQUIREMENT 2:

A close-up photo of a tow-away sign that enables essential information on the sign to be confirmed.



SECTION 01 56 39

TEMPORARY TREE AND PLANT PROTECTION

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section includes the requirements for the protection of existing trees and shrubs, including entire structure of plant material above and below ground impacted by all demolition and construction work under this contract.
- B. Contractor is prohibited from stockpiling any excavation or construction materials within the canopy of trees, on lawn areas or near shrubs.
- C. Contractor shall immediately clean and remove any construction residue that falls within the canopy of a tree or near shrubs.

1.2 RELATED SECTIONS

- A. Section 01 71 33 - Protection of Adjacent Construction

1.3 JOB CONDITIONS

- A. Pre-construction Meeting:
 - 1. Prior to commencement of work, the Contractor shall arrange a meeting on the site with the City Representative, General Contractor, and such others as the City Representative shall direct to review the proposed schedule, the "Trees of Concern", the tree and landscape protection, submittals for this Section, the coordination with work of other trades, and the selective thinning and clearing requirements.
 - 2. Adjustments to the type and extent of the protection shall be addressed at the time of the meeting.
 - 3. Contractor shall coordinate the meeting and inform all parties in writing (5) business days in advance of the scheduled meeting.
- B. Environmental Requirements: Perform work only during suitable weather conditions. Do not disc, rototill, or work soil when frozen, excessively wet, or in otherwise unsatisfactory condition.
- C. Sequencing and Scheduling: Adjust, relate together, and otherwise coordinate work of this Section with work of Project and all other Sections of Project Specifications.

1.4 QUALITY ASSURANCE

- A. Contractor shall employ a certified Arborist who is a member of the American Society of Consulting Arborists, Inc. (ASCA). The name and qualifications of the Arborist shall be submitted for approval by the City Representative.
 - 1. Arboricultural work including tree removal, pruning and care for trees to remain shall be performed by personnel familiar with arboricultural work, under the supervision of an experienced professional Arborist and foreman at all times.

2. Work in this Section shall be by a firm which has successfully completed landscape work similar in quality and extent to that indicated for this project for a period of not less than five (5) years. Supervisory personnel with experience on projects of similar size and extent shall supervise the work.

1.5 APPROVAL OF TRENCHING AND EXCAVATION

- A. The contractor shall obtain written approval from the City Representative and a certified Arborist prior to start of excavation work within the drip line of trees. A Certified Arborist shall be retained as needed to provide written direction at the Contractor's expense.
- B. The Contractor is prohibited from using equipment for trench and excavation work within the tree drip line or where root intrusion exists on asphalt pathways to be reconstructed.
- C. In the event pruning is required for roots greater than 2" in diameter the Contractor shall receive written direction from the City Representative in coordination with Arborist prior to continuation of work.

1.6 NON-APPROVED TRENCHING

- A. In the event trenching or excavation is performed by the Contractor without the approval or not as shown on the Contract Drawings; the Contractor shall be subject to a fine equal to one half (½) day liquidated damages for every 50-feet.
- B. The only exception to paragraph 1.6.A above is for trenching to a maximum of 3-feet as measured horizontally without approval at any particular location for the placement of pipe fittings and quick couplers outside the drip line of any tree.

1.7 DAMAGE TO TREES AND PAYMENT FOR DAMAGE

- A. If the Contractor should cause minor damage as defined by nicked tree trunks, limbs and branches or broken branches to trees or shrubs during the course of construction, the Contractor shall pay the following penalties at the beginning of each billing period:
 1. The Contractor will be penalized the sum of One Hundred dollars (\$100) for the first incident which causes minor damage to trees or shrubs.
 2. The Contractor will be penalized the sum of Two Hundred dollars (\$200) for the second incident which causes minor damage to trees or shrubs.
 3. The Contractor will be penalized the sum of Five Hundred dollars (\$500) for the third and subsequent incidents which cause minor damage to trees or shrubs.
- B. The Contractor shall replace any trees or shrubs that suffer more serious damage, including damage to roots 2-inches in diameter or larger, during construction at no additional cost to the City. The City Representative shall determine the value of such replacement trees or shrubs. In addition to the Contractor's restoration approved by the City Representative, the Contractor will be assessed damages for the difference in the dollar value of the damaged tree or other plant material, and the dollar value of the replacement.
 1. The dollar value will be determined by the City Representative from the "Guide for Establishing Values of Trees and Other Plants," prepared by the Council of Tree and Landscape Appraisers, current edition. Damages assessed will be deducted from moneys due or that may become due to the Contractor.

- C. The Contractor shall in addition be liable for the cost to the City for removing the damaged tree(s). This cost will cover 1.5 times the hourly wage of all person(s) at the site for the required hours to remove the tree(s) and haul offsite as directed by the City Representative.

1.8 EXCAVATION WORK UNDER LOW HANGING BRANCHES

- A. In areas where trenching is required under low hanging tree branches (8 to 12-feet off the ground), the Contractor shall operate equipment to a maximum height of 10-feet to avoid contact and possible damage to the tree branches.
- B. In bidding the work, the Bid Items which include piping and conduit trenching work shall include the use of machinery that will not extend above 10-feet vertically for 5% of the linear trenching performed.

1.9 MANUAL EXCAVATION

- A. In areas where tree branches hang below 12-feet over the area to be excavated, adjacent to elderly trees or as directed by the City Representative, the Contractor shall manually excavate the trench. No machinery shall be used in the areas so designated for manual excavation.

1.10 DAMAGE TO LAWNS, PLANTED AREAS, AND EXISTING IRRIGATION SYSTEMS

- A. Refer to the DPW Standard Specifications, Section 1009 – Restoration of Existing Lawn and Other Planting.

1.11 EXCAVATION FOR CONCRETE PATHWAYS

- A. The Contractor's vehicles and equipment shall not be driven off-road except along designated routes as far away as practical from tree root zones.
- B. Vehicles and equipment shall be operated in such a manner as to avoid damage to tree and bush trunks, leaves and branches.

1.12 ASPHALT PAVING AND TRENCHING AND INSTALLATION OF UNDERGROUND UTILITIES NEAR TREE ROOTS

- A. The Contractor shall place all piping 3 ½-inches and smaller and all conduits a minimum of 18-inch below the existing finished grade. New conduits shall be located at least 25-feet away from all tree trunks, 20-feet away from all buildings, 10-feet away from any pathway lighting, and 5 feet away from and parallel to any asphalt or concrete paths.
- B. The Contractor shall place all piping 4-inches and larger a minimum of 3-feet below the existing finished grade except when approved by the City Representative to clear root systems. In no case shall the 4-inch and larger pipe placed less than 2-feet below the finished grade. Refer to the drawings for additional information when pipes cross over or under other pipes or conduit.
- C. The Contractor shall not cut any tree roots over 2-inch in diameter unless an approved arborist is consulted. The Contractor shall bend and/or transition underground conduit and piping so that the conduit or piping will thread between tree roots. This 2-inch diameter tree root guideline is dependent of the species of tree or bush. Various trees and bushes have a more fibrous root system, consequently, severing a large number of these roots can be as detrimental to certain species of trees as severing a fewer number of larger tree roots.
- D. When possible, trenches shall not be run of the side of the tree exposed to prevailing winds as roots are primarily anchored on the windward side. Trenches shall not be cut across more than one quadrant of the tree root zone.

- E. Excavated material (fill and overlay) shall not be deposited under the leaf/needle canopy of established trees. The excavated material shall be placed in piles along one side of a paved surface. In no case shall the Contractor place the excavated material closer than 6-feet from the base of a tree.
- F. The Contractor shall be responsible for identifying all underground lighting, electrical control, and irrigation utilities within the project site area. The Department of Parks and Recreation is not a party to or a participant in the Underground Service Alert (USA). Rec/Park will not be providing any field marking service, protecting, and warning the Contractor of the underground facilities. As-built drawings and reference drawings of Rec/Park facilities are not available. As part of the contract work, the Contractor shall be required to locate, probe, determine, and flag or mark all underground facilities including, but not limited to, metal and plastic conduits and pipelines, sprinkler heads, quick couplers, valves boxes, controller boxes, pull boxes, prior to excavation.
- G. The Contractor shall replace all affected areas with new sod grass, decomposed granite, new concrete, or asphalt paving within 10 calendar days after beginning trench excavation. All trenches in pathways and planting areas shall be temporarily covered for immediate use. The Contractor shall not accumulate affected areas for group planting of sod or group paving of trench.
- H. The Contractor shall locate quick couplers and lateral lines. The Contractor shall cap tees as shown on the drawings unless located in the field directly under the tree drip line. In these cases, obtain the City Representatives approval for relocating the fitting(s).

PART 2 - PRODUCTS

2.1 TEMPORARY PROTECTION OF EXISTING TREES AND LANDSCAPE PLANTING

- A. Tree Protection shall be composed of the following:
 - 1. 6-foot tall temporary tree protection composed of 2x4s that surround the outer edge of the tree basin.
 - 2. 2x4s shall be mounted on 2-inch diameter galvanized iron posts, anchored into the soil on opposite corners of the guard, and driven into the ground to 2-foot depth (shift stakes if root is greater than 2-inch diameter).
 - 3. 2x4s shall be used as a toe board surrounding the base of the tree protection for ADA compliance.
 - 4. Place orange snow fencing around the tree protection.
 - 5. Refer to Appendix 'A' for additional information.
- B. Temporary materials, new or used, that are adequate in capacity for the required usage, must not create unsafe conditions, and must not violate requirements of applicable Laws and Regulations, and shall be approved by the City Representative.
- C. Protection bedding mulch: Recycled wood chips to conform to the following:
 - 1. Mulch pieces should typically be heavy toothpick-like, 2-inch dimension.

PART 3 - EXECUTION

3.1 GENERAL

- A. Provide protection for existing landscape planting to remain including, but not limited to, trees, shrubs, and ground cover.
- B. Contractor shall provide Temporary Protection suitable for the protection of the landscape planting immediately adjacent to the construction limit of work line, and as directed by the City Representative.
- C. The Contractor shall coordinate all other trades and work.
- D. All trees to be retained shall be enclosed by fencing on the work side when Tree Protection Zone is located inside, adjacent to, or within 10 feet of the limit of work, prior to demolition, grubbing, or grading.
- E. Trees to be retained shall be pruned for clearance as required under supervision of a certified Arborist.
- F. Temporary Protection shall be kept in place for the duration of the Project, maintained during construction, and temporarily relocated as required by the progress of the construction at no additional cost to the City.

3.2 PREPARATION

- A. Stake the location of Temporary Protection barriers and fencing as noted above for the approval of the City Representative prior to installation of Temporary Protection fencing. Place location stakes at corners and ends and 30 feet on center maximum.
- B. Notify the City Representative at least two weeks in advance of the date for on-site review of the staking.
- C. Place six inches (6") of organic mulch over existing grade within Temporary Protection fencing for existing trees to remain.

3.3 INSTALLATION

- A. Install Temporary Protection for tree and landscape planting, as specified herein and as approved in the field by the City Representative and Landscape Architect. Install all other Temporary Protection in locations approved in the field by the City Representative and Landscape Architect.
 - 1. Install posts at 10-foot intervals maximum, at corners, and at other changes in direction. Posts shall be set firmly in undisturbed soil, plumb and with a minimum of exposed height as specified. Securely attach fencing at a minimum of three points.
 - 2. On pavement, provide self-supporting chain link fencing that does not require anchorage into the pavement.
 - 3. Install hay bales or rolls of erosion control wattling, secured around trunk to a height of 6 feet.
- B. Fencing to be relocated closer to trees to remain to accommodate the sequence of construction shall be reviewed by the City Representative and Arborist prior to relocation. No removals or construction shall occur without the City Representative's and Arborist's approval of the new fence location.

- C. Completely remove Temporary Protection, including foundations, associate materials and equipment at the completion of the Project or as directed by the City Representative.
- D. Restore and recondition areas of site damaged or disturbed by barrier installation and removal.

3.4 PROHIBITED ACTIVITIES:

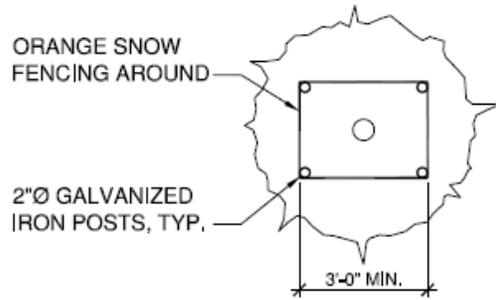
- A. The following are activities prohibited under existing tree canopies and within protected landscape planting areas:
 - 1. Excavating or trenching under tree canopies is prohibited and shall be permitted only under the following conditions:
 - 2. When excavating or trenching within the canopy of trees to remain, the Owner shall be given 48 hours notice. Exercise extreme care during excavation to prevent damage to roots and in a manner that will cause minimum damage to the root system. Such work shall not occur without a professional arborist to perform compensatory root and branch pruning.
 - 3. Prune injured roots cleanly. Backfill as soon as possible.
 - 4. Where tunneling around roots is not practical, roots shall be cut off approximately six inches (6") from construction.
 - 5. Exposed roots shall not be allowed to dry out before permanent backfill is placed. Temporary earth cover shall be provided, or exposed roots shall be packed with wet peat moss or four (4) layers of wet untreated burlap and temporarily supported and protected from damage until permanently covered with backfill.
 - 6. Thinning shall not remove more than thirty percent (30%) of the existing leaf surface.
 - 7. Ripping or tearing of roots will not be allowed.
- B. Placing backfill under protected trees unless indicated otherwise. Where fill is required for grading, and as indicated on the Drawings, do not fill above existing grade line at trunks. Fill soil must percolate at a rate of 1" per hour minimum.
- C. Damage to trunk, canopy, or limbs caused by maneuvering of vehicles or equipment, or stacking of materials and equipment.
- D. Driving or parking vehicles; storage of vehicles, equipment, or supplies.
- E. Disposing of paint, petroleum products, dirty water, soil sterilants, concrete slurry or other deleterious materials on or around roots or on any landscape areas.
- F. Changing site grades which cause drainage to flow into or to collect near protected trees.
- G. Using protected trees as support posts, power poles, crane stays, sign posts, or anchorage for ropes, guy wires, power lines, or other similar functions.
- H. Damage to root system from flooding, erosion, excessive wetting or drying resulting from dewatering or other operations.
- I. Excessive water or heat from equipment, utility line construction, or burning of trash under or near shrubs or trees.

3.5 REPLACEMENT OF DAMAGED LANDSCAPE PLANTING

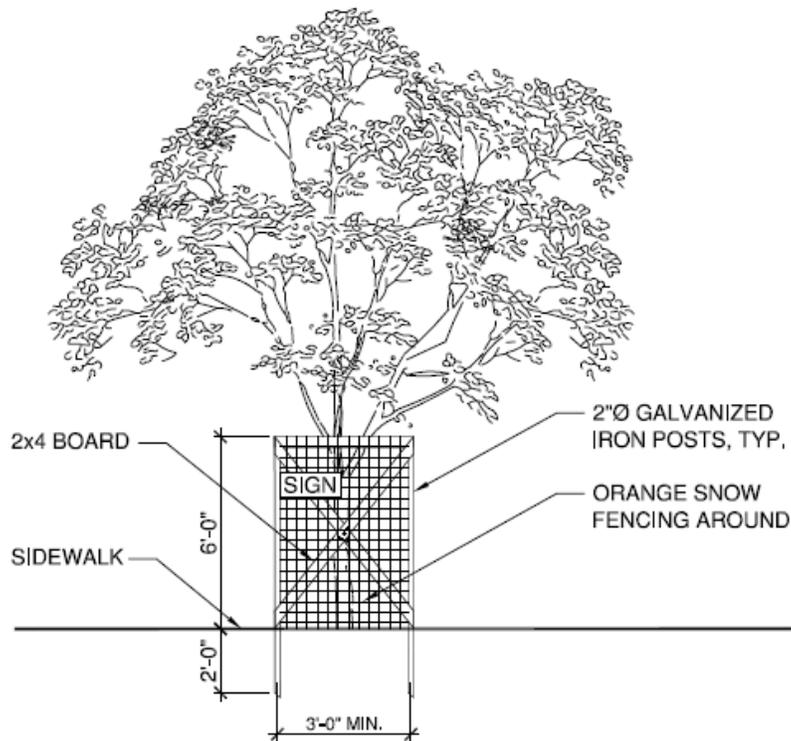
- A. Trees and plants destroyed or damaged beyond repair due to Contractor's negligence, failure to provide adequate protection, or failure to perform recommended selective pruning shall be compensated by the Contractor at no additional cost to the City.
 - 1. Damage beyond repair that requires replacement shall be determined by the City Representative.
 - 2. Replacement shall include the replacement plant material, transportation, installation, a 30-day maintenance period, and a one year warranty.
 - 3. Planting location for replacements may be different from the original location and shall be determined by the City Representative.
- B. Replace shrubs, ground cover and turf with plants similar in species, size and shape.
- C. Replace trees with plants of same species, size and shape.
- D. Replacements for trees of 2"-8" caliper shall be replaced with similar sized plants; trees over 8" caliper shall be 60" box size.
- E. Since age and size of existing tree may prohibit replacement with same size tree, the difference in caliper between size of damaged tree and replacement of tree shall be compensated by the Contractor.
- F. Contractor shall fell trees to be removed so that trees to remain are not injured.

END OF SECTION

APPENDIX A: SAMPLE TREE PROTECTION STREET TREE



PLAN VIEW



STREET TREE PROTECTIVE FENCE

SCALE: 1/4" = 1'-0"

SECTION 01 57 26

TEMPORARY PROTECTION OF CATCH BASINS AND STORM DRAIN INLETS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Documenting and protecting catch basins and storm drain inlets as incidental work.

1.2 RELATED SECTIONS

- A. 01 71 33 - Protection of Adjacent Construction

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Contractor shall provide all labor and materials necessary to protect debris from entering the sewer system.

PART 3 - EXECUTION

3.1 PREPARATION

- A. The contractor shall photograph all catch basins within the limits of work. Each catch basin shall have at least two photos, one from the top view and one from the side view along the flow line. Refer to Section 01 71 33-1.6B.
- B. Contractor shall notify the City Representative of any clogged catch basin or storm water inlet immediately upon discovery.
 - 1. Call SFPUC Sewer Operations at 415-695-2096 to report catch basins or storm water inlets containing debris in the barrels and/or cast iron traps.

3.2 DRAINAGE PROTECTION

- A. Contractor shall be responsible for protecting and keeping in operation all storm water inlets and catch basins throughout the entire project site for the duration of the project until Final Acceptance.
- B. Contractor shall take adequate measures to prevent the impairment of the operation of the sewer system. Contractor shall prevent construction material, pavement, concrete, earth, paints, thinner, solvents, and other debris or toxic material from entering a sewer or sewer structure including surface flow collection system, such as catch basins and culverts.
- C. Prior to the final inspection and acceptance, the Contractor shall check all storm water inlets and catch basins within the project limits for debris.

END OF SECTION

SECTION 01 71 33

PROTECTION OF ADJACENT CONSTRUCTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Section includes requirements for protection of existing facilities and improvements.

1.2 RELATED SECTIONS

- A. Section 01 50 00 –Temporary Facilities and Controls

1.3 EXISTING UTILITIES AND IMPROVEMENTS

- A. Notify Underground Service Alert (USA) prior to excavating in the public right of way areas so that utility companies may be advised of the work and may field mark or otherwise protect and warn the Contractor of their existing utility lines. Contact USA, telephone 1-800-227-2600, or refer to USA website for more information at: <http://www.usanorth.org/>.
 - 1. Provide reasonable access and do not hinder or otherwise interfere with any company or agency having underground facilities in removing, relocating, or protecting such facilities.
- B. Verify the actual locations and depths of all utilities indicated or field marked. Make a sufficient number of exploratory excavations up to a maximum of eight potholes at Contractor's expense of all utilities that may interfere with the work sufficiently in advance of construction to avoid possible delays to Contractor's work.
 - 1. Notify the City if such exploratory excavations show the utility location as shown or as marked to be in error.
 - 2. When utility lines are encountered within the area of Contractor's operations, notify the City Representative and the owner(s) of the utility lines sufficiently in advance for the necessary protection measures to be taken to prevent interruption of service or delay to Contractor's operations.
- C. The Contractor shall protect all existing utilities, facilities, and structures, public or private, and will be held responsible for all damage caused by the Contractor not exercising due care to avoid such damage.
- D. Overhead Contact System: Work on or under the overhead contact system shall be performed with lines and feeders energized unless shutdown of the system is granted. Notify the City Representative at least 10 days prior to performing work on energized overhead trolley wires, feeder circuits, or at substations, so that the City Representative may arrange for any necessary clearances and inspections.
 - 1. Contractor is alerted to the condition that overhead trolley wires and feeder cables distribute electrical energy at up to 700 Volts dc. Comply with the "High Voltage" provisions of the California Code of Regulations (Title 8, Division 1, Chapter 4, and Subchapter 5).
 - 2. Take precautions to avoid accidents and damage to the overhead contact wires, and riser and feeder cables.

- E. Survey Monuments and Bench Marks: Contractor shall bring to the attention of the City Representative all survey monuments, bench marks, property line marks and the like, encountered on the work. Survey monuments, bench marks, or other survey marks or points shall not be removed or disturbed until referenced or relocated by the City Representative or other agency or party having an interest therein, and then removed only at the time and in the manner specifically approved by the City Representative. The contractor shall bring all City monument frames within the limits of the work to grade, with the express provision that any and all work associated with the removal and relocation of such frames, with their covers, shall be under the direct supervision of the City Representative, and all such work shall be considered Incidental Work. The cost of re-establishing and resetting survey monuments, bench marks or other survey marks or points lost or destroyed through the carelessness or negligence of, or inadvertently by, the Contractor or his employees, shall be at the sole expense of the Contractor.

1.4 SAFEGUARDING OF EXISTING FACILITIES

- A. The Contractor shall perform all work, including dewatering operations, in such a manner as to avoid damage to existing fire hydrants, power poles, lighting standards, and all other existing utilities, facilities, trees and vegetation, and structures. The Contractor will be held responsible for any damage due to its failure to exercise due care.
- B. Broken concrete, debris, etc., shall be immediately removed from the property site as the Contractor's property and shall be disposed of in a legal manner.
- C. The Contractor shall take adequate measures to prevent the impairment of the sewer system and to prevent construction material, pavement concrete, earth or other debris from entering a sewer, sewer structures, catch basin, or storm water inlet. The Contractor shall restore damaged utilities and facilities to a condition equal to or better than they were prior to such damage.

1.5 RESTORATION OF PAVEMENT

- A. General: All paved areas cut or damage during construction shall be replaced with similar materials and of equal thickness to match the existing undisturbed areas, except where specific resurfacing requirements are called for in the Contract Documents or in the permit requirements of the agency issuing the permit. All pavements which are subject to partial removal shall be neatly saw cut in straight lines.
- B. Conserving Distinctive Sidewalk Elements: For work located within Landmark and/or Conservation Historic Districts, all distinctive sidewalk elements such as brick surfacing, brick gutters, granite curbs, cobblestones, non-standard sidewalk scoring and streetscape elements that appear to be 45 years or older will be treated as potentially character defining features of their respective historic districts.
1. Contractor shall avoid damaging and protect in place any features described above and shall notify the City Representative of any feature not identified on the plans that is in conflict with the proposed work.
 2. Granite curb shall only be replaced with concrete curb on curved sections and as part of the curb ramp construction.
- C. Temporary Resurfacing: Whenever required by the public authorities having jurisdiction, place temporary surfacing promptly after backfilling and maintain such surfacing in a satisfactory condition for the period of time before proceeding with the final restoration.
- D. Permanent Resurfacing: Damaged edges of pavement along excavations and elsewhere shall be trimmed back by saw cutting in neat straight lines. All pavement restoration shall be constructed to finished grades compatible with undisturbed adjacent pavement.

- E. Restoration of Sidewalks or Driveways: Wherever sidewalks, curbs and gutters, or driveways have been removed for construction purposes, place suitable temporary sidewalks, curbs and gutters, or driveways promptly after backfilling and maintain them in satisfactory condition for the period of time before the final restoration is been made.

1.6 JOINT SURVEY TO ESTABLISH AUTHENTICITY OF POSSIBLE CLAIMS

- A. The Contractor shall use such methods and shall take adequate precautions to prevent damage to existing buildings, structures, and other improvements during the prosecution of the work.
- B. The Contractor shall retain an experienced photographer to perform preconstruction examination and, if necessary, post-construction survey of all nearby structures, including **photographs of all catch basins within the limit of work and nearby intersections. Each catch basin shall have at least two photos, one from the top view, and one from the side view along the gutter line.** The survey shall be made using digital still photographs or digital videos saved to compact discs. The survey shall be considered incidental work and no separate payment will be made therefor.
- C. After the Contract is awarded and before the commencement of work, the City Representative will arrange for a joint examination of existing buildings, structures and other improvements in the vicinity of the work, as applicable, which might be damaged by the Contractor's operations.
- D. The examination of the exterior of existing buildings, structures, and other improvements located within twenty-five (25) feet of the construction excavation will be made jointly by authorized representatives of the Contractor, the City, and property owners under the supervision of the City Representative. The scope of each examination shall include, but is not limited to, recording of cracks in structures, settlement, leakage and the like.
- E. Records in duplicate of all observations will be prepared by the photographer, including photographs on compact discs as required. One copy shall be delivered to the Contractor, and one copy will be kept on file at the office of the City Representative. The photographer may be required to attest to the fact that he took the pictures; however, in no case, will he determine the cause cracks, settlement, leakage, or like condition nor is he being retained for the purpose of engineering evaluation.
- F. The above records and photographs are intended for use as indisputable evidence in ascertaining the extent of any damage which may occur as a result of the Contractor's operations and are for the protection of the adjacent property owners, the Contractor, and the City, and will be a means of determining whether and to what extent damage, resulting from the Contractor operations, occurred during the Contract Work.

PART 2 - PRODUCTS

(NOT USED)

PART 3 - EXECUTION

(NOT USED)

END OF SECTION

SECTION 01 74 50

MATERIAL REDUCTION AND RECOVERY PLAN

PART 1 - GENERAL

1.1 SUMMARY

- A. This section governs the recovery of construction and demolition debris.
- B. In October 16, 2006, the San Francisco Mayor issued Executive Directive 06-05 requiring all Construction Contracts to divert 75% of construction and demolition debris from landfill disposal sites. This directive is supported by existing policies that require reuse, recycling, and management of construction and demolition debris. Some of these policies are described below.
- C. The City and County of San Francisco adopted an ordinance (No. 27-06) that creates a mandatory program to maximize the recovery of all construction and demolition debris.
 - 1. The Ordinance requires that mixed construction and demolition debris material be transported off-site by a Registered Transporter and taken to a Registered Facility.
 - 2. Material source separated at the job site should be taken to a facility that reuses or recycles such material.
 - 3. This ordinance applies to all construction projects within the City and County of San Francisco, such as new construction, remodels, tenant improvements, additions, repairs, and full and partial demolitions.
 - 4. This ordinance prohibits any construction and demolition debris from being placed in trash or sent directly to a landfill.
- D. Contractor shall perform all work and meet all requirements in this Section at no additional cost to the City.
- E. Related Requirements:
 - 1. Section 01 50 00 -Temporary Facilities and Controls
 - 2. Section 01 77 00 - Closeout Procedures

1.2 REFERENCES

- A. Mayor's Executive Directive 06-05, Recycling and Resource Conservation, October 16, 2006.
- B. [San Francisco Environment Code](#)
 - 1. Chapter 5, Resource Conservation Ordinance for City Departments.
 - 2. Chapter 7, Green Building Requirements for City Buildings.
 - 3. Chapter 14, Construction and Demolition Debris Recovery Ordinance.
 - 4. Chapter 16, Food Service and Packaging Waste Reduction Ordinance.
 - 5. Chapter 19, Mandatory Recycling and Compositing Ordinance.

- C. Title 24 California Building Code Standard part 11, CALGreen: <https://law.resource.org/pub/us/code/bsc.ca.gov/>
- D. [California Integrated Waste Management Act of 1989](#) (California Public Resources Code 40000 et. seq.) - Assembly Bill 939.
- E. United States Green Building Council Leadership in Energy and Environmental Design
 - 1. LEED Reference Guide for Building Design and Construction version 4.0.
 - 2. LEED Reference Guide for Interior Design and Construction version 4.0
- F. Universal Waste information from the following website: <https://www.calrecycle.ca.gov/HomeHazWaste/uwaste>
- G. Treated Wood Waste Fact Sheet from the following website: <https://dtsc.ca.gov/toxics-in-products/treated-wood-waste-information-and-fact-sheets/>
- H. San Francisco Board Of Supervisors Resolution Nos. 530-04 and 679-02 establishing a zero waste goal.
- I. Food Service Waste Reduction Ordinance as set forth in San Francisco Environment Code Chapter 16.
- J. Refuse Collection and Disposal Ordinance, adopted November 8, 1932.

1.3 DEFINITIONS

- A. Alternative Daily Cover (ADC): Materials, other than soil, that have been approved by the California Department of Resources Recycling and Recovery ("CalRecycle") or a successor agency for use as a temporary overlay on an exposed landfill face.
- B. Beneficial Reuse: The reuse of material at a landfill that does not include ADC but does include use of materials for the following purposes: alternative intermediate cover; final cover foundation layer; liner operations layer; leachate and landfill gas collection system; construction fill; road base; wet weather operations pads and access roads; and, soil amendments for erosion control and landscaping. "Beneficial reuse" shall not include disposal of material at a landfill.
- C. City-owned Facility: Any building owned by the City and County of San Francisco. "City-owned Facility" includes City-owned facilities or portions thereof that the City leases to non-City entities.
- D. City Leasehold: A building or portion thereof owned by others where the City and County of San Francisco is a tenant.
- E. City Representative: The employee of San Francisco who oversees the construction and/or demolition process for a City construction and/or demolition project and is responsible for ensuring that the contractor complies with all aspects of the contract documents.
- F. Compostable: Any material that can be broken down into, or otherwise become part of, usable compost (e.g., soil-conditioning material) in a safe and timely manner as accepted in San Francisco's compostables collection program, such as food scraps, soiled paper and plant trimmings.
- G. Construction and Demolition Debris or C&D Debris: Building materials and solid waste generated from construction and demolition activities including, but not limited to, fully cured asphalt, concrete, brick, rock, soil, lumber, gypsum wallboard, cardboard and other associated packaging, roofing material, ceramic tile, carpeting, fixtures, plastic pipe, metals, tree stumps, and other vegetative matter resulting from land clearing and landscaping for construction,

deconstruction, demolition or land developments. This term does not include refuse regulated under the 1932 Refuse Collection and Disposal Initiative Ordinance or sections of the Municipal Code that implement the provisions of that ordinance or materials from the public right-of-way. Hazardous material, as defined in California Health and Safety Code section 25100, et seq., as amended, is not construction and demolition debris.

- H. Construction Project: Any building, planning or construction activity, including demolition, new construction, major alteration, or building additions by a City department at a City-owned Facility or a City Leasehold.
- I. Contractor: The company or person to whom the City awards a contract for a construction and/or demolition project. The Contractor is responsible for complying with all aspects of this Specifications Section and for ensuring that all subcontractors, lower-tier subcontractors and suppliers also comply.
- J. Disposal: The final deposition of material at a legally operating permitted landfill that does not include beneficial reuse or at a permitted transformation facility. A legally operating, permitted landfill includes Class III landfills and inert fills. Disposal of inert materials at inert fills or inert backfill sites does not constitute recycling.
- K. Diversion: Use of material for any purpose other than disposal in a landfill or transformation facility, such as source reduction, reuse, recycling, and composting activities that do not result in material being disposed at permitted landfills and transformation facilities.
- L. Hazardous Material: Hazardous material is a waste with properties that make it potentially dangerous or harmful to human health or the environment. The universe of hazardous materials is large and diverse. Hazardous materials can be liquids, solids, or contained gases. They can be the by-products of manufacturing processes, discarded used materials, or discarded unused commercial products, such as cleaning fluids (solvents) or pesticides. In regulatory terms, a hazardous material is a waste that appears on one of the four RCRA hazardous materials lists (the F-list, K-list, P-list, or U-list) or that exhibits one of the four characteristics of a hazardous material - ignitability, corrosivity, reactivity, or toxicity. However, materials can be hazardous materials even if they are not specifically listed or don't exhibit any characteristic of a hazardous material. For example, "used oil," products which contain materials on California's M-list, materials regulated pursuant to the mixture or derived-from rules, and contaminated soil generated from a "clean up" can also be hazardous materials. The State Department of Toxic Substances Control offers assistance on this complex topic through its Regulatory Assistance Office. Call 1-800-728-6942 (from within California) or (916) 255-3618 (from out-of-state) or email RAO@dtsc.ca.gov.
- M. Landfill: A facility that (i) accepts for disposal in or on land non-hazardous material such as household, commercial, and industrial waste, and waste generated during construction, remodeling, repair and demolition operations, and (ii) has a valid current solid waste facilities permit from the California Department of Resources Recycling and Recovery (CalRecycle).
- N. Mixed Construction and Demolition Debris Material or Mixed C&D Debris Material: Construction and demolition (C&D) debris or C&D debris that are combined on the project site and hauled away for sorting.
- O. Person: A natural person, a firm, joint stock company, business concern, association, partnership or corporation or, to the extent permitted by law, governmental entity, including the City and County of San Francisco and its departments, boards and commissions for projects within the nine counties surrounding the San Francisco Bay, and its or their successors or assigns.
- P. Recover or Recovery: Any activity, including source reduction, deconstruction and salvaging, reuse, recycling, composting, or anaerobic digestion which causes materials to be recovered

for use as a resource and diverted from disposal. Recovery shall not include engineered municipal solid waste conversion.

- Q. Recyclable Material: Any material or product that can be sorted and reconstituted, for the purpose of using the altered form in the manufacture of a new product, as accepted in San Francisco's recycling collection program, such as paper, bottles and cans. Recycling does not include burning, incinerating, converting, or otherwise thermally destroying solid waste.
- R. Recycling: The process of collecting, sorting, cleansing, treating, and reconstituting materials that would otherwise become solid waste, and returning them to the economic mainstream in the form of raw material for new, reused, or reconstituted products which meet the quality standards necessary to be used in the marketplace. Recycling does not include burning, incinerating, or thermally destroying solid waste, nor shall it include disposal.
- S. Recycling Facility: An operation or person that collects and processes materials for recycling.
- T. Registered Transporter: Anyone who is hired to remove Mixed Construction and Demolition Debris Material from a construction and/or demolition site in San Francisco, using a vehicle with more than two axles or two tires per axle (such as a large pickup truck with four tires on the rear axle or three-axle dump trucks) and is hauling at least one (1) cubic yard of Mixed Construction and Demolition Debris Material and holds a valid registration from the City and County of San Francisco pursuant to Chapter 14 of the Environment Code. A Registered Transporter is obligated to take all mixed material only to a Registered Facility.
- U. Registered Facility: Any facility that accepts Mixed Construction and Demolition Debris Material for processing and recycling and holds a valid registration issued by the City and County of San Francisco pursuant to Chapter 14 of the Environment Code.
- V. Reuse: Using an object or material again either for its original purpose or for a similar purpose without significantly altering the physical form of the object or material.
- W. Source Reduction: Any action which causes a net reduction in the generation of solid waste. Source reduction includes, but is not limited to, reducing the use of non-recyclable materials, replacing disposable materials and products with reusable materials and products, reducing packaging, reducing the amount of yard wastes generated, establishing garbage rate structures with incentives to reduce waste tonnage generated, and increasing the efficiency of the use of paper, cardboard, glass, metal, plastic, and other materials.
- X. Source Separated Materials: Materials that have been separated or kept separate from the solid waste stream, at the point of generation, for the purpose of reuse, recycling or composting in order to return them to the economic mainstream in the form of raw material for new, reused, or reconstituted products which meet the quality standards necessary to be used in the marketplace.
- Y. Solid Waste: Materials designated as non-recyclable and discarded for the purposes of disposal.
- Z. Universal Waste (CCR Title 22, Division 4.5, Chapter 23): Certain specified hazardous materials that are more common and pose a lower risk to people and the environment than other hazardous materials. Universal wastes are handled with reduced management requirements. Examples of universal waste: batteries, fluorescent tubes (lamps), electronic devices (cell phones, computers, televisions), cathode ray tubes (CRTs), mercury wastes (thermometers and toys), and non-empty aerosol cans.
- AA. Treated Wood Waste (CCR Title 22, Division 4.5, Chapter 34): Dimensional lumber and other wood products which have been removed from service and were treated with preserving chemicals that protect the wood from insect attack and fungal decay during its use. Examples

include fence posts, sill plates, landscape timbers, pilings, railroad ties, guardrails, and decking. Treated Wood Waste is a hazardous material in California and must be managed according to specific regulations.

- BB. Waste Diversion: a management activity that disposes of waste through methods other than incineration or landfilling. Examples include reuse and recycling.

1.4 GENERAL REQUIREMENTS

- A. Recovery Goal: In order to meet the City's zero waste goal, the goal for this contract is to recover no less than 75% of the construction and demolition debris material from landfill disposal through waste prevention, reuse, and recycling. If a construction site contains hazardous materials and/or universal wastes, the 75% minimum recovery requirement should pertain to all non-hazardous material. No construction and demolition debris material shall be disposed in garbage or taken directly to landfill.
- B. In order for construction and/or demolition debris to be considered hazardous, such as containing asbestos or lead, it shall be evaluated and determined to be hazardous by an independent professional such as a Cal/OSHA Certified Asbestos Consultant. The waste determination and other verification shall be included with the C&D Debris Management Plan (refer to Paragraph 1.5 below), together with a list of hazardous materials found at the project site and plans for proper disposal.
- C. All Hazardous Materials, including Universal Wastes and Treated Wood Waste, shall be documented separately, and a summary of all manifests or other disposal documentation, including material description and weights, shall be provided to the City Representative.
- D. Highest and Best Use: The Contractor shall employ the following hierarchy of highest and best use for handling construction and demolition debris as follows:
 - 1. Implement reduced material usage or reuse of materials before any recycling;
 - 2. Implement recycling or reuse of source separated material before any recycling of mixed construction and demolition debris material;
 - 3. Implement recycling of mixed construction and demolition debris material before all other forms of disposal.
- E. Recycling Requirements:
 - 1. Source Separated Materials: The Contractor shall develop and implement procedures for source-separation, to the greatest extent feasible, of the following types of recyclable or reusable materials:
 - a. Asphalt.
 - b. Acoustical ceiling tiles.
 - c. Bricks, stone(s), granite, and other finished stone-type materials.
 - d. Carpet and padding.
 - e. Concrete, concrete block, slump stone (decorative concrete block).
 - f. Corrugated cardboard.
 - g. Dimensional lumber and beams.
 - h. Fixtures, hardware, doors, and windows.
 - i. Metal, ferrous and non-ferrous.

