MEMORANDUM OF UNDERSTANDING BETWEEN THE CITIES OF BEVERLY HILLS AND CULVER CITY TO FUND OPERATIONS AND MAINTENANCE OF THE CULVER BOULEVARD STORMWATER FILTRATION/RETENTION REGIONAL PROJECT

This Memorandum of Understanding (MOU) is made and entered into by the City of Beverly Hills ("Beverly Hills"), a municipal corporation, and the City of Culver City ("Culver City"), a municipal corporation. Beverly Hills and Culver City are collectively referred to herein as the "parties."

WITNESSETH

WHEREAS, both parties are under obligations to comply with the National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System Permit (MS4 Permit) for Los Angeles County, NPDES Permit No. CAS004001, and the Enhanced Watershed Management Program Plan for the Ballona Creek Watershed (EWMP Plan) adopted by Beverly Hills, Culver City, the Cities of Inglewood, Los Angeles, West Hollywood, and Santa Monica, the County of Los Angeles and the Los Angeles County Flood Control District, and approved by the Los Angeles Regional Water Quality Control Board;

WHEREAS, the parties have agreed to jointly develop the Culver Boulevard Stormwater Filtration/Retention Regional Project ("Project") in order to assist both parties to comply with their respective obligations under the MS4 Permit and the EWMP Plan by strategically intercepting runoff before it is discharged into the Ballona Creek channel;

WHEREAS, the Project is designed to reduce sediments, bacteria, metals andother pollutants from entering Ballona Creek and will improve the water quality of the Ballona Creek Watershed;

WHEREAS, the Project is capable of capturing and treating up to 19.51acre-feet of stormwater in a 24-hour period from a roughly 796-acre drainage area;

WHEREAS, Section 7.1 of the EWMP Plan measures compliance by the volume of stormwater captured and managed by the control measures implemented within each agency's jurisdiction. The required volume is the amount of stormwater released over the course of a 24-hour period under the 90th percentile storm event. The volume of captured stormwater is attributed to each jurisdiction under the EWMP Plan's implementation strategy;

WHEREAS, Beverly Hills is currently required to retain a total of 87 acre feet of stormwater, using both private and public best management practices (BMPs);

WHEREAS, on May 14, 2018, the Los Angeles Regional Water Quality Control Board ("Regional Board") authorized a "Structural BMP Capacity" credit for Beverly Hills in exchange for Beverly Hills' financial contribution toward the Project under Section 7.1 of the EWMP Plan. The credit provided to Beverly Hills is attributed to its retention

requirement under the EWMP Plan despite the Project's location outside of Beverly Hills' boundaries and subwatershed;

WHEREAS, 13.05 acre-feet (of a total of 19.51 acre-feet) represents the treatment volume required for the 297 acres within Culver City and, therefore, 6.46 acre-feet remain available for Structural BMP Capacity credit trading by Culver City;

WHEREAS, the Structural BMP Capacity credit provided to Beverly Hills under this Project is approximately 4.4 acre feet;

WHEREAS, in February 2021 the Regional Board approved the Structural BMP Capacity credit attributable to Beverly Hills by way of an amendment to the EWMP Plan that exchanged Beverly Hills' obligation to construct the equivalent of 4.4 acre feet of green streets with the 4.4 acre feet of capacity achieved by Beverly Hills' financial participation in the Project under this MOU.

WHEREAS, the Structural BMP Capacity credit provided to Beverly Hills under this Project was based on the actual sizing of the Project.

WHEREAS, Culver City will provide the majority of the funds for the Project's operations and maintenance costs;

WHEREAS, Culver City will select and hire a contractor to perform the operations and maintenance of the Project;

WHEREAS, Beverly Hills will contribute a fair share of 23% of the annual costs of operating and maintaining the Project;

WHEREAS, this MOU is intended to memorialize the parties' expectations and understanding of their obligations and benefits in operating and maintaining the Project.

NOW, THEREFORE, in consideration of the mutual benefits to be derived by the parties, and of the promises contained in this MOU, the parties agree as follows:

Section 1. Recitals. The recitals set forth above are incorporated into this MOU.

Section 2. Purpose. The purpose of this MOU is to facilitate the parties meeting their respective obligations under the MS4 Permit and the EWMP Plan by jointly operating and maintaining the Project.

Section 3. Cooperation. The parties shall fully cooperate with one another to achievethe purposes of this MOU. The parties agree to work together in good faith, using reasonable efforts to resolve any unforeseen issues and disputes arising out of the performance of this MOU.

Section 4. Project Components. The operations and maintenance of the Project will be conducted by a Culver City-retained contractor per the Project's Operations and Maintenance Plan, including the maintenance of the following components:

1. **Storm Drain Diversions.** Two storm drain diversions have been constructed to divert and capture flows from the storm drains.

2. **Pre-Treatment Units.** Pre-treatment units have been installed for each stormdrain diversion structure located at Sepulveda Blvd and Harter Avenue prior to discharge into the subsurface storage structure.

3. **Subsurface storage structures.** Two undergroundstormwater capture vaults have been installed beneath the existing median between Sepulveda Blvd and Harter Ave. The vaults are intended to store urban and stormwater run-off for future irrigation use and as a holding area for excess run-off for filtration.

4. **Post-Treatment Discharge Units.** Two cartridge filter structures will enable up to 5.76 cfs maximum discharge rate. The filtered water is returned back to the Harter Avenue storm drain, which will convey it to Ballona Creek. A separate filtration system will be used to treat the captured run-off for irrigation re-use.

A copy of the Operations and Maintenance Plan is attached hereto as Exhibit A. Culver City shall not materially change the Operations and Maintenance Plan without the prior written consent of Beverly Hills' Public Works Director.

Section 5. Culver City's Responsibilities and Payment of Costs. Culver City will undertake and pay for the operation of the Project, including all of the following responsibilities:

1. Procure one or more operations and maintenance contractors for the Project in accordance with applicable contracting laws and regulations.

2. Provide staff, consultants, and contractors deemed necessary and appropriate to manage, administer, coordinate, and oversee operations and maintenance of the Project.

3. Maintain the Project in accordance with this MOU, the Operations and Maintenance Plan, and all other applicable federal, state, and local laws and regulations.

4. Manage and control all funds dedicated to the Project in accordance with sound accounting principles and distribute such funds to consultants and contractors as necessary.

5. Maintain for the expected 50-year life of the Project a functional retention capacity of 19.51 acre-feet of stormwater within the Project, provided that this obligation shall survive the expiration of the MOU.

Section 6. Beverly Hills' Financial Responsibilities.

Beverly Hills shall contribute, and pay to Culver City, a total amount equal to 23% of Culver City's contractor costs as Beverly Hills' contribution to the Project's operations and maintenance costs, up to a total not to exceed $230,000 for the four (4) year term of the agreement. Beverly Hills will pay these contributions, quarterly, within 30 days of receiving a quarterly invoice from Culver City. Aside from these 23% quarterly contributions by Beverly Hills, Culver City shall be responsible for paying for, or securing other funding sources for, all remaining Project operations and maintenance costs necessary to operate the Project.

Section 7. Not Used

Section 8. Amendments. This MOU may only be modified or amended upon written mutual consent of all parties. All modifications, amendments, changes and revisions of this MOU in whole or in part, shall be binding upon the parties, so long as the same shall be in writing and executed by the parties.

Section 9. Compliance with Laws. This MOU shall be governed by all applicable federal, state and local laws. The parties warrant that in the performance ofthis MOU, each shall comply with all applicable federal, state and local laws,statutes and ordinances and all lawful orders, rules and regulations promulgated thereunder.

Section 10. Indemnification. Each party agrees to defend, indemnify and hold harmless the other party, their officers, agents, elected officials and employees from all liability, claims, damages, losses and demands, including defense costs and reasonable attorneys' fees, whether resulting from court action or otherwise, arising out of the negligent acts or omissions of the offending party, its officers, agents, or employees, in the performance of this MOU. The provisions of this paragraph shall survive the termination of this MOU.

