



Managing a Post Construction Stormwater Program



Today's Presenter:

Anna Griggs

VP Client Management

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SIG

Stormwater Investment Group

Agenda - Necessary Steps to Manage a Program

- Awareness
 - Regulatory
 - Property Damage
 - Public Perception
- Identification
 - Types of Systems
 - Above Ground
 - Below Ground
 - Retention
 - Detention



Got Stormwater?

Agenda - Necessary Steps Continued

- Inventory
 - Structures
 - Attributes
- Assessment
 - Condition of Systems
 - Neglected
 - Improper installation
- Implementation
 - Analyze
 - Data
 - Budget
 - Repairs or remediation
 - Maintenance - Frequency



Got Stormwater?

Awareness



- Regulatory - EPA*
 - Local Differences
- Property Damage
- Public Perception

One Big Box agreed to pay a \$1.3 million penalty and implemented a nationwide compliance program to resolve alleged violations of the Clean Water Act. (2008)

Another Big Box agreed to pay a \$3.1 million civil penalty and reduce stormwater runoff at its sites by instituting better control measures. (2004)

➤ Regulatory – Local Enforcement Efforts Kent Conservation District DE

To Whom It May Concern:

Kent Conservation District recently performed our annual inspection of the storm water facility at the above referenced address. During our inspection, the following items were noted and our office request the following items be performed:

1. On the south end of the building there is a stormwater facility. Very near to this facility, there is a garbage dumpster. This dumpster is leaking and trash is finding its way into the stormdrain. There are collected sediments on the pavement in the area of this stormdrain. This matter needs to be resolved and the sediment removed from the pavement. Any collected sediments in the pipe system also need to be removed.

The approved plan for this location was approved on July 10, 2002, by Kent Conservation District. The approved plan requires that the facility be maintained per the DE Sediment and Stormwater Regulations. We will be performing a follow up inspection to ensure compliance within 60 days.

Please call my office upon receiving this correspondence, to schedule a meeting so that I may provide you with technical assistance and a better understanding of that work that needs to be completed.

➤ Regulatory – Local Enforcement Efforts Tampa FL

Dear Permittee,

By letter dated 07/07/2010 you were advised that a condition of the permit for the above referenced project requires that you submit an inspection report to the District in accordance with a specific schedule. To date, this information has not been provided. Failure to submit the required documents is a violation of your permit and District rules.

To bring this matter into compliance, you must submit a certified "Statement of Inspection for Proper Operation and Maintenance" form within 14 days. Your response should be directed to me at the Tampa Service office.

If this matter is not brought into compliance in a timely manner at the staff level, the case may be referred to the District's Legal Department for further enforcement action.

If you have any questions, please contact TAMPA Service Office.

➤ Regulatory – Local Enforcement Efforts Bee Cave TX

To Whom It May Concern:


The addressee above is listed as the owner of a non-point source water quality facility located in the City of Bee Cave city limits or ETJ, and you are responsible for maintenance of the facility in accordance with the City's Code of Ordinances, associated environmental and drainage criteria manuals, and approved development plans. This location was recently inspected, and a copy of the inspection report is enclosed with this letter. This water quality facility requires an annual operating permit, and any maintenance required per the inspection report attached shall be performed within 30 days of the date of this letter. Please review the permitting procedures below and submit all required information along with applicable permit fees to the City of Bee Cave's Community Services Department within 30 days of the date of this letter.

Sec. 20.01.104 Annual Operating Permit

(a) **General Requirements.** The owners or operators of all new water quality controls for multi-family residential development, for single-family subdivision development, and for non-residential development must obtain an annual operating permit. The owner or operator is responsible for the proper operation and maintenance of the control and for annual permit renewal. The initial operating permit will be issued by the city upon:

- (1) The completion of construction, if applicable;
- (2) Inspection of the control by the city after review of the maintenance plan accompanying the design engineer's concurrence letter of the completion of construction;
- (3) Final inspection approval by the city;

➤ Regulatory – Local Enforcement Efforts
Thousand Oaks CA

BY: 
Subject: Report on required maintenance for permanent storm water quality facilities
Due June 30, 2018

To the Owner(s) of 512 N Ventu Park Rd (PCID 139): 3179

The developer of the subject property was required to install a permanent storm water treatment system as a condition of developing the property. This system removes pollutants from the property's storm water runoff to protect the downstream natural receiving waters. The installed system is referenced in a Covenant and Deed Restriction upon the subject property, recorded by the County of Ventura as document number 20130917-00159196-0 1/8.

Frequent maintenance of these facilities is necessary for them to operate effectively. Neglecting maintenance could result in an illegal discharge of pollution subject to fines and/or flooding due to blocked storm drains. Maintenance procedures are required by City Municipal Code Section 7-8.201(e) as a preventative measure. Please review the Deed Restriction for the site (typically found among property title documents) and follow the prescribed maintenance including equipment manufacturer's recommendations.

- Property Damage:
- Shopping Center North Wilkesboro NC
- 2017 First sink hole - repaired



- Property Damage:
- Reoccurring in 2018

Original Sink Hole



- Property Damage:
- 2019 Not yet repaired and growing throughout the shopping center



- Property Damage:
- 2019 Not yet repaired and growing throughout the shopping center



- Property Damage:
- 2019 With record rains the issue continues to expand into the parking lot of the shopping center



- **Public Perception**

- The social phenomenon known as **public perception** can be seen as the difference between an absolute truth based on facts and a virtual truth shaped by popular opinion, media coverage and/or reputation



