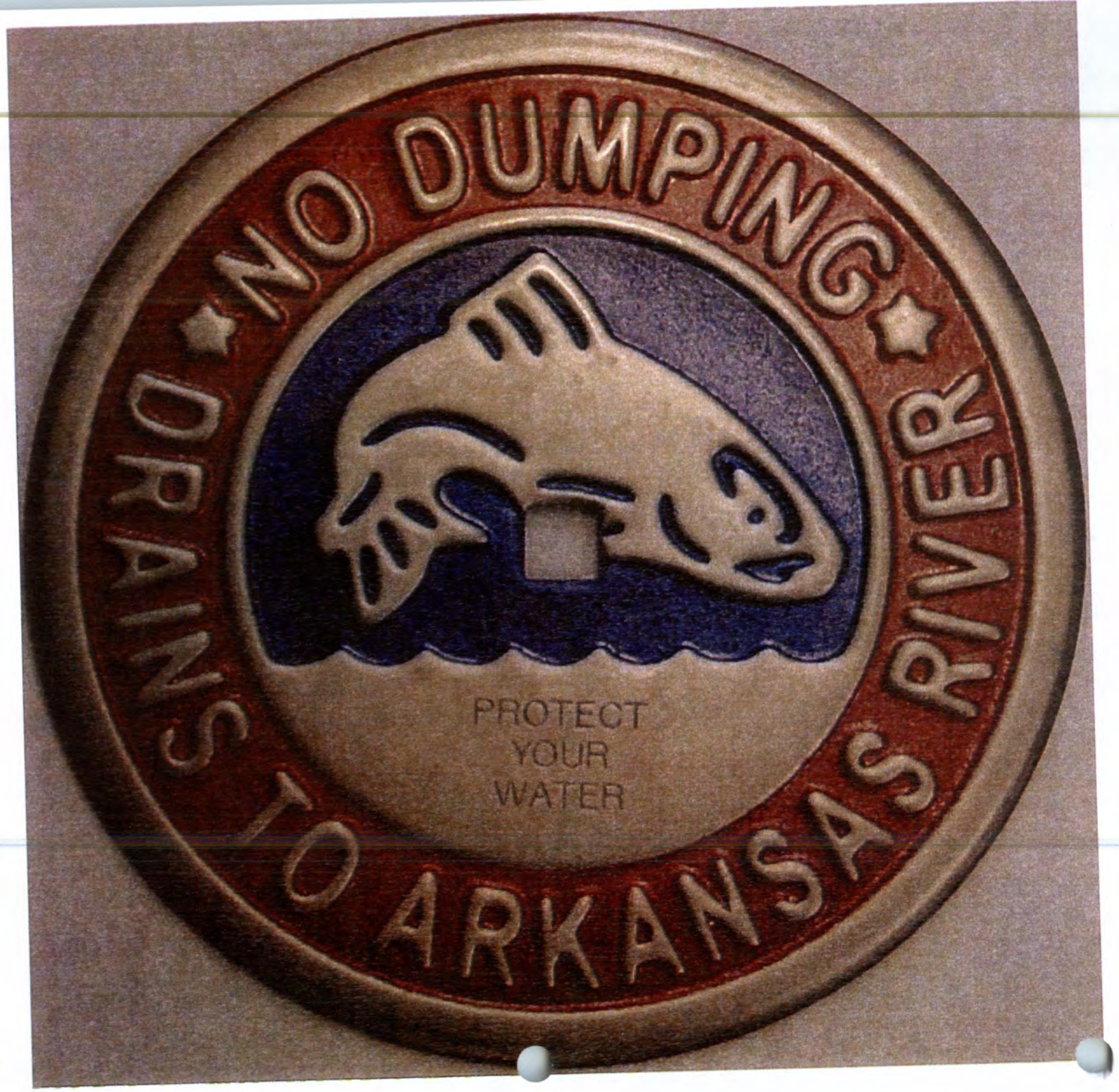

NO DUMPING
DRAINS TO ARKANSAS RIVER
PROTECT
YOUR
WATER

ENVIROTECH
Fabrication & Finishes

I the undersigned hereby certify that I watched "After the Storm" an educational video on how "polluted runoff threatens watersheds highly valued for recreation, commercial fisheries and navigation, and drinking water." Furthermore, I understand the steps we at EnviroTech are striving to make to ensure compliance with all municipal codes, as well as Best Management Practices for controlling and minimizing pollutants whenever and wherever possible.

Employee Name	Employee Signature	Date
Antonio Fussell	[illegible]	5/6/15
John Merrick	John Merrick	8-6-2015

Thank you,

Noah Thomas Noah Thomas

VP of Operations

Justin Thomas Justin Thomas

Owner

EnviroTech Fabrication and Finishes

Hardesty, James

From: Lewis, Rebecca
Sent: Tuesday, May 12, 2015 10:12 AM
To: eablah@kumc.edu; Wichita Clean Streams; Hardesty, James; martha@fgvideo.com
Subject: FW: 2015 Stormwater TV submittal

Keep your fingers crossed! I submitted the Bag It Up video to WEF for a national prize, and they will let us know in July.

From: Kristina Twigg [mailto:ktwigg@wef.org]
Sent: Monday, May 11, 2015 4:33 PM
To: Lewis, Rebecca
Subject: RE: 2015 Stormwater TV submittal

Hi Rebecca,
Thanks for sharing the "Bag it up Wichita" public education video – I'd like to go with the full version for the competition. It is very nicely done – with such a catchy tune! – and will be a great addition to the StormTV library. I've added it to our judging form and the StormTV Project playlist, which also feeds into a widget on our stormwater website. This year, I'll be adding all the submissions to the StormTV map at one time at the end of the contest. Once that is up, I will send everyone a link.