- j. Mixed Inerts.
 - k. Rigid plastic.
 - l. Soil/dirt/rock.
 - m. Trees, Landscape Debris, cleared vegetation and cut-off or other wood scraps.
 - n. Wall board, gypsum sheetrock.
2. Mixed Construction & Demolition Debris Material:
- a. For projects within the legal and geographical boundaries of the City and County of San Francisco, mixed C&D debris material must be taken to a Registered Facility by a Registered Transporter, per Environment Code 14. Registered Facilities Recovery (Diversion) Rates are listed at: <https://sfenvironment.org/construction-demolition-resources>
 - b. For projects outside San Francisco, if mixed C&D debris material is taken to a non-registered facility the diversion rate approved by the local jurisdiction will be used, and official documentation of the diversion rate approved by the local jurisdiction must be provided by the Contractor. If a facility does not have a locally approved recovery/recycling rate, the recovery (diversion) rate is calculated as zero.
3. Handling Of Recyclable Materials:
- a. The Contractor shall assure that recyclable or reusable materials be free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process. The Contractor shall clean materials that are contaminated before placing it in collection containers.
 - b. The Contractor shall arrange for collection of reusable and recyclable materials by or delivery to the appropriate reuse and/or recycling centers for purposes of reuse and/or recycling.
 - c. All mixed C&D debris material from projects in San Francisco must be taken to a Registered Facility authorized to process the material, and it must be hauled by a Registered Transporter. For the lists of Registered Facilities and Registered Transporters refer to the website: <https://sfenvironment.org/construction-demolition-resources>
4. No Construction and Demolition Debris shall be burned, buried or otherwise disposed of on the project site.
- F. The Contractor is prohibited from sending any Construction and Demolition Debris directly to landfill or to any facility that would incinerate or otherwise process such debris using high temperature technology without submitting a written request to and receiving approval from the San Francisco Department of the Environment; see Form A and Form B.
- G. Requirements only for Construction Contracts within the legal and geographical boundaries of the City and County of San Francisco:
- 1. Registered Transporters and Registered Facilities: Only Registered Transporters can remove mixed C&D debris material and they must take this material to a Registered Facility. Source separated material at the job site should be taken to the appropriate recycling or reuse facility.
 - a. For a list of Registered Facilities and Registered Transporters refer to the website: <https://sfenvironment.org/construction-demolition-resources>

2. Full Demolition Requirements: Contractor conducting full demolition of an existing structure must submit a Demolition Debris Recovery Plan (DDRP) to the San Francisco Department of the Environment (SFE).
 - a. The DDRP must demonstrate a minimum of 75% recovery from landfill of demolition debris, including materials source separated for reuse or recycling.
 - b. The DDRP must be submitted to and approved by SFE before the Department of Building Inspection will issue a Full Demolition Permit.
 - c. This requirement does not apply to City construction contracts outside of the legal and geographical boundaries of the City and County of San Francisco.
 - d. The DDRP is available at the following website: <https://sfenvironment.org/construction-demolition-resources>
- H. Mixed C&D debris material from projects outside the legal and geographical boundaries of the City and County of San Francisco must be taken to a Recycling Facility that processes the material to achieve maximum recycling. If the material is taken to a facility not registered with San Francisco, the local jurisdiction's recycling rate for that facility shall be used provided official documentation from the local jurisdiction is attached to all submittals as required in Paragraphs 1.5, 1.6 and 1.7. If a facility does not have a local approved recycling rate, the diversion rate is calculated as zero.
- I. Universal Wastes: Contractor shall handle and dispose of all hazardous material, including "Universal Wastes," in accordance with the requirements of the California Department of Toxic Substances Control (DTSC). Refer to DTSC website: www.dtsc.ca.gov . In general, universal waste may not be discarded in solid waste landfills or with non-hazardous materials collected for recycling or composting. Contractor shall comply with all hazardous material regulations, including, but not limited to, the following:
 1. Universal wastes shall be stored in containers so that they do not spill, leak, break, or are released into the environment.
 2. Label or mark universal wastes, or their containers, to identify their types.
 3. Send all universal waste to a facility authorized to collect, recycle or dispose of universal waste.
 4. Do not dispose of universal waste in the trash.
 5. Do not accumulate more than 5,000 kilograms of universal waste at any one time.
 6. Train employees in proper universal waste management including handling, packaging, storing and labeling the universal waste, as well as how to respond to releases. This training may be accomplished by simply giving employees written instructions about universal waste.
 7. Keep record of all shipments and receipts of universal waste for three years.
- J. Treated Wood Waste: For complete information on handling and disposal of Treated Wood Waste (TWW), refer to the fact sheet available from the DTSC website. For incidental TWW wastes generated during construction, the Contractor shall comply with the following minimum requirements:
 1. Keep TWW segregated from other materials.

- 2. Store no more than 1,000 pounds of TWW for no longer than 30 days. In the event that Contractor stores more than 1,000 pounds of TWW or stores TWW for more than 30 days, Contractor shall comply with additional requirements for routine generators of TWW. Refer to DTSC fact sheet.
- 3. Label all TWW bundle/shipments with the following information:

| |
|--|
| <p style="text-align: center;">TREATED WOOD WASTE – Do not burn or scavenge.</p> <p>TWW Handler Name: _____ Address: _____ Accumulation Date: _____</p> |
|--|

- 4. Take TWW to an authorized TWW facility. See the listings at the end of the factsheet for information on facilities who have been authorized to accept TWW in California.
 - 5. Keep records of all shipments of TWW for three years.
- K. Waste Reduction: Contractor shall implement waste reduction measures, including, but not limited to, the following:
- 1. Eliminating the procurement of unneeded supplies;
 - 2. Reduce waste by printing and copying double-sided;
 - 3. Submit all submittals, reports, and forms in electronic format (PDF);
 - 4. Fully participate in available and required recycling and composting programs; and
 - 5. Purchase products made with recycled content such as paper and recycled aggregate.
- L. LEED:
- 1. Compliance with the requirements of LEED version 4.0 MR Prerequisite Construction and Demolition Waste Management Planning.
 - 2. The 75% minimum recovery requirement cannot include any alternate daily cover (ADC) in order to meet the requirements of LEED version 4.0 MR Credit Construction and Demolition Waste Management to earn the project 2 points.
 - 3. Contractor shall submit the following items in electronic format (Green Halo Systems Platform: <http://sfgov.wastetracking.com/>) to the City Representative and in accordance with Paragraphs 1.5, 1.6, and 1.7 below:
 - 4. Material Reduction and Recovery Plan.
 - 5. Material Reduction and Recovery Monthly Summary of Recovery (Diversion) and supporting documentation.
 - 6. Material Reduction and Recovery Final Report.

1.5 MATERIAL REDUCTION AND RECOVERY PLAN

- A. The requirements under this Paragraph 1.5 apply to all City construction contracts for City-owned Facilities or City leaseholds located within the nine counties surrounding the San Francisco Bay, regardless of size of the project.
- B. After Award of Contract and before commencement of the Work at the site, the Contractor shall conduct a site assessment to estimate the types and quantities of materials that will be generated by construction and/or demolition at the site and which materials are anticipated to be feasible and practical for reuse and recycling. Contractor shall complete a Material Reduction and Recovery Plan (MRRP) to be discussed with the City Representative.
- C. Contractor shall schedule a meeting with the City Representative to discuss its proposed MRRP to develop a mutual understanding regarding the City's reuse and recycling policies and goals and their application to this project. The contractor must manage all project Construction and Demolition Debris to meet a minimum recovery rate of 75%.
 1. The MRRP will be used as a submittal for compliance with the waste management plan requirements of LEED version 4.0 MR Prerequisite Construction and Demolition Waste Management Planning. The MRRP shall include any and all required information to meet the LEED prerequisite.
 2. The minimum recovery (diversion) rate of 75% cannot include any alternate daily cover (ADC) in order to meet the requirements of LEED version 4.0 MR Credit Construction and Demolition Waste Management to earn the project 2 points.
- D. Contractor shall obtain tonnage estimates for all construction and demolition debris from all subcontractors and compile data from all subcontractors into the MRRP. The plan shall include, but not be limited to, the following:
 1. The Contractor's information and Project identification.
 2. Procedures to be used for debris management.
 3. A list of the materials and estimated quantities to be reused or recycled.
 4. The names, locations, and permit or license, as applicable, of recycling and reuse facilities and Registered Facilities (for mixed C&D debris material) that the Contractor plans to use for this project.
 5. Procedures for source separation for the materials listed in subparagraph 1.4F "Recycling Requirements" of this Section.
 6. Source Reduction: Describe any project practices for this project which will reduce waste at the source, such as requiring vendors to deliver materials in reusable packaging.
 7. On-site Processing: Describe procedures in which materials are reused on-site, such as grinding materials for use on-site, or reuse of lumber for concrete frames, etc.
 8. Procedures to educate and train all employees and subcontractors on recycling and reuse procedures to be used at the jobsite.
- E. Contractor shall use the Green Halo System to provide all Material Reduction and Recovery Plans and Reports for the Project. The City Representative will create a Green Halo project account for use by the Contractor. The Contractor shall then use this account to prepare and submit the following:

1. **Material Reduction and Recovery Plan (MRRP).** Develop and submit a project specific MRRP for the Project:
 - a. Register the project and create a project tracking number
 - b. Provide the Plan (<http://sfgov.wastetracking.com/>).
 - c. Coordinate the MRRP with the LEED Construction and Demolition Debris Management Plan (if the project is pursuing a LEED certification) requirements.
 - d. Comply with the City and County of San Francisco's requirement for a minimum 75% recovery rate from landfill.
 - e. Describe the Contractors approach to managing the Project's Construction and Demolition Debris.
 - f. When complete, click "Submit" for review and approval.
- F. The MRRP is subject to approval by the City Representative. Contractor shall revise and resubmit the MRRP as required by the City Representative.
- G. Review of the Contractor's MRRP will not relieve Contractor of responsibility for compliance with applicable laws and regulations governing control and disposal of solid waste or other pollutants.

1.6 MONTHLY UPDATES OF MATERIAL RECOVERY

- A. Contractor shall provide monthly updates through the Green Halo Platform by uploading new information, quantifying the construction and demolition debris generated and reused, or recycled. Contractor should upload information regarding transporter method, recovered materials, facilities used, and weight tickets generated as well as any other applicable supporting files and additional requirements.
 1. Failure provide monthly updates shall render the application for progress payment incomplete and may delay progress payment.

1.7 MATERIAL REDUCTION AND RECOVERY FINAL REPORT

- A. Upon final completion of the Project, the Contractor shall submit a Final Recovery Report, on the Green Halo Platform, showing weight of all construction and demolition debris material recovered for the entire project and the overall recovery rate achieved.
- B. The Final Recovery Report shall be prepared into one plan/report by the Contractor with data from all subcontractors and submitted to the City Representative.
 1. The Final Recovery Report will be used as a submittal for compliance with the final waste report requirements of LEED version 4.0 MR Prerequisite Construction and Demolition Waste Management Planning. The Final Recovery Report shall include any and all required information to meet the LEED prerequisite.

1.8 JOB SITE ADMINISTRATION

- A. The Contractor shall review the environmental goals of this project with all subcontractors and sub-subcontractors. The Contractor shall make a proactive effort to increase awareness of these goals and ensure full compliance to the Construction and Demolition Debris Management Plan among the Contractor's job site workers and all subcontractors and other workers.
- B. The Contractor shall communicate the presence of demolition debris which is hazardous material to all workers on the job site and shall establish and clearly identify hazardous material storage areas. The Contractor shall discuss practices and alternatives to minimize worker exposure to potentially harmful substances expected to be encountered on the job site.

- C. For Construction Contracts within the legal and geographical boundaries of the City and County of San Francisco the Contractor shall provide green, blue and black refuse bins and appropriate signs for field offices to separate recyclable and compostable materials from the trash and subscribe to adequate collection services. To subscribe to these services, contact Recology San Francisco at 415-330-1300
- D. For projects outside the legal and geographical boundaries of the City and County of San Francisco, Contractor shall abide by local jurisdiction's refuse.

PART 2 - PRODUCTS

(NOT USED)

PART 3 - EXECUTION

(NOT USED)

END OF SECTION

SECTION 01 77 00
CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes procedures and requirements for Contract Closeout.
- B. Related Sections:
 - 1. Section 01 50 00 – Temporary Facilities and Controls
 - 2. Section 01 78 23 – Operation and Maintenance Data
 - 3. Section 01 78 36 – Warranties

1.2 PROCEDURES

- A. Close-out Meeting:
 - 1. The Contractor shall submit all outstanding change orders, claims, and time extension requests by the final date as required by the City Representative before the Work is 95% complete.
 - 2. Prior to Substantial Completion, the City Representative will schedule a closeout meeting with the Contractor, Architects or City Representatives and consultants to determine the status of completion.
 - 3. The Contractor shall attend the Close-out meeting scheduled by the City Representative to discuss the close-out procedure and responsibilities of the Contractor and the City.
 - 4. The City Representative will prepare a list of actions which are still open or pending that need to be resolved during the close-out period. Such actions may include, but are not necessarily limited to, equipment testing, operator training, record documents, final inspection, administrative activities, and documentation of final quantities and force account work.

1.3 SUBSTANTIAL COMPLETION

- A. Prerequisites to Substantial Completion:
 - 1. Submit to the City Representative with the application for payment just before Substantial Completion, a statement of all Change Orders, Modifications, claims, and time extension requests.
 - 2. Verify that the following administrative closeout submittals have been received by the City, if applicable:
 - a. Project Record Documents and approved shop drawings, product data, and samples as specified in Section 01 78 39.
 - b. Warranties as specified in Section 01 78 36.
 - c. Keys and keying schedule.

- d. Spare parts and materials extra stock.
 - e. Certificates of Final Inspection and Occupancy as evidence of compliance with the requirements of governmental agencies having jurisdiction.
 - f. Comply with requirements listed in Section 00 73 00, amendments to definitions of Substantial Completion and/or Final Completion, as applicable.
- 3. Advise the City Representative of pending insurance change-over requirements.
 - 4. Submit to the City Representative written certification that the Contract Documents have been reviewed, Work has been inspected, the Work is complete, including start-up, testing, adjusting, and balancing of equipment and systems, and conforms to the requirements of the Contract Documents.
 - 5. At no additional cost to the City, restore and replace, as specified and as determined by the City, material and finishes damaged due to the performance of the Work.
 - 6. Restoration or replacement shall be equal quality and match the appearance of the existing Work.
- B. Substantial Completion Inspection:
- 1. Notify the City Representative in writing that the Work is substantially complete and ready for inspection.
 - 2. Upon receipt of Contractor's written notice, the City Representative will make an inspection to determine the status of completion.
 - 3. Should the City Representative determine that the Work is not substantially complete; the City Representative will so notify Contractor with a deficiency list of all items that shall be completed before the City considers the Work substantially complete.
 - a. Remedy all deficiencies as identified and notify the City Representative, in writing, when the Work is ready for re-inspection.
 - b. Failure to complete this requirement within the time allowed for substantial completion will result in liquidated damages being assessed.
 - 4. The Contractor shall verify that the Work is complete, including but not necessarily limited to, the items required for Substantial Completion.
 - 5. If the City Representative concurs that the Work is substantially complete, the City Representative will prepare a Notice of Substantial Completion and arrange for a punch list inspection by the City's design and maintenance staff, and/or consultants.
 - a. If the Work is not substantially complete, the City Representative will follow the same procedure as for the first inspection, and Contractor shall reimburse the City for all additional re-inspection costs, including but not limited to costs incurred by City staff or for additional consultant visits.
- C. Partial Use or Occupancy of Work: When partial utilization of the Work is required and substantial completion is a condition of such partial utilization, the applicable requirements specified in this Section shall apply to the part of Work to be utilized.

1.4 FINAL ACCEPTANCE Prerequisites for Final Acceptance:

1. At no additional cost to the City, perform all remedial work noted on the punch list before requesting a final inspection and acceptance.
2. Coordinate the performance of remedial work with the City Representative to cause minimal inconvenience and interruption of the City's operations.
3. Perform final cleaning as specified in this Section. Remove protective coverings and similar items.
4. Remove all temporary controls, utilities, facilities, signage, field offices and sheds.
5. Submit consent of surety to final payment.
6. Submit a certified copy of the City Representative's punch list of remedial items to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance by the City.
7. Failure to complete all remedial work and prerequisites for final inspection within the time allowed after the date of Final Completion as specified in the Supplementary Conditions will result in liquidated damages being assessed.

B. Final Inspection:

1. Notify the City in writing that all punch list items of remedial work have been completed and the Work is ready for final inspection.
2. The City Representative will make an inspection to verify the status of completion.
3. Should the City Representative determine that the Work is not complete or is defective, the City Representative will so notify Contractor, in writing, listing remaining incomplete or defective work.
 - a. Promptly complete the remaining deficiencies and notify the City Representative, in writing, when ready for re-inspection.
 - b. If the City Representative finds the Work is still not complete, Contractor shall be responsible for all subsequent re-inspection and meeting costs incurred by the City to resolve the remaining issues. Such costs will be deducted from progress payments owed to Contractor.
4. When the City Representative determines that the Work is acceptable under the Contract Documents and Contractor has made all required closeout submittals, the City Representative will initiate the final payment recommendation and prepare the Certificate of Completion.

C. Prior to the final acceptance, the City Representative shall be furnished with the following administrative close-out submittals:

1. Project Record Documents as specified in Section 01 78 39;
2. Warranties as specified in Section 01 78 36;
3. Keys and keying schedule;

4. Spare parts and materials extra stock;
 5. Operations and Maintenance Manuals;
 6. Relevant Test Reports;
 7. Sewer video records;
 8. Notice to Utilities for completed paving;
 9. Third Party Final Inspection and Sign-Offs (if applicable);
 10. Certificates of Final Inspection and Occupancy as evidence of compliance with the requirements of governmental agencies having jurisdiction;
 11. C&D Management Report as specified in Section 01 74 50;
 12. Evidence of Payment and Release of Liens; and
 13. Comply with all mobilization requirements as specified in Section 01 21 50.
- D. Submittals for final adjustment of accounts shall include, but not necessarily be limited to:
1. Request for Final Payment; and
 2. Final statement of accounting, payroll records, and final change orders showing adjustments to the Contract Price for all force account work and extra payments.
- E. All prior estimates and payments shall be subject to correction in the final estimate and payment.
- FINAL CLEANING**
- A. Final acceptance of the by the City will be withheld until the Contractor has satisfactorily complied with the requirements herein for final cleanup of the project site.
 - B. Should the City elect to partially occupy or use portions of the Work prior to Completion, perform final cleaning for those portions of the Work prior to their being so occupied or used.
 - C. Comply with applicable regulatory requirements during cleaning and disposal operations. Use cleaning materials which will not create hazards to health or property or cause damage to products or Work.
 - D. Use only cleaning materials and methods which are compatible with the surface being cleaned, as recommended by the manufacturer of the products to be cleaned.
 - E. Completely clean the work site including the adjacent sidewalks and street from property line to property line.
 - F. Schedule final cleaning operations to prevent resulting dust and other contaminants from adhering to wet or newly finished surfaces and to enable the City Representative to accept a completely clean work.
 - G. See additional cleaning requirements specified in Section 01 50 00 - Temporary Facilities and Controls.

1.6 PROJECT RECORD DOCUMENTS

- A. Submit the final approved Project Record Drawings to the City Representative prior to final acceptance. Refer to Section 01 78 39 - Project Record Documents.

1.7 OPERATOR INSTRUCTION

- A. Refer to individual Specification Sections for specific requirements for equipment and systems demonstration and safety, operations, and maintenance training.
- B. Where specified in the individual Specification Sections, furnish qualified personnel and coordinate scheduling for on-site instruction of the City's operating and maintenance personnel.

1.8 FINAL PAYMENT

- A. Prior to the final payment, the Contractor shall:
 - 1. Submit CMD Forms 7, 8, and 9
 - 2. Reconcile any outstanding payroll issues with the Office of Labor Standards Enforcement (OLSE).
 - 3. Reconcile any outstanding local hire issues with Office of Economic and Workforce Development (OEWD).

1.9 RELEASE OF LIENS OR CLAIMS

- A. Before the City issues final payment to Contractor, Contractor shall sign and deliver to the City a release of liens or claims sworn to under oath and duly notarized. The release shall state that Contractor has satisfied all claims and indebtedness of every nature in any way connected with the Work, including, but not limited to, the foregoing, all payrolls, amounts due to the subcontractors, accounts for labor performed and materials furnished, incidental services, liens, and judgments.
- B. If any liens or claims remain unsatisfied after all payments to Contractor have been made, Contractor shall refund to the City all moneys that the latter may be compelled to pay in discharging such a lien or claim, including all costs and a reasonable attorney's fee.

END OF SECTION

SECTION 01 78 23

OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Requirements and formats for Operation and Maintenance Data Manual (O&M).

1.2 RELATED SECTIONS

- A. Section 01 77 00 – Closeout Procedures
- B. Section 01 78 36 – Warranties

1.3 OPERATION AND MAINTENANCE DATA REQUIREMENTS

- A. The Contractor shall submit in the format specified herein, a complete package for Operation and Maintenance Data (O&M Manual), to include instruction manuals for installation, operation, maintenance, and lubrication requirements for each component of mechanical, electrical, irrigation equipment, or other equipment and systems.
- B. The Contractor shall inform all equipment manufacturers and subcontractors of these requirements and ensure that all associated costs are included in the costs for furnishing the equipment or system.
- C. The Contractor shall submit plan view drawings to scale to show the as-built layout of work for irrigation work, mechanical, work, electrical work and/or as required by specifications.

1.4 SUBMITTAL AND SCHEDULING REQUIREMENTS

- A. Schedule Requirements: The Contractor shall include in the submittal schedule each submittal listed herein.
- B. Preliminary Submittal: The Contractor shall submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. City Representative will review draft and return one copy with comments.
- C. Substantial Completion Submittal: The Contractor shall submit two copies of final O&M manual of the hard copy and the electronic copy as described herein. City Representative will review draft and return one copy with comments.
- D. Final Completion Submittal: As a requirement of the project closeout and prior to request for final payment, the Contractor shall submit approved 6 copies of the O & M manual 15 days prior to Final Completion, as described herein.

1.5 ELECTRONIC FORMAT

- A. O & M Manual Text and Manufacturers Data
 - 1. Prepare data in the form of an instructional manual.
 - 2. Scan material as required into a PDF file format, to a minimum of 400 DPI and save to CD or DVD.

3. Organize data on a disk, in a manner similar to the hard copy of a binder, using a table of contents and folders for each component of mechanical, electrical, irrigation equipment, or other equipment and systems. Organize information related to each component within that folder.
 4. The CD shall be placed in a jewel case with a label indicating Project Name, Contract Number, "Operations and Data Manual 1 OF X", and Date.
 5. The Contractor shall submit (6) copies of the CD/DVD and originals as part of Closeout procedures as specified in Section 01 77 00.
- B. O & M Manual drawings and/or diagrams
1. Each drawing shall be color scanned, 400 DPI, and saved to a CD.
 2. Each pdf file shall be numbered with prefix "SHT-01-" followed by the drawing number.
 3. The CD shall be placed in a jewel case with a label indicating Project Name, Contract Number, "Operations and Data Manual 2 OF X", and Date.
 4. The Contractor shall submit (6) copies of the CD and original drawings as part of Closeout procedures as specified in Section 01 77 00.

1.6 HARD COPY FORMAT

- A. O & M Manual Text and Manufacturers Data
1. Prepare data in the form of an instructional manual.
 2. Binders: Commercial quality, 8-1/2 x 11 inch three-ring binders with hardback, cleanable, plastic covers; one-inch maximum ring size. When multiple binders are used, correlate data into related consistent groupings.
 3. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; list title of Project; identify subject matter of contents.
 4. Arrange content by systems under section numbers and sequence of Table of Contents of this Project Manual.
 5. Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.
 6. Text: Manufacturer's printed data, or typewritten data on white bond paper.
 7. The Contractor shall submit (6) copies of the binders and originals as part of Closeout procedures as specified in Section 01 77 00.
- B. O & M Manual Text As built drawings and/or diagrams
1. Submit copies of each drawing.
 2. Drawings shall be printed on bond paper, in full color to scale and shall be folded and included with sleeved folder in binder.
 3. The Contractor shall submit (6) copies of the binders and originals as part of Closeout procedures as specified in Section 01 77 00.

1.7 CONTENTS, EACH VOLUME

- A. Table of Contents: Provide title of Project; names, addresses, and telephone numbers of Engineer, sub consultants, and Contractor with name of responsible parties; schedule of products and systems, indexed to content of the volume.
- B. B. For Each Product or System: List names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.
- C. Product Data: Mark each sheet clearly to identify specific products and component parts, and data applicable to installation. Delete inapplicable information.
- D. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.
- E. Type Text: As required to supplement product data.
- F. Warranties: Bind in a hard copy of each and scan a pdf for the electronic format, refer to Section 01 78 36.
- G. Each instruction manual shall include, but not be limited to, the following:
 - 1. Detailed description of the function of each principal component of the system
 - 2. Performance and nameplate data
 - 3. Installation instructions
 - 4. Procedure for start-up and break-in
 - 5. Proper adjustment
 - 6. Test procedures
 - 7. Procedure for operating
 - 8. Shutdown instructions
 - 9. Emergency operating instructions and troubleshooting guide
 - 10. Safety precautions
 - 11. Complete nomenclature and commercial number of replaceable parts.
 - 12. Panel board Circuit Directories: Provide electrical service characteristics, controls, and communications.
 - 13. Include color coded wiring diagrams as installed.
 - 14. Maintenance Requirements: Include routine procedures and guide for disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
 - 15. Provide servicing and lubrication schedule, and list of lubricants required.

16. Include written sequence of operation by controls manufacturer.
17. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
18. Provide control diagrams by controls manufacturer as installed.
19. Provide Contractor's coordination drawings, with color coded piping diagrams as installed.
20. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
21. Include test and balancing reports as specified in Technical Sections.
22. Additional Requirements: As specified in individual product specification Sections.
23. Provide a listing in Table of Contents for design data, with tabbed fly sheet and space for insertion of data.

1.8 INSTRUCTION OF CITY PERSONNEL

- A. Before final inspection, provide detailed instructions to the City's designated personnel in operation, adjustment, and maintenance of products, equipment, and systems, at agreed upon times.
- B. Sales representatives shall not conduct the training sessions. Submit a brief description of the qualifications of the manufacturer's representative designated to conduct this training. The manufacturer's representative shall be a factory trained or manufacturer's certified individual with substantial experience in the repair and servicing of the equipment to be covered during the training session.
- C. The City shall receive a six hundred (\$600.00) dollar per day credit from the Contractor for any training that is not conducted in accordance with the requirements of Paragraph A above or as required in the individual technical specification sections. The Contractor and the City Representative will jointly verify that the required training is conducted.
- D. For equipment requiring seasonal operation, perform instructions for other seasons within six months.
- E. Use operation and maintenance manuals as basis for instruction. Review contents of manual with personnel in detail to explain all aspects of operation and maintenance.
- F. The training shall cover a thorough discussion of the O&M manual. The training shall include but not be limited to, operation and maintenance of the specific equipment and systems installed, telltale signs of equipment malfunctioning and their solutions, other pertinent topics that relate to optimum system operation and energy conservation.
- G. Prepare and insert additional data in Operation and Maintenance manual when need for such data becomes apparent during instruction.
- H. System Familiarization Training shall follow the outline below:
 1. Show location of catalogs, parts lists, drawings and other pertinent material in the part files and O&M manuals.
 2. Check out the installation of the specific equipment items.

3. Demonstrate the unit and show that all parts of the Specifications are met.
4. Answer questions.
- I. Safety Training shall cover the following:
 1. Point out safety references.
 2. Discuss proper precautions around equipment.
- J. Operational Training shall cover the following:
 1. Point out reference literature.
 2. Explain all modes of operation, including emergency.
 3. Check out operators in proper use of the equipment.
- K. Preventive Maintenance (PM) Training shall cover the following items:
 1. Pass out PM list including:
 - a. Reference material.
 - b. Daily, weekly, monthly, quarterly, semi-annual, and annual maintenance and inspection procedures.
 2. Show how to perform PM jobs.
 3. Show operators what to look for as indicators of equipment problems.
- L. Corrective Maintenance Training shall cover the following items:
 1. List possible problems.
 2. Discuss repairs--point out special problems.
 3. Open up equipment and demonstrate procedures, where practical.
- M. Availability of Parts, Outside Service and Manufacturer's Representative
 1. Show how to use parts list and order parts.
 2. Where to order parts: Name, address, telephone.
 3. Check over spare parts on hand. Make recommendations for additional spare parts needed. Sign off their acceptance of the spare parts in the presence of the City's representative.
 4. How to get emergency service help.

1.9 TRAINING SCHEDULES AND PROCEDURE

- A. The Contractor shall designate and provide one or more persons to be responsible for coordinating and expediting Contractor's training duties. The person or persons shall be present at all training coordination meetings with the City.

- B. The Contractor shall submit to the City a Training Schedule, to be used by the City for scheduling the training of City operating personnel by equipment manufacturers. This schedule shall list the estimated completion dates for the installation of all equipment and systems requiring the services of manufacturers' representatives, as stated in the Technical Specifications.
- C. The Contractor shall coordinate the pre-startup training periods with City operating personnel and manufacturers' representatives. All pre-startup training shall be completed 14 days prior to actual Startup. Training services shall be at such times as requested by the City.
- D. The City reserves the right to make video recordings of any of the manufacturer's training sessions for use in ongoing training programs.
- E. Where post-startup training is called for in the Technical Specifications, the Contractor shall supply and coordinate the specified manufacturers' services and Contractor personnel for post-startup training of the City's operating personnel.

PART 2 - PRODUCTS

(NOT USED)

PART 3 - EXECUTION

(NOT USED)

END OF SECTION

SECTION 01 78 36

WARRANTIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Requirements.
2. Submittal Requirements.
3. Quality Assurance.
4. Warranty conditions.
5. Form of Guarantee/Warranty.

B. Related Sections:

1. Section 01 77 00 – Contract Closeout.
2. Individual Specifications Sections: Warranties required for specific products or Work.

1.2 REQUIREMENTS

- A. Except as otherwise specified in the individual Specification sections, guarantee/warranty the Work against defects in materials and workmanship for **24** months from the date of the Substantial Completion Certificate issued by the City.
 1. Upon receipt of written notification by the City Representative, guarantee/warranty the Work, or portions thereof, which are used or occupied by the City before final acceptance from the date of beneficial use or Substantial Completion.
- B. Comply with the guarantee/warranty requirements as specified in the individual Specification sections.
- C. Submit executed guarantees/warranties to the City for review. Deliver them to the City upon Substantial Completion.
- D. These warranties shall be in addition to and not a limitation of other rights the City may have under the Contract and which may be prescribed by law, regardless of the wording of manufacturer's standard warranty.

1.3 SUBMITTAL REQUIREMENTS -

- A. Warranties will be included with Operations and Maintenance manuals associated with the specific construction components, in both hard copy and electronic copy formats.

1.4 QUALITY ASSURANCE

- A. Obtain guarantees/warranties, in duplicate, executed by Contractor and subcontractor or installer responsible for that portion of the Work and countersigned by the manufacturer.
- B. Verify that documents are in proper form, contain complete information, and are notarized if warranties are extended beyond the Manufacturers normal warranty period of TWO years.
- C. Co-execute submittals when required. Acceptance of manufacturer's guarantees/warranties by the City shall not be construed to limit the City's recourse to Contractor for correction of defects under the law and in accordance with the General Conditions.

1.5 WARRANTY CONDITIONS

- A. Contractor shall warrant that work performed under this Contract conforms to the Contract Documents and is free of any defect of equipment, material, installation, design furnished, or workmanship furnished by Contractor, or any of its subcontractors or suppliers. **SUCH WARRANTY SHALL CONTINUE IN EFFECT FOR 24 MONTHS FROM THE DATE OF ACTUAL SUBSTANTIAL COMPLETION ESTABLISHED except where detailed specifications for certain materials, equipment or systems require longer warranty periods.** Refer to technical specification sections to confirm specific warranty needed for such construction material and components.
 - 1. The following list of materials and equipment have warranties that differ than the typical 24 months outlined above, including but not limited to:
 - a. Sanitary Sewerage Utilities
 - b. Concrete Detectable Warning Tiles
- B. Warranties are not intended to cover failures which result from the following:
 - 1. Unusual or abnormal phenomena of the elements.
 - 2. The City's misuse, maltreatment, or improper maintenance of the Work.
 - 3. Insurrection or acts of aggression including war.
- C. Promptly after the receipt of written notice from the City, remove, replace, or correct Work, or portion thereof, which is damaged or found to be defective and not in accordance with the Contract within 10 calendar days.
 - 1. The City may proceed with the correction work at Contractor's expense if Contractor does not proceed with the corrective work within a within 10 calendar days by written notice from the City, the City may proceed with the work at the expense of the Contractor.
 - 2. The City reserves the right to remove and store or dispose of defective equipment or material at Contractor's expense.
 - 3. If Contractor does not pay the costs of such removal and storage within ten days thereafter, the City may, upon ten additional days written notice, sell such defective items and shall account for the net proceeds after deducting all the costs that should have been borne by the City, including compensation for City Representative's additional services.
 - 4. If the proceeds from the sale are insufficient to cover all amounts chargeable to Contractor, Contractor shall pay the difference to the City.

1.6 FORM OF GUARANTEE/WARRANTY

- A. equipment or components of equipment put into service for the City's benefit during the progress of the Work

(Letterhead of Company)

We (name of Contractor), agree to maintain and repair as recommended by equipment and system manufacturers, any such equipment and systems which have been beneficially used by San Francisco City personnel prior to the approval of Contractor's Application For Substantial Completion.

Owner: <Department>, City and County of San Francisco.

Location of Equipment: <Address>, San Francisco, California.

This guarantee is effective this _____ day of _____, 20____ until the date of City Approval of Contractor's Application for Final Payment.

Signed: _____(Name of Contractor)

By: _____

Contractor's Telephone No. _____

- B. For guarantee/warranty of the entire Work against defects in materials and workmanship for the period of warranty after the Notice of Substantial Completion. Refer to Section 1.5- Warranty Conditions, for a list of materials and equipment that have warranties that differ from the typical 24 months.

GUARANTEE/WARRANTY FORM
for
<PROJECT NAME>
<CONTRACT NO.>

GUARANTEE/WARRANTY for _____
We hereby guarantee/warrant that the _____
which we have provided in the _____
has been completed in accordance with the requirements of Specification Section _____ and
the other Contract Documents.

We agree to repair or replace any or all of our Work, together with any other adjacent Work
which may be displaced by so doing, that may prove to be defective in its workmanship or
material within a period of _____ months from the date of Substantial Completion of the above
named Project; and we also agree to repair any and all damages resulting from such defects,
all without any expense to the City, ordinary wear and tear and unusual abuse or neglect
excepted;

In the event of our failure to comply with the above mentioned conditions within ten (10) days
after being notified in writing by the City, we collectively or separately do hereby authorize the
City to proceed to have such defective Work repaired or replaced and made good at our
expense, and we will honor and pay the costs and charges therefor upon demand.

Signed _____ Date _____
(Include Contractor's name, address, and license number)

Countersigned _____ Date _____
(City Representative)

Substantial Completion was granted by the City on _____.

END OF SECTION

SECTION 02 80 13

HAZARDOUS BUILDING MATERIALS – REMEDIATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Many of the materials and items of equipment used to construct the improvements and facilities at the Project Site contain materials known to the State of California to be either carcinogenic or reproductive toxins. Such hazards include but are not limited to asbestos-containing materials (that are not Naturally Occurring Asbestos), lead based paints, lead-containing materials and demolition associated with hazardous materials.
- B. This Section includes hazardous and toxic materials precautions, general requirements, and handling procedures as required to the work and existing conditions of the project. This Section includes requirements and procedures to be performed by the Contractor for the handling, removal, abatement, remediation, transportation and disposal of hazardous building materials.
- C. Hazardous materials removal shall be conducted as per the construction phasing and staging described as specified in the drawings
- D. The Contractor shall perform all hazardous materials remediation work under this contract as described herein and in Section 01 35 44 Building Related Hazardous Materials Procedures.

1.2 RELATED DOCUMENTS AND SECTIONS

- A. Section 01 41 00 Regulatory Requirements
- B. Section 01 35 44 Hazardous Building Materials Scope of Work

1.3 REFERENCES

- A. American Society for Testing and Materials (ASTM):
 - 1. E84: "Test Method for Surface Burning Characteristics of Building Materials."
 - 2. E849: "Safety and Health Requirements Relating to Occupational Exposure to Asbestos."
 - 3. E119: "Standard Method for Fire Tests of Building Construction and Materials"
- B. American National Standards Institute (ANSI):
 - 1. Z41.1: "Men's Safety Toe Footwear."
 - 2. Z86.1: "Commodity Specification for Air."
 - 3. Z87.1: "Practice for Occupational and Educational Eye and Face Protection."
 - 4. Z89.1: "Requirements for Industrial Head Protection."
 - 5. Z9.2: "Fundamentals Governing the Design and Operation of Local Exhaust Systems"
 - 6. Z88.2: "Practices for Respiratory Protection."

7. Z88.6: "Respiratory Protection - Respiratory Use Physical Qualifications for Personnel."

C. National Fire Protection Association (NFPA):

1. Standard 701: "Small Scale Fire Test for Flame Resistant Textiles and Films."

2. Standard 10: "Fire Extinguishers."

3. Standard 70: "National Electric Code."

D. California Department of Industrial Relations, Division of Occupational Safety and Health (Cal/OSHA):

1. Title 8 California Code of Regulations (8 CCR) Section 5144 - Respiratory Protection.

2. Title 8 California Code of Regulations (8 CCR) Section 1532.1 - Construction Lead Standard.

3. Title 8 California Code of Regulations (8 CCR), Article 4, Section 1529 - Asbestos Standard for the Construction Industry.

4. Title 8 California Code of Regulations (8 CCR) Sections 3203 and 1509 - Injury and Illness Prevention Program.

5. Title 8 California Code of Regulations (8 CCR), Article 110, Section 5208 - Asbestos Standard for General Industry.

6. Title 8 California Code of Regulations (8 CCR), Article 2.5, Section 341.6 for employer registration when disturbing more than 100 sq. ft. of ACCM.

7. Title 8 California Code of Regulations (8 CCR), Section 1537: Welding, Cutting, and Heating of Coated Materials.

E. California Department of Public Health Title 17 California Code of Regulations (17 CCR) Sections 35001-36100 for Accreditation, Certification, and Work Practices for Lead-based Paint and Lead Hazards.

F. U. S. Department of Housing and Urban Development (HUD): Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing," referred to as the "HUD Guidelines."