➤ Public Perception

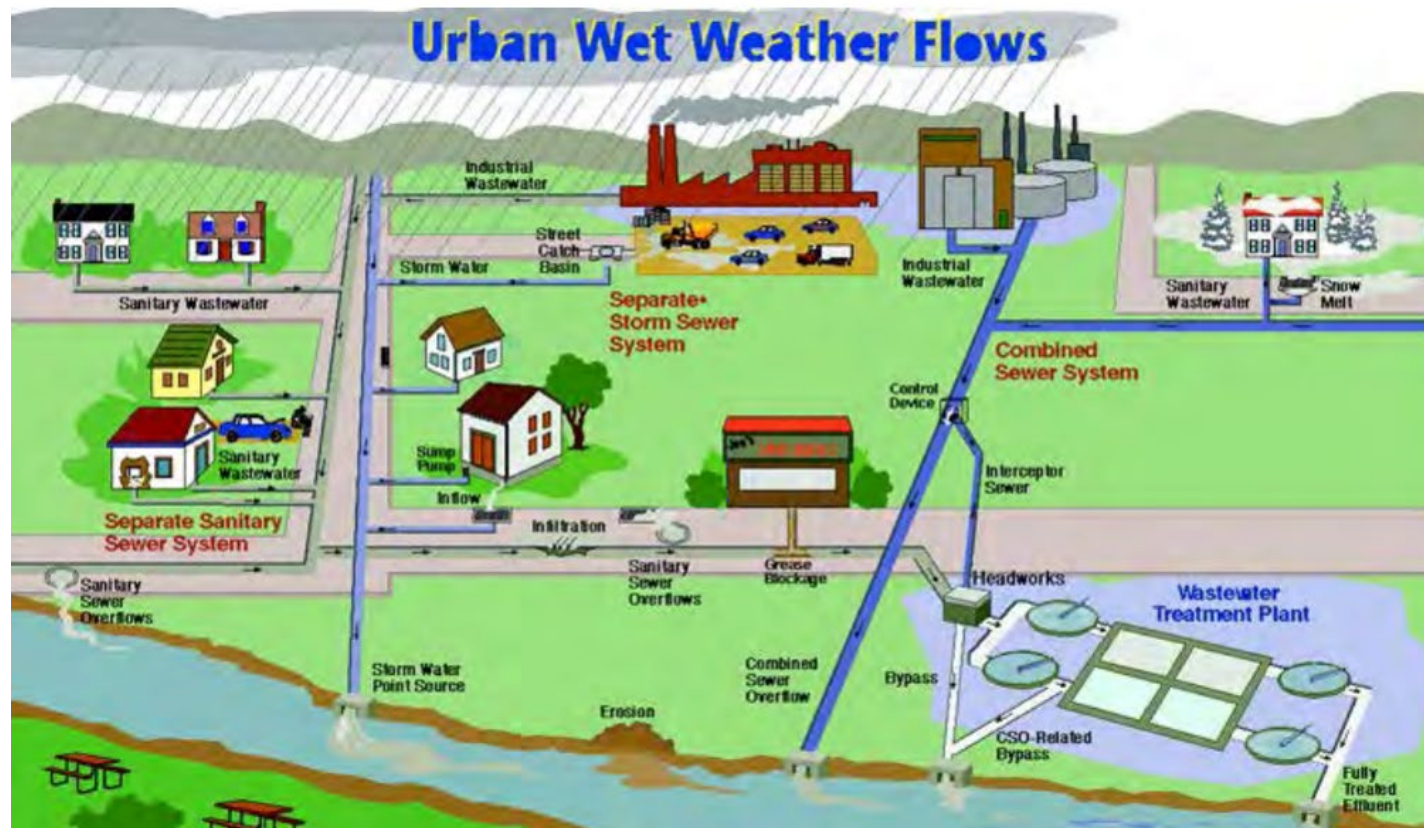


St. Augustine - Pond A - General Overview

Identification of Stormwater Systems

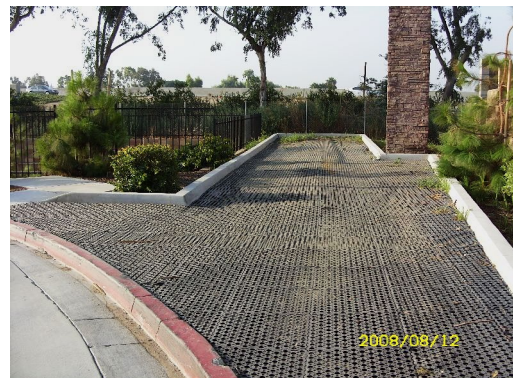
What is a stormwater system?

It's a network of structures, channels, and underground pipes that carry stormwater away from buildings to ponds, lakes, streams, and rivers.