Judging will begin in early June, and winners will be notified in early July.

Thanks again,

Kristina Twigg
Associate Editor
World Water: Stormwater Management
Phone: 703.684.2400 Ext 7739

WATER ENVIRONMENT FEDERATION
601 Wythe Street
Alexandria, Virginia 22314

From: Lewis, Rebecca [mailto:RLewis@wichita.gov]
Sent: Thursday, May 07, 2015 3:27 PM
To: Stormwater
Subject: 2015 Stormwater TV submittal

Full "Bag It Up Wichita" Video
30 second PSA

15 second PSA

"Bag it up Wichita" is a public education video that encourages Wichita pet owners to pick up their pet's waste. Two grass root organizations Wichita Clean Streams and Wichita Initiative to Renew the Environment (WIRE) joined forces with the City of Wichita to develop this fun music video to remind local pet owners to bag up pet waste. The Dog Doogity Video is a spoof on the original No Diggity song by the BlackStreet band. Originally "Puget Sound Starts Here" did this video and gave us permission to use the idea and make it Wichita's own. We used a local country western band, Diamond W Wranglers, and a local blues singer, Jenny Wood, as well as, local venues in Wichita that we are proud of to shoot the video. Many pictures of the Arkansas River, Old Town which includes the Movie marquee "Bag It Up", a local YMCA dance troupe, the annual "Woof Stock" event, along with our local talent, showcases Wichita, and in a fun way, educates the public about pet waste.

Rebecca Lewis
Public Works & Utilities
Sewage Treatment Superintendent
316-303-8702

Hardesty, James

From: Hall, Mark
Sent: Friday, February 27, 2015 8:02 AM
To: Hardesty, James; Hickle, Joseph
Subject: FW: 4195 E Harry waste oil discharge
Attachments: HAZMAT 4195 E Harry 02232015.doc

FYI

From: Redington, Curtis
Sent: Thursday, February 26, 2015 5:51 PM
To: Bronleewe, Tonya; Anderson, Charles; Harris, Richard; Kent Schierkolk; Kyle Parker; Maloney, Shawn; Hall, Mark; Owen, Randy; Quick, Laura; Randy Duncan; Rick Shellenbarger; Stan Marcotte
Cc: smsmith@kdhe.ks.gov; Amy Snyder; dnelson@eagleks.com
Subject: 4195 E Harry waste oil discharge

HazMat incident report for waste oil discharge from Karl's Tire & Auto at 4195 E. Harry in Wichita, Ks attached.
Curtis

Curtis Redington
Environmental Quality Specialist
City of Wichita Environmental Health
1900 E. 9th
Wichita, KS 67214
Phone: (316) 268-8302
Fax: (316) 268-8390
E-mail: credington@wichita.gov

Hardesty, James

From: Locke, Lauragail
Sent: Tuesday, January 08, 2013 5:22 PM
To: Hardesty, James
Subject: FW: Sand Sweeping

Can you mention this in your list as media engagement for Storm water promotion?

From: Henning, Aaron
Sent: Tuesday, January 08, 2013 5:20 PM
To: Williams, Van; Locke, Lauragail; King, Alan
Cc: Pajor, Joseph; Nelson, Ben; Schultze, Matthew; Nicholas, Terry; Lindebak, Scott; Davidson, Tim
Subject: RE: Sand Sweeping

Van, Lauragail,

I just completed an interview with KWCH's Pilar Pedraza regarding the City's efforts to sweep sand from streets following recent snow/ice response efforts. (For a story to air at 9:00 and 10:00 PM, I gather.) Essentially, I conveyed that:

1. We're doing so for the following reasons:
   a. To prevent sand/sediment from entering the river
   b. To eliminate the potential hazards associated with the sand (slipping/sliding)
   c. Aesthetics
2. We typically have 5 sweepers on 1st shift, and 2 sweepers on each of 2nd and 3rd shifts, addressing the emergency routes that were treated during the last snow event
3. It will take us approximately 4-6 weeks to complete the sweeping of all emergency routes, which constitute over 1,200 lane miles of arterial streets
4. After some prodding…that, yes, we would like to sweep as much as possible in advance of tomorrow's forecasted rain event, in order to minimize the amount that might enter the river
5. That "Kansas sand" in a "Kansas river" is a concern because of the EPA's NPDES (National Pollutant Discharge Elimination System) regulations limiting the introduction of sediment in waterways

When asked why the EPA limits sediments, I answered in general that the sediment is believed to damage aquatic wildlife. When asked how, I didn't have a great answer to give, so we contacted Storm Water staff for some help. Tim did a great job of explaining concerns related to potentially trapped road pollutants (oil, etc.) in the sand, via telephone. Pilar and I did some additional investigating on the internet and found a good explanation as to why any (even unpolluted) sediment is considered harmful – primarily revolving around the fact that additional sediment tends to limit the penetration of light (resulting in temperature change, impeded photosynthesis, etc.).

We also arranged for her to film a street sweeper in action, in the vicinity of Pawnee & McLean; and seemed comfortable with the information provided when she left.

If you have any questions/concerns, please let me know.