1.4 DEFINITIONS

A. Activity Class/Category - Lead: Lead hazard designations assigned to work activities that involve lead-containing materials. Activities, which fall into Classes 1 through 3, including as examples the operations defined below, are required to assume the following personal airborne exposure levels, unless otherwise demonstrated.

| Lead Hazard Trigger Activities | Work Activity |
|--|--|
| Trigger Task, Activity 1 Exposure Less than 500 micrograms/m ³ | Surface clean-up of lead-containing dust or debris less than 15,000 microgram/square feet Spray painting with lead-based paints Manual demolition of structures (e.g. drywall, plaster, etc.) Manual sanding, grinding, needle gunning, chiseling, hammering, wire brushing, milling or scraping of lead-based coatings Heat gun removal of surface coating power tool Power tool cleaning with dust collection system |
| Trigger Task, Activity 2 Exposure 500 micrograms/m ³ or greater but less than 2500 micrograms/m ³ | Using lead mortar Lead burning Rivet busting Power tool cleaning without dust collection systems Clean-up of dry abrasive Abrasive blasting enclosure movement and removal |
| Trigger Task, Activity 3 Exposure 2,500 micrograms /m ³ or greater | Abrasive blasting of coated surfaces Welding on coated surfaces Torching or cutting of coated surfaces Torch burning of coated surfaces |

B. Asbestos Work Class: Activities for removing asbestos materials by categories as follows:

| Asbestos Activity Class/Category | Work Activity |
|----------------------------------|--|
| Work Class I | Activity involving removal of Thermal System Insulation (TSI) and surfacing Asbestos-Containing Materials (ACM) or friable Presumed – Asbestos Containing Materials (PACM). |
| Work Class II | Activity involving removal of ACM which is not TSI or surfacing material, including, but not limited to, wallboard, floor tiles and sheeting, roofing and siding shingles, naturally occurring asbestos (soil, rock, etc.) and construction mastics. Note also that Class II materials that cannot be removed intact, such as soil, require usage of respiratory protection at all times, regardless of personal monitoring data showing compliance to PEL and EL. |
| Work Class III | Repair and maintenance operations where TSI or surfacing is likely to be disturbed, which fits within one standard glove bag or waste bag. |
| Work Class IV | Maintenance and custodial activities during which employees contact but do not disturb PACM or ACM and activities to clean up dust, waste bag and debris resulting from Work Class I, II, and III activities. |
| Unclassified | Any activities dealing with materials containing detectable but <1.0 % asbestos. |

- C. Certified Lead Worker: includes those who do lead-related construction work activities on a work site under the directions of a Certified Lead Supervisor, including:
 - 1. Removal, disposal or abatement of loose and peeling lead-based paints as defined by CDPH, including scraping, demolition or other Cal/OSHA Activity 1 through 3 work as defined above.
 - 2. Removal or repair of lead plumbing.
 - 3. Repainting or general construction on surfaces painted with lead-based paints.
 - a. Removal, enclosing or covering of lead-contaminated soils.
 - 4. Exemption: renovations, remodeling, painting, operations and maintenance work or other activities listed above that are considered to be interim controls, or lasting less than 20 years, may be completed by workers satisfying Cal/OSHA's asbestos awareness training requirements only.
- D. Certified Lead Supervisor: includes those who supervise daily work activities on a lead-related construction site, as well as supervision of repainting or general construction performed on surfaces with lead-based paints where abatement is designed to permanently reduce or eliminate lead hazards for public (non-industrial) buildings or to last more than 20 years. The Certified Lead Supervisor shall oversee the Certified Lead Workers, enforce safe work practices, and schedule and coordinate work site activities with the building occupants and other contractors and consultants.
- E. Containment: as defined by the California Department of Public Health includes any system, process or barrier used to contain lead hazards in a work area, including plastic sheeting, wet scraping, and other lead-safe work practices as described in the HUD Guidelines, Chapter 8.
- F. Remediation: abatement, removal, control or containment of hazardous or toxic material(s).

1.5 SUBMITTALS

- A. The Contractor or its hazardous materials abatement subcontractor shall submit copies of any notice of safety and environmental violations received from the regulatory agencies that they may have received in the last 20 years in the USA.
- B. The Contractor or its hazardous materials abatement subcontractor shall submit copies all the Minimum Qualification licensing requirements asked for in Section 01 35 44 Hazardous Building Materials Scope of Work.
- C. The Contractor or its hazardous materials abatement subcontractor shall submit proof of its five (5) years of hazardous materials abatement and/or removal experience asked for in Section 01 35 44 Hazardous Building Materials Scope of Work.
- D. The Contractor or its hazardous materials abatement subcontractor shall submit proof of its environmental training requirements asked for in Section 01 35 44 Hazardous Building Materials Scope of Work.
- E. BAAQMD-issued Approval Letter for Asbestos Demolition. “[Job Number]”. For all demolition of buildings and structures, regardless of whether asbestos is present or not, Contractor shall submit a copy of the BAAQMD-issued Approval Letter for Asbestos Demolition, “[Job Number]” to the City Representative prior to the start of Demolition. To obtain this letter, Contractor shall submit an Asbestos Demolition Notification to the BAAQMD through their web-based Online Asbestos Notification System

(<http://learn.baaqmd.gov/course/view.php?id=4#section-5>) at least ten (10) business days prior to the start of any demolition.

- F. As per Section 01 35 44 – Building Related Hazardous Materials Procedures, the Contractor shall submit a Hazardous Materials Management Plan (HMMP) with the following documentation listed below. The HMMP shall be submitted within (10) ten days after the Notice to Proceed and before commencement of demolition activities. **No hazardous materials work will start without the HMMP reviewed and approved by the City Representative.**
- G. The Hazardous Materials Management Plan (HMMP) is the Contractor's comprehensive plan for the management of hazards encountered during the Work of this project. The HMMP is inclusive the following Plans:
1. An Asbestos Abatement Work Plan.
 2. A Lead Hazard/Removal Control Plan.
 3. A Waste Management Plan (WMP).
 4. Information about the Contractor's designated Project Safety Representative (PSR) as per Section 01 35 44 Building Related Hazardous Materials - Scope of Work, and Section 01 35 45 Health and Safety Criteria. Include his/her training certification, qualifications; his/her name, phone number; fax number, and pager number.
 5. Management spill procedures in the event of asbestos or any hazardous materials release or any event that may require modification or abridgment of site control and decontamination procedures.
 6. Intended methods of compliance for hazardous materials handling work, including description of engineering controls, personal protective equipment as well as compliance monitoring as applicable.
 7. Schedule and sequence of work for all hazardous materials work.
 8. Worksite layout Diagram: Detailing location of each regulated area and construction of each containment identifying location of each decontamination units, fire extinguishers and emergency exits.
 9. A copy of the Site-Specific Hazard Communication Plan in accordance with Federal and California OSHA requirements.
 10. Copies of required licenses, certifications and notifications to handle and control hazardous materials
- H. As part of the Contractor's HMMP, the Contractor shall submit a Waste Management Plan (WMP). The WMP is the Contractor's comprehensive plan for waste management of hazardous and non-hazardous waste generated during the remediation work of this project. The WMP shall include the following:
1. Information about the designated persons who will implement the Plan. Include his/her name, phone number, and his/her roles and responsibilities for implementing the Plan.
 2. Waste segregation procedures for waste generated from demolition debris, abatement, and stabilization.
 3. Proposed location of locked dumpster, if applicable.

4. Sampling plan and protocol for waste characterization in accordance with 22 CCR §66262, ET. Seq.
 5. Handling, segregation, and waste load-out procedures for hazardous and non-hazardous waste, including TSCA-regulated waste. Include diagrams showing regulated areas for waste segregation, load-out stations, paths of travel for off-hauls of waste, and engineering controls to prevent air pollution and potential exposures to airborne contaminants.
 6. Waste hauler identification, information, 24-hour contact number, and copy of licenses.
 7. Asbestos and lead waste disposal sites identification. Include name, address, 24-hour contact number.
- I. For Asbestos Containing Construction Materials (ACCM), or Asbestos Containing Material (ACM), as applicable by regulation, and as part of the Hazardous Materials Management Plan (HMMP) the Contractor shall submit the following, but not limited to:
1. Asbestos Pre-job Submittals:
 - a. Proof of current asbestos contractor's license issued by the California Contractors' State License Board.
 - b. Proof of current California Department of Industrial Relations (CA-DOSH or Cal/OSHA) Asbestos Contractor's registration certification.
 - c. Valid and current Bay Area Air Quality Management District (BAAQMD) notification for the Project and (as applicable).
 - d. Cal/OSHA 24-hour notice per 8 CCR 1529.
 - e. Worker documentation, including:
 - 1) Current AHERA training certification - supervisor/competent person
 - 2) Current AHERA training certifications for workers.
 - 3) Respiratory fit test records within past 12 months.
 - 4) Annual medical examination approvals for respirator use.
 - f. Written Asbestos Abatement Work Plan and schedule with the sequence of work.
 - g. Safety Data sheets (SD) for all materials used.
 - h. Emergency phone numbers, pagers and email addresses.
 - i. Aerosol Challenge Testing Certification
 - 1) Aerosol challenge testing using dioctylphthalate (DOP, also known as Bis(2-ethylhexyl) phthalate) or an approved alternative is required for all equipment fitted with High Efficiency Particulate Air (HEPA) filters including negative pressure units, air machines, fan units and vacuum cleaners.
 - 2) Prior to use, testing must be performed on site:
 - a) Whenever equipment enters the site.
 - b) After replacement of HEPA filters or any other significant repairs or alterations.
 - 3) Equipment which fails testing shall be marked and promptly removed from the site.
 - 4) Equipment which has passed testing shall be marked with a unique identifier number and the date of the testing. The identifier number shall be reflected on all testing documentation.

- 5) Recognized alternatives to DOP include, but are not limited to 4 centistoke (4 cSt) viscosity grade polyalphaolefin (POA) fluids such as Emery 3004 POA and selected mineral oils. Testing equipment modification and/or recalibration may be needed to use DOP alternatives.
- j. Rotameter calibration data calibrated by a primary standard within past 6 months.
- 1. Periodic Submittals: Submitted upon request during abatement:
 - a. Contractor's personal air monitoring results (daily)
 - b. Updated workers documentation (as needed)
 - c. Daily boundary access logs
 - d. Daily negative pressure manometer records (print outs), as applicable
 - e. Copies of updated schedules and notices to the regulatory agencies (as needed)
- 2. Project Closeout Submittals: Within 5 calendar days upon the City's request or within 5 calendar days after completion of the abatement or hazard control work, the Contractor shall submit the following:
 - a. Copies of updated schedules and notices to regulatory agencies, as needed.
 - b. Receipt and weight tickets from landfill operator or incinerator, as applicable.
 - c. Copies of completed uniform waste manifests.
 - d. Certification of Completion.
- J. For Lead - Related Work, and as part of the Hazardous Materials Management Plan (HMMP) the Contractor shall submit the following, but not limited to:
 - 1. Pre-job Submittals: The Contractor shall submit documents pertaining, but not limited to, the following
 - a. San Francisco Department of Building Inspections (DBI) notification and posting requirements as deemed required for exterior paint remediation.
 - b. Cal/OSHA notifications as per 8 CCR 1532.1
 - 2. Workers documentation:
 - a. Current CDPH lead contractor/supervisor training certificates.
 - b. Current lead awareness training certificates - workers or CDPH Certified Lead Workers Certificate, as appropriate.
 - c. Respiratory fit test records within past 6 months.
 - d. Annual Medical Examination approvals.
 - e. Blood lead tests within past 90 days.
 - 3. Lead Hazard/Removal Control Plan pursuant to 8 CCR 1532.1: Procedures for minimizing and controlling the migration of lead from disturbance of lead-containing materials including a written lead hazard or lead removal work plan and schedule with the sequence of work:

4. Project Close-out Submittals: Within 5 calendar days upon the City's request, or within 5 calendar days after completion of the abatement or hazard control work, the Contractor shall submit the following:
 - a. Updated worker documentation, as needed.
 - b. Contractor periodic personal air monitoring results.
 - c. Receipt and weight tickets from landfill operator or recycler, as applicable.
 - d. Waste profiling data (TCLP, WET, and other analytical data)

K. For Copper Chromate Arsenate (CCA) Treated Wood Related Work

1. As part of the Hazardous Materials Management Plan (HMMP), the Contractor shall submit the following, but not limited to:
 - a. Identification of EPA-approved hazardous waste landfill disposal facility, or an EPA-approved solid waste disposal facility.
 - b. Temporary storage plan.
2. Workers Documentation:
 - a. Certification of the workers and supervisor's forty (40) hour HAZWOPER training in compliance with 40 CFR 1910.120.
 - b. Medical examination approvals for respirator use within the past twelve (12) months, or in compliance with 8 CCR 5144.
 - c. Respiratory fit test records within the past twelve (12) months minimum, or in compliance with 8 CCR 5144.
3. Within 5 calendar days upon the City's request or within 5 calendar days after completion of the abatement or hazard control work, the Contractor shall submit the completed manifest or evidence of shipment date, recycler, and quantities shipped.

L. For Fluorescent Light Tube Related Work

1. As part of the Hazardous Materials Management Plan (HMMP), the Contractor shall submit the following, but not limited to:
 - a. Identification of EPA-approved recycler.
 - b. Temporary storage plan.
2. Project Close-out Submittals: Within 5 calendar days upon the City Representative's request, or within 5 calendar days after completion of the abatement or hazard control work, the Contractor shall submit the completed manifest or evidence of shipment date, recycler, and quantities shipped.

1.6 QUALITY CONTROL

A. Meetings

1. Pre-Abatement Meeting: Prior to any removal of hazardous materials and upon the HMMP submittal approved, a meeting will be conducted at the City's discretion. The Contractor shall attend a pre-construction meeting with the City Representative, the City's Consultants, and other Subcontractors whose work may be affected. The meeting agenda shall include the following considerations:

- a. Weekly Meetings: At the City's option, abatement work extending over one week in length may require attendance of the Contractor at a weekly progress meeting. The purpose of this meeting is to review abatement and project scheduling, coordination with other trades, security and site-specific requirements.
- b. Start-Up Hazardous Materials Handler's Meeting: Prior to the beginning of on-site work, all hazardous materials handlers shall attend a pre-start-up safety meeting that addresses hazardous materials issues specific for the project.
- c. Review of the Specifications and Plans in detail related to the abatement and hazards control work. All conflicts and ambiguities, if any, shall be discussed.
- d. Review in detail the project conditions, schedule, construction sequencing, site protection, protection of historic building materials abatement application requirements, and quality of completed work.
- e. Review in detail the means of protecting adjoining areas; protection of Contractor's, Subcontractor's, City's workers, and completed work during the abatement and lead removal activities.
- f. Pre-job submittals requirements.
- g. Site security requirements.

B. Field Quality Control Sampling

1. During all asbestos-related work, perimeter sample(s) will be collected by the City's Certified Industrial Hygienist or its Environmental Consultant (DOSH Certified Asbestos Consultant). These sample(s) will be analyzed by Phase Contrast Microscopy (PCM). Sample results that are in excess of the background level or 0.010 fibers per cubic centimeter (f/cc) Project Action Level may be forwarded for analysis by Transmission Electron Microscopy (TEM) with a 12-hour turnaround specified. Handling, shipping, and analysis charges (including the Environmental Consultants time and expenses) will be paid for by the Contractor. Any sample results in excess of 70 asbestos structures per square millimeter of filter area (corrected for a 1,200 - 1,800 liter sample volume as appropriate, or in excess of 0.018 str/cc, normalized to a 1,500-liter air sample) will require cleaning, inspection, and resampling of the affected area at the Contractor's expense.
2. During all lead-related work, such as demolition, torching and welding activities, etc., as applicable, visual inspections, perimeter air sample and/or lead wipe sample results will be collected by the City's Certified Industrial Hygienist or its Environmental Consultant (DOSH Certified Asbestos Consultant). These samples will be analyzed by flame atomic absorption.

C. Clearance and Re-occupancy Sampling

1. Asbestos Clearance Sampling
 - a. Clearance samples will be collected by the City at the completion of the asbestos abatement activity. Clearance will be either by visual inspection and/or phase contrast microscopy (PCM) and/or aggressive air sampling - transmission electron microscopy (TEM). The City Representative reserves the right to conduct AHERA clearance criteria and limit the number of samples for clearances to be less than AHERA protocol when the City's Representative deems appropriate.
 - b. Clearance air samples using aggressive air sampling techniques shall be collected for all abatement zones, unless otherwise designated in the Contract Documents.
 - c. Phase Contrast Microscopy (PCM) Clearances: Areas cleared by PCM shall show an airborne concentration of total fibers for each sample at or below 0.010 fibers per cubic

centimeter (f/cc) using the NIOSH 7400A counting rules. Any sample result exceeding 0.010 fibers/cc shall require re-cleaning of the work area and retesting. The City Representative will determine the minimum number of samples, based on the quantity and types of materials removed configuration, and sequencing of the work areas, and similar considerations.

- d. When transmission electron microscopy (TEM) clearances are conducted, as designated by the Contract Documents, analysis shall be by the method described in 40 CFR Part 763, Appendix A, Subpart E (AHERA), with an analysis turn-around time of 24 hours, unless otherwise designated by the City. Z-test requirements under the AHERA regulations shall **NOT** apply to this Project. The TEM clearance standard is 0.018 s/cc for **ALL** samples (equivalent to 70 s/mm² for a 1500-liter sample volume). The City Representative may opt to adjust the sample volume to prevent possible overloading of the samples from interference dusts (e.g., demolition, welding particulates), if so, the analytical sensitivity shall be at or below 0.005 s/cc, maintained by having adequate number of grids analyzed by the laboratory.

2. Lead Wipe Sampling

- a. All areas with regular occupancy affected by disturbance, demolition or scraping of painted surfaces shall be cleared by wipe sampling. Lead wipe sampling will be collected immediately prior to area occupancy.
- b. The City Representative will collect clearance wipe samples after approving the work area cleanliness based on visual inspection. The wipe samples will be collected from building surfaces, NOT from plastic sheeting or other temporary barriers. The Contractor shall re-clean the area if surface lead concentrations exceed any of the following HUD definitions for lead contaminated dust:

<10 micrograms/ft² for interior floors

<10 micrograms/ft² for interior horizontal surfaces other than floors

<100 micrograms/ft² for exterior floor and horizontal surfaces, window sills and troughs

- c. All reoccupancy/clearances will be based on floors and any interior horizontal surfaces. Routine use of other levels is not expected and are for use only as determined by the City on a case by case basis. Areas that do not meet the HUD lead contaminated dust criteria shall continue to be cleaned by and at the Contractor's expense until the specified criteria is achieved. Only after passing re-occupancy clearance, shall the Contractor teardown the containment and demobilize.
- d. Where lead remediation occur concurrently with asbestos remediation activities, the area may be cleared (in addition to the wipe samples) by aggressive air sampling, where airborne lead concentrations following the final visual inspection shall not exceed the EPA's NAAQS standard of 1.5 micrograms/m³ as analyzed by NIOSH method 7082 (flame atomic absorption) or 7105 (graphite furnace atomic absorption) or ICP/MS.

D. Final Clearance Criteria

- 1. The City will pay the cost of the final round of visual inspections, aggressive air sampling, and PCM and/or TEM analyses that will meet the asbestos abatement specification. All rounds of visual inspections, aggressive air sampling, and PCM and/or TEM analyses that fail to meet the contract criteria shall be borne by the Contractor. For the purpose of this paragraph, visual inspection includes the area isolation inspection, pre-encapsulation inspection, and final area clean-up inspection.

2. If wipe sampling for re-occupancy clearance fails the HUD lead contaminated dust criteria, the Contractor will be responsible for additional clean-up costs (including costs associated with delays in time, and costs for the oversight Consultant and the City, and at no additional cost to the City), until clearance is achieved.
3. The Contractor shall pay for all Environmental Consultant costs for delays in completion of work beyond the authorized schedule established by the City. Such charges shall include Consultant's observations and inspections, daily air monitoring, equipment, transportation and analysis charges. Such costs are estimated at \$1,200 per day, exclusive of any costs associated with final clearance air testing. See the Liquidated Damages Section in the General Conditions for further requirements.

E. Inspections

1. Work Area Inspections: Inspections are required at the completions of the following job phases:
 - a. Pre-cleaning Inspection(s)
 - b. Work Area Preparation Inspection (Pre and post 24-hour hold times)
 - c. Pre-Encapsulation Inspection
 - d. Final Visual Inspection
 - e. Waste Handling Inspection
2. The Contractor's Supervisor shall provide in writing a signed or initialed request for inspection to the City. Request all inspections at least 24 hours in advance of the time required; inspections shall be performed between the hours of 8:00 a.m. and 3:00 p.m., Monday through Friday, unless otherwise noted. Written requests may be waived, and verbal requests accepted for short-duration projects at the discretion of the City. Adequate lighting is to be provided by the Contractor.
3. Precede all inspection requests by an evaluation by the superintendent. The superintendent shall be a person who has not participated in the supervision, preparation, abatement, and cleanup of the work area, except on small-scale short-duration projects where the contractor's foreman may serve as the superintendent. The superintendent shall verify that criteria for acceptability have been met prior to requesting an inspection.
4. Pre-cleaning Inspection:
 - a. The City Representative shall inspect all surfaces requiring pre-cleaning to verify that dust and debris have been removed and cleaned up to an acceptable condition. Multiple inspections may be required to cover all systems and the required phasing of activities.
 - b. No object shall be covered until inspected or approved by the City Representative as stated in the requirements herein. When covered before such inspections are made and approved, the Contractor shall uncover such work for inspection, subsequently restore it, and replace work of others damaged thereby, all at the Contractor's expense.
5. Work Area Preparation Inspection:
 - a. After preparing the work area and decontamination enclosure system(s) for Activity Class I and II work areas, as applicable, the City's Representative shall conduct an initial inspection to ensure completeness of work and type containment according to the specifications.

- b. No hazardous material removal work shall commence without the approval of the City's Representative following a work area preparation inspection.
6. Pre-Encapsulation Inspection:
 - a. After detail cleaning has been completed and the Superintendent has checked and approved the area as adequately cleaned, the City's Representative shall inspect all surfaces requiring encapsulation to verify that hazardous materials have been removed and the area and abated surfaces leaned to an acceptable condition.
 - b. During such inspections, the Contractor will provide adequate lighting, ladders, scaffolding, workers, etc., so as not to curtail the systematic inspection of all surfaces by the City. Areas requiring rework will be tagged in a manner to allow continuation of the inspection in a timely manner. The City's Representative shall not be expected to remain within an area requiring extensive re-cleaning.
 - c. The pre-encapsulation inspection may be staged to allow inspection of detailed surfaces concurrent with the removal activities in adjoining areas ready for inspection, allowing a buffer zone to protect against cross-contaminating inspected surfaces. For lead removal: a final overall inspection will be required to reconfirm the final wipe down of all horizontal surfaces, which may have been subjected to contamination from airborne releases during the staged inspection process. The staging of inspections shall not preclude the Contractor from conducting internal quality control inspections prior to requesting the City Representative's review.
 7. Final Visual Inspection: After the encapsulation process is complete, the encapsulant is dry, and all debris bags, tools, supplies, and equipment have been removed from the work area, as applicable, City Representative shall inspect the work area to verify the cleanliness of the area, including but not limited to public and attic areas. The work area must be free of visible debris, dust, water, or loose and peeling lead-based paints as a minimum.
 8. Waste Handling Inspection: The City Representative shall inspect waste as it leaves the regulated area. The Contractor shall insure that all waste is packaged, labeled, and handled as required. The City Representative may inspect the waste dumpsters at any time, including prior to transportation. Coordinate temporary relocation to a transport staging area with the City Representative prior to removal.

1.7 ADDITIONAL CONTRACT REQUIREMENTS

- A. Specific mandatory asbestos abatement requirements for *occupied and unoccupied spaces* at San Francisco sites are more stringent than current regulations. This summary of additional requirements is not to be read as a stand-alone document.
 1. If work procedures are going to change, the City Representative must be notified, in writing, and given the opportunity to notify surrounding employees as the new procedures may impact surrounding areas (e.g., noise, vibration).
 2. Localized occupants must be notified in writing of limited access to the work areas prior to the start of project.
 3. The Contractor is responsible for coordinating with the City Representative and site facility representative as to where the exhaust air is to be directed and to ensure the exhausted air will not be recirculated within the facility prior to the initial setup of the work area.
 4. A rigid and robust secondary perimeter with "Caution Construction" sign or equivalent. The secondary perimeter shall be a full height, 1-hour fire-rated, dust and sound proof construction barricade as per the architectural drawings for this project.

5. The regulatory signage is to be posted between the secondary construction perimeter and the regulated work area.
6. All equipment shall be inspected by the City's designated representative prior to being brought into the hospital. All equipment and supplies shall be free of dust and debris.
7. On-site aerosol challenge testing of negative air machines and HEPA vacuums prior to start of work and every 90 days for longer projects, when machines are relocated between floors. The aerosol challenge testing shall be conducted in the work area.
8. Sufficient quantities and types of dehumidifier units shall be installed and operated within the Construction Area to reduce humidity levels to 40% relative humidity.
9. Method of sealing critical barriers including the capping of ducts, supply registers, etc. shall be dust tight and capable of withstanding air flow and pressure generated by the ventilation system. Tape and/or polyethylene sheeting alone shall not be used to seal the supply registers.
10. Negative pressure differential of -0.04 inches of water with manometer reading records is required for all areas at all times during abatement and general construction activities. Downgrading of negative pressure during construction may be considered on a case by case basis.
11. The negative pressure enclosure shall maintain the minimum Negative pressure differential of -0.04 inches of water for at least 24 hours prior to the start of abatement unless otherwise approved by the City Representative. Following 24-hours, the City Representative and its Environmental Consultant will review the containments to determine if the integrity of the containments has been maintained. The Containment will have passed when the following 3 conditions are met:
 - a. Containment integrity has been maintained for at least 24-hours; and
 - b. Negative pressure has been maintained at least at -0.04" w.g. for 24-hours; and
 - c. The City Representative and the Environmental Consultant are satisfied that the containment has been constructed sufficiently so as to last for at least two months without modifications, repairs or improvements
12. In negative pressure enclosures, a calculated air exchange rate of no less than 10 air exchanges per hour for the entire area in which the renovation activities are being performed.
13. Installation of clear, transparent view ports made of plastic or equivalent, in the polyethylene wall so that activities can be visually monitored from outside the containment. This window shall measure approximately 1' wide by 2' high. It shall remain transparent throughout the duration of the abatement process. It is recognized that viewing ports are not possible in all situations.
14. Adhesive tack ("sticky") mats with multiple layers shall be installed at all construction barricade entrances to prevent tracking of construction dust outside of the construction area.
15. The removal of debris shall be in tightly covered containers, and only at times and routes approved by the City Representative and facility personnel.
16. All HEPA equipment, tools, decontamination chambers, etc. shall be clean upon entering the hospital. Typically, the equipment and materials are inspected at a loading dock prior

to bringing them into the facility. NOTE: The use of decontamination showers is limited to Class I work only unless otherwise specified by the Abatement Work Plan.

17. The Contractor is responsible for ensuring that water is properly shut off at lavatory/faucet fixtures at the beginning and ending of each shift. SFGH Facilities shall be immediately notified if the fixtures are unable to be completely shut off.

PART 2 - PRODUCTS

2.1 GENERAL

A. Prohibited Materials

1. Mastic or paint removers shall not result in the generation of hazardous waste.
2. Cleaning Agents, equipment, and methods employed shall not in any way damage the substrate or adjoining surfaces and finishes which are to remain. Cleaning solvents shall be non-injurious to the surfaces upon which they are applied. The methods used shall cause no pitting, erosion or damages to the surfaces.
3. Paint removal chemicals may not attach or leave deposits on the substrate material.
4. The following tools and equipment are specifically prohibited unless accepted in writing by the City Representative:
 - a. High- or low-pressure water-blasting equipment for hosing of ductwork or work areas.
 - b. Gasoline, propane, diesel or other fuel powered equipment inside the building.
5. Equipment that creates excessive noise or vibration that would affect safety of the building or its occupants or generate complaints from the occupants. Equipment shall not exceed an A-weighted sound level of 85 dB as measured at 50 ft. from the radiating source.
6. Asbestos-containing materials shall not be disturbed by cutting, sawing, grinding, pulverizing, crumbling, breaking, or otherwise rendered friable or airborne unless these activities are conducted under the requirements of all applicable regulations and guidelines by trained certified workers.

B. Minimum Requirements:

1. Deliver all materials in original packages, containers, or bundles bearing the names of the manufacturers and the brand names and details for proper storage and usage. Store all materials subject to damage off the ground, away from wet or damp surfaces, and under cover sufficient to prevent damage or contamination. Store materials so as not to interfere with the Owner's or other Contractors' operations.
2. Do not use damaged or deteriorating materials. Remove damaged materials from the premises. Dispose of contaminated materials in accordance with applicable regulations

2.2 MATERIALS AND EQUIPMENT

- A. Protective Devices: Temporary wash stations or showers, disposable clothing, respirators, gloves, hard hats, and other required items. Respirators shall protect against appropriate dusts, fumes and mists as approved by the Mine Safety and Health Administration (MSHA) and the National Institute for Occupational Safety and Health (NIOSH) under provisions of 30 CFR Part 11.

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- B. Waste Receptacles: Conform to federal and State regulations, with 6-mil minimum thickness waste bags.
 - C. Polyethylene Sheeting and Dust Barriers
 - 1. Polyethylene sheeting shall be flame-retardant and approved and listed by the State Fire Marshal in accordance with Section 13121 and/or 13144.1 of the California Health and Safety Code.
 - 2. Thickness and Size: 6-mil thick minimum, unless otherwise specified, sized to minimize the frequency of joints.
 - 3. Flammability: Comply with NFPA Standard 701 with a flame spread rating of no greater than 5 and a smoke development rating of no more than 70 when tested in accordance with ASTM accordance with ASTM E84 procedures.
 - D. Protective Devices to conform to the following:
 - 1. Polyethylene drop cloths and dust barriers, temporary wash stations or showers, disposable clothing, respirators, gloves, hard hats, and other required items.
 - 2. Respirators shall protect against asbestos and other appropriate dusts, fumes and mists as approved by the National Institute for Occupational Safety and Health (NIOSH) under provisions of 30 CFR Part 11.
 - E. Sealants:
 - 1. Sealants shall, at a minimum, conform to the following:
 - a. Shall be Fire resistant
 - b. Shall be compatible with concrete, metals, wood, cable jacketing and other materials capable of preventing fire, smoke, water and toxic fumes from penetrating through sealants.
 - c. Shall be asbestos free and shall have a flame spread, smoke and fuel contribution of zero.
 - d. Shall be ASTM- and UL-rated for 3 hours for standard method of fire test for fire stop systems.
 - 2. Spray adhesives shall not contain methylene chloride or methyl chloroform (1,1,1-trichloroethane) compounds.
 - 3. Adhesive tape shall comply, at a minimum, with the following.
 - a. Must be 2" or wider, shall be capable of sealing joints of adjacent sheet of polyethylene and attaching polyethylene sheet to finished or unfinished surfaces of similar materials.
 - b. Tape shall be capable of adhering under dry and wet conditions, including use of amended water. Complete taping to critical or sensitive surfaces utilizing preservation sealing tape, such as:
 - 1) [3M Scotch Brand No. 4811 Preservation Tape](#); or
 - 2) [3M Scotch Brands No. 472 Plastic Film Tape](#).
 - F. Surfactants and Encapsulants:

1. Wetting agents or surfactants shall be effective and compatible with the ACM being wetted.
2. Bridging or penetrating type encapsulants shall have the following characteristics:
 - a. Water based. Do not utilize an organic solvent in which the solid parts of the encapsulant are suspended.
 - b. Non-flammable with no methylene chloride.
 - c. U.L. listed encapsulants, in full-scale ASTM E119 fire test, compatible with W.R. Grace "Retroguard, RG-1" fireproofing with "Spatterkote" Type SKII" bonding treatment for structural and decking widths exceeding 24 inches.
 - d. Compatible with replacement materials, especially mastics, fireproofing, and adhesives.

G. Mastic and Paint Removers to conform to the following:

1. Non-flammable solvent or gel, with a flash point above 140 degrees Fahrenheit.
2. Of low odor type.
3. Solvent waste shall not result in the generation of hazardous waste as described under 22 CCR, Division 4.
4. Removers shall NOT contain methylene chloride, halogenated hydrocarbons, or any of the following glycol ethers:

| Common Name | Abbreviation | CAS # | Chemical Name |
|--------------------------------------|--------------|----------|-----------------------------|
| Ethylene glycol methyl ether | EGME | 109-86-4 | 2 - methoxyethanol |
| Ethylene glycol methyl ether acetate | EGMEA | 110-49-6 | 2- methoxyethyl acetate |
| Ethylene glycol ethyl ether | EGEEA | 111-15-9 | 2- ethoxyethanol |
| Ethylene glycol dimethyl ether | EGDME | 110-71-4 | 1,2-dimethoxyethane |
| Ethylene glycol diethyl ether | EGDEE | 629-14-1 | 1,2 - diethoxyethane |
| Diethylene glycol | DEG | 111-46-6 | 2,2 - dihydroxyethyl ether |
| Diethylene glycol methyl ether | DEGME | 111-77-3 | 2-(2-methoxyethoxy) ethanol |
| Diethylene glycol ethyl ether | DEGEE | 111-90-0 | 2- (2-ethoxyethoxy) ethanol |
| Diethylene glycol dimethyl ether | DEGDME | 111-90-6 | Bis-(2-methoxyethoxy) ether |
| Triethylene glycol dimethyl ether | TEGDME | 112-49-2 | 2,5,8,11-tetraoxadodecane |
| Dipropylene glycol | DPG | 110-98-5 | 2,2 - dihydroxyisopropyl |

- H. Vacuums and Negative Pressure Units (NPU) used for cleanup of materials and detailing shall be HEPA-filtered, clean, without significant dents, marring, or otherwise unprofessional

appearance. Coordinate with the Environmental Consultant for inspection and approval prior to bringing this equipment into a building. Conduct DOP testing on-site in the presence of the City's Environmental Consultant for all HEPA-filtered units.

- I. Air Filtration Devices shall, at a minimum, conform to the following:
 1. Filtration devices shall be high efficiency particulate absolute (HEPA) filtration systems bearing a UL 586 label indicating its ability to perform under specified conditions. Filters shall be marked with the name of the manufacturer, serial number, airflow rate efficiency and resistance, and the direction of the test airflow. Provide units with two stages of pre-filtering, as follows:
 - a. A low efficiency type first stage pre-filter for particle sizes 100 micrometers and larger.
 - b. A medium efficiency type second stage pre-filter effective for particle sizes down to 5 micrometers.
 - c. Pre-filters installed either on or in the intake grid to the exhaust unit and held in place with special housings or clamps.
 2. HEPA-filtration exhaust units are to include:
 - a. An elapsed time meter showing the total accumulated hours of operation.
 - b. An electrical interlock preventing operation of the unit without a HEPA filter.
 - c. An automatic shutdown system to stop the fan in the event of a rupture in the HEPA filter or a blocked air discharge.
 - d. Warning lights to indicate normal operation (green), moderately high pressure drop across the filters, such as due to filter overloading (yellow), and too high of a pressure drop due to an overloaded or ruptured HEPA filter or obstructed discharge (red).
 - e. An audible alarm if the unit shuts down due to operation of the safety systems.
 - f. Electrical components approved by the National Electrical Manufacturers Association (NEMA) and the Underwriter's Laboratories (UL). Each unit shall be equipped with overload protection sized for the equipment. Properly ground the motor, fan, fan housing, and cabinet.
 - g. A cabinet constructed of steel or aluminum capable of withstanding damage from rough handling and transportation, with a width under 30-inches to fit through a standard-size doorway, mounted on casters or wheels.
 - h. Several spare HEPA-filtered exhaust units on-site to be used as needed should active units fail.
- J. Waste Containers:
 1. Waste Receptacles to conform to federal and State regulations, with 6-mil minimum thickness or glove bags or waste bags.
 2. Sealable drums shall be of 30- or 55-gallon capacity constructed of fiber or metal with tightly fitting lids for hazardous waste disposal. Label the drums and bags in accordance with U.S. EPA and local Air Quality Management District requirements, including the Generator I. D. number or location identification, and manifest number. Provide air and watertight drums. If previously used, the drums shall be food grade and shall be approved by the City Representative prior to their storage or use on-site. Sealable polyethylene bags shall be of 6-mil minimum thickness for asbestos disposal. Size bags to fit within drums specified above.

K. Cleaning Agents:

1. Cleaning agents, equipment, and methods employed shall not in any way damage the substrate or adjoining surfaces and finishes. Cleaning solvents shall be non-injurious to the surfaces upon which they are applied. The methods used shall cause no pitting, erosion or damages to the surfaces.
2. Do not use chemicals that may attach or leave deposits on the substrate material. Modify the process or processes to suit the finish, hardness, and condition of the surface to be cleaned.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Review hazardous materials reports and information and ensure the information is available to all subcontractors and trades.
- B. Promptly notify the City Representative of differing conditions of for suspected materials not identified or listed under Section 01 35 43.
- C. Notify the City Representative, in writing, a minimum of 48 hours in advance of any planned disturbances to any hazardous materials or prior to performing any hazardous materials abatement.
- D. Disturbance of asbestos or lead and other hazardous containing materials, including demolition, surface preparation, or removal of paint, can contaminate air, soil, and water surrounding the work site. It is the responsibility of the Contractor to evaluate and determine the most appropriate level of containment necessary to prevent the uncontrolled release of hazardous materials from the work site.
- E. As per Cal/OSHA regulatory requirements, establish the required site controls, class of containment, of ventilation, and of air monitoring as appropriate for the removal means and methods as selected to perform the specific removal work. These systems shall be sufficient to control exposures to workers, the public, and to protect the surrounding environment.

3.2 PREPARATION

A. Protective Procedures and Workers Protection

1. Protect Visitors and Other Site Personnel: Cordon off the hazardous materials removal and hazard control area(s) with appropriate signs, and provide temporary tunneling or scaffolding, as applicable.
2. Provide site security to assure that no member of the public or any unqualified or untrained person is able to gain access to any hazardous materials work area at any time while maintaining open access and egress routes at all times.
3. Provide worker training, respiratory protection, and medical examinations to meet applicable regulations.
4. Provide temporary lighting and power to work areas, including installation of ground fault interrupters as required. Ensure that all electrical power terminating in the work area, including but not limited to outlets and lights are disconnected and cannot be re-energized

during the course of the work. Fully ground all equipment within the work zone and decontamination assemblies.

5. Construct enclosure system(s) for worker and equipment decontamination.
6. Establish negative pressure in work area(s) as required under 8 CCR Section 1529. Follow and follow hazard control procedures as outlined under Cal/OSHA regulations CCR 1532.1 and CDPH regulations 17 CCR Sections 35001 through 36100
7. Provide workers with sufficient sets of protective full-body clothing to be worn in the designated work area and whenever a potential exposure to lead, asbestos, and hazards exists. Such clothing shall include but not be limited to full-body coveralls, headgear, eye protection, and gloves. Disposable-type protective clothing, headgear, and footwear may be provided.
8. Respiratory Protection: Comply with Cal/OSHA Regulations included in 8 CCR Sections 1529, 1532.1 and ANSI Standard Z88.2, "Practices for Respiratory Protection: Workers shall wear appropriate respiratory protection during lead, asbestos and any other hazards work, unless negative exposure assessment testing verifies that employee exposures are below the PEL or Action levels.

B. Site Protective Controls:

1. Locate temporary scaffolding and dust barriers, as required, and proceed with the construction or demolition, allowing for continued operation of any adjacent occupied areas, as applicable.
2. Erect temporary protective covers over pedestrian walkways and at points of passage for persons or vehicles, which are to remain operational during the work.
3. Where life safety systems shall be made non-operational, coordinate shutoff with City. Protect all wiring associated with the system.
4. Air Filtration Device
 - a. Differential air pressure systems for each work area to be in accordance with Appendix J of the EPA's "Guidance for Controlling Asbestos-Containing Materials in Buildings," EPA 560/5-85-024.
 - b. Minimum work area differential air pressure of -0.025 inches w.g. at all times when required, including during the removal, gross clean-up, waste transfer, and encapsulation activities. Account for fluctuations of the negative pressure by aiming for a higher-pressure differential at the project outset to ensure that the chances of the pressure differential dipping below -0.025 inches w.g. are minimal.
 - c. Provide sufficient number of units for each work area to maintain differential air pressure in the work area at -0.025 inches w.g. between the work area and adjacent non-work areas at all times, allowing for stack and thermal effects. Locate unit(s) so that the primary make-up air enters the zone through the decontamination facilities and traverses the work area as much as possible, unless otherwise approved by the City Representative.
 - d. Provide on-site certification of all HEPA-filtered negative pressure units to document adequate filtration efficiency for all units exhausting internally within the building or as otherwise required by the City. Systems shall be certified by a third-party to conduct onsite dioctylphthalate (DOP) or Portacount challenge testing, signed by an independent tester or the Contractor's Site Safety Representative. DOP testing shall

verify an in-situ efficiency of 99.97% or greater. Portacount testing shall verify an in-situ efficiency of 99.3% or better.