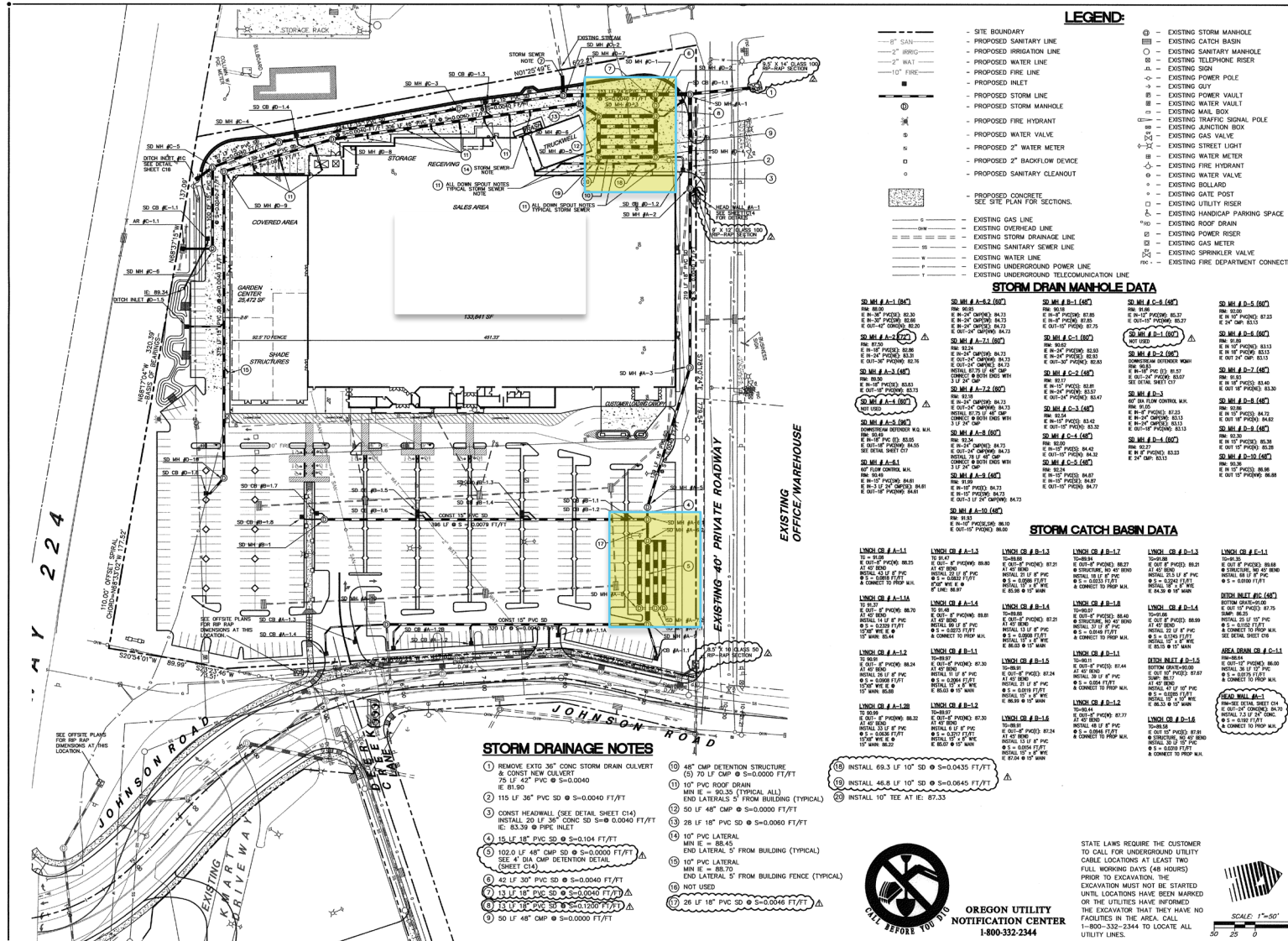


Identification of Stormwater Systems

- Diversion
 - Retention
 - Detention
- Above Ground
- Below Ground
- Ponds vs. Bioretention
- Inlet
- Outlet
- Flow Control
- Box Filter
- Treatment Devices
 - Filters
 - Sand



Identification of Stormwater Systems



LEGEND:

- SITE BOUNDARY
- - - PROPOSED SANITARY LINE
- - - PROPOSED IRRIGATION LINE
- - - PROPOSED WATER LINE
- - - PROPOSED FIRE LINE
- - - PROPOSED INLET
- - - PROPOSED STORM LINE
- - - PROPOSED STORM MANHOLE
- - - PROPOSED FIRE HYDRANT
- - - PROPOSED WATER VALVE
- - - PROPOSED 2" BACKFLOW DEVICE
- - - PROPOSED SANITARY CLEANOUT
- - - PROPOSED CONCRETE
- - - EXISTING GAS LINE
- - - EXISTING OVERHEAD LINE
- - - EXISTING STORM DRAINAGE LINE
- - - EXISTING SANITARY SEWER LINE
- - - EXISTING WATER LINE
- - - EXISTING UNDERGROUND POWER LINE
- - - EXISTING UNDERGROUND TELECOMMUNICATION LINE
- ⊙ EXISTING STORM MANHOLE
- ⊠ EXISTING CATCH BASIN
- EXISTING SANITARY MANHOLE
- EXISTING TELEPHONE RISER
- ⊕ EXISTING SIGN
- ⊖ EXISTING POWER POLE
- ⊗ EXISTING GUY
- ⊘ EXISTING POWER VAULT
- ⊙ EXISTING WATER VAULT
- ⊚ EXISTING MAIL BOX
- ⊛ EXISTING TRAFFIC SIGNAL POLE
- ⊜ EXISTING JUNCTION BOX
- ⊝ EXISTING GAS VALVE
- ⊞ EXISTING STREET LIGHT
- ⊟ EXISTING WATER METER
- ⊠ EXISTING FIRE HYDRANT
- ⊡ EXISTING WATER VALVE
- ⊢ EXISTING BOLLARD
- ⊣ EXISTING GATE POST
- ⊤ EXISTING UTILITY RISER
- ⊥ EXISTING HANDICAP PARKING SPACE
- ⊦ EXISTING ROOF DRAIN
- ⊧ EXISTING POWER RISER
- ⊨ EXISTING GAS METER
- ⊩ EXISTING SPRINKLER VALVE
- ⊪ EXISTING FIRE DEPARTMENT CONNECTION