Thank you,

Aaron

Aaron Henning | Maintenance Engineer | Public Works & Utilities Department | City of Wichita
1801 S. McLean Boulevard | Wichita, KS 67213 | ahenning@wichita.gov
TEL 316.268.4087 | FAX 316.858.7546

-----Original Message-----
From: Nelson, Ben
Sent: Tuesday, January 08, 2013 2:40 PM
To: Henning, Aaron; Schultze, Matthew; Nicholas, Terry
Cc: Pajor, Joseph; Williams, Van
Subject: FW: Sand Sweeping

Aaron, could you call Pilar about our sweeping routes? They'd like a few shots of our crews and to talk about why we're sweeping up the sand. Thanks a lot.

-----Original Message-----
From: Pilar Pedraza [mailto:ppedraza@schurz.com]
Sent: Tuesday, January 08, 2013 2:35 PM
To: Nelson, Ben
Cc: Williams, Van
Subject: Sand Sweeping

Mr. Nelson,

Van Williams suggested I contact you. We at KWCH understand city crews are out sweeping up the sand put down during winter weather in an effort to get it off the streets before it rains. We would love to catch up with a crew, talk to them about what they're doing and why, get a bit of video, etc.

You can reach me at 573-9639.

Thanks so much for your help.

Sincerely,

Pilar Pedraza
KWCH MultiMedia Journalist
cell: 316-573-9639

--
www.kwch.com
Direct# (316) 831-6104
Fax# (316) 831-6193
www.kwch.com
www.kansascw.com
www.catchitkansas.com
www.facebook.com/kwchnews

Hardesty, James

From: Hickle, Joseph
Sent: Friday, July 24, 2015 11:36 AM
To: Hardesty, James
Subject: Fw: Wichita Water Quality Modeling follow-up

I think we got this water quality reporting

Sent from OWA on Android

From: Rance Walker <rcwalker@kdheks.gov>
Sent: Friday, July 24, 2015 9:52:40 AM
To: Hickle, Joseph
Cc: Tom Stiles; Rod Geisler
Subject: RE: Wichita Water Quality Modeling follow-up

Mr. Hickle,

I believe WinSLAMM is used by other MS4s in other states for modeling and decision making. I am comfortable with this software use at Wichita. Regarding the reporting, I anticipate only a summary of the local approvals for participation in the offsite stormwater pollution reduction program need be submitted. Perhaps a one page memo addressing the acceptable BMPs at the site in Wichita and comparing it to the selected BMP exchange at the offsite location should be prepared with each approval. These could be submitted with the reports or a summary of the memos could be prepared and submitted. The more extensive documentation of application, correspondence, calculations, and decision making process should remain in city files.

Rance Walker, P.E.
Kansas Department of Health and Environment
1000 SW Jackson Street, Suite 420
Topeka, Kansas 66612-1367

Phone: (785) 296-5537
E-Mail: rcwalker@kdheks.gov

From: Tom Stiles
Sent: Tuesday, July 21, 2015 3:00 PM
To: Rance Walker
Subject: FW: Wichita Water Quality Modeling follow-up

I can't answer his question if this is acceptable for permit reporting. I do think the modelling effort is good and instructive on what they have and need to accomplish

---

From: Hickle, Joseph [mailto:JHickle@wichita.gov]
Sent: Monday, July 06, 2015 2:20 PM
To: Tom Stiles
Cc: Hardesty, James
Subject: Wichita Water Quality Modeling follow-up

Tom

I have developed WinSLAMM water quality modeling information for presentation and your review. This is a follow-up to our preliminary meeting on the topic at which you thought we were on the right track to use this methodology for our MS4 permit water quality reporting.

Please review and see if this would be acceptable to submit come permit report time.

Thanks.

Joe Hickle

Kansas

NOTICE OF TERMINATION FORM (NOT)

To Relinquish the Authorization to Discharge Stormwater Runoff from Industrial Activity from the Industrial Facility Described Herein. Kansas Water Pollution Control General Permit No. S-ISWA-1111-1

Submission of this Notice of Termination (NOT) constitutes notice that the party identified in Section I of this form relinquishes authorization for coverage under the Kansas Water Pollution Control general permit, or KDHE authorized successors issued for Stormwater Runoff from Industrial Activity in the State of Kansas. Submission of this Notice of Termination to KDHE relinquishes the permittee's authorization to discharge stormwater associated with industrial activity at the industrial facility described herein. Completion of this NOT does not automatically relieve the former permittee of any civil, criminal and/or administrative penalties.

Coverage is terminated when the Kansas Department of Health and Environment (KDHE) receives and accepts a complete NOT. KDHE will notify any permittee whose NOT is incomplete, deficient or denied.

Certification

I certify under penalty of law that all authorized discharges of stormwater associated with industrial activity at the industrial facility described herein have been eliminated. I understand that by submitting this Notice of Termination, I am no longer authorized under the general NPDES permit S-ISWA-1111-1 to discharge stormwater associated with industrial activity at this industrial facility. I understand that discharging pollutants in stormwater associated with industrial activity to waters of the State is unlawful under K.S.A. 65-164 and 65-165 and the Clean Water Act without authorization by a valid Kansas Water Pollution Control Permit. I understand that by submitting this Notice of Termination, I am not released from liability for any violations of the general NPDES permit S-ISWA-1111-1, K.S.A. 65-164 and 65-165, the Kansas Surface Water Quality Standards (K.A.R. 28-16-28 et seq.), or the Clean Water Act. *I also hereby certify that I am authorized to sign this Notice of Termination as a representative of the permittee named herein.*

Please Print or Type.