Section 11. Permitted Delay. Each party shall be excused from performing its obligations under this MOU during the time and to the extent that it is prevented from performing by an unforeseeable cause beyond its control, including but not limited to: any incidence of fire; flood; acts of God; commandeering of material, products, plants or facilities by federal, state orlocal government; national fuel shortage; or a material act of omission by any party; when

satisfactory evidence of such cause is presented to the other party, and provided further such nonperformance is unforeseeable, beyond the control and is not due to the fault or negligence of the party notperforming.

Section 12. Notices. Any notice sent by first class mail, postage paid, to the address and addressee, shall be deemed to have been given when in the ordinary course it would be delivered. The representatives of the parties who are primarily responsible for the administration of this MOU, and to whom notices, demands and communications shall be given are as follows:

City of Beverly Hills
Attn: Public Works Director
345 Foothill Road
Beverly Hills CA 90210

City of Culver City
Attn: Public Works Director/City Engineer
9770 Culver Boulevard
Culver City, CA 90232

Section 13. Time of Essence. Time is of the essence for every provision hereof in which time is a factor.

Section 14. Entire Agreement. This MOU contains the sole and entire agreementand understanding to which the Parties and any and all prior discussions, negotiations, commitments or understandings related hereto, if any, are merged herein and superseded hereby. No representations, warranties, promises, covenants, undertakings, commitments, restrictions, or other obligations, verbal, written or otherwise, expressed or implied, other than those expressly contained herein have been made by either Party to the other.

Section 15. Parties' Remedies. Each Party expressly agrees that damages are an inadequate remedy for a breach of this MOU and that all provisions ofthis MOU shall be specifically enforceable by either affected party.

Section 16. Term. The effective date of this MOU shall be the date that this MOU has been fully executed by both parties. This MOU shall continue in full force and effectfor the life of the Project, unless modified, amended or terminated earlier by mutual written agreement of the parties.

IN WITNESS WHEREOF, the parties hereto have caused this MOU to be executed by their duly authorized representatives as of the dates fixed below:
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CITY OF BEVERLY HILLS

Date: _____

CITY OF BEVERLY HILLS
A Municipal Corporation

LILLI BOSSE
Mayor of the City of Beverly Hills, California

ATTEST:

_____(SEAL)
HUMA AHMED
City Clerk

APPROVED AS TO FORM:

LAURENCE S. WIENER
City Attorney

APPROVED AS TO CONTENT:

GEORGE CHAVEZ
City Manager

SHANA E. EPSTEIN
Director of Public Works

ROBERT WELCH, P.E.
Utilities General Manager

SHARON L'HEUREUX DRESSEL
Risk Manager

CITY OF CULVER CITY

Date: _____ By: _____

John M. Nachbar
City Manager

APPROVED AS TO CONTENT:

By: _____

Yanni Demitri
Director of Public Works/City Engineer

APPROVED AS TO FINANCING:

By_____

Lisa Soghor
Chief Financial Officer

APPROVED AS TO FORM:

By_____

Heather Baker
City Attorney

EXHIBIT A

OPERATIONS AND MAINTENANCE PLAN

Culver Boulevard
Filtration and Retention Project
Operation and Maintenance Plan

November 23, 2021
100-IWM-T38173

PRESENTED TO

City of Culver City
Department of Public Works
9770 Culver Blvd.
Culver City, CA 90232

PRESENTED BY

Tetra Tech, Inc.
17885 Von Karman Ave
Suite 500
Irvine, CA, CA 90017
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1.0 INTRODUCTION AND PURPOSE

Culver City (City), in collaboration with other members of the Ballona Creek Watershed Management Group (BC WMG) (the cities of Beverly Hills, Inglewood, Santa Monica, West Hollywood, the Unincorporated County of Los Angeles, and the Los Angeles County Flood Control District (LACFCD)) is committed to addressing pollutant loading to water bodies in the Ballona Creek (BC) watershed through implementation of the BC Enhanced Watershed Management Program (EWMP). As a major step toward implementing the EWMP, the City designed and implemented the Culver Boulevard Filtration and Retention Project (Project) to divert up to 485 acre-feet stormwater runoff annually from the Storm Drain BI 2901-U2 Line B (referred to herein as Harter Ave drain) and Culver City – Unit 4 Line A, I (referred herein as Sepulveda Blvd drain) for treatment and partial reuse. The Sepulveda Blvd and Harter Ave drains outlet directly to Ballona Creek and intercepting and treating the runoff before it discharges to the creek will reduce the long-term annual loading of pollutants to the BC Watershed. A portion of the intercepted water will also be used to irrigate the nearby Veterans Memorial Park reducing potable water demands.

An Operations and Maintenance (O&M) program ensures that the Project's individual system components maintain lilfespan performance. Regular maintenance helps ensure that stormwater best management practices (BMPs) continue to achieve the intended runoff volume and pollutant load reduction targets. This O&M Plan contains standard operations and maintenance (O&M) procedures for the BMP components of the Project. It is assumed that the City is the operator of the infrastructure, and responsible for performing and tracking long-term operation maintenance. It is also assumed that the City will adopt procedures and protocols within this report that are more stringent or currently not enacted or utilized.

2.0 SUMMARY OF SITE COMPONENTS AND MAINTENANCE TASKS

The Project diverts flows from the Sepulveda Blvd and Harter Ave drains into pretreatment devices by means of a gravity diversion. The pretreated water then flows into underground storage galleries where a portion will be retained for future use and the remainder pumped back into the Harter Ave drain following treatment. Site plan schematics in plan view and cross section are included in **Appendix A**.

In this O&M Plan, recommended O&M activities are organized by system component. Key components of the Project include:

- Drain Diversion
  - Gravity Diversion
- Pretreatment
- Underground Storage Facilities
- Instrumentation Devices (hydrocarbon sensors, flow meters, level sensors)

Essential operation and maintenance activities for the Project are summarized in **Table 2-1**, including recommended inspection and maintenance frequency. Principal tasks include regular inspection and cleaning (i.e., vacuuming) of critical system components, and equipment replacement as needed.

Table 2-1. Summary of Culver Boulevard Project Maintenance Tasks

Task Description	Frequency	Protocol Reference
Diversion Structures		
Inspection	After major storm events or monthly during wet season; Once per dry season	3.1
Debris removal and vacuum cleaning	As needed	
Hydro-jetting	Annually, or as needed	
Pretreatment		
Inspection	After major storm events or monthly during wet season; Once per dry season	3.2
Vacuum clean sump or chambers	Annually, or as needed	
Clean screen(s)	Annually, or as needed	
Replace hydrocarbon media booms (if used)	Annually	
Stormwater BMP (Underground Storage Facilities)		
Inspection	After major storm events or monthly during wet season; Once per dry season	3.3
Settling basin vacuum cleaning	Every 2 years, or as needed	
Vault cleaning	Every 10 years, or as needed	
Pump Station		
Wet well inspection	After major storm events or monthly during wet season; Once per dry season	3.4
Wet well vacuum cleaning	Annually, or as needed	
Valve Maintenance	As needed	
Control Panel Maintenance	As needed	
Exercise pumps for optimal performance	Monthly (minimum) during dry season	
Cleaning and servicing	Annually, in advance of wet season	
Pump Replacement	Every 20 Years	
Return Flow Filtration System		
Inspection	After storm events or monthly during wet season; Once per dry season	3.5
Vacuum clean filtration unit pretreatment	As needed	
Clean membrane filtration cartridges	Every 18 months, or as needed	
Replace membrane filtration cartridges	If damaged or clogged beyond recovery (every 10 years)	
Instrumentation Devices (hydrocarbon sensors, flow meters, level sensors)		
Inspection	After major storm events or monthly during wet season; Once per dry season	3.6

3.0 MAINTENANCE TASKS BY COMPONENT

3.1 GRAVITY DIVERSION STRUCTURES

Two gravity diversion structures, one on the Sepulveda Blvd drain line and the other on Harter Ave drain line, will divert stormwater via gravity along two 24-inch RCP and one 36-inch RCP, respectively, to pretreatment devices and further on to the BMP unit. The diversion structures may look similar to **Figure 3-1** and **Figure 3-2**.