STORM DRAIN MANHOLE DATA

<p>SD MH #A-1 (60') RM: 80.00 E IN-12" PVC SD 80.00 E OUT-12" PVC SD 80.00 E OUT-12" CONCRETE 80.00</p> <p>SD MH #A-2 (60') RM: 80.00 E IN-12" PVC SD 80.00 E OUT-12" CONCRETE 80.00</p> <p>SD MH #A-3 (60') RM: 80.00 E IN-12" PVC SD 80.00 E OUT-12" CONCRETE 80.00</p> <p>SD MH #A-4 (60') RM: 80.00 E IN-12" PVC SD 80.00 E OUT-12" CONCRETE 80.00</p> <p>SD MH #A-5 (60') RM: 80.00 E IN-12" PVC SD 80.00 E OUT-12" CONCRETE 80.00</p> <p>SD MH #A-6 (60') RM: 80.00 E IN-12" PVC SD 80.00 E OUT-12" CONCRETE 80.00</p> <p>SD MH #A-7 (60') RM: 80.00 E IN-12" PVC SD 80.00 E OUT-12" CONCRETE 80.00</p> <p>SD MH #A-8 (60') RM: 80.00 E IN-12" PVC SD 80.00 E OUT-12" CONCRETE 80.00</p> <p>SD MH #A-9 (60') RM: 80.00 E IN-12" PVC SD 80.00 E OUT-12" CONCRETE 80.00</p> <p>SD MH #A-10 (60') RM: 80.00 E IN-12" PVC SD 80.00 E OUT-12" CONCRETE 80.00</p>	<p>SD MH #B-1 (60') RM: 80.00 E IN-12" PVC SD 80.00 E OUT-12" CONCRETE 80.00</p> <p>SD MH #B-2 (60') RM: 80.00 E IN-12" PVC SD 80.00 E OUT-12" CONCRETE 80.00</p> <p>SD MH #B-3 (60') RM: 80.00 E IN-12" PVC SD 80.00 E OUT-12" CONCRETE 80.00</p> <p>SD MH #B-4 (60') RM: 80.00 E IN-12" PVC SD 80.00 E OUT-12" CONCRETE 80.00</p> <p>SD MH #B-5 (60') RM: 80.00 E IN-12" PVC SD 80.00 E OUT-12" CONCRETE 80.00</p> <p>SD MH #B-6 (60') RM: 80.00 E IN-12" PVC SD 80.00 E OUT-12" CONCRETE 80.00</p> <p>SD MH #B-7 (60') RM: 80.00 E IN-12" PVC SD 80.00 E OUT-12" CONCRETE 80.00</p> <p>SD MH #B-8 (60') RM: 80.00 E IN-12" PVC SD 80.00 E OUT-12" CONCRETE 80.00</p> <p>SD MH #B-9 (60') RM: 80.00 E IN-12" PVC SD 80.00 E OUT-12" CONCRETE 80.00</p> <p>SD MH #B-10 (60') RM: 80.00 E IN-12" PVC SD 80.00 E OUT-12" CONCRETE 80.00</p>	<p>SD MH #C-1 (60') RM: 80.00 E IN-12" PVC SD 80.00 E OUT-12" CONCRETE 80.00</p> <p>SD MH #C-2 (60') RM: 80.00 E IN-12" PVC SD 80.00 E OUT-12" CONCRETE 80.00</p> <p>SD MH #C-3 (60') RM: 80.00 E IN-12" PVC SD 80.00 E OUT-12" CONCRETE 80.00</p> <p>SD MH #C-4 (60') RM: 80.00 E IN-12" PVC SD 80.00 E OUT-12" CONCRETE 80.00</p> <p>SD MH #C-5 (60') RM: 80.00 E IN-12" PVC SD 80.00 E OUT-12" CONCRETE 80.00</p> <p>SD MH #C-6 (60') RM: 80.00 E IN-12" PVC SD 80.00 E OUT-12" CONCRETE 80.00</p> <p>SD MH #C-7 (60') RM: 80.00 E IN-12" PVC SD 80.00 E OUT-12" CONCRETE 80.00</p> <p>SD MH #C-8 (60') RM: 80.00 E IN-12" PVC SD 80.00 E OUT-12" CONCRETE 80.00</p> <p>SD MH #C-9 (60') RM: 80.00 E IN-12" PVC SD 80.00 E OUT-12" CONCRETE 80.00</p> <p>SD MH #C-10 (60') RM: 80.00 E IN-12" PVC SD 80.00 E OUT-12" CONCRETE 80.00</p>
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STORM CATCH BASIN DATA

<p>LNCH CB #A-1 12" DIA. 12" PVC 12" DIA. 12" PVC 12" DIA. 12" PVC 12" DIA. 12" PVC</p> <p>LNCH CB #A-2 12" DIA. 12" PVC 12" DIA. 12" PVC 12" DIA. 12" PVC 12" DIA. 12" PVC</p> <p>LNCH CB #A-3 12" DIA. 12" PVC 12" DIA. 12" PVC 12" DIA. 12" PVC 12" DIA. 12" PVC</p> <p>LNCH CB #A-4 12" DIA. 12" PVC 12" DIA. 12" PVC 12" DIA. 12" PVC 12" DIA. 12" PVC</p> <p>LNCH CB #A-5 12" DIA. 12" PVC 12" DIA. 12" PVC 12" DIA. 12" PVC 12" DIA. 12" PVC</p> <p>LNCH CB #A-6 12" DIA. 12" PVC 12" DIA. 12" PVC 12" DIA. 12" PVC 12" DIA. 12" PVC</p> <p>LNCH CB #A-7 12" DIA. 12" PVC 12" DIA. 12" PVC 12" DIA. 12" PVC 12" DIA. 12" PVC</p> <p>LNCH CB #A-8 12" DIA. 12" PVC 12" DIA. 12" PVC 12" DIA. 12" PVC 12" DIA. 12" PVC</p> <p>LNCH CB #A-9 12" DIA. 12" PVC 12" DIA. 12" PVC 12" DIA. 12" PVC 12" DIA. 12" PVC</p> <p>LNCH CB #A-10 12" DIA. 12" PVC 12" DIA. 12" PVC 12" DIA. 12" PVC 12" DIA. 12" PVC</p>	<p>LNCH CB #B-1 12" DIA. 12" PVC 12" DIA. 12" PVC 12" DIA. 12" PVC 12" DIA. 12" PVC</p> <p>LNCH CB #B-2 12" DIA. 12" PVC 12" DIA. 12" PVC 12" DIA. 12" PVC 12" DIA. 12" PVC</p> <p>LNCH CB #B-3 12" DIA. 12" PVC 12" DIA. 12" PVC 12" DIA. 12" PVC 12" DIA. 12" PVC</p> <p>LNCH CB #B-4 12" DIA. 12" PVC 12" DIA. 12" PVC 12" DIA. 12" PVC 12" DIA. 12" PVC</p> <p>LNCH CB #B-5 12" DIA. 12" PVC 12" DIA. 12" PVC 12" DIA. 12" PVC 12" DIA. 12" PVC</p> <p>LNCH CB #B-6 12" DIA. 12" PVC 12" DIA. 12" PVC 12" DIA. 12" PVC 12" DIA. 12" PVC</p> <p>LNCH CB #B-7 12" DIA. 12" PVC 12" DIA. 12" PVC 12" DIA. 12" PVC 12" DIA. 12" PVC</p> <p>LNCH CB #B-8 12" DIA. 12" PVC 12" DIA. 12" PVC 12" DIA. 12" PVC 12" DIA. 12" PVC</p> <p>LNCH CB #B-9 12" DIA. 12" PVC 12" DIA. 12" PVC 12" DIA. 12" PVC 12" DIA. 12" PVC</p> <p>LNCH CB #B-10 12" DIA. 12" PVC 12" DIA. 12" PVC 12" DIA. 12" PVC 12" DIA. 12" PVC</p>	<p>LNCH CB #C-1 12" DIA. 12" PVC 12" DIA. 12" PVC 12" DIA. 12" PVC 12" DIA. 12" PVC</p> <p>LNCH CB #C-2 12" DIA. 12" PVC 12" DIA. 12" PVC 12" DIA. 12" PVC 12" DIA. 12" PVC</p> <p>LNCH CB #C-3 12" DIA. 12" PVC 12" DIA. 12" PVC 12" DIA. 12" PVC 12" DIA. 12" PVC</p> <p>LNCH CB #C-4 12" DIA. 12" PVC 12" DIA. 12" PVC 12" DIA. 12" PVC 12" DIA. 12" PVC</p> <p>LNCH CB #C-5 12" DIA. 12" PVC 12" DIA. 12" PVC 12" DIA. 12" PVC 12" DIA. 12" PVC</p> <p>LNCH CB #C-6 12" DIA. 12" PVC 12" DIA. 12" PVC 12" DIA. 12" PVC 12" DIA. 12" PVC</p> <p>LNCH CB #C-7 12" DIA. 12" PVC 12" DIA. 12" PVC 12" DIA. 12" PVC 12" DIA. 12" PVC</p> <p>LNCH CB #C-8 12" DIA. 12" PVC 12" DIA. 12" PVC 12" DIA. 12" PVC 12" DIA. 12" PVC</p> <p>LNCH CB #C-9 12" DIA. 12" PVC 12" DIA. 12" PVC 12" DIA. 12" PVC 12" DIA. 12" PVC</p> <p>LNCH CB #C-10 12" DIA. 12" PVC 12" DIA. 12" PVC 12" DIA. 12" PVC 12" DIA. 12" PVC</p>
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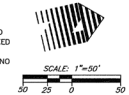
STORM DRAINAGE NOTES