Name of Industrial Facility: HeLiPORT

Address: 1601 S. McLean City: Wichita County: Sg State: KS Zip Code: 66213

Kansas Permit No. G-AR94-0044 Federal Permit No. _____

Print Name: Jim HARDESTY Date: 6/24/15

Signature: Jim Hardesty E-mail address: JHARDESTY@Wichita.gov

Submit the NOT with original signature to:

Kansas Department of Health and Environment
Bureau of Water, Industrial Programs Section
1000 SW Jackson, Suite 420
Topeka, KS 66612 - 1367

KDHE Contact Information

Phone: (785) 296-5545
e-mail: stormwater@kdheks.gov

Emailed
6/24/13

Division of Environment
Curtis State Office Building
1000 SW Jackson St., Suite 400
Topeka, KS 66612-1367

Kansas

Phone: 785-296-1535
Fax: 785-296-8464
www.kdheks.gov

Susan Mosier, MD, Acting Secretary Department of Health & Environment Sam Brownback, Governor

June 17, 2015

Becky Gagnon-Lewis
City of Wichita
1900 E. 9th St.
Wichita, KS 67214

Industrial Stormwater Permit Holders Invoice for Annual Permit Fee
July 2015 through July 2016

Dear Permittee: An Industrial Stormwater Permit was issued to the addressed industrial facility. K.A.R. 28-16-56d requires permit fees to be paid annually. Payment is due **July 28, 2015.**

Facility Name: Heliport
Permit No. G-AR94-0044
Facility Location: Wichita
Please make check payable to: **KDHE**
Permit Fee: $480

NOTE: Your permit fees are not up to date. If payment is not received by May 28, 2015, your permit will be placed on inactive status without further notification. Your current authorization will no longer be valid this facility.

TO BE COMPLETED BY PERMITTEE:

1. Has the annual comprehensive site evaluation (Permit Section 2.4.4) been completed? (Y/N) _____
2. Has the SWP2 Plan been updated and certified (Permit Section 2.4.6)? (Y/N) _____
3. Has a site drainage map been included per enclosed notification/information sheet? (Y/N) _____

If you answered no to either of the above questions you are required to complete the annual evaluation and/or update/modify the SWP2 Plan within 90 days of this certification date.

_____ _____
Signature Date

TO ENSURE PERMIT COMPLIANCE, ALL QUESTIONS MUST BE ANSWERED AND FORM SIGNED AND SUBMITTED WITH PAYMENT.

For official use only.	Check No.	Date Received:

Division of Environment
Bureau of Water – Industrial Programs
1000 SW Jackson – Ste. 420
Topeka, Kansas 66612-1367

Kansas

Phone 785-296-5545
Fax: 785-296-0086
dgeisler@kdheks.gov
www.kdhe.ks.gov

Susan Mosier, MD, Secretary
Department of Health & Environment
Sam Brownback, Governor

KANSAS DEPARTMENT OF HEALTH AND ENVIRONMENT
NPDES STORMWATER RUNOFF FROM INDUSTRIAL ACTIVITY
GENERAL PERMIT RENEWAL

KDHE has reissued the Kansas General Permit for Stormwater Runoff from Industrial Activity effective November 1, 2011 through October 31, 2016. The reissued permit and forms contain new and additional requirements.

Facilities that currently have industrial stormwater discharge coverage with an Authorized Notice of Intent (NOI) from the previous Kansas General Permit for Stormwater Runoff Associated with Industrial Activity (effective September 2, 2006 through August 31, 2011), S-ISWA-0507-1, do not need to submit a new NOI, but need to comply with the requirements of the new general permit. Existing permitted facilities that wish to decline coverage under the new permit must submit an application for coverage under an individual permit and must continue to comply with the conditions of the previous general permit S-ISWA-1111-1.

Owners or operators of new or existing unpermitted facilities subject to regulation of stormwater runoff associated with industrial activity as defined in 40 CFR 122.26(b)(14) or are otherwise designated by KDHE must utilize the new Notice of Intent (NOI) form to apply for and obtain coverage under the industrial stormwater general permit S-ISWA-1111-1.

Existing facilities that have not submitted an NOI form and obtained coverage under the previous Kansas General Permit for Stormwater Runoff Associated with Industrial Activity do not have authorization to discharge stormwater from industrial activities. Facilities that have submitted historical individual applications, EPA group applications, or Notice of Intent (NOI) forms in the past but have not received an Authorized NOI since September 1, 2006 will be contacted in the near future regarding coverage under the new Kansas/NPDES general permit for stormwater runoff from industrial activities.

The principal requirement of the Kansas General Permit for Stormwater Runoff from Industrial Activity is for the owner to develop and implement a Stormwater Pollution Prevention plan. The main requirement of facilities currently covered under an existing NOI are that a site plan/map showing the facility footprint, drainage directions and receiving stream, along with an indication of the acreage of the site being permitted, needs to be submitted to KDHE along with the renewal fee and annual report questions. If an updated map of the facility is on file with KDHE, a new map is not required.

Please review the industrial stormwater general permit information on the KDHE stormwater website at www.kdheks.gov/stormwater to determine if changes to the permit affect your facility. If you should have any questions, please contact Eric Staab (785-296-4347), Joe Mester (785-296-6804), Don Carlson (785-296-5547), or email at stormwater@kdheks.gov.

12/2011

Tips for safely disposing of household items

IICOLE ANZIA
cial to the Washington Post

o you've finally committed lecluttering and have even ne the hard work of gather- everything that you no ger need or want. But the isn't complete until you 're actually taken the stuff of your house, which can challenging if you're not e how to dispose of some- ng properly. Here is a guide safely getting rid of five plexing items.

int

Vater-based latex paint can dried out at home and put egular household trash. all amounts of paint will if you leave the lid off, but ger amounts require com- ing the unused paint with absorbent materials such as cat litter or sand. You can also buy paint hardener at a hardware store. Oil-based paint is considered household hazardous waste (HHW) and should never be thrown in the trash, even if it is dry. Take oil-based paints to your local HHW facility for proper disposal.