5. Exhaust Air:
 - a. Establish negative pressurization within the work area exhausting air ducted through temporary panels located in window frames or exterior doorways. Such panels must be designed to prevent rainwater from entering the work area.
 - b. Unless otherwise directed by the City Representative the Contractor shall replace windows any windows removed at the completion of hazardous materials removal work. Vent exhaust air to the exterior of the building at locations approved by the City Representative unless otherwise noted or directed.
 - c. Do not locate exhaust outlets near or adjacent to other building intake vents or louvers or at the entrances to the building. Do not exhaust air into the building interior spaces or within 50 feet of the building's supply air intakes, unless otherwise noted or directed by the City.

6. Decontamination Enclosure Systems
 - a. Construct a decontamination enclosure system (as a minimum) in accordance with OSHA Regulation 29 CFR Part 1926.1101 and Cal/OSHA Regulation 8 CCR Sections 1529 and 1532.1. The systems shall be contiguous to the work area consisting of three totally enclosed chambers and airlocks. Mobile isolation enclosures will be permitted in areas where space limitations will not permit such construction.
 - b. For Work Class I, II and III work areas, provide as a minimum, with a two (2)-stage decontamination assembly, including an equipment and contiguous clean room with bucket wash-up facilities. A shower will be required if the work is greater than 25SF.
 - c. Post all emergency phone numbers, notifications, emergency exiting diagrams and procedures, as required.
 - d. Post danger signs at the entrance to all decontamination units, per OSHA Regulation 29 CFR Part 1926, 1529 and 1532.1.
 - e. The City's Representative prior to construction must approve location of decontamination enclosure systems
 - f. Mobile Isolation enclosure(s) shall be constructed of rigid frames (either 2 x 4-inch wood construction or PVC tubing, as appropriate) and polyethylene sheeting or rigid Plexiglas sheets. Do not tape, nail, puncture or disturb asbestos containing building materials to attach, or secure the mini enclosure system.
 - g. No eating, drinking, smoking, or chewing gum or tobacco is permitted in or near the asbestos or lead work areas or decontamination enclosure systems except in areas designated by the City. Smoking will not be permitted in the clean room and near storage or usage areas of flammable materials, such as spray adhesive and mastic removers.

3.3 ASBESTOS ABATEMENT PREPARATION

A. Notifications:

1. Notify the City, in writing, a minimum of 48 hours in advance of any asbestos-abatement work.
2. Notify, in writing, the BAAQMD at least 10 working days prior to commencement of any asbestos project equal or greater than 100 linear feet (LF) or more than 100 square feet (SF) or 35 cubic feet or more of regulated asbestos-containing materials. Obtain a J#.

3. Notify Cal/OSHA a minimum of 24 hours in advance of any disturbances of any amount of friable or non-friable asbestos-containing materials or prior to performing asbestos-related work.
4. Advise the Contractor's Site Safety Representative (SSR) of suspect conditions. Do not remove or disturb suspect materials until tested and approved.

B. Prohibited Activities:

1. Asbestos-containing materials shall not be disturbed by cutting, sawing, grinding, pulverizing, crumbling, breaking, or otherwise rendered friable or airborne unless these activities are conducted under the requirements of all applicable regulations and guidelines.
2. Only a registered Asbestos Abatement Contractor per Cal/OSHA regulation 8 CCR 1529 shall complete Work exceeding 100-sq. ft. or 100 linear feet or 35 cubic feet of asbestos-containing construction materials.

C. Demolition of non-ACM obstructing known intact ACM:

1. Remove non-contaminated and non-asbestos materials for access using standard dust control procedures as required for painted assemblies and construction housekeeping controls.
2. Minimize disturbances to substrates concealing friable or damaged asbestos-containing materials, such as laid-in ceiling tiles concealing asbestos-containing fireproofing, demolition of non-ACM partitions which may destabilize sprayed-on asbestos-containing acoustical finishes, etc. Qualified workers shall conduct work impacting asbestos-containing materials

D. Unexpected exposure to known or suspect Asbestos-Containing Material (ACM):

1. Where ACMs are discovered intact, such as intact pipe lagging, proceed to cordon off the affected area and immediately post it with a "caution" sign to prevent unintentional disturbances. Immediately alert the Contractor's Site Safety Representative of the conditions for proper removal and disposal procedures.
2. Where ACMs are damaged or suspect asbestos contaminated conditions are encountered, discontinue work in the immediate suspected area, shutdown the area's HVAC system, if not already disengaged, and alert the Contractor's Site Safety Representative of the conditions for proper removal and disposal procedures.

E. Unexpected release of asbestos into the environment:

1. Cordon off the immediate area (10 to 20 ft. radius minimum), and shutdown the area's HVAC system (if applicable).
2. Notify the Client, the City Representative, and the Environmental Health and Safety Department immediately.
3. Notify the Contractor's Site Safety Representative for proper removal and disposal using wet methods and HEPA-filtered vacuums. Clean-up work shall be completed under the directions of a Competent Person with 16-hour minimum EPA Operations and Maintenance asbestos training and by workers with 2-hours asbestos awareness training minimum unless exposures exceed the permissible exposure limit (PEL) of 0.1 fibers/cc.

4. Decontaminate or dispose of friable waste in double 6-mil thick goose necked labeled waste bags for manifesting and disposal.

F. Work area set up and protection:

1. Pre-Cleaning

- a. Work Areas: Pre-clean surfaces in workspace. If the space has any contamination in the opinion of the City, then the Contractor shall install air locks and negative pressure system prior to pre-cleaning.
- b. Fixed Objects: Pre-clean all fixed objects within the proposed work areas using HEPA filtered vacuum equipment and/or wet cleaning methods, as appropriate. Enclose with a layer of 6-mil polyethylene sheeting sealed with tape unless specified otherwise.
- c. Ductwork: Pre-clean and wrap all active and inactive ductwork within the zone with a minimum of two layers of 6-mil polyethylene sheeting sealed with tape, unless otherwise directed by the City Representative.
- d. Removable Objects: Pre-clean removable objects within the proposed work areas exposed to friable ACM or debris using HEPA filtered vacuum equipment and/or wet cleaning methods, as appropriate. Properly remove and dispose of objects from work area before abatement operations commence
- e. Work area surfaces or items scheduled to remain covered with polyethylene sheeting during the clearance air sampling shall be inspected and approved by the City Representative upon completion of pre-cleaning before critical barriers are erected or any other removal procedures are initiated.
- f. The Contractor shall inspect all of its equipment and shower pans that it brings to the work site before and after its use and ensure that such equipment is not contaminated.

2. Critical Barriers

- a. Seal off all openings, including but not limited to corridors, doorways, ducts, grilles, diffusers, pipe chases, drains, grates, and any other penetrations of the work areas, with 6-mil polyethylene sheeting sealed with tape. Use caulking where necessary to ensure a complete seal.
- b. Except for emergency exits, doorways, which will not be used for passage during work, must be sealed by first applying tape over the gap between the closed door and the doorframe and the gap between the bottom of the door and the floor. Then apply 6-mil polyethylene sheeting over the door and seal it with tape to the wall and to the floor.
- c. Seal windows by applying two layers of 6-mil polyethylene sheeting sealed independently to the wall with tape.
- d. HVAC registers and returns shall be sealed with metal or rigid plastic covered by polyethylene sheeting. Polyethylene sheeting is not an acceptable alternative.
- e. At any time during the abatement activities after barriers have been erected, if visible suspect dust is observed outside of the work area or if the barriers are damaged, work in the abatement area shall immediately stop. Repair the barriers, and clean-up debris/residue using appropriate HEPA vacuuming and wet cleaning procedures before work recommences.

3. Regulated Work Area Isolation and Controls

- a. Establish a pressure differential of -0.025 inches w.g. with manometer reading records. Submit manometer readings daily or upon request.

- b. Conduct DOP testing of the HEPA-filtered negative pressure units and vacuum cleaners on site.
 - c. Install a transparent view port per work area for inspections.
 - d. Notify the City Representative for changes in work practices immediately to allow the facility's Health and Safety Officer the opportunity to notify and prepare the surrounding employees, as the new procedures may impact the surrounding areas (due to noise, vibration, etc.).
 - e. Use a calibrated manometer to monitor the negative pressure, and provide the manometer print out to the City's oversight Consultant at the end of the work shift.
4. For projects on City and County of San Francisco Department of Public Health (SFDPH) sites' public and occupied areas, the following additional regulated work area isolation and controls shall be implemented:
- a. Install a secondary perimeter with a 'Caution Construction' sign or equivalent. The asbestos sign is to be posted between the secondary construction perimeter and the actual regulated asbestos work area.
 - b. Establish a pressure differential of -0.04 inches w.g. with manometer reading records. The negative pressure containment shall have been setup for 24 hours demonstrating uninterrupted negative pressurization of -0.04 inches w.g. or better. Submit manometer readings daily or upon request. Conduct DOP testing of the HEPA filtered negative pressure units on site.
 - c. Install a transparent view port per work area for inspections.
 - d. Notify the City Representative for changes in work practices immediately to allow the facility's Health and Safety Officer the opportunity to notify and prepare the surrounding employees, as the new procedures may impact the surrounding areas.
 - e. Work shall be scheduled with more than 72 hours' notice to the area's users
5. Full Isolation Work Areas - Sequence of Major Events
- a. This subsection outlines the sequence of events only. Modify the sequence as required if the work area is considered contaminated or if demolishing ACM or non-asbestos materials is required for access to the required abatement materials. Refer to other applicable sections of this specification for detailed requirements.
 - b. Cordon off the area with appropriate signs.
 - c. Deactivate HVAC system, unless otherwise noted or directed.
 - d. Protect or remove carpeting, if present, as appropriate. Contaminated carpeting will require decontamination by steam cleaning or disposal, as directed by the City
 - e. Pre-clean work area, as necessary.
 - f. Establish temporary power and lighting.
 - g. Construct critical barriers.
 - h. Construct decontamination enclosure systems. All work areas shall contain a worker decontamination enclosure system and an equipment decontamination enclosure system, unless otherwise noted or directed.
 - i. Erect 6-mil polyethylene sheeting on the walls, windows, ceiling and floor, as applicable.
 - j. Establish negative pressure within the work area.

- k. Request and facilitate a second work area preparation inspection from the City's Representative following demolition and preparation of the final critical barriers, where applicable.
- l. Remove ACM employing wet cleaning methods, HEPA vacuuming and proper work practices.
- m. Clean-up work area.
- n. Dispose of asbestos-containing waste.
- o. Work area final clean up

3.4 HAZARDOUS MATERIALS REMOVAL PROCEDURES FOR CONTROLLED RENOVATION

- A. Controlled Renovation Procedures for Installation of Anchors and Minor Disturbances to Asbestos-Containing Material under one hundred square feet (<100 SF) or under one hundred linear feet (<100 LF), except thermal system insulation (TSI) or surfacing materials (including but not limited to vinyl floor tiles, carpet or tile mastics, transite board, sheetrock wallboard, ceiling tile mastics):
 - 1. Minor work affecting non-friable materials, such as drilling molly anchors into wallboard or seismically bracing equipment through asbestos-containing may be completed by trained construction workers or maintenance personnel following procedures under the General Industry Asbestos Standards, 8 CCR 5208. All Operations and Maintenance procedures and personnel training records must be pre-approved by the City Representative, or the Environmental Consultant prior to commencement of activities.
 - 2. Demarcate the area of exposure to minimize traffic within the area and to protect persons outside the area from airborne asbestos exposures, even if a negative exposure assessment has been produced.
 - 3. Assemble equipment and supplies, including but not limited to a Hudson sprayer, an HEPA- filtered vacuum, polyethylene drop cloths and wetted sponges.
 - 4. Install a drop cloth below the area to be disturbed on the floor and other surfaces and shoot or drill the anchor through the wetted sponge or cut the material through a wetted sponge, as applicable. HEPA vacuum the area following all work and place the sponge and debris into a sealed plastic disposal bag. Do not use these procedures on asbestos-containing thermal system insulation (TSI) or asbestos-containing surfacing materials, such as asbestos fireproofing or acoustical sprayed-on plaster finishes.
 - 5. Immediately clean up all debris dislodged from coring or drilling through asbestos and trace asbestos substrates using a wetted sponge and HEPA vacuum. HEPA vacuum the area immediately following completion of the controlled renovation procedures. Dispose of the debris as non-friable asbestos waste. Contamination of the site by use of improper procedures will require extensive clean-up and clearance air sampling by the City, at the Contractor's expense.
 - 6. The following materials are classified as not "surfacing" materials for controlled renovation purposes involving anchoring or minor disturbances
 - a. Vinyl Floor Tiles: Cordon off the room or area and remove the floor tiles before drilling through the concrete or wooden substrate. Vinyl floor tiles can be removed using heat or manual means such as hand scrappers. Where tiles cannot be removed in advance of coring, saturate the tile with shave cream and core through the tiles, frequently wiping up all chips and debris and disposing as Category 1 non-friable waste. Wet wipe with a clean sponge and HEPA vacuums the area upon completion of work. Seal

- off the area below the core capture any debris that can fall into the ceiling plenum or crawl space below.
- b. Carpet Mastics: Cordon off the room or area and cutout the carpeting and mastics using a carpet knife, saturating the carpet with water to prevent airborne asbestos fiber releases. Remove excess mastics using a mastic remover with a flash point greater than 140 deg. F., as approved by the City. Dispose of the carpet segment and mastics as Category 1 non-friable waste. Wet wipe and HEPA vacuum the area following completion of the controlled renovation procedures.
 - c. Vinyl Floor Tile Mastics: Cordon off the room or area and remove the mastics using a mastic remover with a flash point greater than one hundred and forty degrees Fahrenheit (>140 deg. F.), as approved by City. Dispose of the mastic and rags as Category 1 non-friable waste. Wet wipe and HEPA vacuum the area following completion of the controlled renovation procedures.
 - d. Transite Board and Mastics: Cordon off the room or area and remove the board intact, where feasible, following installation of drop cloths below. If removal is not feasible, drill through the board using the shaving cream methods described
 - e. Sheetrock Wall or Ceiling Board: Shoot or drill anchors through a wetted sponge, where feasible, or use a Hilti-brand rotohammer drill equipped with a spring-loaded local exhaust hood connected to a HEPA-filtered vacuum cleaner. Cordon off the room or area and cut holes for receptacles or other devices using drop cloths on the ground and wet methods. Remove the sheetrock avoiding the joint compounds, where feasible. Continually wet the controlled renovation area during the process and wet wipe and HEPA vacuum the area following completion of the controlled renovation procedures.
 - f. Thin-Layered Asbestos-Containing Paints: Shoot or drill anchors through a wetted sponge or use a Hilti-brand rotohammer drill equipped with a spring-loaded local exhaust hood connected to a HEPA-filtered vacuum cleaner, where feasible. Cordon off the room or area and core using drop cloths on the ground and wet methods. Continually wet the controlled renovation area during the process and wet wipe and HEPA vacuum the area following completion of the controlled renovation procedures. Dispose of the paints as Category 1 or 2 non-friable wastes as determined by the substrate's composition.
 - g. Linoleum Backing: Cordon off the room and work area and cutout the linoleum, using a carpet knife prior to coring. Wet the backing using water and shave cream and remove the asbestos containing backing intact. Dispose of debris as friable asbestos waste. Wet wipe and HEPA vacuum the area of the controlled renovations for final clearance. Do not allow linoleum on cores to fall into the ceiling plenum or the space below, as applicable.
7. Other Non-Friable Materials: Complete controlled renovation procedures in compliance with Cal/OSHA's Work Class 2 procedures per 8 CCR 1529.
 8. A Cal/OSHA & DOSH registered, and licensed Asbestos Abatement Contractor shall complete work equal or greater than one hundred square feet (100 SF) or one hundred linear feet (100 LF) or asbestos-containing construction materials or other work as required in the Abatement Work Plan.
- B. Controlled procedures for installation of anchors or coring through friable asbestos materials, including but not limited to sprayed-on or troweled-on acoustical plasters, structural fireproofing, and linoleum backing (as applicable):
1. Avoid contact with friable ACM where practical. Anchor to non-ACM materials where feasible.

2. Install drop cloths on the ground and use a glovebag or mini-containment constructed of 6-mil polyethylene sheeting to contain work affecting friable materials.
3. Wet the ACM with water and remove limited material as required for installations. Immediately clean up all debris and seal the waste in a double 6-mil disposal bag for disposal as asbestos waste.

C. Core drilling through ACM:

1. Assemble equipment and supplies, including but not limited to Hudson sprayers, nylon brushes, HEPA vacuums, labeled polyethylene disposal bags, approved encapsulant, duct tape, 5-in-1 tools, plastic buckets, etc.
2. Coordinate exact location of the core hole, marking the location on the underside of the structure. Spray material to be disturbed with an approved penetrating encapsulant, restricted to the area of removal and disturbance only.
3. Remove asbestos-containing materials following set-up of the isolation area under full isolation procedures or glove bag removal procedures.
4. Cordon off the area with appropriate signs and deactivate the HVAC systems, as appropriate.
5. Isolate the area with a mini-containment and decontamination assembly, and pre-clean and wrap fixed items and surfaces, as appropriate. Establish a mini-containment and decontamination assembly in the floor below.
6. Establish negative pressure within the mini containment.
7. Begin coring from the floor above, protecting against water seepage or spraying near active electrical or telephone equipment. After coring is complete, double bag, and encapsulate the raw edges of the cored hole with an approved penetrating encapsulant.
8. Clean up any residual debris and insert a non-conductive sleeve into the hole, extending 6-inches minimum below the asbestos coating. Properly secure the sleeve and seal the openings around the circumference with a fire-rated caulking or seal.
9. Dispose of ACM waste and proceed with the final work area clean up and inspection.

D. Hanger installation:

1. Assemble equipment and supplies, including but not limited to Hudson sprayers, nylon brushes, HEPA vacuums, labeled polyethylene disposal bags, approved encapsulant, duct tape, 5-in-1 tools, plastic buckets, etc.
2. Lightly wet the material with an approved penetrating encapsulant, using a 5-gallon bucket lined with a plastic bag as a catch basket during the installation of the hanger or anchor. Cut an appropriately sized hole in the bottom of the bucket for the anchor grip to reach through. Place the plastic bag in the bucket, and with one hand, push the bottom of the anchor through the hole in the bucket sandwiching the plastic bag between the anchor and the gun grip. Locate the anchor location and push the bucket tight against the material before setting the anchor. Carefully lower the bucket and the gun and dispose of the waste gathered in the bag and any loosened materials.
3. As an alternative to the above procedures, lightly wet the material with an approved encapsulant, placing a 3" x 5" sponge dampened with encapsulant against the material.

Shoot the anchor or drill through the sponge so that any localized loosened material is trapped between the sponge and substrate. Leave the sponge in place, removing any signs of loose or dislodged debris. Re-spray any loosened materials with an approved encapsulant, restricted to the area of the disturbance

4. Clean-up the immediate area using wet methods and a HEPA vacuum. Dispose of friable plasters, linoleum backing, fire proofing and thermal system insulation as friable asbestos waste.

E. Coring on Fireproofing and Textured Acoustical Plasters:

1. Cordon off the area and set-up negative pressurization of the controlled renovation activity using glovebag or mini-containment methods. Do not drill or core openly through friable ACM. A Certified Asbestos Worker only under Cal/OSHA Work Class I or III procedures, as applicable shall complete such work. Wet the materials throughout the controlled renovations. Do not allow ACM on cores to fall into the ceiling plenum or Crawl Space below. Following the controlled renovation activities, clean up the mini containment using wet methods and a HEPA vacuum. Gooseneck and dispose of the glovebags, where applicable, within a double waste bag.

F. Work within crawl spaces, confined spaces, or plenums with Thermal System Insulation (TSI): Control Renovation Procedures for Friable Asbestos Materials:

1. Core or anchor through adjoining non-ACM materials, where feasible. If not feasible, cordon off the area and set-up negative pressurization of the controlled renovation activity using glovebag or mini-containment methods per 8 CCR 1529.
2. Do not drill or core openly through friable ACM. Wet the materials throughout the controlled renovations. Do not allow ACM on cores to fall into the ceiling plenum or Crawl Space below. Following the controlled renovation activities, clean-up the mini containment using wet methods and a HEPA vacuum. Gooseneck and dispose of the glovebags and waste in double goose necked bags as friable asbestos waste.
3. Adhere to all the requirements for confined spaces as follows:
 - a. It is the responsibility of the Contractor to provide all equipment and assistance to make the confined space safe for entry by the Contractor's employees, the City Representative, and its representatives in accordance with the California Code of Regulations, Title 8, General Industry Safety Orders entitled "Confined Spaces."
 - b. If any activities associated with confined space entry become necessary, the Contractor shall be required to consult the City for guidance and prepare an appropriate Permit-Required Confined Space Entry Plan.

G. Asbestos-Containing Sheetrock and Joint Compound:

1. Lightly spray the material to be disturbed by spot removal, drilling, etc., with an approved penetrating encapsulant, restricted to the area of disturbance only. For anchoring into ACM, locate the attachment location and push an encapsulant-wetted sponge between the stud or joist and the existing sheetrock before setting the anchor. Carefully shoot the anchor or drill through the stud or joist and sponge, and HEPA-vacuum any loosened materials or debris. For small-scale removals, penetrate the material with care, using a sharp utility knife or other appropriate tools, removing the encapsulated section and catching it directly into a lined bucket or waste disposal bag, where feasible, disposing of as asbestos waste. HEPA-vacuum the edges of the remaining materials and re-encapsulate the friable edges of the remaining sheetrock with penetrating encapsulant. Do not disturb materials beyond the limited scope of work.

3.5 HAZARDOUS MATERIALS REMOVAL PROCEDURES

A. Asbestos-Containing Thermal System Insulation (TSI)

1. Set-up a full isolation containment or a secondary containment for all glovebags abatement areas. Install critical barriers with two layers of polyethylene sheeting on the floors and on the walls. Set up a full decontamination system with shower for quantities greater than 25 LF, unless otherwise directed by the contract documents.
2. Areas with evidence of damaged TSI will require HEPA-vacuuming of the access to this debris as well as vacuuming of all piping, ductwork and substrate materials within a minimum five (5) ft. radius of all such contamination.
3. Use wet methods and HEPA vacuums. The removal of TSI shall be sufficient to accommodate access by applicable trades within the plenum, wall cavity or crawl space zone for routing of conduit, cables, etc. Coordinate with abatement of other applicable materials.
4. Pipe Insulation Removal: Cut and separate metal bands, where appropriate. Locate the section length (typically three feet) and cut around the circumference at the end of the attached section. Twist the section to ensure it is free from the pipe. Using an airless sprayer, saturate the exterior of the covering with amended water to limit fiber release. Locate the upper and lower half seam and position one seam at the top of the pipe. After positioning, cut along the length of the section and carefully open each half. Immediately saturate the exposed inner surface thoroughly with amended water. Lower both halves into 6-mil polyethylene disposal bags. Do not place or allow insulation to fall on the floor. Pick-up debris falling on the floor and place it in disposal bags immediately. Clean to remove all debris remaining on the pipe.
5. Fitting Insulation: Saturate fitting insulation with amended water. Remove fitting insulation using scraping tools, hand pressure and brushing. Immediately saturate the exposed inner surface thoroughly with amended water. Do not remove insulation by striking or chipping the surfaces. Deposit fitting insulation directly into 6-mil disposal bags. Do not place or allow insulation to fall on the floor. Pick-up debris falling on the floor and place it in disposal bags immediately. Clean to remove all debris left on fitting.
6. At a minimum, use glove bags procedures as per Cal/OSHA Regulation 8 CCR 1529, Asbestos Activity Class/Category - Work Class I when removing Asbestos – Containing Thermal System Insulation (TSI) materials.
7. Disassemble the pipping tanks and mechanical component on the boiler and heater systems using wet methods. Saturate the packing ACM before removing the bricks, pipes, and other ACM insulated (tar paint, canvas, materials).
8. Dispose of TSI and packing material in double goose necked-labeled bags or double wrap cutout sections in 6-mil polyethylene sheeting and properly labeled as friable asbestos waste.

B. Friable Insulation, Fireproofing, Acoustical Plaster, and, Laid-in; Splined or Glued-on Acoustical Tiles

1. Mist asbestos material with amended water, using airless sprayers, or spray equipment recommended by the surfactant manufacturer and capable of providing a "mist" application to reduce the release of fibers. Saturate the material sufficiently to wet it to the substrate without causing excessive dripping or de-lamination of the material. Mist the asbestos

material continuously during work process to maintain damp conditions and to minimize asbestos fiber dispersion, but without accumulating water on the floor.

2. Remove ACM and overspray from all surfaces, including but not limited to structural steel, deck, walls, ceilings, ducts, insulation, piping, conduit, junction boxes, cables, etc.
3. Remove the saturated ACM in small sections. As it is removed, place the material in sealable plastic bags. Do not allow materials to dry out prior to insertion into the bags. Do not permit materials to accumulate on floors and other surfaces in the work area.
4. After removing the ACM, wet and wipe all surfaces, or use a soft-bristle brush to remove all residual accumulated material. Clean all surfaces with special emphasis on the top edge of the Spray-Poly or polyethylene covers.

C. Asbestos Floor Coverings

1. Mastic removal solvents, procedures, and equipment information submittals must be approved prior to floor coverings removal.
2. In flooring areas where a solvent-based mastic remover is to be applied, the Contractor shall use a low odor mastic remover. The Contractor shall submit the Safety Data Sheets (SDS) of the mastic remover it intends to use, for the review and approval of the oversight Consultant. After the application of a solvent-based mastic remover, the Contractor shall rinse the flooring areas by wet-mopping, applying "simple green cleaner" or equivalent, scrubbing floors, and finalize the clean up by re-mopping with clean water. The Contractor shall provide adequate ventilation to exhaust out the odors from the solvent-based mastic remover. The Contractor shall ensure that no odors from the solvent-based mastic remover remain.
3. Vinyl floor tiles adhering to old non-ACM linoleum or tiles may require removal of the sub flooring intact to remove the overlying asbestos-containing mastic residues. For Demolition Projects: Remove leveling compounds under VAT and non-VAT removal areas as asbestos containing unless otherwise noted
4. Use an approved mastic removal solvent following the manufacturer's recommended procedures. Wipe residual material and dispose of waste and rags in a proper manner.
5. Where removing the mastic is feasible without the use of solvents, use water with liquid dishwashing detergent (1 ounce of detergent to 1 gallon of water), and scrub surfaces as required to remove residual material, scraping the wetted surface with a stiff-bladed wall or floor scraper. Wipe residual material and dispose of rags as ACM waste. Wet vacuum standing water with a HEPA vacuum.
6. Use of an approved portable shot abrasive "bead blaster" system that strips, cleans, and etches the floor, shall follow the manufacturer's recommended procedures. This method can dislodge sprayed-on fireproofing and/or sprayed-on acoustical plasters on the floor below due to excessive vibrations, where applicable. Therefore, adhesion and cohesion testing of these materials shall be conducted prior to the bead blaster's use. Usage of this system will require a variance from Cal/OSHA and the local Air Quality Management District as a "dry removal" method and approval of the City Representative.
7. Use of a buffer for mastic removal will require wet buffing only. Using a buffer will render the mastic onto a friable state. The Contractor shall conduct mastic removal using a buffer following the BAAQMD Regulation 11, rule 2. Buffer brushes shall be disposed of after each use as asbestos waste. Thoroughly remove all mastic residues from the buffer before removal from the work area.

D. Vinyl Floor Tiles and Mastics:

1. Remove the flooring and mastics as indicated on the Contract Drawings using full isolation procedures, satisfying the requirements of Cal/OSHA Regulation 8 CCR 1529, Work Class II.
2. Set-up critical barriers and splash guards and establish negative pressurization.
3. Remove the tiles using wet methods to minimize breakage and airborne fiber releases.
4. Remove the mastic using an approved mastic remover.
5. HEPA vacuum the contained area following abatement for clearance.
6. Provide a full decontamination system with shower for areas exceeding 25 SF.
7. Dispose of tiles and mastic as Category 1 wastes.

E. Linoleum Flooring and Mastic:

1. Remove the flooring and mastics as indicated on the Contract Drawings using full isolation procedures, satisfying the requirements of Cal/OSHA Regulation 8 CCR 1529, Work Class II and BAAQMD Regulation 11, Rule 2.
2. Set-up critical barriers and splash guards and establish negative pressurization.
3. Remove the linoleum backing using wet methods to minimize breakage and airborne fiber releases.
4. Remove the mastic using an approved mastic remover.
5. HEPA vacuum the contained area following abatement for clearance; minimize use of encapsulant on substrates to be retiled.
6. Provide a full decontamination system with shower for areas exceeding twenty-five square feet (>25 SF).
7. Dispose of linoleum backing and mastics as friable asbestos waste.

F. Electrical/Wiring Insulation:

1. Remove wiring by cutout of the conduit in manageable sections, where possible. Otherwise, pull the wire through the conduit with a properly sized sponge wetted with encapsulant tied to the distal end, misting the insulation continually and HEPA vacuuming any residual debris. Avoid unnecessary cutting or peeling.
2. Clean up the area and dispose of the asbestos-containing waste. Wire bundles may be wrapped in burlap or cardboard, prior to bagging, to protect against penetrating the disposal wrapping.

G. Removal of Tar coated Electrical Wrap

1. After confirming that the systems have been de-energized, including the proper deployment of Log out/Tag out procedure, remove materials using full isolation or mini-containment procedures, satisfying the requirements of Cal/OSHA 8 CCR 1529 Work

Class 2 procedures. Use wet methods for dust controls. Dispose of materials as non-friable asbestos waste.

H. ACM Paint of Ceiling Plasters

1. Remove materials using full isolation or mini-containment procedures, satisfying the requirements of Cal/OSHA 8 CCR 1529 Work Class 2 procedures. Use wet methods for dust controls. Dispose of materials as non-friable asbestos waste. Remove substrates as required to access materials and overspray.
2. Removal of larger ceiling segments, particularly demolition of elements that may impact paint finishes (see Demolition Plans), shall be completed under full isolation or mini-/mobile containment procedures by a licensed Abatement Contractor. The Asbestos Contractor using glovebag and mobile mini-containment methods or full isolation methods, depending on the quantities impacted, shall complete coring greater than two (2) inch diameter, which cannot be properly controlled using a wetted sponge.
3. If a mobile containment is used, clean-up and reseal the phone booth-type containment and airlock entry between uses.

I. Window and Door Glazing Compounds

1. Remove windows and doors following abatement of other interior finishes and materials and wrap in a double layer of polyethylene sheeting, where feasible.
2. Where complete removal and disposal of the frames is not feasible, scrape the glazing compound following installation of polyethylene drop cloths under each window or door.
3. Scrape residual compounds from wood or metal frames, as applicable. Double bag and dispose of materials as Category I non-friable waste unless otherwise directed by the City.

J. Exterior/Perimeter Windows and Door Caulking

1. Cordon off the work area, installing critical barriers at the windows, doors, and other penetrations, as applicable.
2. Remove ACM using wet methods per Cal/OSHA Regulation 8 CCR 1529, Work Class II.
3. Set-up drop cloths on the ground and nearby objects to contain falling materials on the ground or public access areas surrounding the work area.
4. HEPA vacuum the sills and frames following abatement.
5. Provide a full decontamination system with shower for areas exceeding 100 sf.
6. Remove residual caulking from perimeter stucco, wood, metal, window and doorframes and concrete finishes, as applicable. Double bag and dispose of materials as Category I non-friable waste.

K. Roofing Material:

1. Seal any air intakes, operable windows, and skylights within 50 feet of the work area with 6-mil polyethylene sheeting secured in place over the opening. Weather conditions should be dry and wind conditions less than 10 mph with dry. Establish a secured waste storage area where sealed bags of roofing material are stored during removal. Provide such areas

for each different roof elevation or section. Line the storage areas with a layer of 6-mil polyethylene sheeting.

2. Employees and authorized visitors at the work site during on-going work shall wear approved respirators and full body disposable protective clothing as described in "Personnel Protection" and are required to fully shower out when exiting the abatement zone.
3. Set-up drop cloths on the ground under roofing removal area and abate the roofing materials using wet methods. Seal rooftop vents, windows, etc. with one layer of 6-mil polyethylene sheeting as a critical barrier. Bag or wrap waste in 2 layers of 6-mil polyethylene sheeting and lower to ground. Debris chutes must be sealed and negatively pressurized, if used.
4. Comply with the following Cal/OSHA requirements:
 - a. Adequate wet ACM per 8 CCR 1529 Para. (g)(B)(2).
 - b. Provide continuous misting of cutting machines per 8 CCR 1529 Para. (g)(B)(3).
 - c. Use HEPA vacuums or dust collectors during power cutting per 8 CCR 1529 Para. (g)(B)(4).
 - d. Do not throw ACM roofing off the roof per 8 CCR 1529 Para. (g)(B)(5).
5. For Disposal & Cleanup: HEPA vacuum the surrounding area following the abatement for final clearance. Dispose of all roofing debris as Category 1 non-friable asbestos waste.
6. Allow for a 20 ft. minimum buffer zone between the roof removal activities and other demolition or renovation work. Dampen the roof surface with a fine spray of amended water before proceeding with removal. Keep roofing material damp throughout the removal process.
7. Double bag roofing material in 6-mil labeled disposal bags and dispose of by methods described herein. Do not drop bags from the roof to the dumpster; transport bags without risk of their integrity utilizing the stairs or a lined waste chute. Where a lined waste chute is used, contain the opening to the dumpster with polyethylene sheeting and install a HEPA-filtration device to scrub the dumpster containment in the event of a bag rupture. Clean and seal the chutes overnight, as applicable.
8. HEPA vacuum and/or wet wipe the entire work site including adjacent roof area and removed areas following the roofing's abatement. The area may be sprayed with a light coat of encapsulant to lockdown all remaining asbestos fibers, except the skylights, as applicable.
9. Provide a full decontamination system with shower for areas exceeding one hundred square feet (100 SF).
10. Non-friable asbestos roofing material is considered non-hazardous and can be disposed of as non-hazardous asbestos waste. This can be transported and disposed of at a landfill-accepting Category I, non-friable ACM.

L. Window Glazing Putty

1. Set up the lead hazard control regulated areas. Ensure that drop cloths extend sufficiently, about ten (10) ft. minimum, in all directions.

2. Remove the windows intact to avoid disturbance to the window glazing putties. Burrito-wrap and dispose of windows as Category 1 non-friable waste. Where full removal intact is not feasible, close and seal windows and scrape putty utilizing drop cloths and wet methods. HEPA-vacuum the sills and surrounding area and use drop cloths, before final visual clearances.

M. Window and Door Glazing Compounds

1. Remove windows and doors following abatement of other interior finishes and materials and wrap in a double layer of polyethylene sheeting, where feasible.
2. Where complete removal and disposal of the frames is not feasible, scrape the glazing compound following installation of polyethylene drop cloths under each window or door.
3. Scrape residual compounds from wood or metal frames, as applicable. Double bag and dispose of materials as Category I non-friable waste unless otherwise directed by the City.

N. Fire Rated Doors

1. Remove fire doors with 45-minute or greater fire rating intact, burrito-wrap in two (2) layers of six (6) mil fire-retardant polyethylene sheeting and dispose as friable asbestos waste.

O. Lead – Containing Ceramic Tiles

1. Set up the lead hazard control regulated areas. Seal vents, windows, etc., with one layer of six (6) mil polyethylene sheeting as a critical barrier. Post signs.
2. Remove the ceramic tiles off from the substrate without bashing, cutting, grinding, or pulverizing the glaze, or include the ceramic tiles as part of the substrate demolition, if applicable. Bashing, cutting, grinding, or pulverizing glazed ceramic tiles is known to create significant airborne lead above the PEL.
3. Manually demolish ceramic wall tiles using drop cloths, wet methods, and HEPA vacuums for dust control in compliance with Cal/OSHA regulation 8 CCR 1532.1. Do not use power tools or airline tools to demolish ceramic wall tiles.
4. Avoid dry sweeping. Clean-up all work areas before leaving the site daily.
5. For tiles mounted to concrete, plaster or masonry substrates, isolate the room and establish negative pressurization of the work areas using HEPA-filtered negative pressure units and demolish the tiles using a pneumatic or electric chipper or jackhammer. Continuously mist the work area during chipping activities.
6. Dispose of debris as hazardous waste is waste characterization determines the waste to be hazardous. HEPA vacuum the fine debris and dust residues and dispose as hazardous waste.

P. Lead Sheeting

1. Set up a negatively-pressurized containment for removal of the sheeting. Seal vents, windows, etc., with one layer of six (6) mil polyethylene sheeting as a critical barrier. Post signs.
2. Remove lead sheeting intact by unscrewing panels from substrate. Doors with sandwiched lead sheeting shall be removed by the pins/hardware without disturbance to the sheeting within the core.

3. If unbolting panels cannot be performed, and cutting of sheeting is required, non-powered tool shall be used. Lead sheeting is relatively soft and pliable, manual tearing / cutting can be easily done. Absolutely no torching or welding on the lead sheeting or in the vicinity of the lead sheeting, until after the zone has been tested, cleared and released as a non-lead containment work zone.
4. Use wet methods and HEPA vacuums for dust control in compliance with Cal/OSHA regulation 8 CCR 1532.1. Do not dry sweep any dust or debris generated by removal of panels.
5. Wrap sheeting to prevent it from scratching and leaving score marks on the floor. Lead sheeting waste shall be rolled up and wrapped with 10-mil plastic sheeting, labeled, before taken out of the containment. All scuff marks left by the lead sheeting on any surfaces must be thoroughly scrubbed and cleaned.
6. Characterize and dispose of sheeting and debris as potentially hazardous waste.
7. HEPA vacuum debris daily for all work areas before leaving the site.
8. Triple wash all surfaces inside the containment prior to final lead wipe sampling by the Environmental Consultant.

Q. Painted Plaster Ceiling/Wall/Column Lead Paint Removal:

1. Provide ladders, scaffolding, etc., to access and remove paint and or paint/substrate from all surfaces, as applicable. Ceilings are to be scraped first in each area.
2. Remove materials at applicable locations. Wet wipe, as required. Lightly dampen the work surface and mist the surrounding area continuously throughout the scraping process.
3. Scrape and nylon brush decorative or rough ceiling surfaces or trusses, as applicable, to remove the paint and or paint/substrate. Then, HEPA vacuum these surfaces.
4. After scraping, HEPA vacuum all surfaces to remove any remaining dust.