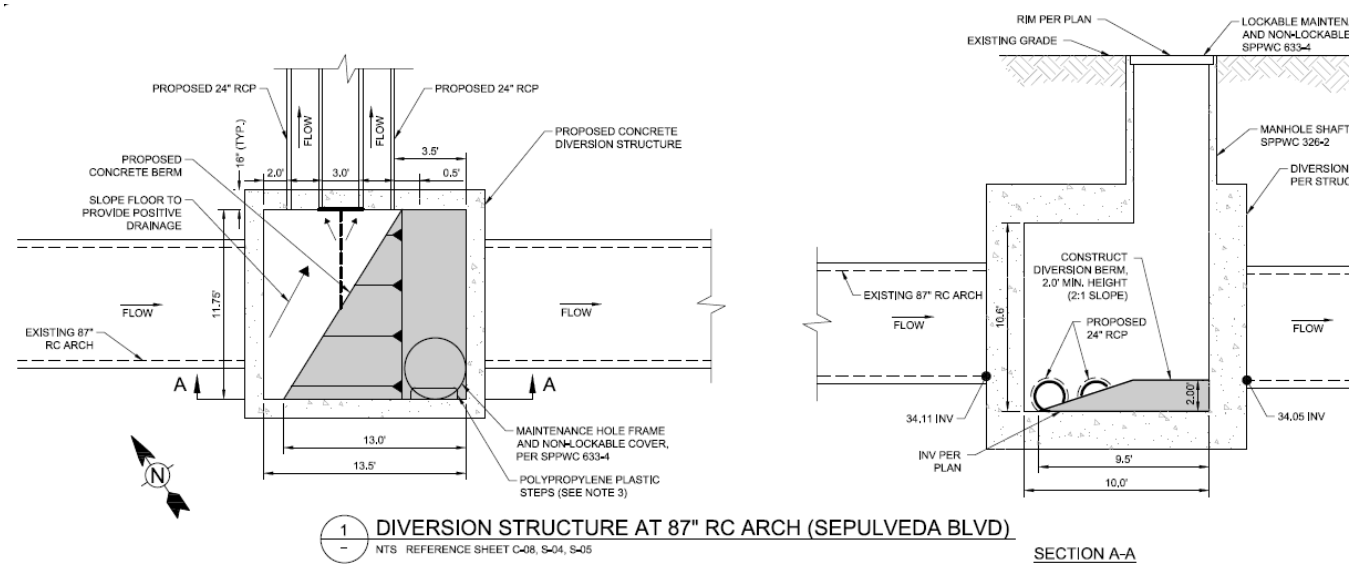

Figure 3-1. Gravity Diversion Structure Sepulveda Blvd Drain

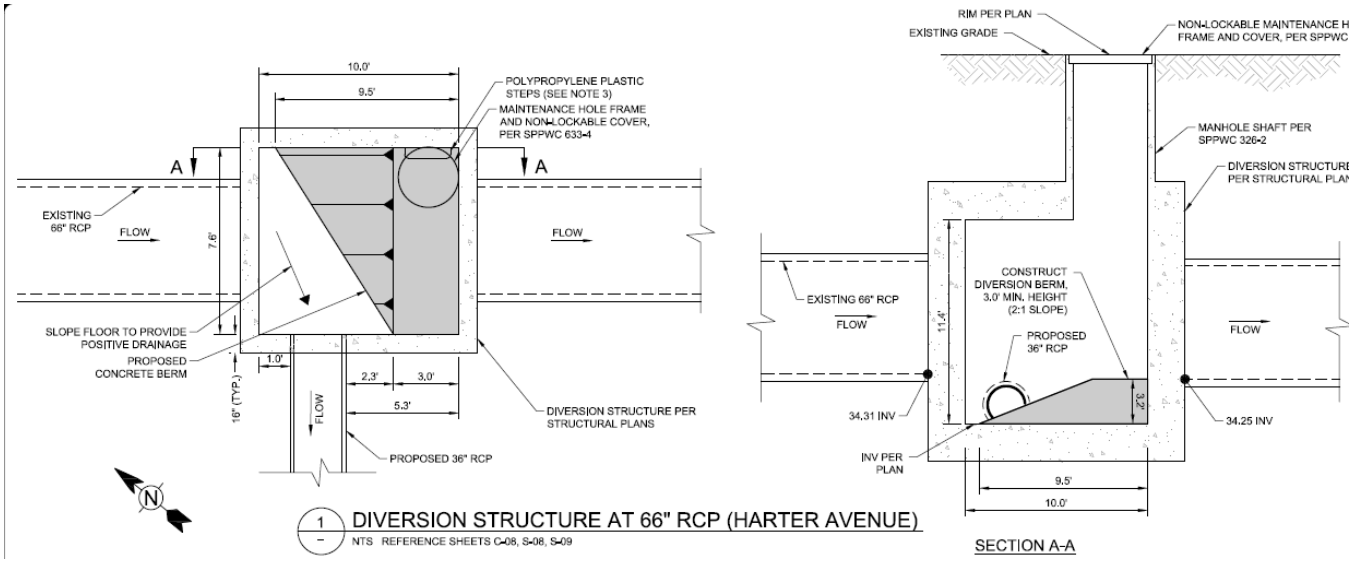

Figure 3-2. Gravity Diversion Structure Harter Ave Drain

3.1.1 Task Description

This section describes the maintenance protocol of the gravity diversion system, including diversion structures, grated side inlets, actuated valves, and conveyance pipes.

3.1.2 Schedule

The following schedule is recommended for routine maintenance of the gravity diversion system:

- **Inspection** shall be conducted after each major storm event or monthly during wet season (whichever is more frequent), and once during the dry season
- **Debris removal and vacuum cleaning** will be conducted as needed (triggered by inspections)
- **Hydro jetting** shall be conducted annually
- **Operation and testing of the actuated valves** shall be conducted every 6 months if no operations occur within the 6-month period
- **Actuator battery replacement** shall be conducted every 5 years

3.1.3 Documentation

- Field forms, which are to be submitted to the City for record keeping:
    - Maintenance log (see **Appendix C**);
    - Inspection and maintenance checklists; and
    - Photo/video log
- Field forms must be reviewed by field personnel prior to submission to the City for completion and/or inconsistencies.
- Site map (i.e. construction plan, as-built, site plan) showing locations of components to be inspected/maintained.
- Hard copy of permits and/or permissions.

3.1.4 Health and Safety

This task shall be executed in accordance to general health and safety procedures set forth by the City, including all necessary protocol for work around opened access structures, flood control channels, and confined spaces.

The following additional health and safety procedures may be required for the execution of this task:

- Ensure water head pressure does not damage or cause flooding of public and/or private property being served by the drainage system.
- Ensure work area is enclosed with safety cones and/or warning tape.
- Ensure all unused access structures are fully closed.
- Ensure personal protective equipment is properly employed before coming in contact with any stormwater, debris, or sediments.

3.1.5 Personnel

Personnel executing maintenance activities shall consist of the following minimum personnel for each task:

- **Inspection:** Two (2) experienced drain camera technicians trained in stormwater BMP inspection
- **Debris removal:** Two (2) experienced technicians
- **Vacuum cleaning and hydrojetting**:
    - One (1) hydro jet operator;
    - One (1) hydro jet technician;
    - One (1) vacuum truck operator; and
    - One (1) vacuum truck technician.

Personnel shall possess applicable and appropriate training, certifications, licenses, and/or experience to execute this task.

3.1.6 Access Requirements

The following access requirements are required for the execution of this task:

- City and/or maintenance personnel shall provide clear and safe access to the site prior to commencing maintenance;
- Applicable required permits and approvals shall be obtained prior to commencing maintenance;
- Maintenance personnel shall verify conditions at both site and travel route are sufficient for equipment (i.e. site access, overhead clearances, path widths, weight restrictions, slopes, road closures, etc.), and
- If applicable, proper traffic control shall be provided in accordance with City requirements.