Medication

Many of us have been told it's OK to flush unused or expired medication. Although that method of disposal is safe for some medications, there are better alternatives. Medicine "take-back" programs provide one easy solution and are often held multiple times throughout the year. Check the website of your local law enforcement agency for dates. If you need to dispose of medication immediately, www.earth911.com recommends putting medication in a sealable plastic bag and adding water to dissolve the pills; add coffee grounds, kitty litter, sawdust or anything else unpalatable to prevent a child or a pet from being tempted by the contents. Seal it and throw it in the trash. Black out personal information on the bottle or remove the label before recycling it.

HOUSEHOLD HAZARDOUS WASTE FACILITY

Sedgwick County's household hazardous waste facility is at 801 Stillwell, south of Kellogg off Seneca. It is open from 9 a.m. to 5 p.m. Tuesday through Friday and 9 a.m. to 3 p.m. Saturday.

It accepts most chemicals, batteries and medications. Go to www.sedgwickcounty.org/environment/household hazardouswaste.asp for more information.

Cleaning supplies

The best way to dispose of household cleaning supplies and chemicals is to use them or give them to someone who can. If neither is possible, it's safe to put most household cleaners — water-soluble gels, liquids or powders — down the drain mixed with water; recycle the container if possible. For specialized compounds such as oven cleaners and furniture polish, check the label for instructions or contact your local recycling or household hazardous waste disposal center to see whether it will accept them.

VHS tapes, cassettes, CDs and DVDs

There are increasingly few options for donating VHS tapes and no real options for donating cassette tapes (and anyone under 25 has probably never even seen either one), so the best option is to take them to the dump. Check your local jurisdiction's website to confirm that they accept both.

DVDs and CDs can usually be donated to your local library or hospital, but call to confirm that the facility wants them before making a trip.

Batteries

Figuring out how to prope ly dispose of batteries can b complicated. Every state bu California allows you to put single-use alkaline batteries the trash. Most recycling fac ities accept them.

Rechargeable batteries m be recycled. They can be tak en to your local waste facili or to a Best Buy — the store accept rechargeable batteri weighing less than 10 pounc as well as laptop batteries, battery back-ups and cell-phone batteries.

Small "button cells" such as those found in hearing aids ar watches contain silver oxide a mercury and must be recycled If you get a professional to replace these batteries, he or s will usually recycle the battery for you.

INSPECTION MANUAL

STORM WATER POLLUTION PREVENTION ORDINANCE

CITY OF WICHITA

Prepared by

DEPARTMENT OF PUBLIC WORKS
STORM WATER MANAGEMENT OFFICE

DECEMBER 1998

Table of Contents

Table of Contents

Introduction

Letter of Introduction 1

Ordinance

See current 16.32 stormwater Ordinance at

WWW.wichita.gov

Pages 3-31 contained an out dated version of chapter 16.32

Therefore they have been removed from updated manual.

Best Management Practices (BMP)

Best Management Practices 32
Temporary Seeding 33
Mulching 36
Geotextiles 38
Chemical Stabilization 40
Permanent Seeding and Planting 41
Buffer Zones 43
Preservation of Natural Vegetation 45
Sod Stabilization 48
Stream Bank Stabilization 50
Soil Retaining Measures 53
Dust Control 55
Earth Dike 57
Drainage Swale 59
Interceptor Dikes and Swales 61
Temporary Stream Crossing 63
Temporary Storm Drain Diversion 67
Pipe Slope Drains 68
Subsurface Drains 70
Silt Fence 72
Gravel or Stone Filter Berm 74
Storm Drain Inlet Protection 76
Sediment Trap 78
Temporary Sediment Basin 80
Outlet Protection 83
Check Dams 85
Surface Roughening 87
Gradient Terraces 90

Right of Entry Guidelines

Right-of-Entry Guidelines 92

Enforcement

Enforcement Mechanisms 94

Illegal Actions

Illegal Dumping 95
Illegal Connections 97
Industrial Violations 98

Inspections

Individual Building Sites 99
Subdivisions 101
Subdivision Street and Utility Construction 102
Subdivision Building Sites 103
Sites of Earthwork Activity 105

Courtroom Procedures

File Documentation 106
Pre-Court Preparation 106
Trial Date and Courtroom Procedures 107
Sample Questions 108

Forms

Incident Report Form 110
Notice of Violation 111
Order of Compliance 112

Introduction

The Storm Water Pollution Prevention Ordinance defines permissible and illegal discharges into rivers, lakes, and storm drain systems according to the City of Wichita's storm water discharge permit as issued by the Kansas Department of Health & Environment. A copy of the Ordinance can be found beginning on page three (3). The purpose of this manual is to provide guidance to inspectors who will be responsible for enforcing the various provisions of Wichita's storm water management program.