R. Exterior Paint Removal:

1. Place drop cloths on the ground surrounding surfaces to catch any debris from scraping lead-based coatings, as applicable.
2. Erect temporary protective covers over pedestrian walkways and at points of passage for persons or vehicles, which may remain operational during the course of the paint removal.
3. Protect glass, metal trim and attachments, polished stone, or other sensitive materials and finishes from contact with chemical paint removers by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape. Apply masking agent to comply with the manufacturer's recommendations. Do not apply liquid masking agent to painted or porous surfaces, or masonry, as applicable.

S. Steel/Metal/Piping Spot Removal

1. Remove paints on steel components scheduled for welding or torching using a chemical stripper, needle gun or other approved methods as outlined in the approved Contractor's Hazardous Materials Management Plan (HMMP).

2. Use drop cloths, polyethylene barriers, Hudson and airless sprayers and other methods as required for dust control.
3. Characterize and dispose of paints, rags, etc., separately for possible disposal as a hazardous waste.

T. Removal of Surface Coatings with Power Tools:

1. Where mechanical removal of surface coatings constitutes a Level II activity, provide power tools, to the extent feasible, with local HEPA exhaust or dust collector systems to capture the aerosolized lead.
 - a. Removal with power blasting tools: For steel coated structures and as approved by the City Representative, power blasting tools may be used for removal of the lead-based paint or hazardous coating materials. To the extent a containment construction will be required to emissions. As part of the HMMP a detailed work plan including an enclosure system with dust collection systems and exhaust ventilation as needed shall be submitted and approved by the City Representative prior to using this method.
 - b. Removal with Power Washing: For industrial facilities or where otherwise approved by the City, power washing may be used for removal of the lead-based paint or contamination. Use of this method requires construction of containment, water collection system, a filtering system, and proper disposal of the wastewater. Adequately protect adjoining sensitive materials and equipment from damage or inclusion within the lead abatement waste. Deactivate electrical systems or adequately protect them prior to the power washing. A detailed work plan including an enclosure system shall be submitted and approved by the City Representative prior to conduct such activities.
 - c. Removal with Sodium Bicarbonate Blasting: For areas requiring complete removal of all coating residues, use of sodium bicarbonate blasting may be used to supplement scraping or chemical stripping. Use of this method requires construction of containment and filtering system to segregate activities and waste from active work areas. Adequately protect adjoining sensitive materials and equipment from damage or inclusion within the lead abatement waste. Deactivate electrical systems or adequately protect them prior to the water and sodium bicarbonate blasting. A detailed work plan including enclosure shall be submitted and approved by the City Representative prior to such activities.

U. Removal of lead containing jacketed telephone cable:

1. Removal, handling and disposal of lead jacketed telephone cables that may be encountered during demolition activities shall be conducted in accordance with the Cal/OSHA's Construction Lead Standards 8 CCR 1532.1 and CDPH Regulation 17 CCR Section 3500 through 36100. This includes, isolation controls, personal protective procedures and dust controls
2. Prevent dust generated from trimming, cutting and otherwise manhandling lead sheathed telephone cables, dust from deconstructing and hauling off outmoded equipment and dust from soldier waste deposited on floors.
3. Isolate and remove in its entirety each cable designated for removal. Use appropriate equipment and work practices to prevent lead releases. If at all feasible remove the cables using hand electrical shear tools with local HEPA exhaust or dust collector systems to capture the aerosolized lead. To further minimize lead dust during the cutting, apply isolation materials such as foam or "Vaseline" in the entire area of the cutting.

4. Segregate, containerize, and characterize the electrical cables for waste disposal

V. Transite Wall and Ceiling Board:

1. Remove transite board using wet cleaning methods and HEPA vacuuming. Avoid unnecessary sawing and breakage. Take out as whole sheets, if possible. Remove debris remaining at the nails, screws, or other attachments to the studs and joists. Scrape residue remaining on studs or joists flush with the surface of these materials, if these materials are not scheduled for demolition. Continually mist the air with an airless sprayer or Hudson sprayer to lockdown suspended particulate
2. Clean up debris from pipe insulation, fireproofing, acoustical insulation, or other sources (as applicable), which may exist on the topside of the studs or within the wall or ceiling cavity.
3. Clean up the area and dispose of the asbestos-containing waste. Panels may be wrapped in burlap or cardboard, prior to bagging, to protect against penetrating the disposal wrapping.

W. Transite Pipelines, Ducts, Breechings, or Flues:

1. Remove using full isolation procedures satisfying the requirements of Cal/OSHA Regulation 8 CCR 1529, Work Class II.
2. Remove transite materials using wet cleaning methods and HEPA vacuuming. Avoid unnecessary sawing and breakage. Take out as whole lengths, if possible, cutting at the hanger supports and wrapping the separated sections in a double layer of polyethylene sheeting [note that water penetration of this material is usually minimal].

X. Underground transite piping or pipe insulation:

1. Carefully excavate the areas identified for the underground utility or with potential to encounter underground piping. Using wet methods mist the excavated areas, as the pipe gets uncovered. To the extent feasible provide an enclosure for removal as required to control airborne fibers.
2. Using wet methods and HEPA vacuuming techniques, remove pipe intact to the extent feasible. Cutting abrading or breaking the pipe shall be prohibited. Immediately place pipe in polyethylene bag or wrap in polyethylene and label the waste.
3. At the end of each work shift, all removed pipe shall be transferred to a closed receptacle
4. Clean up the regulated area and dispose of the asbestos-containing waste. Duct or flue edges may be wrapped in burlap or cardboard, prior to polyethylene sheeting, to protect against penetrating the disposal wrapping.
5. Dispose of transite as Category 2 non-friable waste, double wrapping intact segments in six (6)-mil polyethylene sheeting.

Y. For Exterior Vapor Barrier or Expansion Joint:

1. Cordon area and set up drop cloths on the ground under the removal area and abate using wet methods. Seal vents, windows, etc. with one layer of six (6) mil polyethylene sheeting as a critical barrier. HEPA-vacuum surrounding area and drop cloths before final visual clearances.

Z. PCBs and Mercury Containing Lamps

1. Disassemble all light fixtures to visually examine the ballasts; ballasts that are not labeled as non-PCB shall be collected and disposed of as PCB-waste. Collect fluorescent tubes for disposal / recycling as mercury containing wastes.
2. Handling and Disposal of Lamps
 - a. Spent fluorescent and other mercury-containing lamps shall be considered a hazardous waste as per the California Department of Health Services.
 - b. Ship lamps to a commercial recycler (e.g., Mercury Technologies) where they are to be crushed and the mercury reclaimed.
 - c. Comply with DOT requirements for manifests, with evidence of proper disposal provided to the City, including a log of shipping dates and quantities.
 - d. Remove mercury fluorescent lights and load into secured cardboard boxes for shipment to prevent unnecessary breakage.
 - e. In the event of lamp breakage, clean-up broken glass and debris immediately, using a HEPA-filtered vacuum for final clean up.

AA. Loose Debris Cleanup:

- a. Construction operations may occasionally disturb loose and peeling paints outside the immediate work area through building vibration or other means. All such loose paint and debris shall be cleaned-up daily using a HEPA-filtration vacuum. Provide adequate protection to offset future disturbances by abating or otherwise sealing affected surfaces.
- b. Clean-up background or construction-related dusts from demolition of lead-coated elements or other contaminant sources using wet methods and HEPA-filtered vacuums.
- c. Do not dry sweep.

BB. Stabilization of Loose & Peeling Paints:

1. Post notices, including CDPH, Cal/OSHA and EPA RR&P notices, as applicable, prior to start of work.
2. Manually scrape and stabilize loose and peeling paints prior to demolition of painted substrates using drop cloths, wet methods, and HEPA vacuums for dust control in compliance with Cal/OSHA regulation 8 CCR 1532.11 and the EPA's RR&P rules. Avoid dry sweeping. Burning of paints, use of heat guns greater than 1,100 deg. F, and use of leaf blowers or compressed air for clean-up are prohibited
3. Use of mechanical equipment, such as sanders, grinders and needle guns without a HEPA-vacuum attached thereto are prohibited for sites with children under the age of 6 as occupants (per EPA's RR&P rules).
4. Work areas shall be cleaned-up of lead hazards daily before leaving the site.

CC. For Mechanical Sanding:

1. Sanding is prohibited without written authorization from the City.
2. If approved, work areas requiring mechanical sanding or stripping of painted surfaces with any lead content shall be fully contained with polyethylene dust barriers, establishing

negative pressure of the zone, and using HEPA-filtered tools and other dust control procedures as outlined under 8 CCR 1532.1.

DD. Prime or Painted Structural Steel Spot Abatement

1. Manually scrape paints and primers at locations of new welded connections as shown on Structural Drawings. Use an approved chemical stripper with "low odor" and scrape using manual, wet methods, drop cloths, visqueen barriers, and HEPA vacuums for dust control in compliance with Cal/OSHA regulation 8 CCR 1532.1, CDPH regulation 17 CCR Section 35001 through 36100 and the EPA's RR&P rules, as applicable.
2. Avoid dry sweeping, burning of paints, use of heat guns greater than 1,100 deg. F, and use of leaf blowers or compressed air for clean-up. Use of mechanical equipment, such as sanders, grinders and needle guns without a HEPA-vacuum attached thereto are prohibited for this site per the EPA RR&P rules. Work areas shall be cleaned-up of lead hazards daily before leaving the site.
3. Note that 8 CCR 1537(c) and SFPUC require stripping of any painting coating for a distance of at least 12-inches from the area of heat application (torching/welding, etc.), or workers shall be required to use supplied air respirators in accordance with 8 CCR 1532.1 or the provisions of 8 CCR 1536(b)(c). Dispose of stripper and contaminated drop cloths as hazardous waste.
4. Ventilate the abatement zone as required by the stripper manufacturer. Workers shall wear combination organic (charcoal) and HEPA filter respirator cartridges, as necessary.
5. Note that despite the quality of abatement, some minor residues may remain on structural elements as well as paints and primers on inaccessible surfaces, which cannot be abated. During the welding phase, the Contractor shall operate "smog hogs" or localized exhaust units in the vicinity of welding work to prevent build-up of airborne lead contaminants within occupied and other construction areas. Localized exhaust units shall exhaust outdoors.
6. For Disposal & Cleanup: Demolish and dispose of intact painted substrates as non-hazardous waste. Characterize and dispose of loose and peeling paint debris, chemical strippers, rags, etc. as potentially hazardous waste. Clean-up drop cloths and HEPA vacuum loose and peeling chips and debris daily for all work areas before leaving the site.

EE. Encapsulation Procedures

1. Upon notice to proceed from the City, apply encapsulant.
2. Prepare and apply encapsulant in accordance with the manufacturer's specification, using airless spraying equipment. Because application by spraying could cause dissemination of residual fibers, encapsulant must be applied with as much caution and at as low a nozzle pressure as possible.
3. Apply encapsulant in 2 coats with a tint to be approved by the City. Apply the first coat as a penetrating encapsulant, allowing it to properly dry. Then apply a second coat of bridging encapsulant.
4. Apply penetrating type encapsulant to provide complete penetration of asbestos fireproofing surfaces exposed during the controlled renovation activities in accordance with manufacturer's recommendation. Apply encapsulant using airless spray equipment.

FF. Daily Cleaning

1. Clean asbestos-containing debris and contaminated water from the work area daily using wet methods and HEPA vacuuming equipment. Place asbestos debris and water in bags, sealed and either stored or removed from the work area.
2. Worker decontamination enclosure system; clean the clean room, shower, and equipment room daily or as required more frequently to maintain acceptable clean room perimeter air sample total fiber counts. Keep the clean room floor dry and free of any waste. Repair and replace the clean room flap whenever damaged or torn.

GG. Bagging, Drumming, and Handling Waste:

1. Protect all workers handling waste in full body protective clothing and at least a respirator approved by NIOSH for protection against asbestos. Workers transporting clean, sealed drums or other clean, sealed waste may handle waste with less protective clothing if approved by the City's or its Environmental Consultant.
2. Do not allow asbestos waste to dry out prior to sealing bags.
3. Seal bags of asbestos-containing waste with tape within the work area. Seal bags with a goose neck fold: first twist bag and seal top opening with tape; fold remaining bag extension over the first tape enclosure and re-tape around top of bag there by double sealing the top opening. No free-flowing water shall be present at any time in the bag. If free-flowing water is present, the Contractor shall add absorbent into the bags to remedy the condition.
4. Wrap and seal waste treated as asbestos contaminated that cannot be contained in bags in 6-mil clear polyethylene plastic or other impermeable material approved by the City. Wrap objects that will tear, cut, or damage the integrity of the plastic in a protective material such as canvas or burlap to reduce the potential for damage to the plastic or other impermeable material
5. Sealing Waste from Glove Bag with Cut-Out: Wrap sections of piping covered with ACM in a minimum of two layers of 6-mil polyethylene sheeting before removal from the work zone.
6. While in the work area, decontaminate bags and/or wrapped objects of any bulk debris by wet wiping. Utilizing the equipment decontamination enclosure system, pass the bags and/or wrapped objects into the washroom where they will be thoroughly decontaminated by wet sponging with amended water. Decontaminated bags will then be passed directly into the holding room where they will immediately be placed in a second clean bag and sealed with tape.
7. Wrap and seal decontaminated objects in a second layer of impermeable material.
8. Deposit bags with friable hazardous waste into clean sealable drums for transport. Seal filled drums. Mark drums with the label prescribed by the EPA, including the Generator I.D. Number or source location and the Waste Manifest Number.
9. Deposit bags into clean sealable dumpster for transport, except non-friable roofing which can be deposited directly into double-lined waste dumpsters for disposal at a landfill accepting Category I, non-friable ACM.
10. The City's Representative must be notified prior to removing materials from the work area and prior to loading waste into dumpsters or other transport containers for removal from the site. At least 24 hours of advance written notification must be given.

END OF SECTION

SECTION 02 81 10

ENVIRONMENTAL MANAGEMENT OF EXCAVATED MATERIALS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. The Contractor is alerted that up to 80% of the surplus soils to be excavated, transported and disposed may be classified as a hazardous waste and/or contaminated material. Work in this Contract will involve working environments that may be hazardous, contaminated, or non-hazardous to activities associated with the excavation, handling, transportation, and disposal of all excavated materials and other wastes in the project area with emphasis to hazardous and contaminated materials.
- B. Serpentine, serpentinite, or other ultramafic rocks and soils containing Naturally Occurring Asbestos (NOA) shall be encountered on this project.
- C. Such hazardous, contaminated, and non-hazardous environments include, and are not limited to hazardous and non-hazardous materials, soils, groundwater, heavy metals, petroleum hydrocarbons, polynuclear aromatic hydrocarbons, organic compounds, serpentine rock and ultramafic material (which may contain natural occurring asbestos - NOA), lead-based paint materials, sewage, sludge, debris, grit, sewer gases, bacterial/biological contamination, rail road ties, oxygen deficiency, and confined spaces.
- D. In the event that hazardous and contaminated material is unexpectedly discovered, the Contractor shall immediately notify the City Representative both verbally and in writing. Upon receipt of such notification, the City, at its sole option, may either (a) perform the remediation work using its own forces or using an outside contractor specializing in remediation work or, (b) direct the Contractor to perform all or any part of the remediation and hazardous materials removal work.
- E. The Contractor shall be responsible for providing its employees with all levels of personal protective equipment (PPE). The Contractor shall be responsible, and the City will not pay any additional compensation to the Contractor for providing its employees with the all levels of training and personnel protective equipment (PPE), including personal air monitoring if required. This includes areas where hazardous and contaminated soils and waste is encountered. For work in this Contract, the Contractor shall have taken into account the productivity losses, if any, due to the use of respirators and personal protective equipment.
- F. The Contractor shall not use the Project site as a storage facility for work its doing at another site.
- G. Lead Hazards: All work that affects any level of lead will at a minimum be performed by the General Contractor or its subcontractors under the Cal/OSHA Lead in Construction Standard 8 CCR 1532.1 as well as all Federal, State, and Local regulations at no additional cost to the City.
- H. Hazardous and non-hazardous waste shall only be disposed at permitted California landfills (22 CCR 66262), equivalent out-of-state landfills (40 CFR 262), permitted recycling facilities, and at other projects as approved by the City.
- I. The Contractor is hereby notified that any screening or crushing operations of excavated materials cannot proceed without the appropriate BAAQMD and Cal-EPA/DTSC permits.

1.2 RELATED SECTIONS

- A. Section 01 35 49 Minimum Environmental Procedures
- B. Section 01 35 50 Additional Environmental Procedures
- C. Section 01 41 00 Regulatory Requirements

1.3 SUBMITTALS

- A. The Contractor shall submit the documents listed below, and have the Plans approved by the City Representative at least 15 calendar days before any soil disturbing activity, and no later than 30 calendar days after the Notice to Proceed.
- B. Pursuant to the provisions of the General Conditions and Section 01 33 00, Submittal Procedures, the Contractor shall submit the following as separate submittals:
 - 1. Name environmental consultant and the accredited environmental laboratory, if used.
 - 2. Pre-Excavation Soil Profiling Sampling Plan draft and final version in accordance with Part 1.4 herein.
 - 3. An Environmental Site Assessment (Phase II) draft and final report in accordance with Part 1.4 herein.
 - 4. Waste Profile Application Package on each waste stream that the Contractor plans for disposing the excavated soil. The Contractor shall prepare and submit waste profile application to each proposed disposal facilities for acceptance. The formal waste profile application will also include, if any, additional information (such as slurry additive applied by the construction contractor as part of the construction) will be included in the formal waste profile application. Only the Generator (City) will sign the profile application.
 - 5. Waste Profile # (s) from the permitted landfills or the permitted disposal & recycling facilities that the Contractor will use.
 - 6. Workers Mandatory Environmental Training Records in accordance with Part 1.7 herein, as requested by the City's Representative.
 - 7. Transporter's current Class 1 Certificate of Compliance from the California Highway Patrol and Hazardous Substance Removal Certification in accordance with Part 1.9 herein, as warranted.
 - 8. Copy of the Non-Hazardous Waste form for and subsequent copies attached to the monthly Soil Disposal Spreadsheet in accordance with Part 1.10 herein.
 - 9. Hazardous Waste Manifest in accordance with Part 1.11 herein, as warranted.
 - 10. The original source of where the import soils are coming from, the name of the laboratory used to analyze the soils, and the date of chemical analysis, and the analytical test results, and frequency of the analytical testing in accordance with Part 3.3 herein.
 - 11. Monthly Import Fill Spreadsheet in accordance with Part 3.3 herein.
 - 12. Cal/OSHA asbestos Competent Person training records as pertaining to requirements specified in the Cal/OSHA standard 8 CCR § 1529, and when Serpentine, serpentinite, or other ultramafic rocks containing Naturally Occurring Asbestos (NOA) is present.

13. Cal/OSHA asbestos worker training records as pertaining to requirements specified in the Cal/OSHA standard 8 CCR § 1529, and when Serpentine, serpentinite, or other ultramafic rocks containing Naturally Occurring Asbestos (NOA) is present.

1.4 PRE-EXCAVATION ENVIRONMENTAL SOIL PROFILING (PHASE II ENVIRONMENTAL SITE ASSESSMENT)

- A. The Contractor may choose an environmental consultant from current list of as needed environmental consultants with master agreements with San Francisco Public Works to perform the pre-excitation soil profiling (Subsurface Investigation Work Plan and Phase II Environmental Site Assessment).
- B. If the Contractor seeks an exemption from the list of environmental consultants listed below, then the Contractor shall submit the name and qualifications of an environmental consultant that has done work in compliance with Article 21 of the City's Health Code (Maher Ordinance) for the City Representative's approval.

NOTE: Environmental Consultants that work on the planning, design phase, and construction of this project are not allowed to work under the Contractor to perform this pre-excitation profiling.

- C. The current list of as needed environmental consultants with master agreements with San Francisco Public Works is alphabetically listed as follows.
 1. AEW Engineering, Inc; telephone: (415) 495-8400
 2. Baseline Environmental Consulting; telephone: (510) 420-8686
 3. Fugro USA Land, Inc; telephone: (916) 773-2600, ext. 128
 4. Ninyo & Moore; telephone: (510) 343-3000, ext.15212
 5. SCA Environmental, Inc; telephone: (415) 867-9540
 6. TRC-Avila JV LLC; telephone: (925) 688-2479
 7. Ward & Associates; telephone: (415) 626-3030
- D. The pre-excitation profiling (Phase II Environmental Site Assessment) shall be done so as to classify the excavated soils for disposal to a permitted landfill or to a reuse facility. The Contractor is responsible for working with the landfill or to a reuse facility to correctly profile the soils to the depth of the excavation, for landfill acceptance, and to ensure a load and go off-hauling during construction, with no further environmental testing. The pre-excitation profiling shall be done at least 40 days prior to excavation work. It is therefore necessary for the Contractor to identify this work in its schedule.
- E. The Contractor shall submit a Pre-Excavation Soil Profiling Sampling Plan for review and approval by both the City's Representative and SF Dept. of Public Health prior to any drilling. The Pre-Excavation Soil Profiling Sampling Plan shall:
 1. Be prepared, signed and stamped by a registered Professional Engineer or Geologist.
 2. Include excavation volumes in cubic yards.
 3. Include a diagram showing sampling locations and depths.
 4. Include sampling analytical tests and sampling methods.

5. Include the collection and compositing strategy.
- F. After receipt of the above approval, the Contractor shall drill holes to the required depths of the excavation. The contractor shall collect a adequate number vertical composite soil samples per hole. This sampling strategy is subject to change pending the review and approval of the San Francisco Department of Public Health (SFDPH). At a minimum, the Contractor shall analyze each sample for:
 1. Total Petroleum Hydrocarbons-Gasoline/BTEX/MTBE (EPA Method 8015 mod/8021).
 2. TPH-Diesel/Motor Oil (EPA Method 8015 with silica gel cleanup).
 3. Volatile Organic Carbons VOCs (EPA Method 8260). NOTE: All RCRA regulated compounds, including MEK must be reported.
 4. Semi-Volatile Organic Carbons SVOCs (EPA Method 8270C Full Scan/entire suite) with organic cleanup to achieve the lowest extent possible detection limits below the current San Francisco Regional Water Quality Control's Residential Shallow Soil Exposure Environmental Screening Level (ESLs). (http://www.waterboards.ca.gov/rwqcb2/water_issues/programs/esl.shtml). NOTE: All RCRA regulated compounds must be reported including pyridine and cresols.
 5. Organochlorine Pesticides (EPA Method 8081) and Polychlorinated Biphenyls (PCB's) by EPA Method 8082 with organic cleanup to achieve the lowest extent possible detection limits below the current San Francisco Regional Water Quality Control's Residential Shallow Soil Exposure Environmental Screening Level (ESLs). (http://www.waterboards.ca.gov/rwqcb2/water_issues/programs/esl.shtml). NOTE: All RCRA regulated compounds must be reported.
 6. Title 22 Metals (EPA Methods 6000/7000 Series) and soluble Total Concentration Leaching Potential (TCLP) and Soluble Threshold Limit Concentration (STLC) metals (as warranted – 10x STLC & 20x TCLP).
 7. pH and Corrosivity tests (RCI).
 8. Asbestos (CARB Method 435, 400-point count for 0.25% sensitivity).
 9. Chromium +6 (EPA Method 7199).
 10. Methane (using field instruments).
 11. NOTE: For the above analyses, the Laboratory Reporting Limit (RL) for all constituents must be reported below state or federal limits to determine waste disposal classification.
- G. The Contractor shall forward the samples to an accredited environmental laboratory. The furnishing of all labor, materials, and equipment for sample collection and delivery to the testing laboratory will not be separate measures for payment.
- H. The Contractor shall determine the exact location of the drill holes, with reference to utility plans and Underground Service Alert clearance. The Contractor shall be responsible for all permits, utility clearance and traffic routing during the pre-excavation environmental soil profiling and as per other Sections in this Contract.
- I. The Contractor shall coordinate with the City Representative prior to scheduling the sampling to allow the City Representative to witness the sampling.

- J. The pre-excavation environmental soil profiling (Phase II Environmental Site Assessment) required in this Article shall be conducted by a California licensed Professional Geologist or Professional Civil Engineer, and the driller shall possess a State of California C-57 (Well Drilling) license.
- K. The Contractor shall provide the City Representative with a schedule for drilling the bore holes, at least 72 hours in advance of drilling the first hole or change any thereof.
- L. The Contractor shall allow in its schedule of work the time required in obtaining environmental analytical results of the soil samples on a standard (normal) turnaround time. The standard turnaround time to obtain environmental analytical results varies between 5 to 20 working days.
- M. Analytical testing shall be done at a California State accredited laboratory (or an out-of-state accredited laboratory if appropriate). The selected laboratory shall guarantee a maximum of 10 days standard turnaround time at standard rates for results of analytical testing. All original copies of test results shall be forwarded to the City Representative. Emailed copies of results are acceptable as an interim step.
- N. For the Environmental Site Assessment (Phase II) Report, the Contractor shall:
1. Perform a statistical analysis of the results in accordance with USEPA: SW-846 (Manual of Test Methods for Evaluating Solid Waste). The Contractor shall work with the landfill and the City Representative to obtain pre-acceptance approval letters and complete the generator's waste profile sheet, so as to get the excavated soils accepted for disposal at a landfill prior to its excavation. This will ensure a "load & go" operation during construction.
 2. The Contractor shall tabulate the results from the laboratory results and submit it to the City Representative. Tabulation of the results shall compare the results against ESLs for Direct Exposure Human Health Risk Levels - Residential Shallow Soil Exposure, and for Construction Worker, TTLC, STLC, 10x STLC, TCLP, 20x TCLP values.
 3. Discuss the results and its implications as it relates to:
 - a. Federal and State hazardous waste disposal criteria.
 - b. Acceptance at local landfill in accordance with the landfill's acceptance criteria.
 - c. The Federal Regional Screening Levels (RSLs).
 - d. The Regional Water Quality Control Board (RWQCB)'s Environmental Screening Levels (ESLs, Table A).
 - e. California Human Health Screening Levels (CHHSLs).
 - f. Soils re-use strategy.
 - g. Health Risk to the construction workers (ESLs, Table K).
 4. Prepare a draft and final report of this Environmental Site Assessment (Phase II) that is signed and stamped by both the principal and a registered Professional Engineer or Geologist.
 5. The Environmental report shall also contain:
 - a. A table showing analytical parameters, test methods, locations and sample depths.
 - b. Tables showing analytical results for soil and groundwater. Field screening instrumentation readings to be included in both the tables and boring logs.
 - c. All units to be stated in "mg/l", "ug/l", "mg/kg", "ug/ft²", etc. (i.e., do not use "ppm" or "ppb")

- d. Figures, drawings, maps, and photographs.
 - e. A 3-dimensional drawing showing excavation depths and categories/blocks of soil waste classifications based on the analytical results.
 - f. Laboratory analytical results, QC/QC and chain-of-custody documentation.
 - g. Log of boring/pothole.
- O. The Contractor shall initially forward a digital copy of the draft environmental report for the City's review. After which, the Contractor shall forward the final environmental report at least 5 days prior to excavation work. This report shall be prepared, stamped, and signed by a California licensed Professional Geologist or Professional Civil Engineer.

1.5 CLASSIFICATION AND MANAGEMENT OF EXCAVATED MATERIALS

- A. The pre-excavation profiling shall be done so as to classify the excavated soils for a "load and go" disposal to a permitted California landfill or equivalent out of State landfill for Class I, II & III disposal, or permitted disposal & recycling facilities.
- B. An intermediate soil staging and loading facility is not provided as part of this Contract. The Contractor may use its own or a subcontracted intermediate soil staging and loading facility. Such a facility shall be permitted in accordance with federal, State, and local regulations and meet the definitions of the California Code of Regulations (CCR) Title 22, 66260.10 for "Individual generation site", "Onsite", "Onsite facility".
- C. Except as otherwise stated in the Contract Documents, the Contractor is responsible for the excavation, loading, handling, transportation, and disposal of all surplus waste excavated soils and sediments from dewatering activities, meeting requirements of a certified and permitted California landfill or an equivalent out-of-state landfill. All such disposal activities shall require the approval of the City Representative prior to actual loading and disposal.
- D. Conditions for acceptance at various local landfills/waste disposal facilities include, filling out of a waste profile, that the surplus waste excavated soil hauled to the landfill will have greater than 50 percent solids, and cannot have any free liquids. It is the Contractor's responsibility to meet landfill requirements for disposal.
- E. The Contractor shall maximize reuse of excavated soils. Excavated soils can be reused anywhere along the project alignment. If the soils from this area cannot be reused, such surplus waste excavated soils shall be disposed at a certified and permitted California landfill for Class I, or Class II, or Class III, disposal or an equivalent out-of-state landfill. Acceptable landfills/waste disposal facilities for California Class I, II and III wastes are:
 - 1. Republic Services, <http://www.republicservices.com/Corporate/Business/WasteRecycling/Facilities/landfills.aspx>
 - 2. Waste Management Inc, <https://www.wm.com/find-a-facility.jsp>
 - 3. Clean Harbors Buttonwillow LLC, www.cleanharbors.com
- F. Except for Article 1.4 herein, the Contractor shall not conduct any environmental or hazardous materials sampling or analysis without prior permission from the City Representative. If approved, the environmental or hazardous materials sampling shall be done in the presence of the City Representative. This does not include the Contractor's obligation for any personnel air monitoring.

- G. The Contractor shall inform the City Representative in writing and obtain City's approval prior to any sale, supply, or offer to sell excavated material. The Contractor shall similarly comply with Bay Area Air Quality Management District's (BAAQMD's) Regulation 11, Rule 14 for asbestos-containing serpentine. Additional information may be found at <http://www.baaqmd.gov/~media/dotgov/files/rules/reg-11-rule-14-asbestoscontaining-serpentine/documents/rg1114.pdf?la=en>, the California Air Resource Board Advisory #161 (<https://ww2.arb.ca.gov/enforcement-advisory-161-serpentine-rock>), and Title 17, Section 93106 of the California Code of Regulation (CCR). In such a case, the Contractor, at its own expense, shall perform all the engineering and chemical testing as required by the City and by federal, State, and local statutes, laws, regulations, and policies.
- H. Cal/OSHA regulations are triggered when asbestos is present in any amount. The Contractor shall meet its obligations under CCR Title 8, Section 1529. The regulation requires monitoring to determine exposure levels, wet methods, respirators and protective clothing, controlled access to the work area, and similar precautions associated with asbestos work regardless of the origin of the asbestos. Use of a competent person to oversee the work may also be necessary. The Contractor shall utilize an experienced Certified Industrial Hygienist (CIH) and a Professional Geologist (PG) to assist it with this work.
- I. Asphalt, concrete, aggregate base, vegetation, debris, wood, obstructions, and other organic, unsound or deleterious matter shall be excavated separately from the soil layer, and shall not be reused as backfill. The removal, management, transportation, and disposal of asphalt, concrete, aggregate base, vegetation, debris, wood, obstructions, and other organic, unsound, or deleterious matter shall be incidental to its respective bid items.
- J. Soils of different waste disposal classification shall be segregated when excavated, managed, transported, and disposed separately with no mixing of the different types of wastes.
- K. For work in this Contract, the Contractor shall take into account the productivity losses, if any, due to but not limited to encountering and managing hazardous or non-hazardous materials, the use of respirators and personal protective equipment. The City will not pay additional compensation to the Contractor due to encountering and managing hazardous or non-hazardous materials, use of respirators, and personal protective equipment.
- L. The City reserves the option and right, at any time, to use its own forces to excavate, remediate, bioremediate, haul, recycle, or dispose of both, hazardous and non-hazardous materials at its own facilities, California State approved facilities, contracted facilities or contracted out-of-state facilities.

1.6 DEFINITIONS

- A. Generator: The City is the "generator" as defined in Section 66260.10 of Article 2, Chapter 10, Division 4.5 of Title 22 of the California Code of Regulations (CCR) and in Title 40, Code of Federal Regulations (CFR) of any excavated pre-existing hazardous waste. The City will be responsible as the generator to the extent of the law.
- B. Waste: Discarded material of any form as defined by the Code of Federal Regulations 40 CFR 261.2 (<http://www.access.gpo.gov/nara/cfr>) and the California Code of Regulations 22 CCR 66261.2 (<http://ccr.oal.ca.gov>).
- C. Hazardous Waste: This may include excavated material, friable asbestos containing material (ACM) that is not naturally occurring in rock and soil, loose and peeling lead-based paints, and other material that is regulated by and requires management, handling, transport, treatment, storage, and disposal according to the requirements of the Federal Resource conservation Recovery Act (RCRA) and associated regulation 42 U.S.C. 6901 et seq. (<https://www.epa.gov/laws-regulations/summary-resource-conservation-and-recovery-act>)

and 40 CFR Part 260 et seq., or the California Hazardous Waste Control Law (<https://www.epa.gov/rcra/resource-conservation-and-recovery-act-rcra-regulations>) and associated regulations (Health and Safety Code 25000 et seq. (https://leginfo.ca.gov/faces/codes_displayexpandedbranch.xhtml?tocCode=HSC&division=20.&title=&part=&chapter=&article= and 22 CCR 66260 et seq.).

- D. References to hazardous material or contaminated material incorporate definitions of hazardous pollutants, hazardous contaminants, hazardous material, hazardous substances, hazardous waste, toxic pollutants, and toxic substances applicable in accordance with federal, State, and local statutes, laws, and regulations.
- E. Management of excavated materials or “management” means transportation, transfer, recycling, recovery, disposal, handling, processing, storage, and treatment of excavated materials in accordance with federal, State, and local laws and regulations
- F. Soil: earth material composing the superficial geologic strata (material overlying bedrock), consisting of clay, silt, sand, or gravel size particles as classified by the U.S. Soil Conservation Service. Soil does not include asphalt, concrete, aggregate base, vegetation, debris, wood, obstructions, and other organic, unsound, or deleterious matter.
- G. Excavated material includes all soils (fill, alluvium, bedrock), and other materials generated in the course of the project work, which are to be excavated, handled, or disposed of as part of the Contract.
- H. Waste excavated soil is excavated soil that is a waste and cannot be reused within the project site in accordance with reuse criteria of this Section. It is surplus and shall be managed, transported, and disposed of as part of the Contract. Waste excavated soil does not include asphalt, concrete, vegetation, wood, debris, obstructions, and other organic, unsound, or deleterious matter.
- I. Naturally Occurring Asbestos (NOA): NOA in the City and County of San Francisco is typically associated with ultramafic, metamorphic or metamorphosed rocks within the Franciscan mélange, including serpentinite, greenstone, and blueschist. There are six regulated naturally occurring asbestos minerals: chrysotile, crocidolite (asbestiform riebeckite), amosite (grunerite-cummingtonite), tremolite, actinolite, and anthophyllite (CGS 2002). The six asbestos minerals are divided into two distinct mineral groups; serpentine minerals (chrysotile), and amphibole minerals, which include the remaining five above-mentioned minerals. These asbestos minerals are classified as known human cancer-causing substances by local, state, and federal health agencies (DTSC 2004), and regulated by name.
- J. The following soil classifications with corresponding requirements are established solely for the purpose of payment for the handling, transportation and disposal of the excavated materials determined to be a waste:
 - 1. California Class I (non-RCRA) hazardous waste: is waste excavated material that is classified as California (non-RCRA) hazardous waste, requires disposal at a California Class I disposal facility or a similarly permitted out-of-state facility and requires transport by a registered hazardous waste transporter.
 - 2. California Class II and Class III designated waste (Class II and Class III): is non-hazardous waste, and is not a California or Federal hazardous waste. It requires disposal at a California Class II or Class III disposal facility or at a similarly permitted out-of-state facility without the need of a registered hazardous waste transporter.
 - 3. Asbestos containing rock and soil where the asbestos is naturally occurring and not associated with cross contamination by building materials may be classified as California

Class II waste. The Contractor shall contact the landfill it identifies to receive waste to assure that asbestos containing naturally occurring materials meet the acceptance criteria of the California Class II landfill.

1.7 WORKER'S MANDATORY ENVIRONMENTAL TRAINING

- A. At no cost to the City, the Contractor shall provide sufficient numbers of properly trained personnel (including its subcontractors) who may come in contact with, may be exposed to, disturb, operate equipment in, or otherwise excavate, handle, transport and dispose hazardous or contaminated excavated materials, asbestos, naturally occurring asbestos (NOA), and silica.
- B. At no cost to the City, the Contractor shall ensure that its workers and that of its subcontractors have the following appropriate environmental training. It is the Contractor's responsibility (and not that of the City) to ensure that its workers and its subcontractors have the necessary training certifications, and personal protective equipment (PPE) as required by federal, state and local laws and regulations. The Contractor shall submit certifications or proof of such training when requested by the City.
- C. At no cost to the City, the Contractor shall hire an experienced Certified Industrial Hygienist (CIH) and a Registered Geologist (RG) to assist it with the following:
1. HAZWOPER: This training is required of the Contractor's employees (including its subcontractors) who may come in contact with, may be exposed to, disturb, operate equipment in, or otherwise excavate, handle, transport and dispose hazardous or contaminated excavated materials, asbestos, naturally occurring asbestos (NOA), and silica. Employee(s) shall possess a current 40-hour Hazardous Waste Operation and Emergency Response ("HAZWOPER") training and certification and the associated 8-hour HAZWOPER refresher training (in accordance with Sections 5192 and 5144 of Title 8, CCR and Title 29 CFR, Sections 1910.120 and 1910.134), and shall be certified to wear appropriate personal protective equipment and respirators.
 2. Cal/OSHA Asbestos Class II asbestos operations and Asbestos Competent Person (ACP): The Contractor shall meet its obligations under CCR Title 8, Section 1529 when Serpentine, serpentinite, or other ultramafic rocks containing Naturally Occurring Asbestos (NOA) is present.
 - a. The Contractor and its subcontractors shall have its workers, trades people and Competent Person that will come in contact with serpentine, serpentinite, or other ultramafic rocks containing Naturally Occurring Asbestos (NOA) be trained for the Class II work activity level as per the Cal/OSHA standard 8 CCR § 1529.
 - b. The Contractor shall have a Cal/OSHA asbestos Competent Person as it pertains to requirements specified in the Cal/OSHA standard 8 CCR § 1529, and when serpentine, serpentinite, or other ultramafic rocks containing Naturally Occurring Asbestos (NOA) is present.
 3. SILICA: The Contractor shall meet its obligations under the Respirable Crystalline Silica standard for construction, found in the California Code of Regulations, Title 8, Sections 1530.1, 1532.3, and 5155; and OSHA Regulation 29 CFR 1926.1153.
 4. Health and Safety training.
 5. Lead awareness training (for all trades who will come in contact and disturb lead containing paints as per Cal/OSHA 1532.1 Lead in Construction standard). If personal exposures to the workers exceed the 8-hr Permissible Exposure Level (PEL) of 50 micrograms/cubic meter, such worker(s) must have received training as a CDPH Certified Lead Worker (as per 17 CCR Division 1, Chapter 8).