- 1 REMOVE EXIST 36" CONCRETE STORM DRAIN CULVERT & CONCRETE NEW CULVERT 75 LF 42" PVC @ S=0.0040 FT/FT @ 81.50
- 2 115 LF 36" PVC SD @ S=0.0040 FT/FT
- 3 CONST HEADWALL (SEE DETAIL SHEET C14) INSTALL 20 LF 36" CONCRETE SD @ S=0.0040 FT/FT @ 83.39 @ FIRE INLET
- 4 15 LF 48" PVC SD @ S=0.0104 FT/FT
- 5 102.0 LF 48" CMP SD @ S=0.0000 FT/FT SEE 4" DIA CMP DETENTION DETAIL (CONCRETE C14)
- 6 42 LF 30" PVC SD @ S=0.0040 FT/FT
- 7 13 LF 18" PVC SD @ S=0.0040 FT/FT
- 8 21 LF 18" PVC SD @ S=0.0100 FT/FT
- 9 50 LF 48" CMP @ S=0.0000 FT/FT
- 10 48" CMP DETENTION STRUCTURE (5) 70 LF CMP @ S=0.0000 FT/FT
- 11 10" PVC ROOF DRAIN (5) 70 LF CMP @ S=0.0000 FT/FT END LATERALS 5' FROM BUILDING (TYPICAL)
- 12 50 LF 48" CMP @ S=0.0000 FT/FT
- 13 26 LF 18" PVC SD @ S=0.0060 FT/FT
- 14 10" PVC LATERAL (5) 50 LF @ S=0.45
- 15 10" PVC LATERAL (5) 50 LF @ S=0.45 END LATERALS 5' FROM BUILDING (TYPICAL)
- 16 10" PVC LATERAL (5) 50 LF @ S=0.45 END LATERALS 5' FROM BUILDING FENCE (TYPICAL)
- 17 NOT USED
- 18 26 LF 18" PVC SD @ S=0.0046 FT/FT
- 19 INSTALL 69.3 LF 10" SD @ S=0.0435 FT/FT
- 20 INSTALL 46.8 LF 10" SD @ S=0.0645 FT/FT
- 21 INSTALL 10" TEE AT: 87.33



OREGON UTILITY NOTIFICATION CENTER 1-800-332-2344

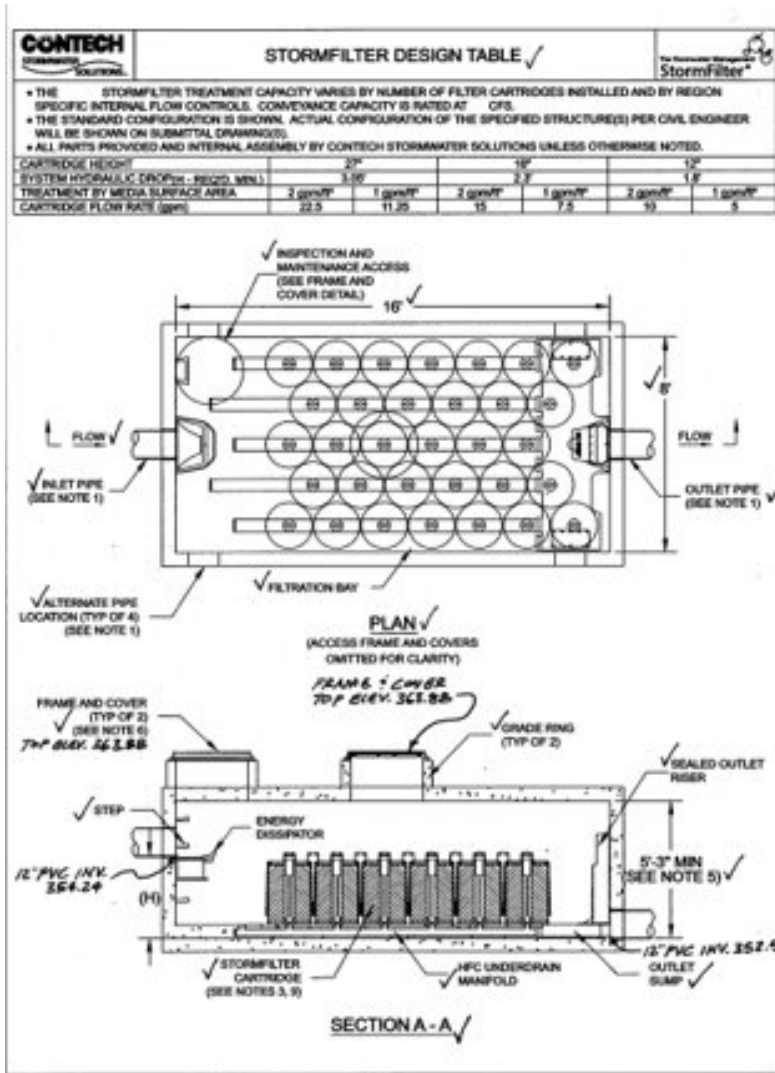
STATE LAWS REQUIRE THE CUSTOMER TO CALL FOR UNDERGROUND UTILITY CABLE LOCATIONS AT LEAST TWO FULL WORKING DAYS (48 HOURS) PRIOR TO EXCAVATION. THE EXCAVATION MUST NOT BE STARTED UNTIL LOCATIONS HAVE BEEN MARKED OR THE UTILITIES HAVE INFORMED THE EXCAVATOR THAT THEY HAVE NO FACILITIES IN THE AREA. CALL 1-800-332-2344 TO LOCATE ALL UTILITY LINES.