Several Departments in the City will be responsible for enforcing the various ordinance provisions. Those responsibilities are outlined in more detail in the following sections of this manual. The principal Departments involved will be the Storm Water Management Office, the Storm Water Utility Field Office, the Office of Central Inspection, City-County Health Department, and the Storm Water Specialist in the Department of Water and Sewer. The City of Wichita Storm Water Pollution Prevention Ordinance establishes the following as violations:

1. Illegal dumping or discharging.
2. Illegal connections.
3. Failure to get a State NPDES permit.
4. Failure to prepare a storm water pollution prevention plan .
5. Failure to install Best Management Practice (BMP) devices.
6. Failure to maintain BMP devices.
7. Failure to comply with any order or directive issued under the Ordinance

Listed below are the telephone numbers of the key Departments or individuals that will be involved in the enforcement effort:

Jim Hardesty	Mark Hall
Stormwater Specialist	Stromwater Compliance Officer
316-268-8317 (office)	316-268-8337 (office)
316-312-5464 (cell)	316-393-1492 (cell)

Storm Water Management
8th Floor, City Hall
268-4498

Storm Water Utility Field Office
Central Maintenance Facility
268-4090

Office of Central Inspection
7th floor, City Hall
268-4461

City-County Health Department
1900 E. 9th Street
268-8351

City Engineer's Office
7th Floor, City Hall
268-4501

Best Management Practices (BMP)

Current storm water rules and regulations do not require that storm water be treated to improve its quality. Instead, the E.P.A. has taken the approach that "Best Management Practices" should be employed in an effort to improve water quality. As those practices are implemented, the City is required to continue water quality testing. Hopefully, as more BMP's are installed, water quality will improve.

What are B.M.P.'s? Simply put, they are any practice that will reduce the potential for storm water pollution, and, in a general sense, can be broken down into the following categories:

1. Good housekeeping.
2. Preventative maintenance.
3. Visual inspections.
4. Spill prevention and response.
5. Sediment and erosion control.
6. Management of runoff.
7. Employee training.
8. Record keeping and reporting.

Although we will have the occasion to be involved with all of the above BMP's at one time or another, in most cases we will be dealing with runoff management, good housekeeping, and sediment control. The following pages show some typical BMP devices and their uses for sediment and erosion control.

Other good housekeeping practices to look at will include: Litter Control, fuel storage areas, construction material storage areas, and any practices on a site that could result in storm water pollution.

Temporary Seeding

What Is It

Temporary seeding means growing a short-term vegetative cover (plants) on disturbed site areas that may be in danger of erosion. The purpose of temporary seeding is to reduce erosion and sedimentation by stabilizing disturbed areas that will not be stabilized for long periods of time or where permanent plant growth is not necessary or appropriate. This practice uses fast-growing grasses whose root systems hold down the soils so that they are less apt to be carried offsite by storm water runoff or wind. Temporary seeding also reduces the problems associated with mud and dust from bare soil surfaces during construction.

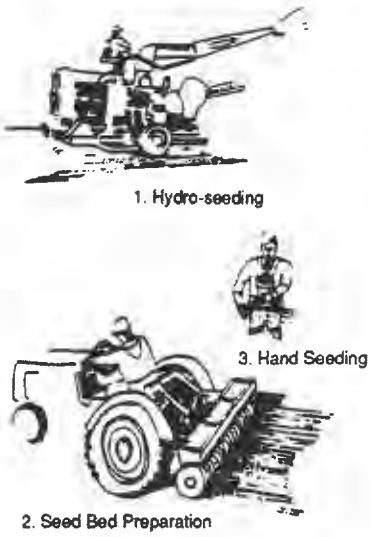


FIGURE 3.2 SEEDING PRACTICES
(Modified from Washington State, 1992)

When and Where to Use It

Temporary seeding should be performed on areas which have been disturbed by construction and which are likely to be redisturbed, but not for several weeks or more. Typical areas might include denuded areas, soil stockpiles, dikes, dams, sides of sediment basins, and temporary roadbanks. Temporary seeding should take place as soon as practicable after the

last land disturbing activity in an area. Check the requirements of your permit for the maximum amount of time allowed between the last disturbance of an area and temporary stabilization. Temporary seeding may not be an effective practice in arid and semi-arid regions where the climate prevents fast plant growth, particularly during the dry seasons. In those areas, mulching or chemical stabilization may be better for the short-term (see sections on Mulching, Geotextiles, and Chemical Stabilization).

What to Consider

Proper seed bed preparation and the use of high-quality seed are needed to grow plants for effective erosion control. Soil that has been compacted by heavy traffic or machinery may need to be loosened. Successful growth usually requires that the soil be tilled before the seed is applied. Topsoiling is not necessary for temporary seeding; however, it may improve the chances of establishing temporary vegetation in an area. Seed bed preparation may also require applying fertilizer and/or lime to the soil to make conditions more suitable for plant growth. Proper fertilizer, seeding mixtures, and seeding rates vary depending on the location of the site, soil types, slopes, and season. Local suppliers, State and local regulatory agencies, and the USDA Soil Conservation Service will supply information on the best seed mixes and soil conditioning methods.

Seeded areas should be covered with mulch to provide protection from the weather. Seeding on slopes of 2:1 or more, in adverse soil conditions, during excessively hot or dry weather, or where heavy rain is expected should be followed by spreading mulch (see section on Mulching). Frequent inspections are necessary to check that conditions for growth are good. If the plants do not grow quickly or thick enough to prevent erosion, the area should be reseeded as soon as possible. Seeded areas should be kept adequately moist. If normal rainfall will not be enough, mulching, matting, and controlled watering should be done. If seeded areas are watered, watering rates should be watched so that over-irrigation (which can cause erosion itself) does not occur.

Advantages of Temporary Seeding
• Is generally inexpensive and easy to do • Established plant cover fast when conditions are good • Stabilizes soils well, is aesthetic, and can provide sedimentation controls for other site areas • May help reduce costs of maintenance on other erosion controls (e.g., sediment basins may need to be cleaned out less often)
Disadvantages of Temporary Seeding
• Depends heavily on the season and rainfall rate for success • May require extensive fertilizing of plants grown on some soils, which can cause problems with local water quality • Requires protection from heavy use, once seeded • May produce vegetation that requires irrigation and maintenance

Mulching

What Is It

Mulching is a temporary soil stabilization or erosion control practice where materials such as grass, hay, woodchips, wood fibers, straw, or gravel are placed on the soil surface. In addition to stabilizing soils, mulching can reduce the speed of storm water runoff over an area. When used together with seeding or planting, mulching can aid in plant growth by holding the seeds, fertilizers, and topsoil in place, by helping to retain moisture, and by insulating against extreme temperatures.