6. Dust Control and Mitigation awareness training to enable the Contractor's personnel to comply with Sections 01 35 49 Minimum Environmental Procedures and 01 35 50 Additional Environmental Procedures.
 7. Medical examination and blood tests (as warranted).
 8. Respiratory protection (including current respirator fit test records).
 9. Storm water pollution prevention awareness training to enable the Contractor's personnel to comply with Section 01 57 13.
 10. Other training as necessary and pertaining to the work being conducted.
- D. Only qualified persons shall engage in hazardous materials-related work. Contractor and Subcontractor personnel, who come in contact with, are exposed to, disturb, operate equipment in, or otherwise handle hazardous or contaminated materials, or demolition debris shall have appropriate hazards communication, environmental training and medical monitoring.
 - E. The City will not grant extensions of time or increases in payment for costs associated with the Contractor's productivity losses, inability to provide properly trained personnel, costs of training Contractor's workers, or hiring of required personnel.
 - F. It is the Contractor's responsibility and liability to ensure that its workers and that of its subcontractors have the proper training, personal protective equipment (PPE), and respiratory protection.
 - G. The Contractor, not the City, is responsible for the health and safety, training, personal protective equipment (PPE), and monitoring and protection from exposure risks of its employees and subcontractors, as per federal, state and local statutes, laws and regulations.
 - H. The Contractor is obligated to conduct any required personal air monitoring of its workers, at its own expense, in accordance with Section 01 35 45 Health and Safety Criteria.

1.8 REGULATORY INDEMNIFICATION

- A. The City will not indemnify against liability of the Contractor resulting from the activities or duties, which are the responsibility of the Contractor under the terms of this Contract. This includes, but is not limited to, liability arising from the arrangement of transportation of excavated material, whether on- or off-site. Therefore, the City will not assume any liability, present or future, incurred by the Contractor by reason of these activities.
- B. The Contractor is specifically alerted to, and shall familiarize itself and its Subcontractor(s) to, the liability statutes of:
 1. The Comprehensive Environmental Responses, Compensation, and Liability Act (CERCLA) of 1980 found in 42 USC, Section 9601 et seq.
 2. The Superfund Amendments and Re-authorization Act (SARA) of 1986 found in 42 USC, Section 9601 et seq.
 3. The California Hazardous Substance Account Act (HSAA) of 1981 found in California Health and Safety Code, Section 25300 et seq.
 4. California Health and Safety Code, Division 20, Regulations and CCR 22 Section 6600 et seq.
 5. Cal/OSHA Lead in Construction Standard, Title 8, CCR, Section 1532.1.

6. BAAQMD Regulation 6 for Particulate Matter and Visible Emissions (<http://www.baaqmd.gov/~media/files/planning-and-research/rules-and-regs/workshops/2017/rg0601-pdf.pdf?la=en>) and Regulation 11 for Hazardous Pollutants (<http://www.baaqmd.gov/regs/rulereg.htm>).
 7. The Final Regulation Order of the California Code of Regulations (CCR) Title 17, Public Health, Section 93105, on Asbestos Airborne Toxic Control Measure for Construction, Grading, Quarrying, and Surface Mining Operations (http://www.baaqmd.gov/~media/Files/Compliance%20and%20Enforcement/Asbestos/final_reg_order.ashx).
 8. The California Air Resources Board (CARB) Asbestos Airborne Toxic Control Measure for Surfacing Applications.
 9. The San Francisco Building Code Section 106.3.2.6
 10. San Francisco Health Code, Article 22B - Construction Dust Control Requirements.
 11. The DPW Dust Control Order 171,378.
- C. The Contractor shall be responsible for all liability and costs necessary to prevent its own or Subcontractors' operations from violating federal, State, or local statutes, laws, regulations, and policies.

1.9 REQUIREMENTS FOR THE TRANSPORTER

- A. As warranted, the Contractor shall ensure that its drivers as well as the subcontractor drivers have in their possession, during the hauling of material and soil, all applicable California State and local vehicle insurance requirements, valid driver's license, and vehicle registration and licensing. A current Class 1 Certificate of Compliance from the California Highway Patrol shall be affixed to each vehicle.
- B. All hazardous materials/waste haulers shall possess a Hazardous Substance Removal Certification granted by the State of California, Contractors State License Board (1 800-321-2752 or <http://www.cslb.ca.gov>), and all other required certifications and insurance.
- C. Haul trucks carrying excavated material shall be loaded so that the material does not extend above the walls of the truck bed, and there is no leakage from any vehicle. All truckloads shall be covered.
- D. All truckloads containing Naturally Occurring Asbestos (NOA) and Serpentinite require both covering the load as well as lining the underneath of the truck bed ("burrito wrap") with 10mil HDPE. This is required regardless if the material is wet, hazardous, or non-hazardous.
- E. The Contractor shall be responsible for cleaning up excavated material spill, which occurs during loading, handling, and transportation.
- F. Preparation for shipment: Marking, labeling, placards, and packaging prior to transport shall be in accordance with all regulations and shall be the responsibility of the Contractor.

1.10 USE OF NON-HAZARDOUS WASTE MANIFEST FOR CLASS II MATERIAL OR LESSER

- A. For transportation and disposal of the non-hazardous waste, the Contractor shall initiate and fill out a non-hazardous waste profile form with the Class II/III landfill of its choosing. Then, submit this waste profile form to the City Representative's for its approval & signature. Next the Contractor shall prepare a Non-Hazardous Waste Manifest form from the landfill. The Non-

Hazardous Waste Manifest form shall be completed for each vehicle carrying excavated material classified as California Class II and Class III designated waste, or of a lesser waste classification. The Contractor shall submit the Non-Hazardous Waste Manifest form to the City Representative for the Generator's signature at least 72 hours in advance of the day of the off-haul with an estimate of the number of loads scheduled for off-haul. The Non-Hazardous Waste Manifest form shall contain the following information before providing the final copy for the City Representative to sign:

1. Name, address and phone number of the Generator, Project name, and Specification Section number.
 2. The Contractor's billing information
 3. The soil profile approval number and description of the waste.
 4. Name, address and phone number of the transport company.
 5. The Name, address, and telephone number of the receiving facility i.e., disposal facility.
- B. The City will not be responsible for off haul delays if the Contractor does not notify the City Representative in a timely manner to sign the Non-Hazardous Waste Manifest forms.
- C. On a monthly basis, the Contractor shall provide the City Representative with a copy of each completed Non-Hazardous Waste Manifest Form (with the landfills signature) and its corresponding certified weight ticket.

1.11 HAZARDOUS WASTE MANIFESTING PROCEDURES FOR CLASS I MATERIAL

- A. As warranted, the Contractor shall furnish all labor, materials, equipment, and incidentals required to transport those materials identified as hazardous waste for the purpose of disposal.
- B. The Contractor shall comply with all applicable regulatory requirements listed as well as other applicable federal, State, or local laws, codes, and ordinances, which govern or regulate transportation of wastes (including but not limited to DOT-HM 181 in accordance with 49 CFR 172).
- C. All material classified as hazardous waste (Federal Class1 RCRA and California Class1 non-RCRA wastes only) shall be hauled off using a licensed hazardous waste transporter and the uniform hazardous waste manifest form (DTSC Form 8022A and/or EPA Form 8700-22 a.k.a. the manifest).
- D. Preparation and handling of waste manifests:
1. For transportation and disposal of the hazardous waste, the Contractor shall initiate and fill out a hazardous waste profile form with the Class I landfill of its choosing. Then, submit this hazardous waste profile form to the City Representative's for its approval & signature. Next the Contractor shall provide and prepare the hazardous waste manifest for each shipment of hazardous wastes from the site. The Contractor is hereby notified that hazardous waste manifest, waste profiling, and landfill service agreements have to be prepared and have to be approved by the landfill in advance of the off haul. The Contractor shall consult with the City Representative for local requirements in filling out the forms
 - a. The manifest shall describe the contents of each truck carrying materials to the waste disposal site, including the weight of the waste materials. Weight, not volume, shall be used to measure waste quantities.

- b. The City Representative will provide a hazardous waste generator identification number for use on the manifest. The Contractor shall provide the State Transporter identification number and telephone number.
 - c. The licensed transporter shall also sign and date the manifest indicating that it has accepted the load described in the manifest on that particular day.
 - d. Only a City employee (and not the Contractor) will sign the manifest for the "generator" of the waste.
- E. The Contractor shall notify the City Representative 72 hours prior to off-haul of all excavated material. If the manifest and other forms above are to be signed by the City Representative during periods other than the hours stipulated above, the Contractor shall give an additional 72-hour advance notice to the City Representative.
- F. The City Representative will sign and keep the Generator's copy and give the remaining copies to the licensed transporter.
- G. The licensed transporter shall carry the hazardous waste manifest with each truckload using the traffic control approved routes for off haul
- H. Within 2 days of its return, the Contractor shall provide the City Representative with the completed waste manifest. The completed waste manifest shall be certified by the receiver of the waste shipment, confirming that the shipment was received at the waste treatment or disposal facility designated in the Contractor's bid, and certifying the weight of the shipment.
- I. Should any waste manifest not be returned within 35 days of shipment, the Contractor shall initiate follow-up, shall document such follow-up effort in writing with an Exception Report in accordance with 40 CFR 262.42 and/or 22 CFR 66262.42, and shall provide a copy to the City Representative.
- J. Mandatory City Information for the Manifest
- 1. Manifest Item 1: Generator's US EPA ID Number for Project. (Will be provided by the City Representative after NTP as deemed necessary)
 - 2. Manifest Item 3: Emergency response Phone: # 24 hours line to be provided by the Contractor
 - 3. Manifest Item 5:
 - a. Generator's Name and Mailing Address:
SFDPH
Municipal Hazardous Waste Program
49 South Van Ness Avenue, Suite 600
San Francisco, Ca 94103
 - b. Generator's Site Address:
Name of the project
 - 4. Manifest Item 14: The following information is mandatory:
 - a. Contract JO # & Name of Project TBD
 - b. Project Manager: TBD
 - c. Project Manager Phone Number #: (

- d. Profile # _____ (Defined when manifest is generated. To be obtained and provided by the Contractor)
- 5. The City & County of San Francisco applies for an exemption from the BOE Hazardous Waste Generator fees in accordance with H&SC 25174.7, 25174.1; 25205.5, and 25345. (1) Hazardous wastes which result when a government agency, or its contractor, removes or remedies a release of hazardous waste in the state caused by another person, and in an area from beneath a public street and originated from earthquake fill.”

1.12 UNDERGROUND TANK REMOVAL PROCEDURES

- A. The Contractor is alerted to the fact that underground structures and tanks may be encountered during excavation. In the event that an underground storage tank, pipes, and associated fixtures are encountered, the Contractor shall immediately suspend the work in the immediate area and notify the City Representative as well as the San Francisco Department of Public Health (415-252-3900).
- B. The City Representative reserves the right to use City forces or City Contractors to remove any underground storage tank that may be discovered as part of this Contract. The Contractor shall work cooperatively with any City Contractor or City force in an effort to expedite the removal of the underground tank.
- C. If directed by the City, the Contractor under differing site conditions, shall be responsible for removing and disposing the underground storage tank, pipes, and associated piping in the excavation area according to applicable laws and regulations including:
 - 1. California Health and Safety Code (H&SC), Division 20, Chapter 6.9 (Section 25280 et.seq.)
 - 2. California Code of Regulations (CCR), Title 23, Division 3, Chapter 16 (Section 2610 et.seq.)
 - 3. California State Water Resources Control Board (SWRCB), Leaking Underground Fuel Tank (LUFT) Manual.
 - 4. City & County of San Francisco, Department of Public Health, Underground Storage Tank Removal Regulations. Information available at but not limited to <https://www.sfdph.org/dph/EH/HMUPA/UST.asp>
- D. The Contractor shall obtain all permits, excavate, sample, analyze and prepare all reports as required by the San Francisco Health Code.
- E. The Contractor shall prepare an Underground Storage Tank (UST) Closure Plan in compliance with Article 21 of the San Francisco Health Code, if UST's will be removed. The Contractor shall only remove the underground tanks, pipes, and related appurtenances only in the presence of an inspector from the City's Department of Public Health, the City's Fire Department, and the City's Representative.
- F. The Contractor shall furnish three (3) copies of the draft report for review, and five (5) copies of the final report documenting the removal of an underground tank.
- G. Such work will be considered as change order work.

1.13 DISPOSAL OF RAILROAD TIES AND TREATED WOOD WASTE

- A. Railroad ties and wood treated with preservatives (e.g. utility poles, piers, pilings, posts, pressure treated lumber, etc), such as creosote, and/or pentachlorophenol, and/or Copper Napthenate, Zinc Napthenate, and/or Copper, Chromium, Arsenate (CCA), and/or Ammonical Chromium, Zinc, and Arsenate (ACZA) (that are not otherwise recycled by the Contractor) shall be transported and disposed of at a California Class 2 (non-hazardous) landfill.
- B. For wood treated with chemical preservatives such as Chromate Copper Arsenate (CCA) treated wood: The Contractor shall comply with the Federal Insecticide, Fungicide, Rodenticide Act (FIFRA) and by the California Department of Pesticide Regulation (DPR) and Department of Toxic Substances Controls (DTSC) Regulations or for the treated wood waste as per the Health and Safety Code (HSC) 25150.7 and 25150.
- C. The Contractor shall fill out a separate waste profile with the landfill for such materials.
- D. The transportation and disposal of the railroad ties and treated wood waste shall be paid as a change order.

1.14 POLLUTION INSURANCE

- A. All Work that involves the management, handling, transportation, and disposal of hazardous and contaminated (non-hazardous) materials shall be performed either by the Contractor or a properly licensed subcontractor, who shall furnish evidence of Contractor's Environmental Pollution Liability Insurance.

PART 2 - PRODUCTS

(NOT USED)

PART 3 - EXECUTION

3.1 TEMPORARY STOCKPILING OF EXCAVATED MATERIAL AND IMPORT MATERIAL

- A. The Contractor shall comply with Article 2.4: Excavation in the Public-Right of-Way and specifically Article 2.4.53(c) Storage of Materials and Equipment.
- B. If feasible and in the event that the City Representative permits the Contractor to temporarily stockpile excavated and import material along the project alignment, the following conditions shall apply (including those in Sections 01 35 49 Minimum Environmental Procedures and 01 35 50 Additional Environmental Procedures):
 - 1. Material shall be stockpiled at a location approved by the City Representative. The volume of the stockpile will be limited within the discretion of the City Representative.
 - 2. Stockpiled materials shall not be stored for more than 48 hours.
 - 3. The City Representative retains the right to suspend the use of temporary stockpiling in the event of negative public perception, aesthetic concerns, and regulatory concerns. In such an event, the Contractor is directed to remove the stockpile within 24 hours.
 - 4. After a stockpile has been removed, the Contractor shall wet sweep and vacuum the area, street, and sidewalk to remove residual soil, restore the site to its original condition.

5. Stockpiles of site backfill soils shall be tarped using a different colored tarp from that of import soils.
 6. Stockpiles must be kept adequately wetted, treated with a chemical dust suppressant, or covered when material is not being added to or removed from the pile, and securely tarped & braced (weighted or tied down).
 7. Stockpile Maintenance requirements in Section 01 35 49 Minimum Environmental Procedures and Section 01 35 50 Additional Environmental Procedures.
- C. All costs associated with the temporary stockpiling of soils shall be borne by the Contractor, unless necessitated by an event that is otherwise compensable under the terms of the Contract. Such related incidental costs include, but are not limited to dust control, vacuum and wet sweeping, covering of stockpiles, multiple handling and transportation, multiple staging, work re-sequencing or rescheduling, time loss and standby time due to the duration of storage, and complying with Federal, State, and local requirements.

3.2 REUSE OF EXCAVATED SOILS AS BACKFILL

- A. For backfill work: The Contractor shall maximize the reuse of native soils from the excavation, unless directed otherwise by the City Representative. In such a case, the following conditions shall apply:
- The reuse of native soils as backfill material shall meet the requirements of Part 7 – Excavation, Backfill and Embankment of the Standard Specifications and Plans, Department of Public Works, City and County of San Francisco. The Standard Specifications and Standard Plans are accessible online at <http://www.sfpublishworks.org/services/standards-specifications-and-plans>
1. Native soils to be reused must not contain asphalt, concrete, bentonite, bay mud, clay, bricks, cobblestones, rocks, rubble, scrap metal, railroad tracks and ties, debris, contaminated soils, vegetation, wood obstructions, and other organic, unsound, objectionable, or deleterious matter. The Contractor shall remove such materials matter prior to the placement and reuse of fill.
 2. Native soils must meet sieve and chloride requirements. The Contractor shall submit sample results to the City Representative prior to placement.
 3. With the City Representative's approval, native soils that are visually contaminated or are classified as a California Class I (non-RCRA) may be reused within the "area of contamination" and within 150 linear feet from its origin. Re-use of native soils must meet the engineering backfill and compaction requirements, is delineated with markers, documented, and meets the San Francisco Department of Public Health (SFDPH) requirements.
 4. The Contractor shall notify the City Representative when and where the soils are used as backfill.
 5. Surplus native soils shall be properly characterized and disposed of.

3.3 REUSE AND RECYCLING OF EXCAVATED SOILS AT OTHER FACILITIES

- A. If the Contractor seeks to reuse or recycle surplus excavated soils at other projects or recycling facilities rather than dispose of them at a permitted landfill, the contractor at its cost shall:

1. Demonstrate that with the existing environmental test results that the soils can be reused or recycled. The Contractor at its expense may be allowed to conduct additional testing, and characterization of the soils, only with the City's prior approval.
 2. Submit the acceptance criteria of the receiving facility or project.
 3. Submit a letter of acceptance from the receiving facility or project. The letter shall indicate the volumes of soils accepted. Submit a value engineering calculation demonstrating cost savings to the City. Savings should be a split 50/50.
- B. If the City accepts the above, the Contractor shall prior to reuse or recycling:
1. Incur on the risk of, and indemnify the City from any and all increased cost and future liability arising from the reclassification, recycling, or reuse or the surplus excavated soils if, upon reuse or recycling of such soils at any time thereafter, it is determined that the surplus excavated soils are in fact hazardous, and should not have been reused or recycled.
 2. Submit a copy of the letter of acceptance and all records, including the financial statements for the value engineering saving prior to the approval of the reuse or recycling of these soils.
 3. Bear all costs for any additional testing, characterization and profiling of the soils, including the value engineering cost.
 4. Bear all costs for the transportation, and any other associated cost for moving these soils to another project or to a recycling facility.
 5. Revise and retain its Pollution Liability insurance to cover this work.
 6. Repay any cost that the City at its discretion will incur to conduct its own testing to confirm the Contractor's findings.
 7. Submit a monthly Reuse and Recycling spreadsheet of all reused and recycled materials generated from the project. The spreadsheet shall include information of the receiving facility or project, quantity transported (Cubic Yards), weight tags from the recycling facility.
 8. The City will issue a Change Order for this work to effectuate any saving that may accrue from this Section.
 9. Such work will only be done as a change order after the acceptance and approval of the City and after the change order is processed.

3.4 IMPORT SOIL (FILL)

- A. Import Soil (Fill) is soil or fill material received from sources outside of the project right-of-way. Import soil (fill) includes import bedding sand and import recycled backfill sand used in the base and subbase layers of a pavement or roadway or sporting field.
- B. Environmental/chemical testing is required for each source and of the same soil classification type (based on the unified soil classification system) of the import soil (fill).
- C. In advance of hauling in and use of import soil (fill) the Contractor for each source of import soil (fill), shall provide the City the original source of where the import soil (fill) is coming from, the name of the laboratory used to analyze the soils, and the date of chemical analysis. Laboratory results shall not be over 6 months old.

- D. The Contractor shall provide chemical analytical results for each source and of the same soil classification type (based on the unified soil classification system) of import soil (fill) in accordance with the Recommended Fill Material Sampling Schedule stated in the Department of Toxic Substances Control (DTSC) Advisory Note for Clean Imported Material (as shown below). If the Contractor brings import soils from different sources, then the "Sample per Volume" count re-starts for each of different source of import soil (fill) (as shown below).

| Import Fill Volumes (for each source of import soil (fill) and of the same soil classification type) | Samples Per Volume for each source of import soil (fill) and of the same soil classification type |
|--|---|
| Up to 1,000 cubic yards | 1 sample per 250 cubic yards |
| 1,000 to 5,000 cubic yards | 4 samples for the first 1,000 yards + 1 sample per each additional 500 cubic yards |
| Greater than 5,000 cubic yards | 12 samples for the first 5,000 cubic yards + 1 sample per each additional 1,000 cubic yards |

- E. Each source of import soil (fill), import bedding sand and import recycled backfill sand of the same type, shall be analyzed as a four-point composite. Each composite shall be analyzed for Total Petroleum Hydrocarbons-Gasoline/BTEX/MTBE (EPA Method 8015 mod/8021), TPH-Diesel/Motor Oil (EPA Method 8015 with silica gel cleanup), Volatile Organic Carbons VOC's (EPA Method 8260), Semi-Volatile Organic Carbons SVOC's (EPA Method 8270), Organochlorine Pesticides (EPA Method 8081), Polychlorinated Biphenyls (EPA Method 8082), Title 22 Metals (EPA Methods 6000/7000 Series), Asbestos (CARB Method 435), Chromium +6 (EPA Method 7199), and soluble Total Concentration Leaching Potential (TCLP) and Soluble Threshold Limit Concentration (STLC) metals (as warranted – 10x STLC & 20x TCLP).
- F. Import soils (fill) has to meet both the engineering backfill criteria and the chemical criteria of these contract specifications.
- G. Chemical Criteria: To be accepted, the chemical concentrations of the import soil (fill) has to be equal or less than the values set forth in the Regional Water Quality Control Board (RWQCB)'s Environmental Screening Levels (ESLs), Tier 1 levels. Soils (fill) with the following chemical levels shall not be accepted as import soils (fill).
 1. Exceedance of the chemical values set forth in the Regional Water Quality Control Board (RWQCB)'s Environmental Screening Levels (ESLs), Tier 1 levels.
 2. Lead that exceeds 80 mg/kg.
 3. Serpentine (naturally occurring asbestos) and odorous soils
 4. Petroleum Hydrocarbons or Oil and Grease of any type that exceed 100 mg/kg.
 5. Asphalt, concrete, bentonite, bay mud, clay, bricks, cobblestones, rocks, rubble, scrap metal, railroad tracks and ties, debris, soils containing asbestos, imported contaminated soils, vegetation, wood, debris, slag, obstructions, and other organic, unsound, unsatisfactory, or deleterious matter.

- H. Environmental/chemical testing is not required of the base and subbase layers for the following materials that are used to build a pavement or roadway or sporting field: Base rock, Class II Aggregate Base (AB), Class II Recycled Base, Crushed Aggregate Base (CAB), Crushed Miscellaneous base (CMB), Processed Miscellaneous Base (PMB), Recycled Aggregate, Aggregate Subbase (ASB), reclaimed/recycled asphalt concrete (AC), and drain/crushed rock.
- I. Reclaimed/recycled asphalt concrete (AC) is acceptable for the base and subbase layers to build a pavement or roadway or sporting field.
- J. Crushed concrete is acceptable for the base and subbase layers to build a pavement or roadway or sporting field.
- K. Import material for backfill shall comply with the Section 714 Standard Specifications and Plans, Department of Public Works, City and County of San Francisco. The Standard Specifications and Standard Plans are accessible online at <http://www.sfpublishworks.org/services/standards-specifications-and-plans>; and the specifications of the Water Department for work under the jurisdiction of the SFPUC's Water Department.
- L. The City reserves the right to spot check and analyze the import soils (fill) as it deems necessary, including prior to it being brought on to the project site, even after the approval of the submittal of analytical results from the Contractor, as well as after its brought onsite.
- M. Should the analyses of the import soils (fill) test out to exceed the above criteria, then the Contractor shall be given a chance to re-sample and spilt the samples with the City, for re-analyses. Should the re-analyses import soils (fill) test out to exceed the above criteria, then the Contractor shall have to remove the import soils (fill) at its own expense and replace with clean import soil (fill). In such a case, the Contractor shall bear all the cost (including the City's cost) for re-analysis.
- N. For Recreation and Park projects, and Community/Urban Gardens, the Contractor shall install a visual barrier (such as a plastic orange snow fence) in all areas between the native fill, backfill from other areas of the site, and the import (soil) fill. The Contractor shall call the City Representative for an inspection of the visual barrier, and wait for the approval of it, prior to the Contractor filling soil over it.
- O. The Contractor shall call the City Representative for an inspection of the subbase placement, and wait for the approval of it, prior to the Contractor filling soil over it, so that the City Representative may check the proper grades and depths.
- P. Analytical costs for imported fill (soil) incurred by the Contractor shall be Incidental Work to Division 31 Earthwork.
- Q. The Contractor shall furnish the above analytical results at least 10 working days prior to bringing in the import soil (fill). The acceptance of import soil (fill) will be made by the City Representative and will depend on the results of the analytical testing, backfill requirements in this Contract, regardless if it meets the testing requirements of Division 31 Earthwork and Section 31 23 33 Trenching and Backfilling.
- R. Import soil (fill) shall not be brought on-site, prior to the City Representative's approval of the analytical results submittal. Analytical results submitted shall be referenced on the import fill spreadsheet submittal.
- S. Import soil (fill) shall be brought on-site at a rate where it is immediately used in the excavation. If the City Representative allows for import material to be stored overnight (only, and not longer) on site, then such import material shall be covered and placed at the Contractor's soils management yard, approved soil stockpile staging area or an area within the project alignment

authorized by the City Representative. Stockpiles being stored overnight shall be completely covered with 10 mil HDPE plastic and braced (weighted or tied down) securely.

- T. Import Fill Spreadsheet: As warranted, the Contractor shall submit five hardcopies or a digital copy of a monthly spreadsheet of all imported fill deposited at the project site to the City Representative. The spreadsheet shall include information on the project name, contract No., origin of import (street address, city), location of deposit (street address and depth range), quantity (cubic yards), soil type based on the unified soil classification system, the corresponding chemical, correspondent environmental analytical results submitted, truckers and trucking firm(s) used and trucking logs and invoices.

3.5 SECURING AREAS WITH EXPOSED, EXISTING SOIL

- A. Wherever construction work exposes the existing soil or where existing soil is stockpiled, these areas shall be barricaded all around with continuous (no gaps greater than 4 inches) fencing (either metal wire or orange plastic), Triton barriers or other barricades at least 3 feet high. The Contractor shall ensure that barricades are installed taut and secured against strong winds. Alternatively, the exposed, existing soil in excavation areas such as trenches, may be covered over with plates or other acceptable means. The intent is to secure the exposed, existing soil from public contact.

END OF SECTION

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Division 11: SFPW Standard Construction Measures

In the event of conflict between this Division 11 (*SFPW Standard Construction Measures*) and Division 10 (*SFPW Div 01 General Requirements for Construction*), the requirements of Division 11 shall prevail.

Public Works Standard Construction Measures

1. SEISMIC AND GEOTECHNICAL STUDIES: The project manager shall ensure that projects that may potentially be affected by existing soil, slope and/or geologic conditions at the project site will be screened for liquefaction, subsidence, landslide, fault displacement, and other geological hazards at the project site, and will be engineered and designed as necessary to minimize risks to safety and reliability due to such hazards. As necessary, geotechnical investigations will be performed.
2. AIR QUALITY: All projects will comply with the Construction Dust Control Ordinance (see Attachment A). Major construction projects that are estimated to require 20 or more days of cumulative days of work within the Air Pollutant Exposure Zone must comply with the additional clean construction requirements of the Clean Construction Ordinance (see Attachment B).
3. WATER QUALITY: All projects will implement erosion and sedimentation controls to be tailored to the project site, such as fiber rolls and/or gravel bags around stormdrain inlets, installation of silt fences, and other such measures sufficient to prevent discharges of sediment and other pollutants to storm drains and all surface waterways, such as San Francisco Bay, the Pacific Ocean, water supply reservoirs, wetlands, swales, and streams. As required based on project location and size, a Stormwater Control Plan (in most areas of San Francisco) or a Stormwater Pollution Prevention Plan (SWPPP) (in certain areas of San Francisco) will be prepared. If uncontaminated groundwater is encountered during excavation activities, it will be discharged in compliance with applicable water quality standards and discharge permit requirements. Groundwater contamination is addressed in item 6 below.
4. TRAFFIC: All projects will implement traffic control measures sufficient to maintain traffic and pedestrian circulation on streets affected by construction of the project. The measures will also, at a minimum, be consistent with the requirements of San Francisco Municipal Transportation Agency (SFMTA)'s Blue Book. Traffic control measures may include, but not be limited to, flaggers and/or construction warning signage of work ahead; scheduling truck trips during non-peak hours to the extent feasible; maintaining access to driveways, private roads, and off-street commercial loading facilities by using steel trench plates or other such method; and coordination with local emergency responders to maintain emergency access. Any temporary rerouting of transit vehicles or relocation of transit facilities would be coordinated with SFMTA Muni Operations.
5. NOISE: All projects will comply with local noise ordinances regulating construction noise. Public Works shall undertake measures to minimize noise disruption to nearby neighbors and sensitive receptors during construction. These efforts could include using best

available noise control technologies on equipment (i.e., mufflers, ducts, and acoustically attenuating shields), locating stationary noise sources (i.e., pumps and generators) away from sensitive receptors, erecting temporary noise barriers, and other such measures.

During nighttime construction activities, the following shall apply: impact tools and vibratory pile drivers shall have intake exhaust mufflers and/or acoustically attenuating shields or shrouds recommended by the manufacturers and approved by the Director of Public Works; the construction contractor shall avoid using water blasters; and the use of vehicles that are legally required to be equipped with backing warning alarms will be reduced to the extent feasible; and administrative controls as defined in the California Code of Regulations, Title 8 Sec. 1592 will be used for worker protection for backing movements by other vehicles. Hours of vibration-intensive activities, such as vibratory pile driving, shall be restricted to between 7:00 a.m. and 8:00 p.m.

6. HAZARDOUS MATERIALS: Projects that involve excavation of 50 cubic yards of soil in the Maher Z will comply with the Maher Ordinance (see Attachment C). Projects on sites that are not currently located in the Maher Zone but have the potential to contain hazardous materials in soil and/or groundwater will be referred to the Department of Public Health as newly identified Maher sites.

7. BIOLOGICAL RESOURCES: Public Works will comply with all local, State, and federal requirements for surveys, analysis, and protection of biological resources (e.g., Migratory Bird Treaty Act, Federal and State Endangered Species Acts, etc.). All project sites and the immediately surrounding area will be screened to determine whether biological resources may be affected by construction. If biological resources are present, a qualified biologist will carry out a survey of the project site to note the presence of general biological resources and to identify whether habitat for special-status species and/or migratory birds is present. If necessary, measures will be implemented to protect biological resources, such as installing wildlife exclusion fencing, establishing work buffer zones, installing bird deterrents, monitoring by a qualified biologist and other such measures. If tree removal is required, Public Works will comply with any applicable tree protection ordinance.

8. VISUAL AND AESTHETIC CONSIDERATIONS, PROJECT SITE: All project sites will be maintained in a clean and orderly state. Construction staging areas will be sited away from public view, and on currently paved or previously disturbed areas, where possible. Nighttime lighting will be directed away from residential areas and have shields to prevent light spillover effects. Upon project completion, project sites on City-owned lands will be returned to their general pre-project condition, including re-grading of the site and re-vegetation or re-paving of disturbed areas to the extent this is consistent with Public Works Bureau of Urban Forestry policy and San Francisco Code. Project sites on non-City land will be restored to their general

pre-project condition so that the owner may return them to their prior use, unless otherwise arranged with the property owner.

9. CULTURAL RESOURCES: All projects that will alter a building or structure, produce vibrations, or include soil disturbance¹ will be screened to assess whether cultural resources are or may be present and could be affected, as detailed below.

Archeological Resources. No archeological review is required for a project that will not entail soil disturbance. Projects involving soil disturbance will initially be screened by Public Works Regulatory Affairs staff to identify whether there is demonstrable evidence of prior soil disturbance at the project site to the maximum vertical and horizontal extent of the current project's planned disturbance. Public Works will complete the Public Works Preliminary Archeological Checklist (PAC), Part I only (see Attachment D). For projects where prior complete soil disturbance has occurred throughout areas of planned work, Public Works will provide evidence of the previous disturbance in the environmental application to be reviewed by EP Archeological staff.

- 1) For projects that are on previously undisturbed sites or where the depth/extent of prior soil disturbance cannot be documented, or where the planned project-related soil disturbance will extend beyond the depth/extent of prior soil disturbance, additional screening will be carried out as detailed below and shown on the flow chart titled "Public Works Standard Construction Measure #9 Archeological Assessment Process" (see Attachment E). The EP Archeologist will complete the Preliminary Archeological Checklist, Part II (PAC) for the project, which will include recommendations for one of three Standard Archeological Measures (I - Discovery, II – Monitoring, or III – Testing/Data Recovery) to be implemented by Public Works to protect and/or treat significant archeological resources identified as being present within the site and potentially affected by the project (see Attachments F, G, and H). Additional research and documentation, such as an Archeological Research Design and Treatment Plan (ARDTP), Archeological Sensitivity Study (ASA), or an archeological field survey, may also be requested by the EP Archeologist. These documents should be completed by a qualified consultant from the EP Archeological Resources Consultant Pool and should be scoped, reviewed, and approved by the EP Archeologist.
- 2) Public Works shall implement the PAC recommendations prior to and/or during project construction consistent with Standard Archeological Measures I, II, and III, and shall consult with the EP Archeologist in selecting a qualified archeological consultant from

¹ Soil is defined as native earthen deposits or introduced earthen fill. Soil does not include materials that were previously introduced as part of the roadway pavement section including asphalt concrete wearing surface, roadway base, and subbase.

the EP Archeological Resources Consultant Pool, as needed, to implement these measures.

- 3) Soil-disturbing activities in archeologically sensitive areas, as identified through the above screening, will not begin until required preconstruction archeological measures of the PAC (e.g., preparation of an Archeological Monitoring Plan, Archeological Treatment Plan, and/or an Archeological Research Design and Data Recovery Plan) have been implemented.

Public Works, the EP Archeologist and the ERO will revisit the PAC process outlined above one year after these measures are finalized.

Historic (Built Environment) Resources. Public Works will consult with CCSF Planning Department Preservation staff to determine if projects that would modify an existing building, structure, or landscape feature require preservation review and if a Historic Resource Evaluation (HRE) will be required. The HRE will be prepared by a qualified architectural historian and will be scoped with CCSF Planning Department Preservation staff. Where the potential for the project to have adverse effects on an historical resource is identified by CCSF Planning Department Preservation staff, the CCSF Planning Department Preservation Planner will consult with Public Works to determine if the project can be conducted as planned or if the project design can be revised to avoid the significant impact. If these options are not feasible, the project will need to undergo further environmental review with the CCSF Planning Department and mitigation may be required. If so, the project would not qualify for a Categorical Exemption from CEQA review.

Within historic districts established by ordinance, and/or mapped by the San Francisco Planning Department as eligible for or on the California Register of Historic Resources and/or the National Register of Historic Places, all distinctive sidewalk elements such as brick surfacing, brick gutters, granite curbs, cobblestones and non-standard sidewalk scoring, and streetscape elements that may include, but are not limited to, streetlights, sidewalk lights, sidewalk elevators and chutes, benches, and utility plates, that appear to be 45 years or older will be treated as potentially character-defining features of their respective historic districts. For those locations, historic materials will be protected in place (preferred method), salvaged and re-installed, or replaced in-kind to match the existing color, texture, material, and character of the existing condition.

Where construction will take place in proximity to a building or structure identified as a significant historical resource but would not otherwise directly affect it, Public Works will implement protective measures, such as but not limited to, the erection of temporary construction barriers to ensure that inadvertent impacts to such buildings or structures are avoided. These measures shall require the development of a Construction Best Practices for

Historical Resources Plan and a plan outlining the Construction Monitoring for Historical Resources Program to be reviewed and approved by CCSF Planning Department Preservation staff.

If a project includes or is directly adjacent to historic buildings or structures susceptible to vibration (such as but not limited to unreinforced masonry, earthen construction, lathe and plaster, or fragile architectural ornamentation) as determined in consultation with CCSF Planning Department Preservation staff, Public Works will determine if vibrations associated with proposed construction activities has the potential to cause damage to such buildings or structures. Generally, vibration below 0.12 inches per second peak particle velocity does not have the potential to damage sensitive buildings or structures. A vibration study may be necessary to determine if such vibration levels will occur. If Public Works determines in consultation with CCSF Planning Department Preservation staff that vibration damage may occur, Public Works will engage a qualified historic architect or historic preservation professional to document and photograph the pre-construction condition of the building and prepare a plan for monitoring the building during construction. The monitoring plan will be submitted to and approved by CCSF Planning Department Preservation Planner prior to the beginning of construction and will be implemented during construction. The monitoring plan will identify how often monitoring will occur, who will undertake the monitoring, reporting requirements on vibration levels, reporting requirements on damage to adjacent historical resources during construction, reporting procedures to follow if such damage occurs, and the scope of the preconstruction survey and post-construction conditions assessment.

If any damage to a historic building or structure occurs, Public Works will modify activities to minimize further vibration. If any damage occurs, the building will be repaired following the Secretary of the Interior's Standards for the Treatment of Historic Properties under the guidance of a qualified historic architect or historic preservation professional in consultation with CCSF Department Preservation Planner.

cc: Lisa Gibson, Environmental Review Officer, San Francisco Planning Department

ATTACHMENTS

- A. Construction Dust Measures
- B. Clean Construction Measures
- C. Maher Compliance
- D. Public Works Preliminary Archeological Checklist (PAC)

- E. Flow Chart: Public Works Standard Construction Measure #9 Archeological Assessment Process
- F. Public Works Archeological Measure I (Archeological Discovery)
- G. Public Works Archeological Measure II (Archeological Monitoring)
- H. Public Works Archeological Measure III (Archeological Testing/Data Recovery)

Attachment A: Public Works Dust-Control Measures

For the purposes of this document, “sensitive receptor” means residence, school, childcare center, hospital or other health-care facility or group living quarters, and “visible dust” means dust comprising visible emissions as defined in Bay Area Air Quality Management Board Regulation 6 – Particulate Matter.

For all projects, Public Works will institute through its construction specifications the following dust-control measures to achieve a goal of no visible dust emissions:

- Clean up spillage on City streets, whether directly or indirectly caused by construction operations.
- Remove demolition debris from the Site no later than the end of each workday. Any hazardous materials and/or suspected hazardous materials stored on site shall be stored in accordance with all applicable Cal EPA regulations, including being stored in proper containers and being protected from exposure from the elements. Any such materials shall be removed from the site as soon as possible for disposal/recycling in accordance with all applicable statutes and regulations.
- Keep the Site and adjacent areas clean and perform wet sweeping at the end of each shift.
- Perform continuous water spraying during dust generating activities. Mist or spraying shall be conducted in such a way as to prevent puddling or generation of runoff. Mist any immediate area of demolition with a water spray to prevent airborne dust particles.
- Wet all exposed soil surfaces at least three times daily during dry weather or more frequently if dust is blowing or if required by the City. Any serpentine residuals on the street shall be wet swept immediately.
- Use dust enclosures, curtains, and dust collectors as necessary to control dust.
- Load haul trucks, hauling debris, soils, sand or other such materials so that the material does not extend above the walls or back of the truck bed. Wet before covering and tightly cover the surface of each load before the haul truck leaves the loading area.
- Limit vehicle speed limit on unpaved roads to 15 miles per hour (mph).
- Cover any inactive (no disturbance for more than seven days) stockpiles greater than ten cubic yards or 500 square feet of excavated materials, backfill material, import material, gravel, sand, road base, and soil with a 10 mil (0.01 inch) polyethylene plastic or equivalent tarp and brace it down or use other equivalent soil stabilization techniques.
- Reclaimed water will be used for all dust-control operations to the extent feasible (without resorting to extraordinary means and measures) and allowed by law.