NOT APPROVED FOR CONSTRUCTION

BID SET

Identification of Stormwater Systems



- ### GENERAL NOTES
1. INLET AND OUTLET PIPING SHALL BE SPECIFIED BY SITE CIVIL ENGINEER (SEE PLANS) AND PROVIDED BY CONTRACTOR. STORMFILTER IS PROVIDED WITH OPENINGS AT INLET AND OUTLET LOCATIONS.
 2. IF THE PEAK FLOW RATE, AS DETERMINED BY THE SITE CIVIL ENGINEER, EXCEEDS THE PEAK HYDRAULIC CAPACITY OF THE PRODUCT, AN UPSTREAM BYPASS STRUCTURE IS REQUIRED. PLEASE CONTACT CONTECH STORMWATER SOLUTIONS FOR OPTIONS.
 3. THE FILTER CARTRIDGE(S) ARE SIPHON-ACTUATED AND SELF-CLEANING. THE STANDARD DETAIL DRAWING SHOWS THE MAXIMUM NUMBER OF CARTRIDGES. THE ACTUAL NUMBER SHALL BE SPECIFIED BY THE SITE CIVIL ENGINEER ON SITE PLANS OR IN DATA TABLE BELOW. PRECAST STRUCTURE TO BE CONSTRUCTED IN ACCORDANCE WITH ASTM C887 AND C898.
 4. SEE STORMFILTER DESIGN TABLE FOR REQUIRED HYDRAULIC DROP. FOR SHALLOW, LOW DROP OR SPECIAL DESIGN CONSTRAINTS, CONTACT CONTECH STORMWATER SOLUTIONS FOR DESIGN OPTIONS.
 5. ALL WATER QUALITY PRODUCTS REQUIRE PERIODIC MAINTENANCE AS OUTLINED IN THE O&M GUIDELINES. PROVIDE MINIMUM CLEARANCE FOR MAINTENANCE ACCESS.
 6. STRUCTURE AND ACCESS COVERS TO MEET AASHTO H-20 LOAD RATING.
 7. THE STRUCTURE THICKNESSES SHOWN ARE FOR REPRESENTATIONAL PURPOSES AND VARY REGIONALLY.
 8. ANY BACKFILL, DEPTH, SUB-BASE, AND OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY SITE CIVIL ENGINEER.
 9. STANDARD CARTRIDGE HEIGHT IS 2" (SHOWN). CARTRIDGE HEIGHT AND ASSOCIATED DESIGN PARAMETERS PER STORMFILTER DESIGN TABLE.
 10. STORMFILTER BY CONTECH STORMWATER SOLUTIONS; (800) 925-6240.