When and Where to Use it

Mulching is often used alone in areas where temporary seeding cannot be used because of the season or climate. Mulching can provide immediate, effective, and inexpensive erosion control. On steep slopes and critical areas such as waterways, mulch matting is used with netting or anchoring to hold it in place.

Mulch seeded and planted areas where slopes are steeper than 2:1, where runoff is flowing across the area, or when seedlings need protection from bad weather.

What to Consider

Use of mulch may or may not require a binder, netting, or the tacking of mulch to the ground. Final grading is not necessary before mulching. Mulched areas should be inspected often to find where mulched material has been loosened or removed. Such areas should be reseeded (if necessary) and the mulch cover replaced immediately. Mulch binders should be applied at rates recommended by the manufacturer.

Advantages of Mulching
• Provides immediate protection to soils that are exposed and that are subject to heavy erosion • Retains moisture, which may minimize the need for watering • Requires no removal because of natural deterioration of mulching and matting
Disadvantages of Mulching
• May delay germination of some seeds because cover reduces the soil surface temperature • Mulch can be easily blown or washed away by runoff if not secured • Some mulch materials such as wood chips may absorb nutrients necessary for plant growth

Geotextiles

What are They

Geotextiles are porous fabrics known in the construction industry as filter fabrics, road rugs, synthetic fabrics, construction fabrics, or simply fabrics. Geotextiles are manufactured by weaving or bonding fibers made from synthetic materials such as polypropelene, polyester, polyethylene, nylon, polyvinyl chloride, glass and various mixtures of these. As a synthetic construction material, geotextiles are used for a variety of purposes in the United States and foreign countries. The uses of geotextiles include separators, reinforcement, filtration and drainage, and erosion control. We will discuss the use of geotextiles in preventing erosion at construction sites in this section.

Some geotextiles are also biodegradable materials such as mulch matting and netting. Mulch mattings are materials (jute or other wood fibers) that have been formed into sheets of mulch that are more stable than normal mulch. Nettings is typically made from jute, other wood fiber, plastic, paper, or cotton and can be used to hold the mulching and matting to the ground. Netting can also be used alone to stabilize soils while the plants are growing; however, it does not retain moisture or temperature well. Mulch binders (either asphalt or synthetic) are sometimes used instead of netting to hold loose mulches together.

When and Where to Use Them

Geotextiles can be used for erosion control by using it alone. Geotextiles, when used alone, can be used as matting. Mattings are used to stabilize the flow on channels and swales. Also, matting is used on recently planted slopes to protect seedlings until they become established. Also, matting may be used on tidal or stream banks where moving water is likely to wash out new plantings.

Geotextiles are also used as separators. An example of such a use is geotextile as a separator between riprap and soil. This "sandwiching" prevents the soil from being eroded from beneath the riprap and maintaining the riprap's base.

What to Consider

As stated above, the types of geotextiles available are vast, therefore, the selected fabric should match its purpose. Also, State or local requirements, design procedures, and any other applicable requirements should also be consulted. In the field, important concerns include regular inspections to determine if cracks, tears, or breaches are present in the fabric and appropriate repairs should be made.

Effective netting and matting require firm, continuous contact between the materials and the soil. If there is no contact, the material will not hold the soil and erosion will occur underneath the material.

FIGURE 3.3 ORIENTATION OF MULCH NETTING AND MATTING
(Modified from County of Fairfax, 1987)

Advantages of Geotextiles
• Fabrics are relatively inexpensive for certain applications
• Offer convenience to the installer
• Design methodologies for the use of geotextiles are available
• A wide variety of geotextiles to match specific needs are available
• Mulch matting and netting are biodegradable
Disadvantages of Geotextiles
• If the fabric is not properly selected, design, or installed, the effectiveness may be reduced drastically
• Many synthetic geotextiles are sensitive to light and must be protected prior to installation

Chemical Stabilization

What Is It

Chemical stabilization practices, often referred to as a chemical mulch, soil binder, or soil palliative, are temporary erosion control practices. Materials made of vinyl, asphalt, or rubber are sprayed onto the surface of the soil to hold the soil in place and protect against erosion from storm water runoff and wind. Many of the products used for chemical stabilization are human-made, and many different products are on the market.

When and Where to Use It

Chemical stabilization can be used as an alternative in areas where temporary seeding practices cannot be used because of the season or climate. It can provide immediate, effective, and inexpensive erosion control anywhere erosion is occurring on a site.

What to Consider

The application rates and procedures recommended by the manufacturer of a chemical stabilization product should be followed as closely as possible to prevent the products from forming ponds and from creating large areas where moisture cannot get through.

Advantages of Chemical Stabilization
• Is easily applied to the surface of the soil
• Is effective in stabilizing areas where plants will not grow
• Provides immediate protection to soils that are in danger of erosion
Disadvantages of Chemical Stabilization
• Can create impervious surfaces (where water cannot get through), which may in turn increase the amount and speed of storm water runoff
• May cause harmful effects on water quality if not used correctly
• Is usually more expensive that vegetative cover

Permanent Seeding and Planting

What Is It

Permanent seeding of grass and planting trees and brush provides stabilization to the soil by holding soil particles in place. Vegetation reduces sediments and runoff to downstream areas by slowing the velocity of runoff and permitting greater infiltration of the runoff. Vegetation also filters sediments, helps the soil absorb water, improves wildlife habitats, and enhances the aesthetics of a site.