3.1.7 Equipment

The following equipment may be required for execution of this task:

- **Inspection:**
  - ☐ Personal protective equipment
  - ☐ Drain inspection camera
  - ☐ Digital or cell phone camera
  - ☐ Measuring tape or pole
  - ☐ Flashlight
- **Debris removal:**
  - ☐ Personal protective equipment
  - ☐ Shovel
  - ☐ Garbage bags or waste receptacles/bins
- **Vacuum cleaning and hydrojetting:**
  - ☐ Personal protective equipment
  - ☐ Drain inspection camera
  - ☐ Hydro jetting equipment
  - ☐ Vacuum truck
  - ☐ Digital or cell phone camera
  - ☐ Measuring tape and/or pole
  - ☐ Confined space equipment per OSHA standards
  - ☐ Shovel
  - ☐ Ladder
  - ☐ Backflow preventer
  - ☐ Water hose
  - ☐ Tools such as:
    - ☐ Wrenches
    - ☐ Hammer
    - ☐ Manhole hooks
    - ☐ Crowbar

3.1.8 Standard Operating Procedure

The following standard operating procedure shall be implemented for the execution of this task. All inspections shall be documented, and any damages, deformities, function impairments, and/or concerns shall be reported to the City:

1. Determine appropriate documentation and equipment to be used prior to maintenance and ensure equipment waste storage tank is empty.

2. Open access point and visually inspect the structure. Note any abnormalities or excessive debris or sediment accumulation. Note the presence of standing or flowing water.
3. If the structure includes a grated side inlet, remove any large debris accumulated on the grate. Extract side inlet grate. When removing the side inlet grate, be careful to not drop suspended sediment back into the side inlet. Remove trash, sediment, and/or organic debris from inlet grate. Inspect inlet grate.
4. Using the drain inspection camera, inspect the diversion structure and diversion conduit for integrity concerns and/or damages by checking for:
    - Evidence of infiltration including drips or water flowing into structure at joints,
    - Cracks and deterioration of the structure,
    - Accumulation of debris, sediment, or blockages (note amount or depth of accumulation),
    - Structural shifts such as shearing, cracking, lifting, or movement, and
    - Signs of abrasion and/or corrosion.
5. Report concerns to the City prior to continuing maintenance activities.
6. If sediment and/or debris have accumulated in the structure, remove using a vacuum truck and/or hand tools and properly dispose.
7. If sediment or other material have accumulated in the conduit, perform hydro jetting and remove sediment/slurry from conveyance structure using a vacuum truck. If diversion structure has no sump, be sure to temporarily dam the downstream storm drain to prevent sediment from exiting the structure and flowing downstream.
8. Remove temporary dam (if used), replace side inlet grate in proper orientation, and close access point.
9. Removal and disposal of waste shall be in accordance with applicable waste disposal requirements.

3.2 PRETREATMENT

Pretreatment is an integral component of the treatment strategies to extend the life of the system. It is prescribed in order to reduce the maintenance frequency of the Project's stormwater facilities, focus maintenance efforts to a concentrated area, and bolster compliance. The pretreatment devices consist of two inline hydrodynamic separators capable of treating a maximum rate of 25 cfs (**Figure 3-3**) and a grated catch basin filter basket. The diversion flow rate of 25 cfs from the drain lines (Sepulveda Blvd and Harter Ave) was used in selecting an appropriately-sized hydrodynamic pretreatment device.

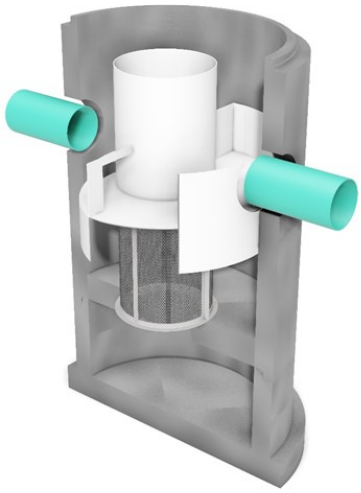

Figure 3-3. Typical Inline Hydrodynamic Separator

3.2.1 Task Description

This section describes the protocol for maintenance of the pretreatment device. The task includes inspection, vacuum cleaning structures to remove trash/sediment/organic debris, cleaning screens, and parts replacement.

3.2.2 Schedule

The following schedule is recommended for routine maintenance of the pretreatment system:

- **Inspection** shall be conducted after each major storm event or monthly during wet season (whichever is more frequent), and once during the dry season
- **Vacuum cleaning sumps or chambers** shall be conducted as need (triggered by inspection) or at least annually
- **Cleaning screen(s)** shall be conducted shall be conducted as need (triggered by inspection) or at least annually
- **Replacing hydrocarbon media booms** (if used) shall be conducted annually

3.2.3 Documentation

The following documentation may be required for the execution of this task:

- Field forms, which are to be submitted to the City for record keeping:
    - Maintenance log (see **Appendix C**);
        - Shall include amount and description of debris collected.
        - Shall include condition of storm brooms.
    - Inspection and maintenance checklists; and
    - Photo/video log.

  Field forms must be reviewed by field personnel prior to submission to the City for completion and/or inconsistencies.
- Site map (i.e. construction plan, as-built, site plan) showing locations of components to be inspected/maintained.
- Manufacturer maintenance manual.
- Hard copy of permits and/or permissions.

3.2.4 Health and Safety

This task shall be executed in accordance to general health and safety procedures set forth by the City, including all necessary protocol for work around opened access structures, flood control channels, and confined spaces.

The following additional health and safety procedures may be required for the execution of this task:

- Ensure work area is enclosed with safety cones and/or warning tape.
- Ensure all unused access structures are fully closed.
- Ensure personal protective equipment is properly employed before coming in contact with any stormwater, debris, or sediments.
- Use caution, proper lifting techniques or mechanical assistance, and proper personal protective equipment if lifting components (filters, booms, screens) out of the pretreatment device.

3.2.5 Personnel

Personnel executing this task shall consist of a minimum of:

- One (1) vacuum operator; and
- One (1) vacuum technician.

Personnel shall possess applicable and appropriate training, certifications, licenses, and/or experience to execute this task, including certification of confined space training for entry into the structure.

Note that contracted maintenance can be provided by the manufacturer, or a manufacturer-approved contractor.

3.2.6 Access Requirements

The following access requirements are required for the execution of this task:

- City and/or maintenance personnel shall provide clear and safe access to the site prior to commencing maintenance;
- Applicable required permits and approvals shall be obtained prior to commencing maintenance;
- Maintenance personnel shall verify conditions at both site and travel route are sufficient for equipment (i.e. site access, overhead clearances, path widths, weight restrictions, slopes, road closures, etc.);

3.2.7 Equipment

The following equipment may be required for execution of this task:

- ☐ Personal protective equipment
- ☐ Vacuum cleaning equipment (vacuum or vacuum truck)
- ☐ Portable vacuum extractor
- ☐ Hand tools as necessary for assembling and disassembling tubes and hoses
- ☐ Digital or cell phone camera
- ☐ Flashlight
- ☐ Measuring tape and/or pole
- ☐ Confined space equipment per OSHA standards
- ☐ Shovel
- ☐ Ladder
- ☐ Backflow preventer
- ☐ Water hose
- ☐ Replacement parts (filters, booms, etc.)
- ☐ Tools such as:
    - ☐ Wrenches
    - ☐ Hammer
    - ☐ Manhole hooks
    - ☐ Crowbar

3.2.8 Standard Operating Procedure

The following standard operating procedures shall be implemented for the execution of this task. Review the manufacturer maintenance manuals and recommendations in **Appendix B** for additional information. All inspections shall be documented, and any damages, deformities, function impairments, and/or concerns shall be reported to the City:

1. Determine appropriate documentation and equipment to be used prior to maintenance and ensure equipment waste storage tank is empty.
2. Open pretreatment access point and visually inspect the structure. Note any abnormalities or excessive debris or sediment accumulation. Note the presence of standing or flowing water.
3. Visually inspect the unit for concerns and/or damages by checking for:
    a. Evidence of infiltration including drips or water flowing into structure at joints,
    b. Cracks and deterioration of the structure,
    c. Accumulation of debris, sediment, or blockages (note amount or depth of accumulation),
    d. Structural shifts such as shearing, cracking, lifting, or movement, and

   e. Signs of abrasion and/or corrosion.
4. Report concerns to the City prior to continuing maintenance activities.
5. If the device contains screens or screening baskets, remove debris manually or with a vacuum truck. A pressure washer may be needed to dislodge material attached to the screen.
6. If sediment and/or debris have accumulated in the sump or chambers of the structure, remove using a vacuum truck and/or hand tools and properly dispose. Refer to manufacturer recommendations for sediment removal – some manufacturers recommend removing sediment when it has reached 75 percent of the sump capacity.
7. If replacing filters or booms, remove and properly dispose of used parts and replace per manufacturer recommendations.
8. Close access point.
9. Removal and disposal of waste shall be in accordance with applicable waste disposal requirements.