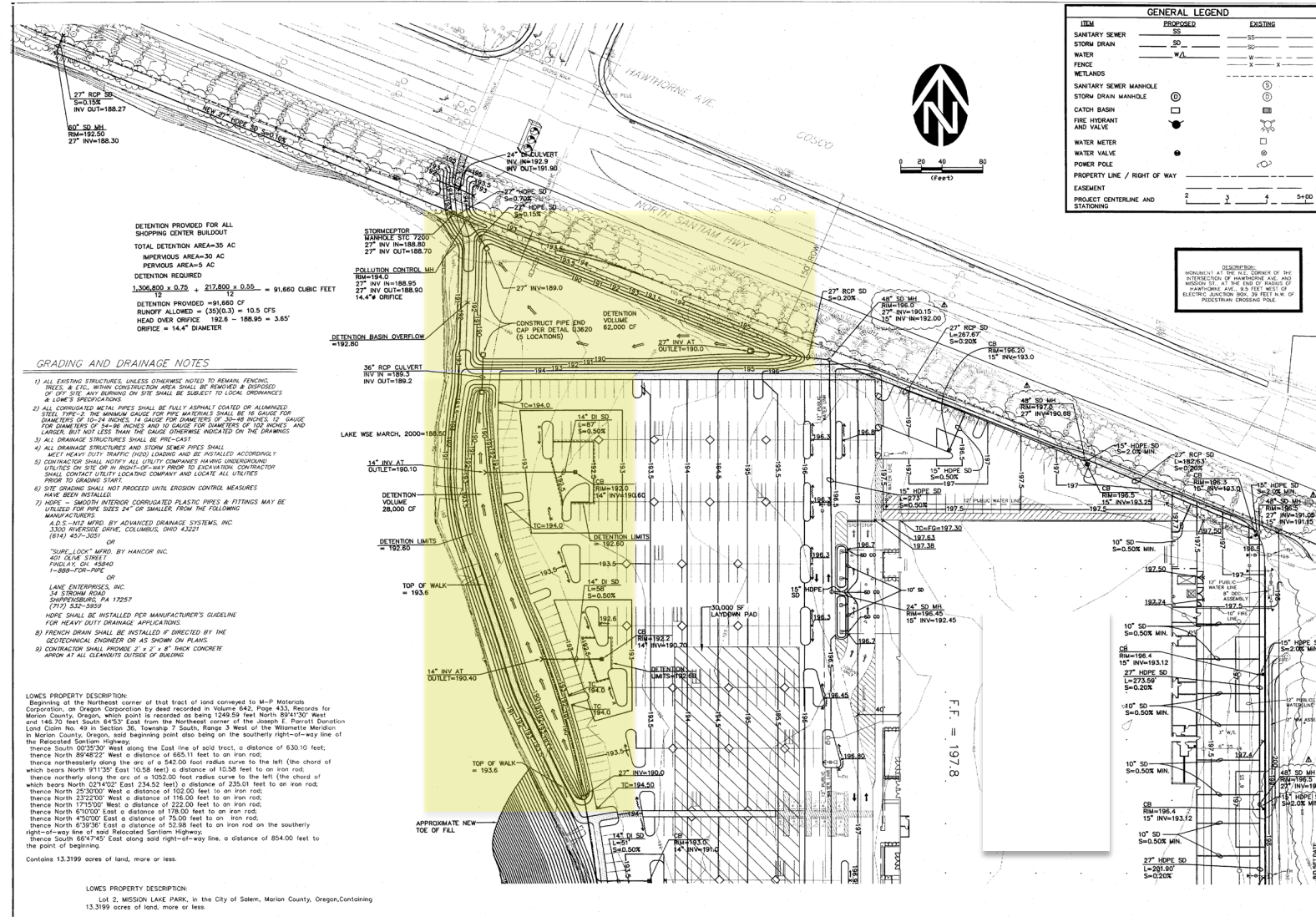
SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID	SP-1 ✓		
WATER QUALITY VOLUME (cu ft)	5.80 ✓		
VOLUME STORED IN VAULT (cu ft)	512 ✓		
RETURN PERIOD OF PEAK FLOW (yrs)	NA ✓		
# OF CARTRIDGES REQUIRED	32 (12) ✓		
CARTRIDGE FLOW RATE	7.5 ✓		
MEDIA TYPE (SIF, PERLITE, ZPC)	CSF ✓		
PIPE DATA	1.5" MATERIAL	DIAMETER	
INLET PIPE #1	36424 ✓	PVC ✓	12" ✓
INLET PIPE #2			
OUTLET PIPE	352.5 ✓	PVC ✓	12" ✓
UPSTREAM RM ELEVATION			
CENTER RM ELEVATION			
DOWNSTREAM RM ELEVATION			
ANTI-FLOTATION BALLAST		WIDTH	HEIGHT

NOTES/SPECIAL REQUIREMENTS:
* PER SITE CIVIL ENGINEER



Identification of Stormwater Systems



Identification of Stormwater Systems



Diversion & Detention



Structural or
Manufactured BMPs



Green Infrastructure

Inventory: Stormwater Assets/Structures

Diversion & Detention

Definition: an artificial pond or other structure that is designed to collect and retain or detain urban stormwater.



Inventory:

Stormwater Assets/Structures

Structural or Manufactured BMPs

Definition: Proprietary or manufactured structures, catch basins, filtered devices, formed inlets/outlets, etc.



Inventory: Stormwater Assets/Structures

“Green Infrastructure”

Definition: The process in which contaminants and sedimentation are removed from stormwater runoff through a system utilizing vegetation, various soil media for infiltration, and temporary retention.



Assessing Systems



- Has the system received routine maintenance?
 - Is it neglected?
- Are repairs required?
 - Major or minor?
- Is the system out of regulatory compliance?
 - Has a notice of violation been received?
 - Are fines being assessed?

CITY OF _____
CODE COMPLIANCE

NOTICE OF VIOLATION

To: JOHN Q. PUBLIC

Property Address: 1234 MAIN STREET

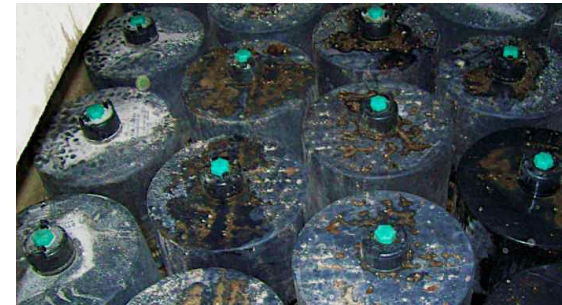
Date of Inspection: MAY 15, 2009

Notice of Violation of City Ord. 200 8-07-24, Section 8.1015 "Exterior Property Conditions." It shall be unlawful for any person to allow, permit, conduct or maintain real property within the City of _____ in violation of this section. You will have ten (10) days from date of this notice to mow any high grass/weeds above 12 inches in height or remove any unsightly matter from this property in violation of the adopted ordinance. Violation could be abated by City contractor and cost assessed by lien toward the property. If you feel this notice is not valid, you have the right to appeal.

Notice issued by: Bill Smith Code Officer

Assessing Systems

- Above/Below Ground Detention Systems Common Issues
- **Underground Detention/Retention**
- Inconsistent Maintenance
- Improper Installation
- Location of Access
- Paved-Over Lids
- Locked or Specialized Tool Required for Entry
- Broken Structures
- Dumping Regulations
- End of Pipe (where is it going?)
- MS4
 - Pond
 - Vault



Assessing Systems - Example Issues

Underground Detention/Retention

- Inconsistent Maintenance
- Location of Access



Assessing Systems

Other System Attributes Common Issues

Inlets/Outlets

- Inconsistent Maintenance
- Improper Installation
- Location of Access
- Broken Structures
- Dumping Regulations
- End of Pipe (where is it going?)
 - MS4
 - Stream/Creek
 - Lake
 - Ocean



Assessing Systems

- **Inlets/Outlets**
 - Inconsistent Maintenance
 - Broken Structures
 - Liability



Assessing Systems

Above Ground Systems Common Issues

Above Ground Detention/Retention

- Inconsistent Maintenance
- Improper Installation of Inlet/Outlet
- Location of Access (if any)
- Irregular and Incorrect Herbicide Use (erosion)
- Locked Entry (gates locked)
- Broken Structures
- Regulatory Requirements
- Illegal Dumping (landscape debris, trash, transients)
- End of Pipe (where is it going & where did it come from?)
 - MS4
 - Vault
 - Receiving Waters



Assessing Systems

Above Ground

- Inconsistent Maintenance
- Broken Structures
- Dumping Regulations



Assessing Systems



Property development stopped due to economy. No inspections, no maintenance.