If the project grades or excavates more than one half acre surface area at any given time, and the project is within 1,000 feet of a sensitive receptor as defined above, Public Works or its contractor shall prepare a Site-Specific Dust Control Plan for the review and approval of the Department of Public Health. The site-specific dust control plan shall contain mapping identifying locations of sensitive receptors and contain additional site-specific dust monitoring and control measures that will apply to the project. These site-specific measures may include the following or equivalent measures, which accomplish the goal of minimizing visible dust:

- Wetting down areas around soil improvement operations, visibly dry disturbed soil surface areas, and visibly dry disturbed unpaved driveways at least three times per shift per day.
- Analysis of the wind direction.
- Placement of upwind and downwind particulate dust monitors.
- Recordkeeping for particulate monitoring results.
- Hiring of an independent third party to conduct inspections for visible dust and keeping records of those inspections.
- Requirements for when dust generating operations have to be shut down due to dust crossing the property boundary or if dust is contained within the property boundary but not controlled after a specified number of minutes.
- Establishing a hotline for surrounding community members to call and report visible dust problems so that Public Works or its contractor can promptly fix those problems; posting signs around the site with the hotline number and making sure that the number is given to adjacent residents, schools and businesses.
- Limiting the area subject to excavation, grading, and other demolition or construction activities at any one time.
- Minimizing the amount of excavated material or waste materials stored at the site.
- Installing dust curtains, plastic tarps or windbreaks, or planting tree windbreaks on the property line on windward and down windward sides of construction areas, as necessary.
- Paving, applying water three times daily, or applying non-toxic soil stabilizers on all unpaved access roads, parking areas and staging areas at the construction site. Reclaimed water must be used if required by Article 21, Section 1100 et seq. of the San Francisco Public Works Code, Article 22. If not required, reclaimed water should be used whenever possible.
- Establishing speed limits so that vehicles entering or exiting construction areas shall travel at a speed that minimizes dust emissions. This speed shall be no more than 15 mph.
- Installing wheel washers to clean all trucks and equipment leaving the construction site. If wheel washers cannot be installed, tires or tracks and spoil trucks shall be brushed off before they re-enter City streets to minimize deposition of dust-causing materials.
- Terminating excavation, grading, and other construction activities when winds speeds exceed 25 mph.
- Hydroseeding inactive construction areas, including previously graded areas inactive for at least 10 calendar days, or applying non-toxic soil stabilizers.
- Sweeping of surrounding streets during demolition, excavation and construction at least once per day to reduce particulate emissions.

SECTION 01 35 48

**ADDITIONAL CLEAN CONSTRUCTION REQUIREMENTS ON MAJOR
CONSTRUCTION PROJECTS**

PART 1 – GENERAL

1.01 SUMMARY

- A. This Section 01 35 48 incorporates additional requirements of the San Francisco Clean Construction Ordinance (“Ordinance”) for projects that meet the requirements of Environment Code Section 2504(a), which are located in the Air Pollutant Exposure Zone and which are within 1,000 feet of a Sensitive Use, as set forth in Chapter 25 of the Environment Code and Section 6.25 of the Administrative Code.
- B. For projects that meet Environment Code Section 2504(b), which are located outside the Air Pollutant Exposure Zone, or which are in the Air Pollutant Exposure Zone but are not within 1,000 feet of a Sensitive Use, refer to Section 00 73 73, Article "CLEAN CONSTRUCTION REQUIREMENTS ON MAJOR CONSTRUCTION PROJECTS."
- C. The Department of the Environment is responsible for administering the Ordinance. For more information about the Ordinance and its implementation, please visit the Department of Public Health website at:
<https://www.sfdph.org/dph/EH/Air/CleanConstruction.asp> and
https://www.sfdph.org/dph/files/EHSdocs/AirQuality/San_Francisco_Clean_Construction_Ordinance_2015.pdf.

1.02 DEFINITIONS

- A. "Air Pollutant Exposure Zone" means a zone having a substantially greater than average concentration of air pollutants as defined in Health Code Section 3804.
- B. "Alternative Fuels" means any transportation fuel that is less polluting than gasoline or petroleum diesel fuel, as determined by the California Air Resource Board and that is shown to have lower lifecycle carbon emissions than gasoline or petroleum diesel. Alternative Fuels may include, but are not limited to: natural gas; propane; biofuels from low carbon, sustainable and preferably local sources; hydrogen produced from low carbon and/or renewable sources; and electricity.
- C. "Alternative Sources of Power" means utility-based electric power or other power sources other than diesel engines.
- D. "ARB" means the California Air Resources Board.

- E. "Clean Construction" means the performance of all work required to be performed under a Public Works contract meeting the requirements in Sections 2504, 2505 and 2506 of the Environment Code, as applicable.
- F. "Construction" means building, demolition, excavation, grading or foundation work, whether or not the work requires a City permit.
- G. "Construction Activities" means the performance of all work involved in or required for Construction, except for the issuance or obtaining of a site permit for a project.
- H. "Construction Phase" means a particular construction activity over a certain period of time. Construction phases may include, but are not limited to, demolition, site preparation, grading, building construction, architectural coatings, and paving. Multiple Construction Phases of a single project may take place at the same time.
- I. "Equipment" means off-road and on-road equipment.
- J. "Equipment Type" means a category of off-road equipment. Types of off-road equipment include bore/drill rigs, cranes, crawler tractors, excavators, graders, off-highway tractors, off-highway trucks, other construction equipment, pavers, paving equipment, rollers, rough terrain forklifts, rubber-tired dozers, rubber-tired loaders, scrapers, skid steer loaders, surfacing equipment, tractors/loaders/backhoes, and trenchers.
- K. "Major Construction Project" means a public work to be performed within the geographic limits of the City that uses off-road equipment and that is estimated to require 20 or more cumulative days of work, including non-consecutive days, to complete.
- L. "Most Effective Verified Diesel Emission Control Strategy" means a device, system or strategy that is verified, pursuant to Division 3, Chapter 14, of Title 13 of the California Code of Regulations, to achieve the highest level of pollution control from an off-road vehicle.
- M. "Off-Road Engine" means a non-road engine as defined in Title 40 of the Code of Federal Regulations, Section 89.2.
- N. "Off-Road Equipment" means equipment with an off-road engine having greater than 25 horsepower and operating for more than 20 total hours over the entire duration of Construction Activities.
- O. "On-Road Equipment" means a heavy-duty vehicle as defined in Title 40 of the Code of Federal Regulations, Section 86.1803-01.
- P. "Portable Diesel Engine" means a diesel engine that is portable as defined in 71 California Code of Regulations, Section 93116.2(bb).

- Q. "Sensitive Use" means a category of building use identified as a "Sensitive Use" in Health Code Section 3804.
- R. "Tier 2 Off-Road Emission Standards" means the Tier 2 new engine emission standards in Title 13, California Code of Regulations, Section 2423(b)(1)(A) and/or Title 40, Code of Federal Regulations, Part 89.112(a).
- S. "VDECS" means a verified diesel emission control strategy, designed primarily for the reduction of diesel particulate matter emissions, which has been verified by ARB pursuant to "Verification Procedures, Warranty and In-Use Strategies to Control Emissions from Diesel Engines," Title 13, California Code of Regulations, Sections 2700-2710. VDECS can be verified to achieve Level 1 diesel particulate matter reductions (at least 25 percent), Level 2 diesel particulate matter reductions (at least 50 percent), or Level 3 diesel particulate matter reductions (at least 85 percent).

1.03 SUBMITTALS

- A. Construction Emissions Minimization Plan:
 - 1. Contractor shall submit its initial Construction Emissions Minimization Plan no less than 28 days prior to mobilization. (See Subsection 1.04B.)
 - 2. Contractor shall submit an updated Construction Emissions Plan on a quarterly basis in compliance with Subsection 1.04B.5.a, and submit each quarterly report within seven business days of the end of each quarter.
 - 3. Contractor shall submit a final Construction Emissions Minimization Plan report summarizing construction activities within two weeks of achieving Substantial Completion in compliance with Subsection 1.04B.5.b.
- B. Clean Construction Emissions Plan Certification Statement: Contractor shall submit this statement with its Construction Emissions Minimization Plan. (See Subsection 1.04B.3.)
- C. Waiver Request: Contractor shall submit a waiver request to the Department Head no less than two weeks prior to the planned use of a specific piece of off-road equipment. (See Subsection 1.05A.)

1.04 REQUIREMENTS FOR MAJOR CONSTRUCTION PROJECTS WITHIN THE AIR POLLUTANT EXPOSURE ZONE

- A. For all Major Construction Projects that meet the requirements of Environment Code Section 2504(a) and which are located in the Air Pollutant Exposure Zone and within 1,000 feet of a Sensitive Use, the following requirements apply:
 - 1. All off-road equipment shall have engines that (a) meet or exceed either United States Environmental Protection Agency or ARB Tier 2 off-road

emission standards, and (b) have been retrofitted with an ARB Level 3 VDECS. Equipment with engines meeting Tier 4 Interim or Tier 4 Final off- road emission standards automatically meet this requirement. See Section 1.05A regarding the procedure for requesting a waiver to this requirement.

2. Where access to alternative sources of power is available, use of portable diesel engines to perform work on the project shall be prohibited. See Section 1.05B regarding the waiver procedure for this requirement.
 3. Diesel engines, whether for off-road or on-road equipment, shall not be left idling for more than two minutes at any location, except as allowed for in applicable state regulations regarding idling for off-road and on-road equipment (e.g., traffic conditions, safe operating conditions). The Contractor shall post legible and visible signs, in English, Spanish, and Chinese, in designated queuing areas and at the construction site to remind operators of the idling limit. Refer to the following link for the Clean Construction Sign Template:
<https://www.sfdph.org/dph/EH/Air/CleanConstruction.asp>.
 4. The Contractor shall instruct construction workers and equipment operators on the maintenance and tuning of construction equipment, and require that such workers and operators properly maintain and tune equipment in accordance with manufacturer specifications.
- B. Construction Emissions Minimization Plan: All Major Construction Projects that meet the requirements of Environment Code Section 2504(a), which are located in the Air Pollutant Exposure Zone and are within 1,000 feet of a Sensitive Use, also must comply with the following requirements:
1. Before starting on-site Construction Activities, the Contractor shall submit a Construction Emissions Minimization Plan ("Emissions Plan") to the City Representative for review and approval. The Emissions Plan shall state, in reasonable detail, how the Contractor will meet the requirements of Section 2505 of the Environment Code.
 2. The Emissions Plan shall include estimates of the construction timeline by phase, with a description of each piece of off-road equipment required for each Construction Phase.
 - a. The description may include, but is not limited to: equipment type, equipment manufacturer, equipment identification number, engine model year, engine certification (Tier rating), horsepower, engine serial number, and expected fuel usage and hours of operation.
 - b. For the VDECS installed, the description may include, but is not limited to: technology type, serial number, make, model,

- manufacturer, ARB verification number level, and installation date and hour meter reading on installation date.
- c. For off-road equipment using alternative fuels, the description shall also specify the type of alternative fuel.
 - d. Contractor may use the Clean Construction Equipment Inventory Template to satisfy the Emissions Plan requirements. Refer to the following link for that template:
<https://www.sfdph.org/dph/EH/Air/CleanConstruction.asp>.
3. The Contractor agrees to comply fully with the Emissions Plan and acknowledges that a significant violation of the Emissions Plan shall constitute a material breach of the Agreement. Contractor must submit a signed Clean Construction Emissions Plan Certification Statement to the City Representative. Refer to the following link for the Emissions Plan Certification Statement Template:
<https://www.sfdph.org/dph/EH/Air/CleanConstruction.asp>.
4. After City review and approval, the Contractor shall make the Emissions Plan available to the public for review onsite during working hours.
- a. The Contractor shall post at the construction site a legible and visible sign summarizing the Emissions Plan. Refer to the following link for the Clean Construction Sign Template:
<https://www.sfdph.org/dph/EH/Air/CleanConstruction.asp>.
 - b. The sign shall also state that the public may ask to inspect the Emissions Plan for the project at any time during working hours, and shall explain how to request to inspect the Emissions Plan.
 - c. The Contractor shall post at least one copy of the sign in a visible location on each side of the construction site facing a public right-of-way.
5. Reporting:
- a. After Construction Activities begin, the Contractor shall update the Emissions Plan on a quarterly basis documenting changes from the original plan and demonstrating compliance with the Emissions Plan. The report shall be submitted to the City Representative quarterly and a copy shall also be maintained at the construction site.
 - b. Prior to receiving a Notice of Final Completion, or within six months of completion of Construction Activities if a final certificate of acceptance is not required, the Contractor shall submit to the City Representative a final report summarizing Construction Activities, including the start and end dates and duration of each Construction Phase, and the specific information required in the Emissions Plan.

1.05 WAIVERS

A. Waivers Under Subsection 1.04A.

1. The Contractor may request to waive the equipment requirements of Paragraph 1.04A.1 if: (a) a particular piece of off-road equipment with an ARB Level 3 VDECS is technically not feasible; (b) the equipment would not produce desired emissions reduction due to expected operating modes; (c) installation of the equipment would create a safety hazard or impaired visibility for the operator; or, (d) there is a compelling emergency need to use off-road equipment that is not retrofitted with an ARB Level 3 VDECS.
2. Contractor shall submit a waiver request to the Department Head, or designee, no less than two weeks prior to the planned use of a specific piece of off-road equipment.
3. If the Department Head, or designee, grants the waiver specified in Section 1.05A.1, the Contractor must use the next cleanest piece of off-road equipment, according to Table 1, below.

| <i>Table 1</i> Off-Road Equipment Compliance Step Down Schedule* | | |
|--|---------------------------------|--------------------------|
| Compliance Alternative | Engine Emission Standard | Emissions Control |
| 1 | Tier 2 | ARB Level 2 VDECS |
| 2 | Tier 2 | ARB Level 1 VDECS |
| 3 | Tier 2 | Alternative Fuel** |
| * If the City determines that the equipment requirements cannot be met, the Contractor must meet Compliance Alternative 1. If the City determines that the Contractor cannot supply off-road equipment meeting Compliance Alternative 1, then the Contractor must meet Compliance Alternative 2. If the City determines that the Contractor cannot supply off-road equipment meeting Compliance Alternative 2, then the Contractor must meet Compliance Alternative 3. | | |
| ** Alternative fuels are not a VDECS | | |

B. Waivers Under Subsection 1.04A.2.

1. The Department Head, or designee, may waive the alternative source of power requirement set forth in Subsection 1.04A.2 if an alternative source of power is limited or infeasible at the project site. If the City grants the waiver, the Contractor must submit documentation that the equipment used for onsite power generation meets the requirements of Subsection 1.04A.1, above.

- C. All Other Waivers: The Department Head or designee also may waive the requirements of the Ordinance on the grounds set forth in Section 2507 of the Environment Code.
- D. For any waiver granted in this Subsection 1.05, the City Representative will within two business days prepare a written notice of the waiver and a written memorandum explaining the basis for the waiver and the steps that will be taken to safeguard public and City employee health during the noncomplying work. The memorandum will also state the steps that the City and the Contractor will take to minimize the use of noncomplying equipment or engines during the noncomplying work.

1.06 NONCOMPLIANCE AND PENALTIES

- A. Liquidated Damages: By entering into the Agreement, Contractor and City agree that if Contractor uses off-road equipment and/or off-road engines in violation of the Clean Construction requirements set forth in Administrative Code Section 6.25 and Chapter 25 of the Environment Code, the City will suffer actual damages that will be impractical or extremely difficult to determine. Accordingly, Contractor and the City agree that Contractor shall pay the City the amount of \$100 per day per each piece of off-road equipment and each off-road engine used to complete Work on the Project in violation of the Ordinance. Such amount shall not be considered a penalty, but rather agreed monetary damages sustained by City because of Contractor's failure to comply with the Clean Construction requirements.
- B. False Representations: False representations by the Contractor, in connection with the bidding, execution or performance of any City contract, regarding the nature or character of the off-road equipment and/or off-road engines to be utilized, on the contract, or to the City about the nature or character of the off-road equipment and/or off-road engines actually used may subject the Contractor to the consequences of noncompliance specified in Section 2510 of the Environment Code, including but not limited to the penalties prescribed therein. The assessment of penalties for noncompliance shall not preclude the City from exercising any other rights or remedies to which it is entitled.

END OF SECTION

Maher Ordinance Screening Request

For a project to which you have been assigned as a Public Works project manager, complete the top of this form and submit to SAR, with plan showing the limits of excavation and of known Maher locations in the work area.

Project Name: _____ JO# _____ Date submitted: _____

Submitted by: _____ Date requested by (minimum of 20 working days): _____

Describe the general project scope, and give details of ground-disturbing activities:

Describe the project location(s). For work in parcels, provide street addresses. For work in the public right-of-way, provide street addresses for the beginning and ends of each street segment in which work will be done:

Estimated volume of excavated native material or earthen fill that the project will generate: yd³ Does the project require a building or grading permit from DBI? Yes No

FOR SITE ASSESSMENT & REMEDIATION USE

SA&R: Complete this section, initial, and forward to Project Manager and Regulatory Affairs Manager:

Date returned to PM: _____ Initial: _____ Date forwarded to RA: _____ Initial: _____

- Project does not meet excavation-volume threshold and/or intersect with a known Maher site. Maher does not apply.
- Project does not require a building or grading permit from the Department of Building Inspection. This includes all projects for the repair and replacement ("R&R") of existing structures in the public right-of-way for end-of-life replacement and/or to address structural inadequacies found during regular inspection. Per Health Code §22A.3 and Building Code §106A.2.4, the Maher Ordinance does not apply.
- Project does not require a building or grading permit and Maher does not apply, but the project will require construction specifications for protection for workers and the public, and for hazardous-materials handling and disposal to meet state and federal regulatory requirements. Please budget an estimated \$_____ for specification development.
- Project requires a building permit and/or grading permit and will bring to the surface 50 or more cubic yards of native material or earthen fill. A Maher application is required. Please budget an initial \$_____ in SFPH fees. We anticipate that the following will also be required:
 - Site history (Phase I ESA).
 - Phase II / Phase II workplan.
 - With site mitigation plan.
 - With site mitigation report/ Environmental inspection.

Recommended by: _____

Signature

Print Name

Date

To complete this form, you will need the following information:

You will need to know that approximate total amount of excavated earth and earthen fill your project will bring to the surface, both permanent excavation and excavation that later will be backfilled. The key to whether or not activities add to your Maher total is whether or not the material brought up is earth or earthen fill -- roadway base, for example, does not count -- and whether or not it is brought to the surface -- pile driving does not count, but the spoils of holes drilled for piles will.

The easiest way to arrive at an approximate total is to classify excavations by type. For example, your project may have 12 pole footings, and two linear trenches. Each footing requires excavation of an area approximately 5' x 5' to a depth of 5'. There are 12 of these, so $5' \times 5' \times 5' \times 12 = 1,500 \text{ ft}^3$. For the trenches, one is 10' deep, 5' wide, and 40' long, and the other is 8' deep, 5' wide, and 20' long. This would be $(10' \times 5' \times 40') + (8' \times 5' \times 20') = 2,800 \text{ ft}^3$. Together, the total excavation for Maher is about 150 yd³, which would go over the 50 yd³ limit that triggers Maher screening.

You'll need to provide a brief description of your project. Provide a general scope of your project (whether it is a streetscape project, a building-rehabilitation project, etc.) and provide details on the construction activities that will disturb the soil. For example, discuss the pole footings and the excavation that will accompany their construction. Provide identifiable project location(s). If your project is on a parcel, give the project address. If the project is in the public right-of-way, give, at a minimum, the street addresses at the beginning and end of each street segment. If the project is on a large public parcel (such as a park/open space), give enough information so that the location can clearly be identified.

You will need to provide mapping of your excavations with the Maher mapping overlain in order to facilitate SAR's presentation of your project information to San Francisco Public Health (SFPH), who oversee Maher compliance. Present the layers of your plans that contain the bulk of your excavation activities, and overlay the Maher Map. Maher mapping in GIS and DWG form can be found on the Public Works GIS server at \\dpwhyd1\boe5m\sfgGeology\MaherSitesAndBlocks. (You may have \\dpwhyd1\boe5m mapped as the K: drive.)

Email this mapping along with the filled-out (top section only) digital version of the PDF form to the Site Assessment and Remediation (SAR) section. SAR will respond (after a minimum of 20 working days) with an assessment of whether or not your project requires further action, and what this action will be.

SAR: Stanley DeSouza <stanley.desouza@sfdpw.org>

Regulatory Affairs: Boris Deunert <boris.deunert@sfdpw.org>



SAN FRANCISCO PLANNING DEPARTMENT

San Francisco Public Works Preliminary Archeological Checklist (PAC)

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

Reception:
415.558.6378

Fax:
415.558.6409

Planning
Information:
415.558.6377

PART I - PROJECT INFORMATION:

Date: _____ Public Works RA Staff: _____

Project name: _____ Case No: _____

Application type: EE CatEx

Project address: _____

APN/Cross streets: _____

EP Planner: _____ EP Archeologist: _____

Consultant Archeologist name/firm (if applicable): _____

1. PROJECT DESCRIPTION: (include description of construction methods, all potentially ground-disturbing activities including parking, staging, equipment and spoils storage, temporary and permanent work areas, utility lines)

2. POTENTIAL GROUND DISTURBANCE

| | | |
|--------------------------|--------------------------|---|
| Yes | No | Project Component |
| <input type="checkbox"/> | <input type="checkbox"/> | Excavation (basement, elevator, utilities, seismic retrofit, remediation, underground vaults, septic tank system, culverts, etc.) |

Maximum depth: _____

2. POTENTIAL GROUND DISTURBANCE (cont.)

- Pipeline replacement or installation (specify cut and cover, directional drilling, pipe bursting, etc):
- Tunnels, transport storage boxes
- Bore pits, test pits
- Shallow Building Foundation (Mat, Spread Footings, etc.)
Depth:
- Piles, piers, micropiles, pilings, piling replacement
- Grading, scraping
- Demolition
- Construction staging, spoils on unpaved area, fill
- Road construction
- Geotechnical trenching (dimensions)_____
- New rip rap
- Wharf or seawall modification
- Other (specify):

Anticipated maximum extent of project ground disturbance:

Vertical_____Horizontal_____

APE Map Attached Y N

3. PREVIOUS SOILS DISTURBANCE AT PROJECT SITE:

Has the project site been previously disturbed by any of the following?

- | Yes | No | Component of disturbance |
|--------------------------|--------------------------|---|
| <input type="checkbox"/> | <input type="checkbox"/> | Existing Basement Depth:_____ Area:_____ |
| <input type="checkbox"/> | <input type="checkbox"/> | Existing Foundation (footings, perimeter, piles, micropiles, etc.) Depth: |
| <input type="checkbox"/> | <input type="checkbox"/> | Site remediation/UST installation or removal, other excavation. Depth: |
| <input type="checkbox"/> | <input type="checkbox"/> | Site Grading |
| <input type="checkbox"/> | <input type="checkbox"/> | Demolition |
| <input type="checkbox"/> | <input type="checkbox"/> | Dredging |
| <input type="checkbox"/> | <input type="checkbox"/> | Piling installation (width and depth of trench):_____ |
| <input type="checkbox"/> | <input type="checkbox"/> | Riprap |
| <input type="checkbox"/> | <input type="checkbox"/> | Seawall construction |
| <input type="checkbox"/> | <input type="checkbox"/> | Other (specify): |

4. Has the entire project area previously been disturbed to the maximum depth and extent of proposed project disturbance? Y N

(Attach documentary evidence such as plans and profiles of prior trenching, utility street occupancy, historic photos, specifications from prior projects, etc.)

List attachments provided:_____

Complete prior disturbance adequately documented. No further archeological assessment is required. EP Archeologist Concur:_____

Prior ground disturbance is unknown or cannot be adequately documented; Part II Required.

PART II - ARCHEOLOGICAL DATA ASSESSMENT

1. ARCHIVAL AND DATA REVIEW

Dates of review: _____

Resources reviewed:

- Maher zone maps. Dates/ origin/ depth of fill if known _____
 - Geotechnical data for project site and vicinity. Report _____
 - EP Archeological GIS maps (all layers or specify applicable layers) _____
-
- Sanborn Insurance maps (1887-93, 1899-1900)
 - U.S. Coast Survey maps (1853, 1857, 1869)
 - Information Center archeological records search (attach request and response)
 - NAHC Sacred Lands File
 - Native American/ Ethnic group consultation
 - Other: _____
 - Historical Maps or other information provided by Public Works

2. ARCHEOLOGICAL FIELD INVENTORY

- Not warranted; no exposed ground surface in project area
- Results negative
- Results positive
- Survey results inconclusive

Archeologist/ Firm _____ Date of Survey _____

Attach Archeological Survey Report/Memo; may combine with results of archival review.

3. SUMMARY OF RESULTS OF PROJECT ASSESSMENT

Site History/Formation:

Recorded/documented archeological sites/ investigations on/in the vicinity of the project site:

4. CONCLUSIONS AND RECOMMENDATIONS

a) **NO EFFECTS TO ARCHEOLOGICAL RESOURCES EXPECTED:**

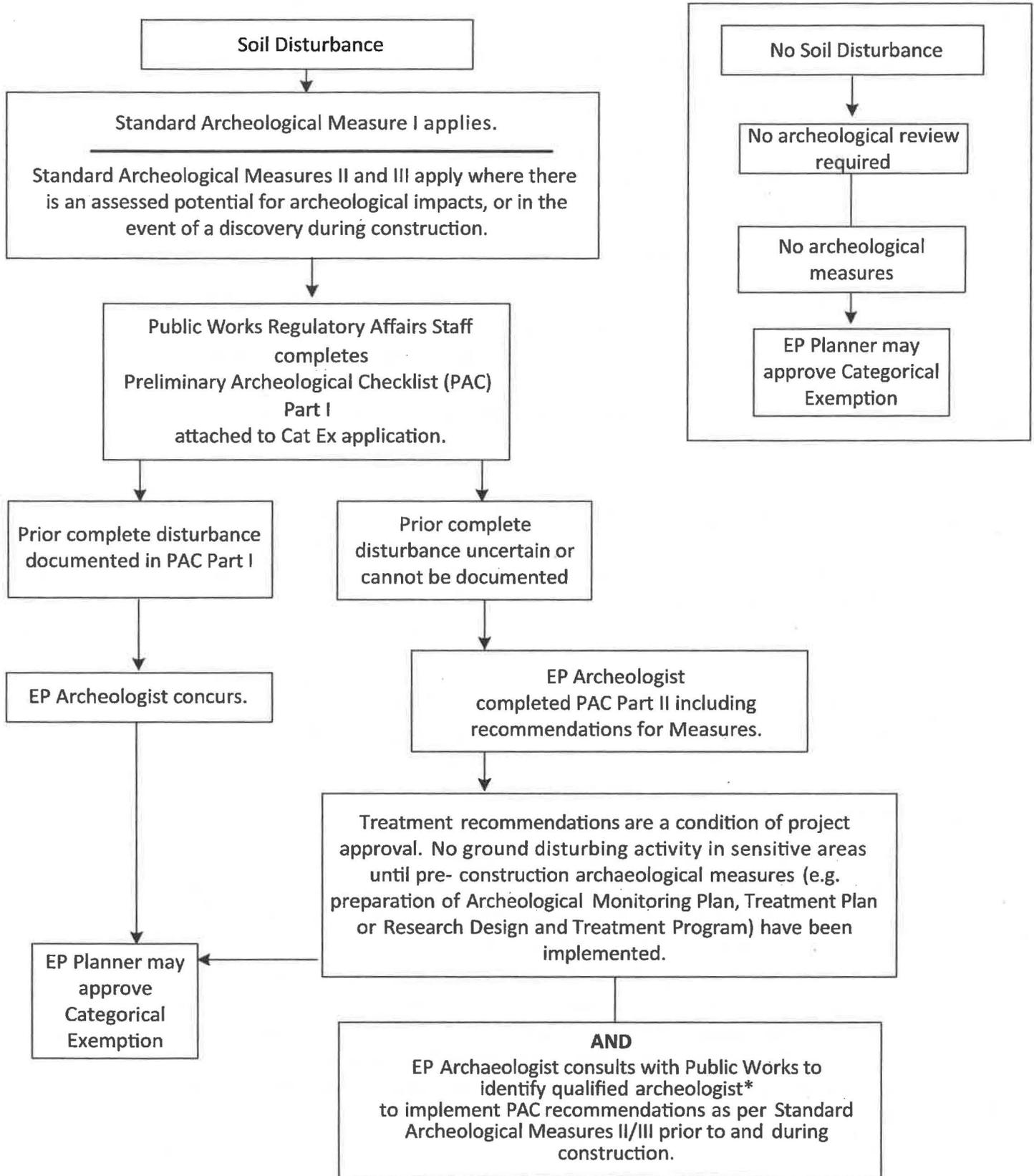
- Project effects limited to previously-disturbed soils
- Project effects limited to culturally sterile soils
- Based on assessment above, no potentially CEQA-significant archeological resources are expected within project area affected soils.

b) **AVOIDANCE AND TREATMENT MEASURES NECESSARY TO AVOID AN ADVERSE EFFECT TO SIGNIFICANT ARCHEOLOGICAL RESOURCES:**

- Discovery: potential to adversely affect archeological resources; may be avoided by implementation of **Public Works Standard Archeological Measure I** (Discovery during Construction), with implementation of Standard Archeological Measures II (Monitoring) and/or III (Testing/ Data Recovery) in the event of a discovery during construction.
- Monitoring: some potential for the project to adversely affect archeological resources; may be avoided by implementation of **Public Works Standard Archeological Measure II** (Archeological Monitoring) during construction.
- Testing/Data Recovery: potential of the project to adversely affect archeological resources; may be avoided by implementation of **Public Works Standard Archeological Measure III** (Archeological Testing/Data Recovery)
Implementation Require:
 prior to or during construction.
- CEQA evaluation of the project requires preparation and implementation of an archeological research design and treatment plan (ARDTP) by a qualified archeological consultant. See attached scope of work for the ARDTP

Attachment E:

Public Works Standard Construction Measure #9 Archeological Assessment Process



* Archeologist or archeological consultant who meets the Secretary of the Interior's Professional Qualifications Standards (36 CFR 61) as defined in Standard Archeological Measure I.

Attachment F: Public Works Archeological Measure I (Archeological Discovery)

The following requirements are applicable to:

- All projects that will include soil disturbance,
- Any discovery of a potential historical resource or of human remains, with or without an archeological monitor present.

Prior to ground disturbing activities:

A. Alert Sheet. Public Works shall, prior to any soils disturbing activities, distribute the Planning Department archeological resource "ALERT" sheet to each project contractor or vendor involved in project-related soils disturbing activities; ensure that each contractor circulates it to all field personnel; and provide the Environmental Review Officer (ERO) with a signed affidavit from each contractor confirming distribution to all field personnel.

Upon making a discovery:

B. Work Suspension. Should a potential archeological resource be encountered during project soils disturbing activity, with or without an archeological monitor present, the project Head Foreman shall immediately suspend soils-disturbing activities within 50 feet (15 meters) of the discovery in order to protect the find from further disturbance, and notify the Public Works Project Manager (PM) and/or environmental planning staff, who shall immediately notify the ERO for further consultation.

C. Qualified Archeologist. All archeological work conducted under this measure shall be performed by an archeologist who meets the Secretary of the Interior's Professional Qualifications Standards (36-CFR 61); consultants will be selected in consultation with the ERO and meeting the criteria or specialization required for the resource type as identified by the ERO in a manner consistent with Public Works's on-call contracting requirements.

D. Assessment and Additional Measures. If the ERO determines that the discovery is a potential archeological/historical resource, the archeologist, in consultation with the ERO, shall document the find, evaluate based on available information whether it qualifies as a significant historical resource under the CEQA criteria, and provide recommendations for additional treatment as warranted. The ERO will consult with Public Works and the qualified archeologist on these recommendations and may require implementation of additional measures as set forth below in Archeological Measures II and III, such as preparation and implementation of an Archeological Monitoring Plan, an Archeological Testing Plan, and/or an Archeological Data Recovery Plan, and including associated research designs, descendant group consultation, other reporting, curation, and public interpretation of results.

E. Report Reviews. All plans and reports prepared by an archeological consultant, as specified herein, shall be submitted first and directly to the ERO for review and comment with a copy to the Public Works and shall be considered draft reports subject to revision until final approval by the ERO.

F. Draft and Final Archeological Resources Reports. For projects in which a significant archeological resource is encountered and treated during project implementation (see Archeological Measures II and III), the archeological consultant shall submit a draft Final Archeological Resources Report (FARR) to the ERO that evaluates the historical significance of any discovered archeological resource and describes the archeological and historical research methods employed in the archeological testing/monitoring/data recovery program(s) undertaken, research questions addressed, and research results. Information that may put at risk any archeological resource shall be provided in a separate, removable insert within the draft final report.

Once approved by the ERO, copies of the FARR shall be distributed as follows: two copies to the applicable California Historic Information System Information Center (CHRIS), one copy to each descendant group involved in the project, and documentation to the San Francisco Planning Department of transmittal of the above copies. In addition, the Planning Department shall be provided one bound, one unbound and one unlocked, searchable PDF copy on CD of the FARR, which shall include copies of any formal site recordation forms (CA DPR 523 series) and/or National Register of Historic Places/California Register of Historical Resources nominations.

G. Other Reports. In instances of high public interest or interpretive value, the ERO may require different or additional final report content, format, and distribution than that presented above.

H. Human Remains, Associated or Unassociated Funerary Objects. Public Works shall ensure that human remains and associated or unassociated funerary objects discovered during any soils disturbing activity are treated in compliance with applicable State and federal laws. In the event of the discovery of potential human remains, the construction contractor shall ensure that construction activity within 50 feet of the find is halted and the Public Works PM, ERO, and the County Coroner are notified immediately. If the Coroner determines that the remains are of Native American origin, he/she will notify the California State Native American Heritage Commission. Subsequent consultation on and treatment of the remains shall be conducted consistent with Public Resources Code Section 5097.98 and CEQA Guidelines Section 15064.5(d), in consultation with the ERO.

I. Consultation with Descendant Communities. Consistent with AB 52 requirements, if requested, Public Works shall provide opportunities for Native American descendant groups to provide input during project planning for projects that may affect potential Tribal Cultural Resources. In addition, on discovery during construction of an archeological site associated with descendant Native Americans, the Overseas Chinese, or other descendant group, an appropriate representative of the descendant group shall be contacted by Public Works at the direction of the ERO. Public Works will offer this representative the opportunity to monitor archeological field investigations of the site and to consult with the ERO regarding the appropriate treatment and, if applicable, interpretation of the site and the recovered materials.

J. Construction Delays. Archeological monitoring and/or data recovery programs required by this measure may suspend construction of the project for up to a maximum of four weeks. At the direction of the ERO, the suspension of construction can be extended beyond four weeks only if this is the only feasible means to reduce potential effects on a significant archeological find to a less-than-significant level.

Attachment G. Public Works Archeological Measure II (Archeological Monitoring)

A. Archeological Monitoring Plan (AMP). Where an archeological field investigation to identify expected buried or submerged resources cannot reasonably be carried out during project planning/ environmental review (for example, where definitive determination would require extensive street opening prior to construction), prior to any project-related soils-disturbing activities the qualified archeologist identified under Archeological Measure I.C. shall consult with Public Works and the ERO to develop an Archeological Monitoring Plan (AMP). The AMP which will be implemented in conjunction with soil-disturbing activities during construction. Preparation and implementation of an AMP also may be required based on the results of pre-construction archeological testing or upon a discovery during construction.

The AMP shall include the following elements, at minimum:

- Historical context and research design for assessment of resource types likely to be encountered;
- Project activities to be archeologically monitored and intensity of monitoring of each type and location of project construction activity; and
- Procedures for the documentation, significance and integrity assessment, treatment, interpretation and reporting of the types of resources likely to be encountered.

B. Reporting. Whether or not significant archeological resources are encountered, the archeological consultant shall submit a written report of the findings of the monitoring program to the ERO at the end of construction (See Archeological Measure I.E [Report Reviews] and I.F. [Draft and Final Archeological Research Report]).

C. Monitoring Authorities

- The archeological monitor will have the authority to halt construction activity at the location of a suspected resource for inspection, documentation, and assessment of the need for further measures as set forth in Archeological Measure III.
- The Archeological Monitor shall record and be authorized to collect soil samples and artifactual/ecofactual material as warranted for analysis.
- The Archeological Monitor(s) shall be present on the project site according to a schedule identified in the AMP, subject to modification upon ERO concurrence, based on findings.

D. Testing/Data Recovery. In the event of a discovery during construction, if the ERO and archeological consultant determine that the discovery is a significant resource (that is, a

resource that meets the eligibility criteria of the California Register of Historic Resources or qualifies as a unique archeological resource) that will be adversely affected (that is, where the project would result in loss of data potential) or that additional investigation is required to make this determination, all applicable elements of Archeological Measure III (Archeological Testing/Data Recovery) also shall be implemented.

Attachment H. Public Works Archeological Measure III (Testing / Data Recovery)

The following provisions apply prior to or during construction when a significant archeological resource (as defined in Measure II.D) or an archeological resource of undetermined significance is expected to be present in the work area and the ERO, in consultation with the qualified archeologist, determines that an archeological field investigation is needed to determine: a) the presence of an archeological resource, b) whether it retains depositional integrity, and c) whether it qualifies as a legally significant resource under CEQA criteria. All archeological work under this Measure will be carried out by a qualified archeologist as identified in Archeological Measure I.C. Per Archeological Measure I.J, implementation of this measure shall not exceed four weeks except at the direction of the ERO and only if this is the only feasible means to reduce potential effects on a significant archeological find to a less-than-significant level.

A. Archeological Testing Program. If an archeological investigation is required in order to verify resource location and/ or assess the significance of the resource, the archeological consultant shall consult with the ERO to prepare and implement an Archeological Testing Plan (ATP) that identifies:

- Key research questions and associated data needs,
- Testing/ sampling methods, and
- Testing locations.

Results of testing shall be presented to ERO in a written report following Measure I.E. If, based on the archeological testing program, the archeological consultant finds and the ERO concurs that significant archeological resources may be present, Measures III.B and/or III.C below will be implemented.

B. Treatment. If the project could adversely affect a significant (CRHR-eligible) archeological resource, preservation in place is the preferred manner of mitigating impacts, as detailed in CEQA Guidelines 15126.6(b) (3)(a) and (b).

If preservation in place is determined to be infeasible, the Public Works at its discretion shall either:

- Re-design the proposed project so as to reduce the adverse effect to a less-than-significant level through preservation in place or other feasible measures; and/or
- For a resource important for its association with an important event or person, or which is of demonstrable public interest for both its scientific and historical values (e.g., a submerged ship), and where feasible, preserve the resource in

place with appropriate documentation; or, if not feasible to preserve in place, systematically document and/or recover for interpretive use, at the discretion of the ERO, and/or;

- For an archeological resource significant primarily for its data potential, design and implement an archeological data recovery program, as detailed under Measure III.D, below.