3.3 UNDERGROUND STORAGE FACILITY

The BMP system features gravity-fed diversions to two underground storage facilities with a combined 8.0 acre-feet of storage capacity. The underground storage facilities provide initial detention before the captured stormwater can be filtered and returned to the Harter Ave drain or used for irrigation. These precast concrete storage systems are made from durable, reinforced, high-strength concrete. See **Figure 3-4** for a picture of an example precast system during installation. While it is expected that the pretreatment devices will protect the BMP from excessive sediment and debris and extend the period between maintenance activities, a sediment trap wall is also in place to concentrate infrequent maintenance to a smaller footprint in the facility.

3.3.1 Task Description

This section describes the protocol for inspection and maintenance of the underground stormwater facility using vacuum cleaning equipment to remove accumulated sediment.

Figure 3-4. Typical Concrete Storage System

3.3.2 Schedule

The following schedule is recommended for routine maintenance of the stormwater BMP system:

- **Inspection** shall be conducted after each major storm event or monthly during wet season (whichever is more frequent), and once during the dry season
- **Settling basin vacuum cleaning** shall be conducted as needed (triggered by inspections), or at least every 2 years (actual frequency will depend on actual sediment loading to site, and may be less frequent)
- **Storage gallery vacuum cleaning** shall be conducted as needed (triggered by inspections), or at least every 10 years (actual frequency will depend on sediment loading to the site and may be less frequent).

3.3.3 Documentation

- Field forms, which are to be submitted to the City for record keeping:
    - Maintenance log (see **Appendix C**);
    - Inspection and maintenance checklists; and
    - Photo/video log.
- Field forms must be reviewed by field personnel prior to submission to the City for completion and/or inconsistencies.
- Site map (i.e. construction plan, as-built, site plan) showing locations of components to be inspected/maintained.
- Hard copy of permits and/or permissions.

3.3.4 Health and Safety

This task shall be executed in accordance to general health and safety procedures set forth by the City, including all necessary protocol for work around opened access structures, flood control channels, and confined spaces.

The following additional health and safety procedures may be required for the execution of this task:

- Ensure work area is enclosed with safety cones and/or warning tape.
- Ensure all unused access structures are fully closed.
- Ensure personal protective equipment is properly employed before coming in contact with any stormwater, debris, or sediments.

3.3.5 Personnel

Personnel executing maintenance activities shall consist of the following minimum personnel for each task:

- **Inspection:** Two (2) experienced technicians trained in stormwater BMP inspection.
- **Settling basin and gallery vacuum cleaning**:
    - One (1) vacuum truck operator; and
    - One (1) vacuum truck technician.

Personnel shall possess applicable and appropriate training, certifications, licenses, and/or experience to execute this task including confined space entry.

3.3.6 Access Requirements

The following access requirements are required for the execution of this task:

- City and/or maintenance personnel shall provide clear and safe access to the site prior to commencing maintenance;
- Applicable required permits and approvals shall be obtained prior to commencing maintenance;
- Maintenance personnel shall verify conditions at both site and travel route are sufficient for equipment (i.e. site access, overhead clearances, path widths, weight restrictions, slopes, road closures, etc.)

3.3.7 Equipment

The following equipment may be required for execution of this task:

- **Inspection**
    - Personal protective equipment
    - Drain inspection camera (optional)
    - Flashlight
    - Digital or cell phone camera
    - Measuring tape
- **Vacuum cleaning**
    - Vacuum cleaning equipment (vacuum or vacuum truck)
    - Portable vacuum extractor
    - Hand tools as necessary for assembling and disassembling tubes and hoses
    - Digital or cell phone camera
    - Flashlight
    - Measuring tape and/or pole
    - Confined space equipment per OSHA standards
    - Shovel
    - Ladder
    - Backflow preventer
    - Water hose
    - Replacement parts (filters, booms, etc.), and
    - Tools such as:
        - Wrenches
        - Hammer
        - Manhole hooks
        - Crowbar

3.3.8 Standard Operating Procedure

The following standard operating procedure shall be implemented for the execution of this task. All inspections shall be documented, and any damages, deformities, function impairments, and/or concerns shall be reported to the City (if applicable):

1. Determine appropriate documentation and equipment to be used prior to maintenance and ensure equipment waste storage tank is empty.
2. Open maintenance shaft and visually inspect each of the structure's settling areas. Note any abnormalities or excessive debris or sediment accumulation. Note the presence of standing or flowing water.
3. Visually inspect the gallery for integrity concerns and/or damages by checking for:
    a. Evidence of infiltration including drips or water flowing into structure at joints,
    b. Cracks and deterioration of the structure,
    c. Accumulation of debris, sediment, or blockages (note amount or depth of accumulation),
    d. Structural shifts such as shearing, cracking, lifting, or movement, and
    e. Signs of abrasion and/or corrosion.
4. Report concerns to the City (if applicable) prior to continuing maintenance activities.
5. If sediment and/or debris have accumulated in the forebay greater than one foot in depth or 50% of the settling basin volume, remove using a vacuum truck and/or hand tools and properly dispose.
6. If excessive sediment or other material have accumulated in the vault, remove sediment using a vacuum truck.
7. Close access point.
8. Removal and disposal of waste shall be in accordance with applicable waste disposal requirements.

3.4 PUMP STATION

Pumps will be used onsite to convey captured water out of the stormwater BMP either for filtration and return to the Harter Ave drain or for Veterans Memorial Park irrigation. The pumps will be housed in a common wet well (similar to that shown in **Figure 3-5**) and the control panel may look similar to **Figure 3-6**.

Figure 3-5. Example Stormwater Pumps Installed in a Wet Well

Figure 3-6. Example Pump Station Control Panel

3.4.1 Task Description

This section describes the maintenance protocol of the pump station.

3.4.2 Schedule

The following schedule is recommended for routine maintenance of the pump station:

- **Wet well inspection** shall be conducted after each major storm event or monthly during wet season (whichever is more frequent), and once during the dry season
- **Wet well vacuum cleaning** shall be conducted as needed (triggered by inspection) or at least annually
- **Valve maintenance** shall be conducted as needed, per manufacturer recommendations
- **Control panel maintenance** shall be conducted as needed, per manufacturer recommendations
- **Exercising pumps for optimal performance** shall be conducted monthly at a minimum during the dry season and at least monthly during the wet season if no rainfall has occurred (or as recommended by the manufacturer)
- **Pump cleaning and servicing** annually, in advance of wet season, or as recommended by the manufacturer
- **Pump replacement** shall be conducted every 20 years, or as recommended by the manufacturer

3.4.3 Documentation

- Field forms, which are to be submitted to the City for record keeping:
    - Maintenance log (see **Appendix C**);
    - Inspection and maintenance checklists; and
    - Photo/video log.