Marietta, GA



Assessing Systems - the cost of neglect

Outlet to System: \$45,000 Rehab - Lafayette, LA



Assessing Systems - the cost of neglect



Overgrown Vegetation. No Inspections.
No Prior Maintenance.

Lafayette, LA



Assessing Systems - the cost of neglect

Above Ground Detention/Retention

- Inconsistent Maintenance
- Regulatory Requirements
- Illegal Dumping (landscape debris, trash, transients)

Flow Control Weir – impacted by vegetation and trash



Assessing Systems - the cost of neglect

Flow Control Weir – impacted by vegetation and trash - 45' swale rebuild and dumping restrictions
\$25,000 repair – Gaithersburg, MD – no ongoing maintenance



Implementing a Program

How to manage all that information!

Data

- Where Does it Go?
- Ease of Access

Requirements (Inspection, etc.)

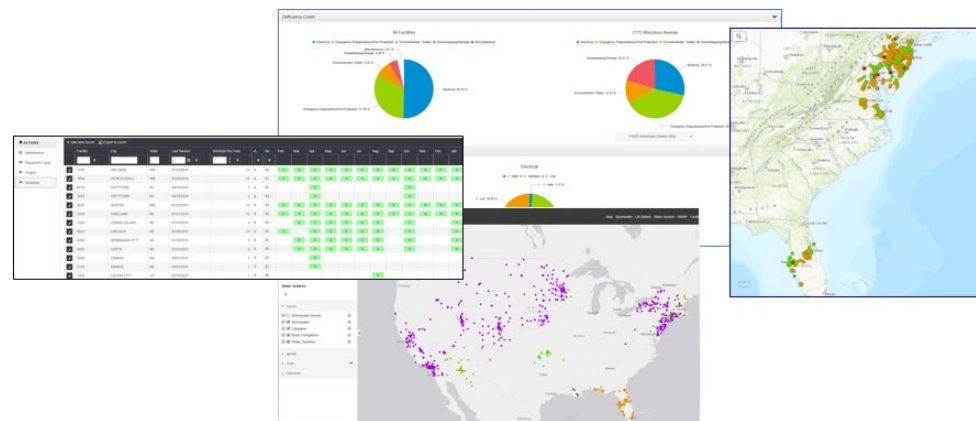
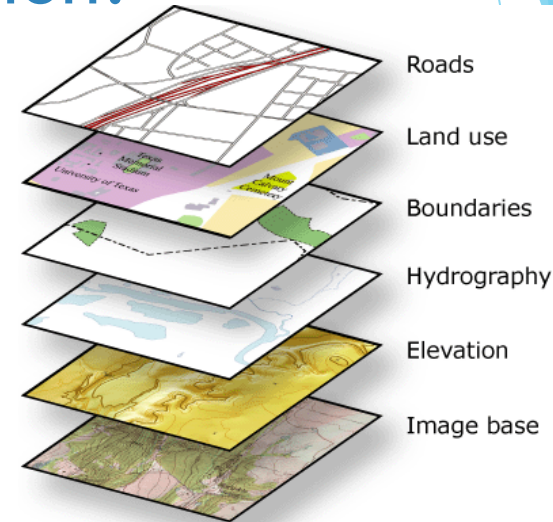
- When, Where, Who?

Repair/Remediation

- How Much?
 - Time for Budget
 - Immediate Repair?

Maintenance

- How much?
- How often?



Summary -Keys to Success

- Awareness
- Identification
- Inventory
- Assessment
- Implementation - Data

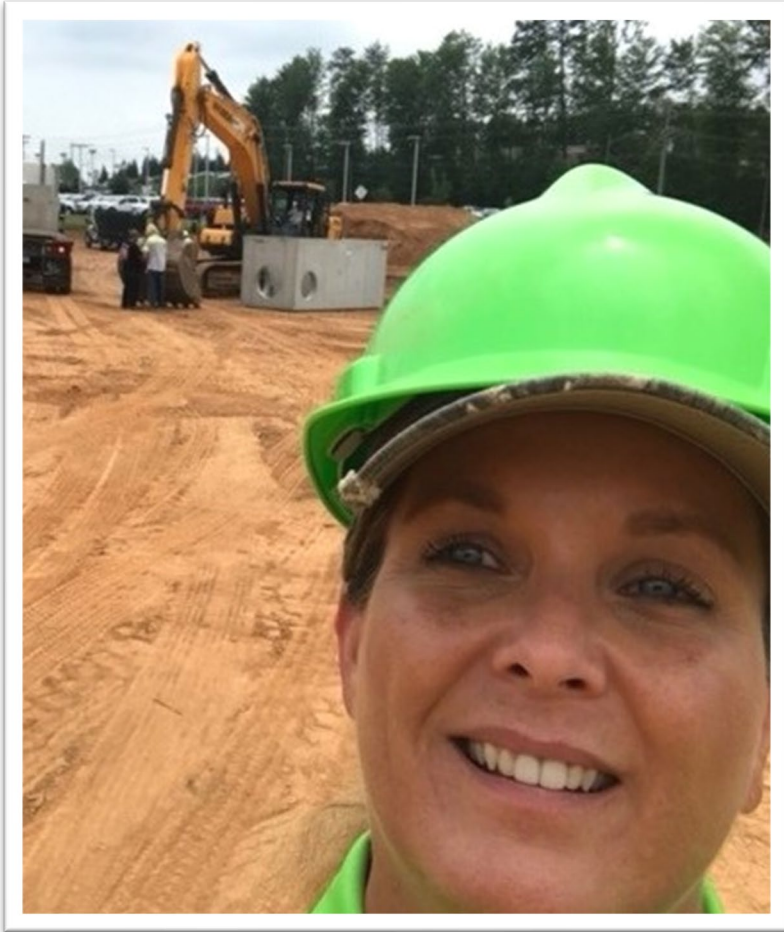
**Your positive action
combined with positive
thinking results in success.**

Shiv Khera





Questions?



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