C. Archeological Data Recovery Plan (ADRP). For resources for which the elected treatment is archeological data recovery, the archeological consultant, in consultation with the ERO, shall prepare and implement an ADRP. It will identify how the significant information the archeological resource is expected to contain will be recovered and preserved. Data recovery results will be reported in the FARR, as detailed in Measure I.F. The ADRP shall include the following elements:

- Historic context and research design
- Field methods and procedures, including sampling strategy
- Archeological monitoring recommendations for ongoing construction
- Cataloguing and laboratory analysis
- Discard, deaccession, and curation policy
- Interpretive program
- Security measures

VIBRATION CONTROL PROCEDURES FOR INCLUSION IN CONSTRUCTION CONTRACTS

SECTION 01 35 51
VIBRATION CONTROL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes minimum provisions for compliance with City, state, and federal laws and regulations for vibration control, and notes to which Standard Construction Measure (SCM) the section refers.
 - 1. Vibration Control (SCM-5).

- B. Related Sections:
 - 1. Section 00 41 00 Bid Form
 - 2. Section 01 35 49 Minimum Environmental Procedures
 - 3. Section 01 31 19 Project Meetings

1.2 REFERENCES

- A. Refer to the following references:
 - 1. Andrews, Jim, et al. Transportation and Construction Vibration Guidance Manual. California Department of Transportation Report No. CT-HWANP-RT-13-069.25.3, September 2013.

1.3 DEFINITIONS

- A. For the purposes of this Section, the following definitions apply:
 - 1. Historic buildings or historic structures: Buildings or structures labeled as historic structures on project plans.

1.4 SUBMITTALS

- A. Contractor shall submit the following prior to the start of construction and prior to performing any vibration monitoring:
 - 1. A record of laboratory calibration shall be provided for all vibration-monitoring instruments to be used on site. Certification shall be provided to indicate that the instruments are calibrated and maintained in accordance with the equipment manufacturer's calibration requirements and that calibrations are traceable to the U. S. National Institute of Standards and Technology (NIST). The record shall certify that all seismographs shall have been calibrated by the manufacturer or certified calibration laboratory within one year of their use on site.
 - 2. Manufacturer's product data for all vibration-monitoring instruments to be used on site describing all specified vibration-monitoring instruments, together with product data and instruction manuals.
 - 3. Documentation and photography of the properties that are the subject of the Vibration Monitoring Plan, as specified below in 3.4.G.

4. A written Vibration Monitoring Plan detailing the procedures for vibration monitoring. Such plan shall include:
 - (a) The name of the Firm providing the vibration monitoring services.
 - (b) Description of the instrumentation and equipment to be used.
 - (c) Measurement locations and methods for mounting the vibration sensors.
 - (d) Procedures for data collection and analysis.
 - (e) A limiting value as applied in 3.4, below.
 - (f) Means and methods of providing warning when a limiting value is reached.
 - (g) Generalized plans of action to be implemented in the event the limiting values is reached. The generalized plans of action shall be positive measures by the Contractor to control vibrations (e.g. using alternative construction methods).
 - (h) Procedures for post-construction assessment of any damage due to vibration during construction to historic buildings or structures susceptible to vibration in or adjacent to the project, and reporting requirements and procedures if such damage occurs.
 5. Within 10 working days after the completion of the background vibration monitoring as described in 3.4.G, Contractor shall submit a hard copy report documenting the results of background vibration monitoring at each monitoring location.
- B. Qualification Data: For firms and persons specified in subsection 1.5 "Quality Assurance" of this Section to demonstrate their capabilities and experience.

1.5 QUALITY ASSURANCE

- A. Qualifications
1. Qualified Vibration Instrumentation Engineer: a registered Professional Engineer in the State of California, who has a minimum of a Bachelor of Science degree in civil engineering, and who has at least 4 years of experience in the installation and use of vibration-monitoring instrumentation and in interpreting instrumentation data.
- B. Regulatory Requirements
1. All work shall comply with the following:
 - (a) San Francisco Police Code, Article 29, Ordinance #274-72 ("Noise Ordinance")
 - (b) San Francisco Public Works Code, Article 2.4 ("Excavation in the Public Right-of-Way")
 - (c) San Francisco Public Works Code Ordinance #175-91, Sections 1100-1107
- C. The City will inspect and monitor Contractor's adherence to the requirements specified herein and will report on Contractor's compliance.
1. Said inspection, monitoring, and reporting activities may include, but are not limited to, qualitative, quantitative and photographic observations and data collection on the impacts of vibration.
 2. Contractor shall cooperate with such inspection and monitoring activities, provide access to the Work site to establish and secure monitoring stations, and make its facilities and records available to the City for performing such monitoring.

3. The City will issue a Non-Compliance Notice to Contractor for any detected non-compliance with the provisions herein or of any environmentally objectionable acts and the corrective action to be taken.

1.6 SEQUENCING

- A. Contractor shall submit a Vibration Control Plan to the City for review and approval at least 30 days prior to commencing construction.
- B. Contractor shall notify the City Representative at least 24 hours prior to starting a new construction task potentially capable of exceeding the project's vibration Threshold Value.

1.8 DAMAGES FOR FAILURE TO MEET ENVIRONMENTAL REQUIREMENTS

- A. The Contractor shall be liable for all fines, penalties, liquidated damages and costs arising from any failure to implement mitigation measures to control vibration impacts that are subject to Federal, State, and local regulatory fines.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Materials necessary for compliance with the Vibration Monitoring Program:
 1. The seismograph(s) used as part of the program shall have the following minimum features:
 - (a) Seismic range: 0.01 to 4 inches per second with an accuracy of +5 percent of the measured peak particle velocity or better at frequencies between 10 Hertz and 100 Hertz, and with a resolution of 0.01 inches per second or less.
 - (b) Frequency response (+3 dB points): 2 to 200 Hertz.
 - (c) Three channels for simultaneous time-domain monitoring of vibration velocities in digital format on three perpendicular axes.
 - (d) Two power sources: internal rechargeable battery and charger and 115 volts AC. Battery must be capable of supplying power to monitor vibrations continuously for up to 24 hours.
 - (e) Capable of internal, dynamic calibration.
 - (f) Direct writing to printer and capability to transfer data from memory to a secure digital memory card and/or USB mass storage device. Instruments must be capable of producing strip chart recordings of readings on site within one hour of obtaining the readings. Provide computer software to perform analysis and produce reports of continuous monitoring.
 - (g) Continuous monitoring mode must be capable of recording single-component peak particle velocities, and frequency of peaks with an interval of one minute or less.

PART 3 - EXECUTION

3.1 VIBRATION CONTROL

- A. This subsection applies when trees, rock outcroppings, historic buildings, historic structures, or other resources or landscape features are shown on the project plans and are labeled as requiring a vibration-monitoring program.
- B. Where the project includes or is directly adjacent to a resource susceptible to vibration, as shown on project plans, the Contractor shall institute a vibration-monitoring program to protect such properties from excess vibration during demolition and construction activities associated with the project.
- C. The Contractor shall submit a Vibration Control Plan to the City for review and approval, to be fully implemented upon approval.
 1. For purposes of this subsection, "limiting value" shall be:
 - (a) For Vibration Control Plans for historic buildings or historic structures, 0.12 inches per second peak particle velocity (in/sec PPV) for sustained vibration (e.g. impact pile drivers, vibratory equipment) in any direction, unless a greater value is approved in writing by the City Representative.
 - (b) For Vibration Control Plans for all other resources, 0.2 inches per second peak particle velocity (in/sec PPV) for sustained vibration (e.g. impact pile drivers, vibratory equipment) in any direction, unless a greater value is approved in writing by the City Representative.
 2. The Contractor's vibration-monitoring personnel shall include a Qualified Vibration Instrumentation Engineer approved by the City's Representative. The Qualified Vibration Instrumentation Engineer shall:
 - (a) Be on site and supervise the initial installation of each vibration-monitoring instrument.
 - (b) Supervise interpretations of vibration-monitoring data.
 3. Contractor shall collect seismograph data prior to any vibration-producing demolition or construction activities to document background vibrations at each monitoring location. The background monitoring shall be performed for a minimum of two non-consecutive workdays, spanning the hours during which demolition and construction activities will take place. Monitoring shall consist of a continuous recording of the maximum single-component peak particle velocities for one-minute intervals, which shall be printed on a strip chart.
 4. Contractor shall have seismographs in place and functioning at least 24 hours prior to any such activity within 200 feet of the monitoring locations. No significant vibration-producing activity shall occur within this zone unless the monitoring equipment is functioning properly, as determined by the City Representative.
 5. Contractor shall monitor vibration during demolition and other significant vibration-producing construction activities as determined by the City Representative. This monitoring shall consist of a continuous recording of the maximum single-component peak particle velocities for one-minute intervals, which shall be printed on a strip chart. During the monitoring, Contractor shall document all events that are responsible for the measured vibration levels, and submit the documentation to the City Representative with the data.
 6. All vibration monitoring data shall be recorded contemporaneously and plotted continuously on a graph by the data acquisition equipment. Each graph shall show time-domain wave traces (particle velocity versus time) for each transducer with the same vertical and horizontal axes scale
 7. The Contractor shall interpret the data collected, including making correlations between seismograph data and specific construction activities. The data shall be

- evaluated to determine whether the measured vibrations can be reasonably attributed to construction activities
8. The equipment shall be set up in a manner such that an immediate warning is given when the peak particle velocity in any direction exceeds the Threshold Value in the previously submitted Vibration Monitoring Plan. The warning emitted by the vibration-monitoring equipment shall be instantaneously transmitted to the responsible person designated by Contractor by means of warning lights, audible sounds or electronic transmission.
 9. If a Limiting Value is reached, the Contractor shall:
 - (a) Immediately notify the City Representative and suspend activities in the affected area, with the exception of those actions necessary to avoid exceeding the Limiting Value.
 - (b) Meet with the City Representative to discuss the need for response action(s).
 - (c) If directed by the City Representative during the above meeting that a response action is needed, submit within 24 hours a detailed specific plan of action based as appropriate on the generalized plan of action submitted previously as part of the vibration-monitoring plan.
 - (d) If directed by the City Representative, implement response action(s) within 24 hours of submitting a detailed specific plan of action, so that the Limiting Value is not exceeded.
 10. Where the subject of the Vibration Monitoring Plan is a historic building or structure, Contractor shall engage a Qualified Historic Architect or Historic Preservation Professional to document and photograph the properties that are the subject of the Vibration Monitoring Plan to ensure structural damage does not result from construction activities that could cause ground vibration.
 - (a) The post-construction survey and monitoring results will be evaluated to determine whether the new structural and/or architectural damage was caused by vibration due to Contractor's performance of this Work.
 - (b) If, following completion of construction, changes in the architectural or structural conditions the properties that are the subject of the Vibration Monitoring Plan have occurred, Contractor shall restore the buildings to pre-construction conditions, and to the satisfaction of the City Representative.

END OF SECTION

**DRAFT WATER AND AWSS PROTECTION
PROCEDURES FOR INCLUSION IN CONSTRUCTION
CONTRACTS**

SECTION 01 41 28**PROTECTION OF EXISTING WATER AND AWSS FACILITIES****PART 1 GENERAL****1.01 DESCRIPTION**

- A. Design and install temporary supports to work around the San Francisco Public Utilities Commission's (SFPUC) Potable Water (PW), Recycled Water (RW), and Auxiliary Water Supply System (AWSS) facilities to protect and provide uninterrupted service to these facilities. Contractor will be held responsible for any damage related to or caused by failure to exercise due care. Repair of existing utilities and improvements damaged during construction shall be at the Contractor's expense.
- B. The Contractor shall furnish, install and remove upon completion of the work, Settlement Reference Points (SRP) and Settlement Monitoring Points (SMP) for the San Francisco Public Utilities Commission's (SFPUC) Auxiliary Water Supply System (AWSS) piping as shown on drawings and conduct the survey of SRPs and SMPs as specified hereinafter.
- C. The Contractor shall perform all required work as stated in this specification section and as shown on the Drawing(s) and furnish all materials, other than those specified to be furnished by the City, which are necessary or required to complete the work.

1.02 RELATED SECTIONS

Not Used

1.03 RECORD DRAWINGS AND STANDARDS

Records of the existing PW, RW, and AWSS facilities and Standard requirements are available for examination by bidders/awarded Contractor at the SFPUC's City Distribution Division (CDD), Engineering Section, 1990 Newcomb Ave, San Francisco, CA 94124. Telephone number 415-550-4994.

Contractors are warned that changes which do not appear in the records for existing CDD facilities may have been made. The City makes no representation as to the completeness or accuracy of said records and assumes no responsibility thereto.

1.04 DEFINITIONS

- A. **Maximum Allowable Settlement:** Level at which no further movement will be acceptable and if reached requires work to be halted until submittal and acceptance of a written plan detailing corrective actions and restorative measures.
- B. **Response Values:** Predetermined values within the instrument range indicating different levels of response as specified herein.
- C. **Settlement Monitoring Point:** A system of points along the alignment of the AWSS for monitoring vertical deformation (settlement or heave) at or near the ground surface using optical survey techniques.
- E. **Settlement Reference Point:** A stable, fixed control point established at a surface structure above ground that is referenced during settlement monitoring point measurements to permit calculation of vertical movements.

1.05 REFERENCES

- A. AWSS Standard Plans

| <u>Drawing No.</u> | <u>Title</u> |
|--------------------|---|
| HPL-5993 Ch. 3 | AWSS Standard Details AWSS Settlement Point; 07/09/84 |
| HPL-5993.1 Ch. 1 | AWSS Settlement Point for Double Spigot; 05/16/83 |

- B. AWSS Settlement Monitoring Drawings in the Contract showing approximate locations of settlement monitoring and reference points.
- C. State of California Labor Code, Section 6705 and 6707.
- D. State of California Construction Safety Orders, Article 6 - Excavation.

1.06 SUBMITTALS

Submit the following to City Representative for review:

- A. Work plan, support details, and calculations.
 - 1. Work Plan for working around existing PW, RW, and AWSS facilities. The plan shall show the locations of proposed facilities, existing utilities and pipelines, proposed pipe supports for SFPUC CDD facilities, pipe storage, spoil bank, excavation and pipe laying equipment, shoring system, and a description of how the work will proceed around the

existing SFPUC CDD facilities. Provide drawings that include dimensions to allow determining the distances of objects relative to the SFPUC CDD facilities. Sizes of existing and proposed facilities, width and depth of proposed trench, and any other pertinent information must be shown in the drawings. For proposed structural facilities, such as retaining walls, potentially impacting CDD facilities, submit elevation and or section views showing horizontal and vertical locations of CDD facilities relative to the proposed structure.

2. Where supports are required, submit support details and calculations, signed and stamped by a California licensed Civil or Structural Engineer, for structural support for the protection of all exposed and/or undermined sections of SFPUC CDD pipe or facilities. At the discretion of SFPUC CDD Engineering, revised support details and calculations may be required to be submitted if conditions vary significantly following excavation.
 3. Submit minimum (7) days before planned excavation.
- B. Control Density Fill (CDF) mix design where CDF is required per this Specification. Submit certified laboratory test results within the past 1-year that the mix proportions and materials comply with these Specifications.
- C. Survey of Settlement Reference and Monitoring Points data: The Contractor shall submit elevations of all SMPs and SRPs (to be provided in “feet”) by a State of California licensed Land Surveyor in addition to deflection calculations for each pipe joint.

Data and calculations shall be submitted once prior to the start of construction, once a week during construction, once at the end of construction and final survey is completed, and when threshold values are exceeded as specified below. Pipe deflection angles and elevation readings calculated from SMPs and SRPs are to be tabulated in chronological order with all previous results for review and approval within 24 hours of the survey being performed.

PART 2 PRODUCTS

2.01 CONTROLLED DENSITY FILL

- A. Materials shall conform to the following:
1. Cement: ASTM C150, Type II or V.
 2. Aggregate: ASTM C33. Aggregate shall consist of fine aggregate with a maximum size of 1/4", free of clay, organics, and other deleterious

materials. Less than 10 percent by weight shall pass the No. 200 sieve, and material passing the No. 40 sieve shall be nonplastic as determined in accordance with ASTM D4318.

3. Water: Potable.
 4. Pozzolans: ASTM C618, Class C fly ash. Class F fly ash and slag is not permitted.
 5. Air entraining: ASTM C260. Air content shall not exceed 25 percent.
 6. Admixtures: Shall not contain chloride ions and shall not cause delayed strength gain.
- B. Mixes:
1. Performance requirement: proportioned to be free-flowing, self-consolidating, hand tool excavatable, low-shrink slurry.
 2. Mix design requirement: The Contractor and its supplier shall determine the materials and proportions used to meet the requirements of the Specifications.
 3. Strength: Unconfined compressive strength at 28 days shall be between 50 to 125 psi tested per ASTM D 4832.
 4. Flowability: 6 to 9 inches when tested per ASTM C-143 or ASTM D 6103.
 5. Cementitious Material: Portland Cement. Where pozzolans are used, pozzolans shall be limited to maximum 60% of the weight of cement.

2.02 AWSS SETTLEMENT REFERENCE AND MONITORING POINTS

A. AWSS Settlement Reference and Monitoring Well Covers

6-inch valve cover, H-20 load rated, cover similar to the San Francisco Water Department's 6-inch gate valve cover.

B. Required survey monitoring of AWSS facilities outside of trenches and/or excavations:

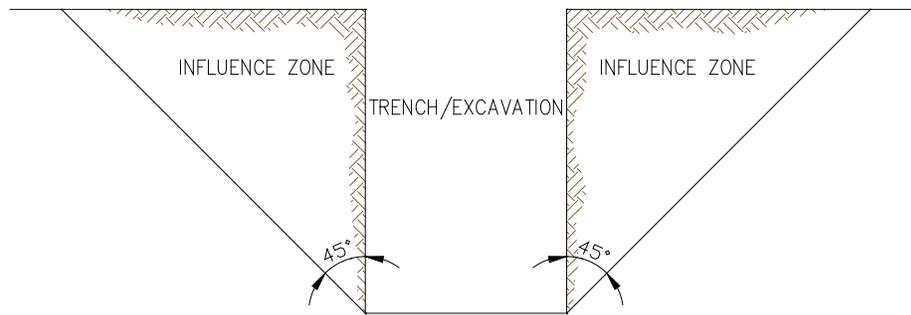
1. Refer to the AWSS Settlement Monitoring Drawing(s) for the minimum number of SMPs to be installed as part of the contract work; and

2. For trench/excavation crossing AWSS, the SMPs shall be located starting on the closest pipe bell near the edge of the trench and/or excavation and installed outward away from the trench and/or excavation; and
 3. Rod, guide pipe, and monitoring well shall be per Drawings “HPL-5993” and/or “HPL-5993.1”, which are attached to this specification section and shall be at the approximate locations as shown on the AWSS work contract drawing(s), which are included in the contract documents. The exact SRP and SMP locations shall be determined in the field and approved by the SFPUC CDD Representative.
- C. Required monitoring of AWSS facilities inside of trenches and/or excavations:
1. Exposed AWSS pipe joints in trenches and/or excavations shall be identified as a SMP regardless of whether the joint is called out on the AWSS Settlement Monitoring Drawing(s) to be surveyed and monitored. Price for additional survey locations when required by the specifications and/or by the SFPUC CDD Representative shall be based on the Contractor’s total bid price for SMPs divided by the quantity of SMPs as shown on the AWSS work drawing(s) to be installed, surveyed and removed. Field verification of the exact location shall be required and approved by SFPUC CDD Engineering.
 2. Additional SMPs within trenches and/or excavations may be necessary on either or both sides of the AWSS joint to distinguish the difference between vertical displacement and joint deflection.
- D. Placement of SRP(s) for survey monitoring of SMPs:
1. A settlement reference point shall be designated by a marking on a hydrant or other stable, permanent fixture located within the public right-of-way. The same location shall be surveyed for reference over the course of the project. Refer to the AWSS Settlement Monitoring Drawing(s) for the minimum number of SRP(s) to be installed as part of the survey monitoring work.

PART 3 EXECUTION

3.01 SUPPORT OF EXISTING PW, RW, AND AWSS FACILITIES

- A. Inspection, Review and Approval of Methods



1. If existing SFPUC CDD facility, not shown on the drawing or is shown on the drawing outside of the influence zone, is found to be within the influence zone of the proposed trench/excavation as shown in the figure above, the Contractor is required to contact CDD Engineering and request an inspection to review and approve the field methods being used and/or proposed for the protection of CDD facility. CDD Engineering reserves the right to require the Contractor to implement protection methods, such as placement of steel plates over AWSS or water facilities, additional shoring and pipe supports, use of hand-digging, change shoring system around impacted CDD facilities, or other protective methods, as appropriate for full protection of the CDD facilities.
2. If two or more consecutive SFPUC CDD lead filled, cast-iron pipe joints are located within the trench/excavation, CDD requires replacement of the existing pipe with new ductile iron pipe with elastomeric EPDM joint gaskets within the influence zone prior to excavating below the pipe.
3. Existing valves exposed in trench/excavation:
 - a. If existing valve with lead filled joints will be exposed within the trench/excavation, CDD requires replacement of the existing valve and cast-iron pipe with new ductile iron pipe with elastomeric EPDM joint gaskets within the influence zone prior to excavating below the pipe as shown in the drawings.
 - b. If existing valve with restrained elastomeric gasketed joints connecting to ductile-iron pipe will be exposed within trench/excavation, pipe support requirement shall be the same as that for ductile-iron pipe as specified in the following requirement. If valve is not restrained, restraints shall be added by CDD prior to excavating below the valve.
4. Pipe supports are required where CDD pipe is exposed more than:
 - a. 6 ft. for cast-iron pipe with no exposed joint.

- b. 3.5 ft. for cast-iron pipe with exposed joint.
 - c. 10 ft. for ductile-iron pipe with no exposed joint.
 - d. 6 ft. for ductile iron pipe with exposed joint(s).
5. Sheet pile driving adjacent to existing CDD pipe shall maintain a minimum clear spacing between back of sheet pile and edge of pipe of:
 - a. 1.5 ft. for ductile iron pipes.
 - b. 4 ft. for cast-iron pipes. If within 4 ft., settlement monitoring is required for both LPW and AWSS lines. Settlement monitoring of LPW lines shall be the same as for AWSS lines unless approved otherwise by CDD Engineering.
 6. Main disconnection/reconnection, and valve replacement work for PW and RW shall be performed by SFPUC CDD. Excavation, backfilling, pipe laying, paving, traffic control, permitting, and any other support work necessary for the PW and RW replacement work shall be the Contractor's responsibility. All AWSS replacement work shall be performed by Contractor or subcontractor qualified by CDD to perform AWSS main installation. All replacement valves and piping for CDD replacement is supplied by CDD.
 7. Provide details and calculations for structural support for the protection of exposed and/or undermined sections of SFPUC CDD facilities. Details and calculations shall be signed and stamped by a California licensed Civil or Structural Engineer. Structural supports shall be designed to protect (1) AWSS pipes constructed with Class H cast iron lead jointed pipe operating at 350 psi static pressure, (2) AWSS pipes constructed with Class 56 ductile iron pipe, (3) PW pipes constructed with Class B cast iron lead jointed pipe operating at 150 psi static pressure, and (4) PW or RW pipes constructed with Class 53 ductile iron pipe operating at 150 psi static pressure. Maximum deflection in pipe support members shall not exceed $L/500$, where L is the unsupported length of the member.

B. Restoration of Facilities

If project work exposes CDD facilities, the Contractor is required to

1. backfill and compact in compliance with San Francisco Department of Public Works (SFDPW) Street Excavation Code or as required by SFPUC CDD; and

2. perform soil compaction testing for backfill material placed within three (3) feet, horizontally or vertically, from the outside edge of a water facility, with all test results furnished to CDD Engineering.

For excavations that expose more than four (4) feet of CDD facilities or pipe joint (4-inch and smaller pipes are excluded), backfill is required to be constructed with control density fill (CDF) material. CDF material shall be free of organic materials and other deleterious substances. The CDF material shall have produced 28 days unconfined compressive strength from 50 pounds per square inch (psi) to a maximum of 100 psi and shall contain aggregate no larger than 3/8" top size with the 3/8" aggregate comprise less than 30% of the total aggregate content.

CDF material shall begin at one (1) foot above the top of any utility crossing under a CDD facility and continue up to the bottom of the CDD facility. CDF material shall not extend beyond the spring-line of any CDD facility. Width of CDF backfill shall be OD of CDD pipe + 1ft on each side.

3.02 INSTALLATION OF AWSS SETTLEMENT REFERENCE AND MONITORING POINTS AND SUPPORT OF PIPE

A. Installation

The SRPs and SMPs shall be installed prior to the start of construction work requiring excavation around AWSS pipe.

For SRPs at fire hydrants, the contractor shall select the top center of fire hydrant. The contractor must ensure that the exact same point is used to establish survey control prior to monitoring of SMPs and additional SRPs.

For installation of SMPs outside of trench/excavations, the Contractor shall expose the bell of the pipe so that the position of the guide pipe on the bell can be visually verified before backfilling. The installation method used shall not cause the guide pipe to move from its intended position.

For installation of SMPs inside of trench/excavations, the Contractor shall verify the leveling rod is positioned on top of the pipe by verifying the pipe crown with a level vial and marking the exact location on the pipe to ensure consistent monitoring of the same point.

The correct positioning of each SRP and SMP on the top of the pipe bell shall be verified and approved by a CDD Representative by visual inspection. To request an inspection by a CDD Representative, please contact CDD Engineering a minimum of five (5) business days in advance to schedule the inspection.

It is the responsibility of the Contractor to maintain all SRP and SMP installations in working order at all times.

The Contractor shall contact CDD Engineering to perform a “drop test” before installation of SMPs or SRPs to determine the ability of the pipe to maintain pressure. The CDD Representative will isolate the AWSS line during the installation of SMPs and SRPs and reactivate the line after the construction of the SMPs and SRPs is completed by the Contractor. To request a drop test by a CDD Representative, please contact CDD Engineering a minimum of five (5) business days in advance to schedule the test.

B. Removal

The SMPs and SRPs shall be removed by the Contractor, including pipe guides, monitoring well frames and covers and the roadway restored to its original condition(s).

C. Survey of Settlement Reference and Monitoring Points

1. The Contractor shall obtain elevations of all SMPs and SRPs, by a State of California licensed Land Surveyor.
2. Initial Survey: Record the elevations within an accuracy of 0.005 feet (1/16-inch) for each settlement monitoring point on all surveys. After completion of each instrument installation, take 3 sets of verification data readings for each instrument to demonstrate the adequacy of the installation, to demonstrate the proper operation and precision of the instrument, and to establish an initial value. Differential Leveling and Total station accuracy shall comply with the accuracy standard specified in Caltrans Second Order Differential Leveling Specifications and Second Order (Vertical) TSSS Survey Specifications respectively. If differential leveling survey method is used, a collimation (Two-Peg) test shall be performed to ensure accuracy within 0.003 feet prior to each survey run. Submit the initial readings to the City Representative.
3. Monitoring Schedule: Take readings of all SMPs and SRPs prior to the start of construction, once after the construction work is completed, and a final time a week after all construction work is completed. Intermediate monitoring frequency during construction shall as a minimum comply with the following:

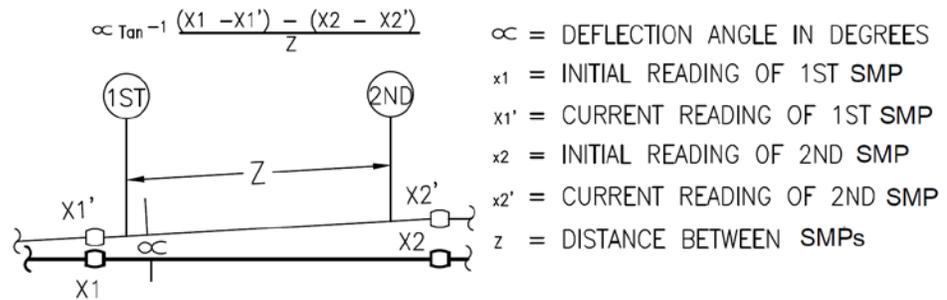
| Monitoring Frequency During Sheet Pile Driving | Monitoring Frequency During Excavation or Backfill | Monitoring Frequency in or Around Open Trench | Monitoring Frequency Away from Open Trench |
|--|--|---|--|
| Daily ¹ | Daily ² | 3 Days ³ | Once ⁴ |

Notes:

- ¹ For SMP's within 25 ft. of pile driving, monitor daily if pile installation using vibratory hammer and every four hours if pile installation using impact hammer.
 - ² Daily for SMPs within 25 ft. of a trench section being actively excavated or backfilled.
 - ³ Once every three days for SMPs within 25 ft. of an open trench after excavation is completed and utilities are being installed.
 - ⁴ Once after trench within 25 ft of SMP is completely backfilled unless directed otherwise by the City Representative.
4. Elevation readings from SMPs and SRPs are to be tabulated in chronological order with all previous results and sent to CDD Engineering for review and approval within 24 hours of the survey being performed. Measurements shall be provided in "feet". Provide a plot of measured values versus time, including a time history of construction activity likely to influence such readings.

D. Response Values and Required Actions

1. The Maximum Allowable Settlement shall not result in any joint deflecting more than 1/4 degrees, where the deflection angle is calculated using this equation:



2. The response values are measured as a percentage of the Maximum Allowable Settlement. The Contractor shall abide by the following Response Values.

| Threshold Value | Contractor Response Value | Shutdown Value |
|-----------------|---------------------------|----------------|
| 50% | 80% | 100% |

3. When a given response value is reached, the Contractor shall provide written notice within the specified time and respond in accordance with the following:
- a. **Threshold Value:** The Contractor shall provide written notice within 24 hours of occurrence and meet with the City Representative within 24 hours of providing notice to discuss his means and method to determine what changes, if any, shall be made to better control ground movement. Instrument readings shall be required on a daily basis, unless instructed otherwise, until five consecutive working days of readings do not worsen the settlement by more than 5% of the Maximum Allowable.
 - b. **Contractor Response Value:** The Contractor shall provide written notice and meet with the City Representative within 24 hours to discuss his means and method to determine what changes shall be made to better control ground movement. The Contractor shall actively control ground movement in accordance with the approved plan to prevent reaching the Shutdown Value:
 - c. **Shutdown Value:** Contractor shall stop all work immediately and provide written notice within one hour upon occurrence. The Contractor shall meet with the City Representative to develop a plan of action before the work can be resumed. A drop-test will be performed by CDD prior to continuation of work.

E. Arrangement with Utility Companies

The Contractor shall make all necessary arrangements with the public service utility companies and obtain all necessary permits for any work or alteration of facilities as may be required due to the above described work.

E. Street and Sidewalk Restoration

Sidewalk and pavement restoration shall include the replacement of traffic lane(s) and crosswalk stripes, parking stall markings, and curb painting that might be obliterated during the installation/removal of the SRPs and SMPs construction.

F. Expose, Test, Realign, and Repair of AWSS Facilities

1. Requirement of Repair Work

Should readings from any two sets of surveys indicate a change in deflection at or exceeding the Shut Down Value, the Contractor shall stop all construction work in the vicinity of the AWSS facilities until the AWSS facilities have been inspected, repaired, if necessary, and the CDD Representative authorizes the Contractor to resume construction work.

If the CDD Representative determines that repairs are required, the Contractor will be responsible for preparing and restoring the site(s) for repairing the damaged joint(s). Repair of damaged joint(s) shall be done by CDD at Contractor's expense.

Site preparation and restoration will include

- a. Contractor shall submit for review and approval by CDD Engineering, structural plans and details for the support and protection of AWSS facilities in the vicinity during repair of the damaged joint;
- b. Contractor shall support and protect AWSS facilities per approved submittal(s);
- c. Contractor shall excavate a trench as required by CDD Engineering to expose the damaged AWSS pipe joint for repair purposes;
- d. Upon direction and approval from a CDD Representative, Contractor shall remove support and protection devices, and restore facilities as described in this Section; and
- e. CDD Representative shall inspect and approve all site preparation and restoration for AWSS joint repair work.

2. Contractor Responsible for all Costs

Exposure and restoration, testing, realignment, replacement, and repair of existing AWSS facilities as described in this Section including furnishing of materials, labor, equipment including pump and tools necessary, or required, to do such work shall be at the expense of the Contractor.

The Contractor shall be responsible for all CDD labor and material costs associated with repairing the damaged AWSS facilities.

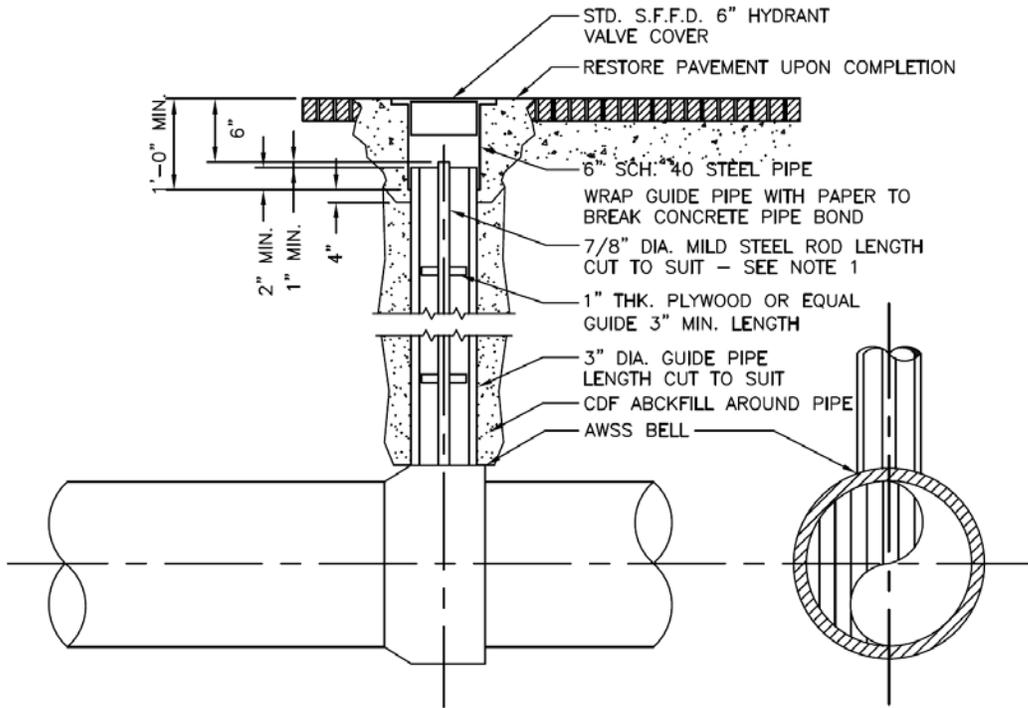
3. Testing

The Contractor is hereby notified that change in deflection of an AWSS pipe joint will require all the joints between two adjacent SRPs (on each side of the surveyed joint) to be exposed and realigned to the original alignment. The realignment of the pipe shall require CDD to isolate the pipe by closing gate valve(s), testing the aligned pipe at a pressure of 350 psi (or other pressure designed by the CDD Engineer), repair any joints showing leakage or lead extrusions, and reactivating the pipe.

A CDD Representative will witness all pressure tests when performed by the Contractor where alignment of the pipe is not required. The Contractor shall inform CDD Engineering a minimum of five (5) business days before all tests.

NOTES:

1. THE CONTRACTOR SHALL REPORT THE LENGTH OF THE ROD TO THE NEAREST HUNDREDTH OF A FOOT TO THE CITY.
2. PLYWOOD SHALL BE PRESS FIT TO THE 7/8"Ø STEEL ROD AND SHALL FLOAT IN THE GUIDE PIPE.
3. MONITORING HOLE COVER AND FRAME ASSEMBLIES SHALL BE RATED FOR H-20 LOADING.
4. CONTRACTOR SHALL RESTORE ROADWAY TO (E) CONDITIONS UPON COMPLETION OF SURVEY WORK.



**CITY AND COUNTY OF SAN FRANCISCO
PUBLIC UTILITIES COMMISSION
SAN FRANCISCO WATER DEPARTMENT**

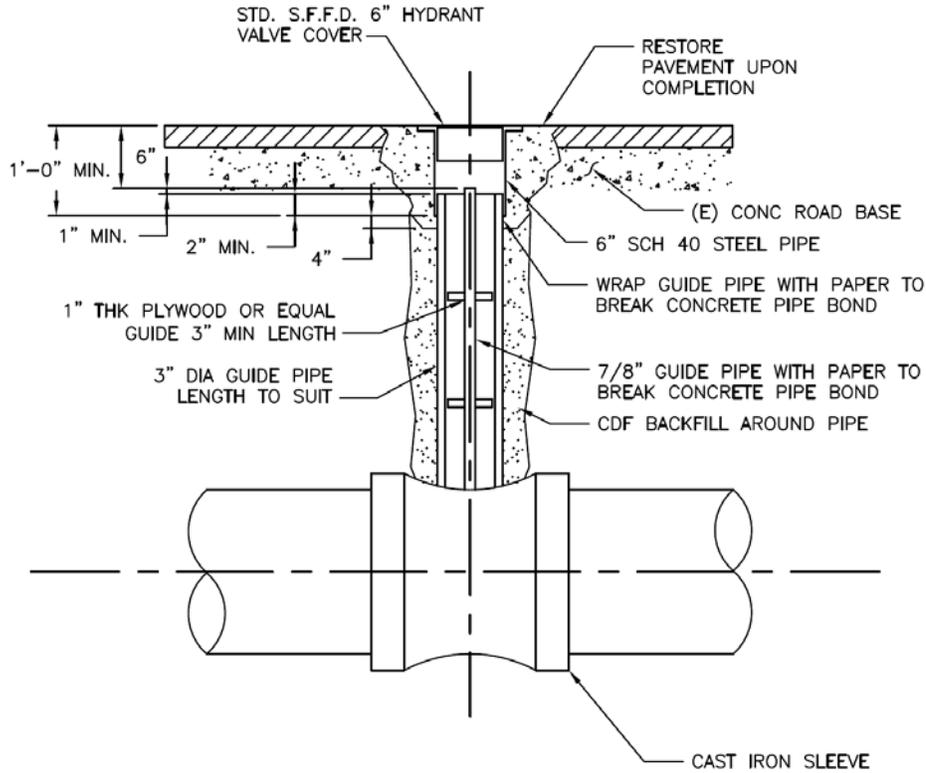
AUXILIARY WATER SUPPLY SYSTEM - STANDARD DETAILS

AWSS SETTLEMENT MONITORING POINT FOR BELL AND SPIGOT PIPE

| | | | |
|---------------------------|------------------|----------------|-------------|
| | BY: DOUG LEE | DR: GLORIA CHU | DRAWING NO. |
| APPROVED: SAM YOUNG | CH: THANH NGUYEN | SCALE: NONE | HPL-5993 |
| CDD MANAGER: KATIE MILLER | DATE: 01/2015 | VERSION: | |

NOTES:

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**CITY AND COUNTY OF SAN FRANCISCO
PUBLIC UTILITIES COMMISSION
SAN FRANCISCO WATER DEPARTMENT**

AUXILIARY WATER SUPPLY SYSTEM -- STANDARD DETAILS

AWSS SETTLEMENT MONITORING POINT FOR DOUBLE SPIGOT PIPE

| | | | |
|--------------------------|------------------|----------------|---------------------------|
| | BY: DOUG LEE | DR: GLORIA CHU | DRAWING NO. HPL-5993.1 |
| APPROVED: SAM YOUNG | CH: THANH NGUYEN | SCALE: NONE | |
| CDD MANAGER KATIE MILLER | DATE: 01/2015 | | |

END OF SECTION