  Field forms must be reviewed by field personnel for completeness and/or inconsistencies prior to submission to the City.
- Site map (i.e. construction plan, as-built, site plan) showing locations of components to be inspected/maintained.
- Pump maintenance manual.
- Hard copy of permits and/or permissions.

3.4.4 Health and Safety

This task shall be executed in accordance to general health and safety procedures set forth by the City, including all necessary protocol for work around opened access structures, flood control channels, and confined spaces.

The following additional health and safety procedures may be required for the execution of this task:

- Before inspecting and maintaining any moving parts, ensure that the electrical power supply has been isolated, locked off, and tagged.
- Ensure that automatic start/stop functions, and other automated controls are switched off before servicing any moving parts.
- Ensure work area is enclosed with safety cones and/or warning tape.
- Ensure all unused access structures are fully closed.
- Ensure personal protective equipment is properly employed before coming in contact with any stormwater, debris, or sediments.

3.4.5 Personnel

Personnel executing this task shall consist of a minimum of:

- **Wet well inspection**: Two (2) experienced technicians with confined-space entry certification
- **Wet well vacuum cleaning:**
  - One (1) vacuum truck operator; and
  - One (1) vacuum truck technician.
- **Valve and control panel maintenance, pump exercising, pump cleaning and servicing:** One (1) trained pump maintenance technician.

3.4.6 Access Requirements

The following access requirements are required for the execution of this task:

- City and/or maintenance personnel shall provide clear and safe access to the site prior to commencing maintenance;
- Applicable required permits and approvals shall be obtained prior to commencing maintenance;
- Maintenance personnel shall verify conditions at both site and travel route are sufficient for equipment (i.e. site access, overhead clearances, path widths, weight restrictions, slopes, road closures, etc.);
- The pump controls will be located with the irrigation control panel, so an access key will be required.

3.4.7 Equipment

The following equipment may be required for execution of this task:

- ☐ Personal protective equipment
- ☐ Enclosure access key
- ☐ Digital or cell phone camera
- ☐ Flashlight
- ☐ Measuring tape and/or pole
- ☐ Confined space equipment per OSHA standards
- ☐ Pressure washer
- ☐ Vacuum truck
- ☐ Shovel
- ☐ Ladder
- ☐ Backflow preventer
- ☐ Water hose
- ☐ Spare replaceable pump components, and
- ☐ Tools such as:
  - ☐ Wrenches
  - ☐ Hammer
  - ☐ Manhole hooks
  - ☐ Crowbar

3.4.8 Standard Operating Procedure

The following standard operating procedure shall be implemented for the execution of this task. Actual protocol will vary based on the specific device – see manufacturer maintenance manuals and recommendations in **Appendix B**. All inspections shall be documented, and any damages, deformities, function impairments, and/or concerns shall be reported to the City:

1. Determine appropriate equipment to be used prior to inspection and maintenance.
2. Open wet well access point and inspect well and conveyance structures. Note depth of water and sediment (if visible). Document and report concerns to the City prior to commencing task activities.

3. Remove sediment from wet well using vacuum truck
4. If servicing pump, perform pump manufacturer recommended maintenance tasks, such as:
    a. Exercising pump (note: may need to provide a makeup water supply for exercising if the facility is dry during the wet season)
    b. Inspecting components for corrosion, erosion, and cavitation;
    c. Checking electrical connections and components; and
    d. Checking clearances and fittings.
5. Replace any faulty component(s) per manufacturer recommendations.
6. Close access point.

3.5 RETURN FLOW STORMWATER FILTRATION SYSTEM

Before diversion for irrigation or returning the stored water to the Harter Ave drain, water will be pumped to a filtration system for treatment. Using this process to dewater the facility between storm events will help ensure that it has capacity to accept polluted runoff during the onset of the next storm. Stormwater will be treated using Kraken Filters similar to the example shown in **Figure 3-7**. The units will be capable of filtering at a maximum rate of 2.88 cfs.

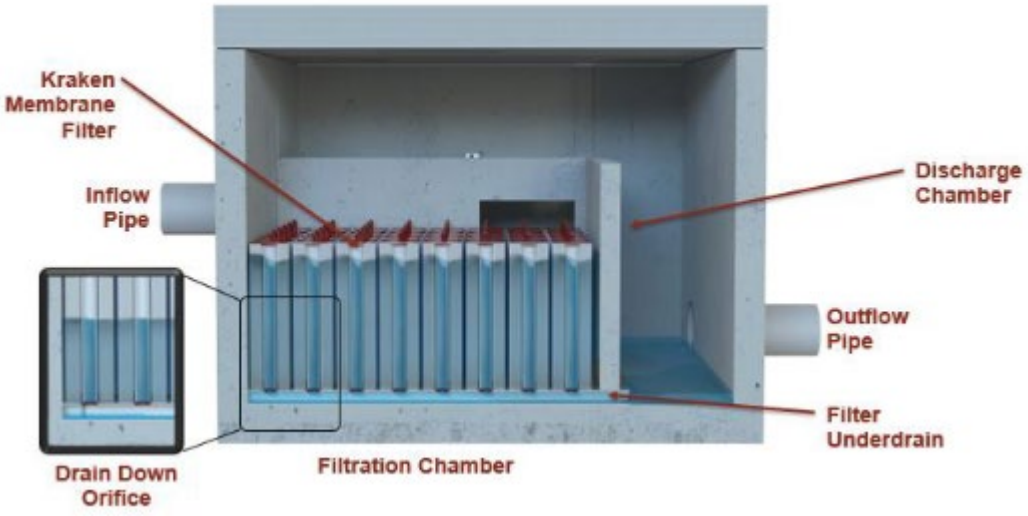

Figure 3-7. Kraken Filter Chamber Diagram

3.5.1 Task Description

This section describes the protocol for maintenance of the stormwater filtration system.

3.5.2 Schedule

The following schedule is recommended for routine maintenance of the stormwater filtration system:

- **Inspection** shall occur after storm events or monthly during the wet season (whichever is more frequent), and once during the dry season
- **Vacuum cleaning filtration unit pretreatment** shall occur as needed (triggered by inspection)
- **Cleaning membrane filtration cartridges** shall occur every 18 months, or as needed (triggered by inspections), or per manufacturer recommendations

- **Replacement of membrane filtration cartridges** shall occur if damaged or clogged beyond recovery (potentially every 10 years), or per manufacturer recommendations

3.5.3 Documentation

The following documentation may be required for the execution of this task:

- Field forms, which are to be submitted to the City for record keeping shall include
    - Maintenance log (see **Appendix C**);
    - Maintenance checklist;
        - Shall include amount and description of debris collected
        - Shall include condition of membrane filters
    - Inspection checklist; and
    - Photo/video log.

  Field forms must be reviewed by field personnel for completeness and/or inconsistencies prior to submission to the City.
- Site map (i.e. construction plan, as-built, site plan) showing locations of components to be inspected/maintained
- Kraken Filter maintenance manual
- Hard copy of permits and/or permissions

3.5.4 Health and Safety

This task shall be executed in accordance to general health and safety procedures set forth by the City, including all necessary protocol for work around opened access structures, flood control channels, and confined spaces.

The following additional health and safety procedures may be required for the execution of this task:

- Ensure work area is enclosed with safety cones and/or warning tape.
- Ensure all unused access structures are fully closed.
- Ensure personal protective equipment is properly employed before coming in contact with any stormwater, debris, or sediments.
- Use caution, proper lifting techniques or mechanical assistance, and proper personal protective equipment if lifting components out of the filtration device.

3.5.5 Personnel

Personnel executing this task shall consist of a minimum of:

- **Inspection:** One (1) trained technician
- **Vacuum cleaning and cleaning filtration cartridges**:
    - One (1) vacuum operator; and
    - One (1) vacuum technician.

Personnel shall possess applicable and appropriate training, certifications, licenses, and/or experience to execute this task, including certification of confined space training for entry into the structure.

Note that contracted maintenance can be provided by the manufacturer, or a manufacturer-approved contractor.

3.5.6 Access Requirements

The following access requirements are required for the execution of this task:

- City and/or maintenance personnel shall provide clear and safe access to the site prior to commencing maintenance;
- Applicable required permits and approvals shall be obtained prior to commencing maintenance;

- Maintenance personnel shall verify conditions at both site and travel route are sufficient for equipment (i.e. site access, overhead clearances, path widths, weight restrictions, slopes, road closures, etc.);

3.5.7 Equipment

The following equipment may be required for the execution of this task:

- ☐ Personal protective equipment
- ☐ Vacuum cleaning equipment (vacuum or vacuum truck with pressure washer)
- ☐ Portable vacuum extractor
- ☐ Hand tools as necessary for assembling tubes and hoses
- ☐ Digital or cell phone camera
- ☐ Flashlight
- ☐ Measuring tape and/or pole
- ☐ Confined space equipment per OSHA standards
- ☐ Shovel
- ☐ Backflow preventer
- ☐ Water hose
- ☐ Replacement parts if applicable (i.e. filter cartridges, etc.)
- ☐ Tools such as:
  - ☐ Wrenches
  - ☐ Hammer
  - ☐ Manhole hooks
  - ☐ Crowbar

3.5.8 Standard Operating Procedure

The following standard operating procedures shall be implemented for the execution of this task. Actual protocol will vary based on specific device – see the Kraken Filter manufacturer maintenance manual and recommendations in **Appendix B**. All inspections shall be documented, and any damages, deformities, function impairments, and/or concerns shall be reported to the City:

1. Determine appropriate documentation and equipment to be used prior to maintenance and ensure equipment waste storage tank is empty.
2. Open access point and visually inspect the structure. Note any abnormalities or excessive debris or sediment accumulation. Note the presence of standing or flowing water.
   a. Visually inspect the unit for concerns and/or damages by checking for:
   b. Evidence of infiltration including drips or water flowing into structure at joints,
   c. Cracks and deterioration of the structure,
   d. Accumulation of debris, sediment, or blockages (note amount or depth of accumulation),
   e. Structural shifts such as shearing, cracking, lifting, or movement, and
   f. Signs of abrasion and/or corrosion.
3. Report concerns to the City prior to continuing maintenance activities.
4. If the pretreatment chamber of the device has accumulated sediment, remove with a vacuum truck. A pressure washer may be needed to dislodge material.
5. If sediment has accumulated on the membrane filters, follow manufacturer recommendations for removal, cleaning, and replacement. Typically this involves pressure washing the cartridges until clean of sediment deposits. Be sure to pressure wash over an appropriate waste receptacle, or over a sump that will not allow dislodged materials to flow to the storm drain or underground BMP; vacuum dislodged sediment and wash water out of sump with vacuum truck
6. If replacing filters, remove and properly dispose of used parts and replace per manufacturer recommendations.

7. Close access point.
8. Removal and disposal of waste shall be in accordance with applicable waste disposal requirements.

3.6 INSTRUMENTATION DEVICES

Instrumentation devices for the Project include an ultrasonic level sensor in the underground storage facility, a hydrocarbon sensor in each of the pretreatment devices and flow monitoring equipment with the wet well system. The devices are integral to tracking and monitoring the operation of Project components.

3.6.1 Task Description and Schedule

This section describes the maintenance protocol of the instrumentation devices, including hydrocarbon sensors, flow meters, and level sensors.

The following schedule is recommended for routine maintenance of the instrumentation devices:

- Prior to and after sampling storm events (as applicable);
- Monthly during wet season; and
- Once per dry season

3.6.2 Documentation

- Field forms, which are to be submitted to the City for record keeping:
    - Maintenance log (see **Appendix C**);
    - Inspection and maintenance checklists; and
    - Photo/video log.

  Field forms must be reviewed by field personnel prior to submission to the City for completion and/or inconsistencies.
- Site map (i.e. construction plan, as-built, site plan) showing locations of components to be inspected/maintained.
- Hard copy of permits and/or permissions.

3.6.3 Health and Safety

This task shall be executed in accordance to general health and safety procedures set forth by the City.

The following additional health and safety procedures may be required for the execution of this task:

- Ensure all unused access structures are fully closed
- Ensure power supplies are disconnected before maintenance activities commence
- Ensure personal protective equipment is properly employed before coming in contact with any stormwater, debris, or sediments

3.6.4 Personnel

Personnel executing maintenance activities shall consist of the following minimum personnel for each task:

- **Inspection:** One (1) trained technician
- **Maintenance:** One (1) experienced technician

Personnel shall possess applicable and appropriate training, certifications, licenses, and/or experience to execute this task. Confined space entry training may be required to conduct maintenance and inspection activities.

3.6.5 Access Requirements

The following access requirements are required for the execution of this task:

- City and/or maintenance personnel shall provide clear and safe access to the site prior to commencing maintenance;
- Applicable required permits and approvals shall be obtained prior to commencing maintenance;
- Maintenance personnel shall verify conditions at both site and travel route are sufficient for equipment (i.e. site access, overhead clearances, path widths, weight restrictions, slopes, road closures, etc.), and
- If applicable, proper traffic control shall be provided in accordance with City requirements.

3.6.6 Equipment

The following equipment may be required for execution of this task:

- ☐ Personal protective equipment
- ☐ Hand tools as necessary for assembling/disassembling cables and battery housing
- ☐ Digital or cell phone camera
- ☐ Flashlight
- ☐ Measuring tape and/or pole
- ☐ Confined space equipment per OSHA standards
- ☐ Scrub brush and distilled water
- ☐ Water source
- ☐ Replacement parts if applicable (i.e. batteries, membranes, etc.)
- ☐ Tools such as:
  - ☐ Wrenches
  - ☐ Hammer
  - ☐ Manhole hooks
  - ☐ Crowbar

3.6.7 Standard Operating Procedure

The following standard operating procedure shall be implemented for the execution of this task. Actual protocol will vary based on specific device – see manufacturer maintenance manual and recommendations in **Appendix B**. All inspections shall be documented, and any damages, deformities, function impairments, and/or concerns shall be reported to the City:

1. Determine appropriate documentation and equipment to be used prior to maintenance and ensure equipment waste storage tank is empty.
2. Open access point and visually inspect the instrumentation Note any abnormalities or excessive debris or sediment accumulation on the field form.
3. Visually inspect the housing unit for concerns and/or damages by checking for:
   a. Evidence of infiltration including drips or water flowing into the housing; and
   b. Cracks and deterioration of the housing body
4. Disconnect the power source
5. Open the housing cover
6. Inspect the housing and manually remove any sediment or debris
7. Detach sensor from housing and clean sediment and debris from the sensor using soft cloth, scrub brush and distilled water (or per manufacturer recommendations)
8. Perform maintenance activities such as membrane or battery replacement according to manufacturer specifications
9. Restore the power source ensuring the housing unit is securely closed
10. Close access point
11. Removal and disposal of waste shall be in accordance with applicable waste disposal requirements.

APPENDIX A CULVER BOULEVARD PROJECT SITE PLAN

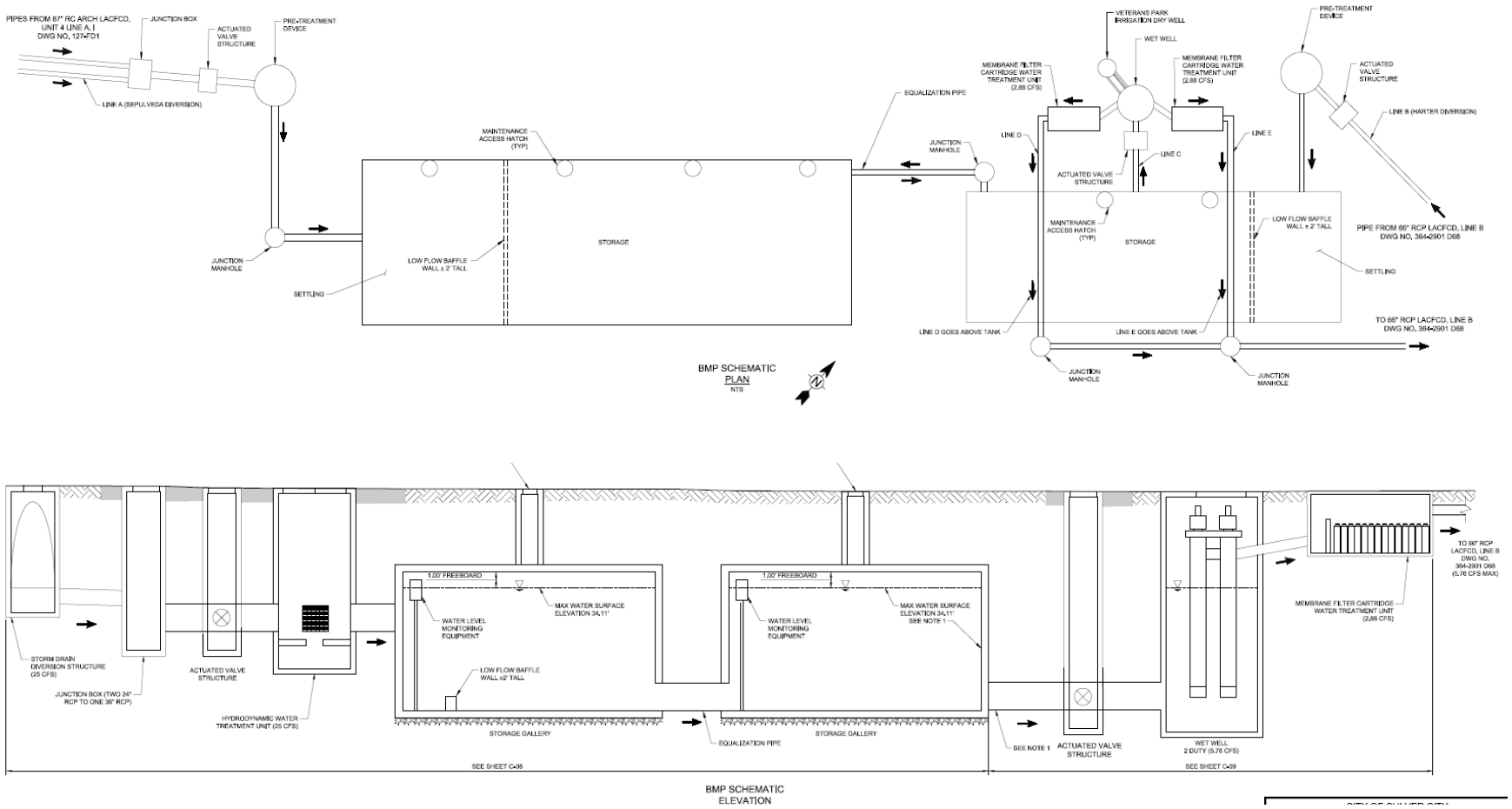

Figure A-1. Schematics depicting the BMP component configuration for the Project

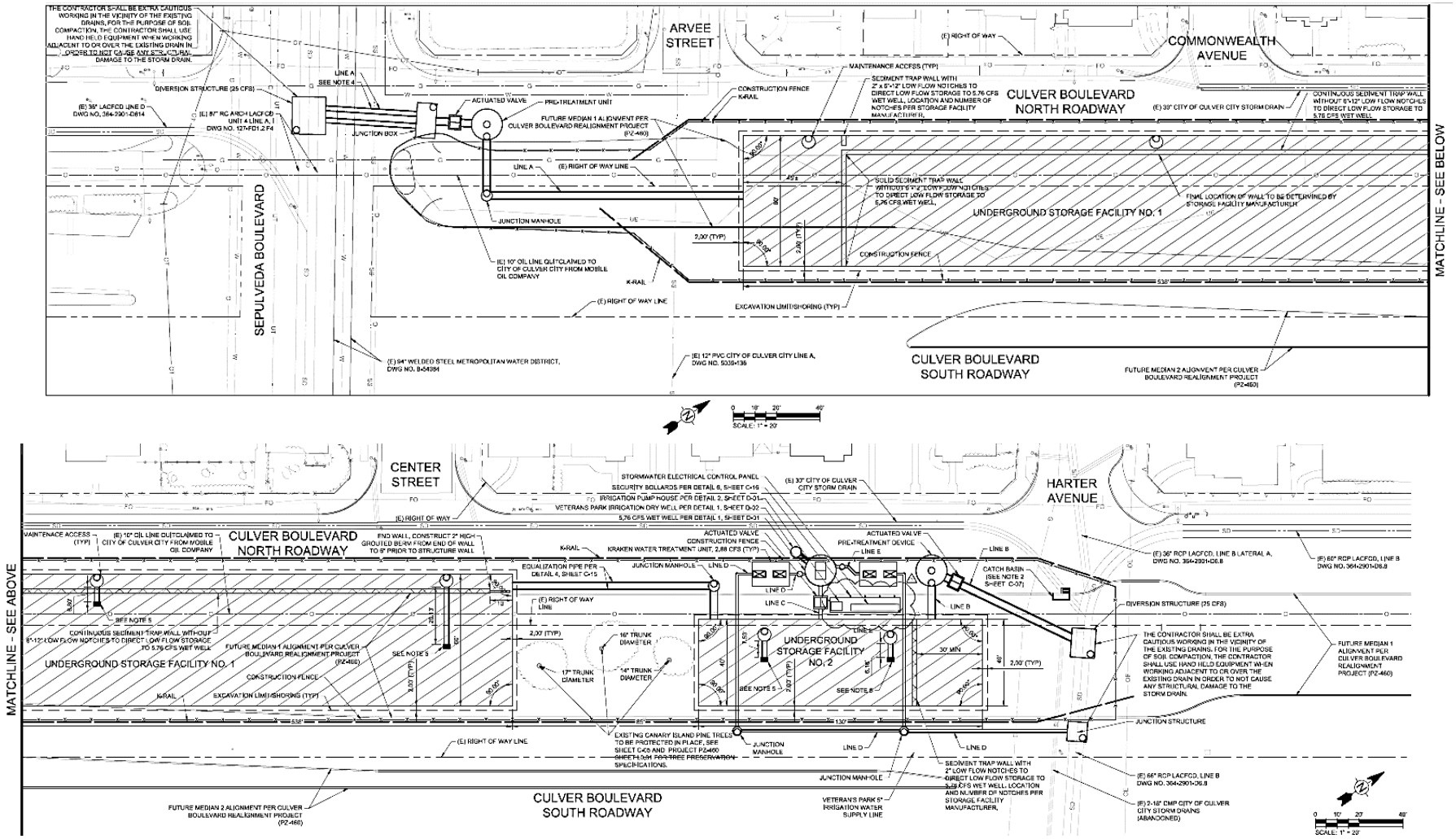

Figure A-2. Project plan view

APPENDIX B MANUFACTURER DOCUMENTATION

The applicable manuals for each system component are listed below. The manuals are provided as separate attachments.

Gravity Diversion Structure

- None

Pretreatment System

- Pretreatment Devices Jensen Deflective Separator
- Flogard+Plus Catch Basin Insert Filter

Underground Storage Facility

- None

Pump Station

- Tesco O&M
- Badger Meter
- Main Pump Station
- Rain Water Harvesting
- Valves
- Drywell

Return Flow Stormwater Filtration System

- Kraken Filter O&M

Instrumentation Devices

- See Section 10 of the Tesco O&M

APPENDIX C MAINTENANCE LOG FORM

Culver Boulevard Filtration and Retention Project Maintenance Log Form

Refer to the Culver Boulevard Filtration and Retention Project Operations and Maintenance Manual for a description of the O&M procedures for project components.

Inspection /Maintenance Item	Date	Maintenance Activities Completed or Action Items	Inspected By	Additional Notes
Jensen HDS	1/1/21	Vac Truck cleanout of sediment and debris	Jane Smith	Completed during post rain event inspection