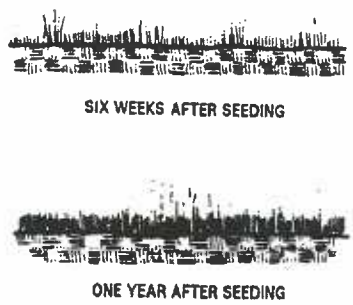


FIGURE 3.4 ESTABLISHING PERMANENT COVER WITH VEGETATION
(Modified from State of North Carolina, 1988)

When and Where to Use It

Permanent seeding and planting is appropriate for any graded or cleared area where long-lived plant cover is desired. Some areas where permanent seeding is especially important are filter strips, buffer areas, vegetated swales, steep slopes, and stream banks. This practice is effective on areas where soils are unstable because of their texture, structure, a high water table, high winds, or high slope.

What to Consider

For this practice to work, it is important to select appropriate vegetation, prepare a good seedbed, properly time planting, and to condition the soil. Planting local plants during their

regular growing season will increase the chances for success and may lessen the need for watering. Check seeded areas frequently for proper watering and growth conditions.

When seeding in cold climates during fall or winter, cover the area with mulch to provide a protective barrier against cold weather (see Mulching). Seeding should also be mulched if the seeded area slopes 4:1 or more, if soil is sandy or clayey, or if weather is excessively hot or dry.

Plant when conditions are most favorable for growth. When possible, use low-maintenance local plant species.

Topsoil should be used on areas where topsoils have been removed, where the soils are dense or impermeable, or where mulching and fertilizers alone cannot improve soil quality. Topsoiling should be coordinated with the seeding and planting practices and should not be planned while the ground is frozen or too wet. Topsoil layers should be at least 2 inches deep (or similar to the existing topsoil depth).

To minimize erosion and sedimentation, remove as little existing topsoil as possible. All site controls should be in place before the topsoil is removed. If topsoils are brought in from another site, it is important that its texture is compatible with the subsoils onsite; for example, sandy topsoils are not compatible with clay subsoils.

Stockpiling of topsoils onsite requires good planning so soils will not obstruct other operations. If soil is to be stockpiled, consider using temporary seeding, mulching, or silt fencing to prevent or control erosion. Inspect the stockpiles frequently for erosion. After topsoil has been spread, inspect it regularly, and reseed or replace areas that have eroded.

Advantages of Permanent Seeding and Planting
• Improves the aesthetics of a site
• Provides excellent stabilization
• Provides filtering of sediments
• Provides wildlife habitat
• Is relatively inexpensive
Disadvantages of Permanent Seeding and Planting
• May require irrigation to establish vegetation
• Depends initially on climate and weather for success

Buffer Zones

What are They

Buffer zones are vegetated strips of land used for temporary or permanent water quality benefits. Buffer zones are used to decrease the velocity of storm water runoff, which in turn helps to prevent soil erosion. Buffer zones are different from vegetated filter strips (see section on Vegetated Filter Strips) because buffer zone effectiveness is not measured by its ability to improve infiltration (allow water to go into the ground). The buffer zone can be an area of vegetation that is left undisturbed during construction, or it can be newly planted.

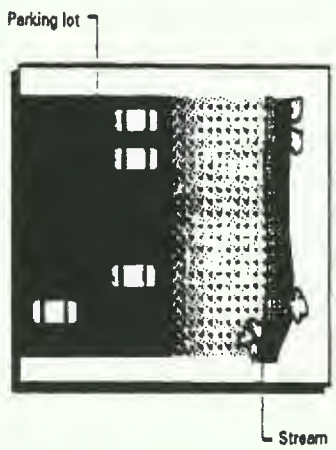


FIGURE 3.5 EXAMPLE BUFFER ZONE
(Modified from Washington State, 1992)

When and Where to Use Them

Buffer zones technique can be used at any site that can support vegetation. Buffer zones are particularly effective on floodplains, next to wetlands, along stream banks, and on steep, unstable slopes.

What to Consider

If buffer zones are preserved, existing vegetation, good planning, and site management are needed to protect against disturbances such as grade changes, excavation, damage from equipment, and other activities. Establishing new buffer strips requires the establishment of a good dense turf, trees, and shrubs (see Permanent Seeding and Planting). Careful maintenance is important to ensure healthy vegetation. The need for routine maintenance such as mowing, fertilizing, liming, irrigating, pruning, and weed and pest control will depend on the species of plants and trees involved, soil types and climatic conditions. Maintaining planted areas may require debris removal and protection against unintended uses or traffic.

Advantages of Buffer Zones
• Provide aesthetic as well as water quality benefits
• Provide areas for infiltration, which reduces amount and speed of storm water runoff
• Provide areas for wildlife habitat
• Provide areas for recreation
• Provide buffers and screens for onsite noise if trees or large bushes are used
• Low maintenance requirements
• Low cost when using existing vegetation
Disadvantages of Buffer Zones
• May not be cost effective to use if the cost of land is high
• Are not feasible if land is not available
• Require plant growth before they are effective

Preservation of Natural Vegetation

What Is It

The preservation of natural vegetation (existing trees, vines, brushes, and grasses) provides natural buffer zones. By preserving stabilized areas, it minimizes erosion potential, protects water quality, and provides aesthetic benefits. This practice is used as a permanent control measure.

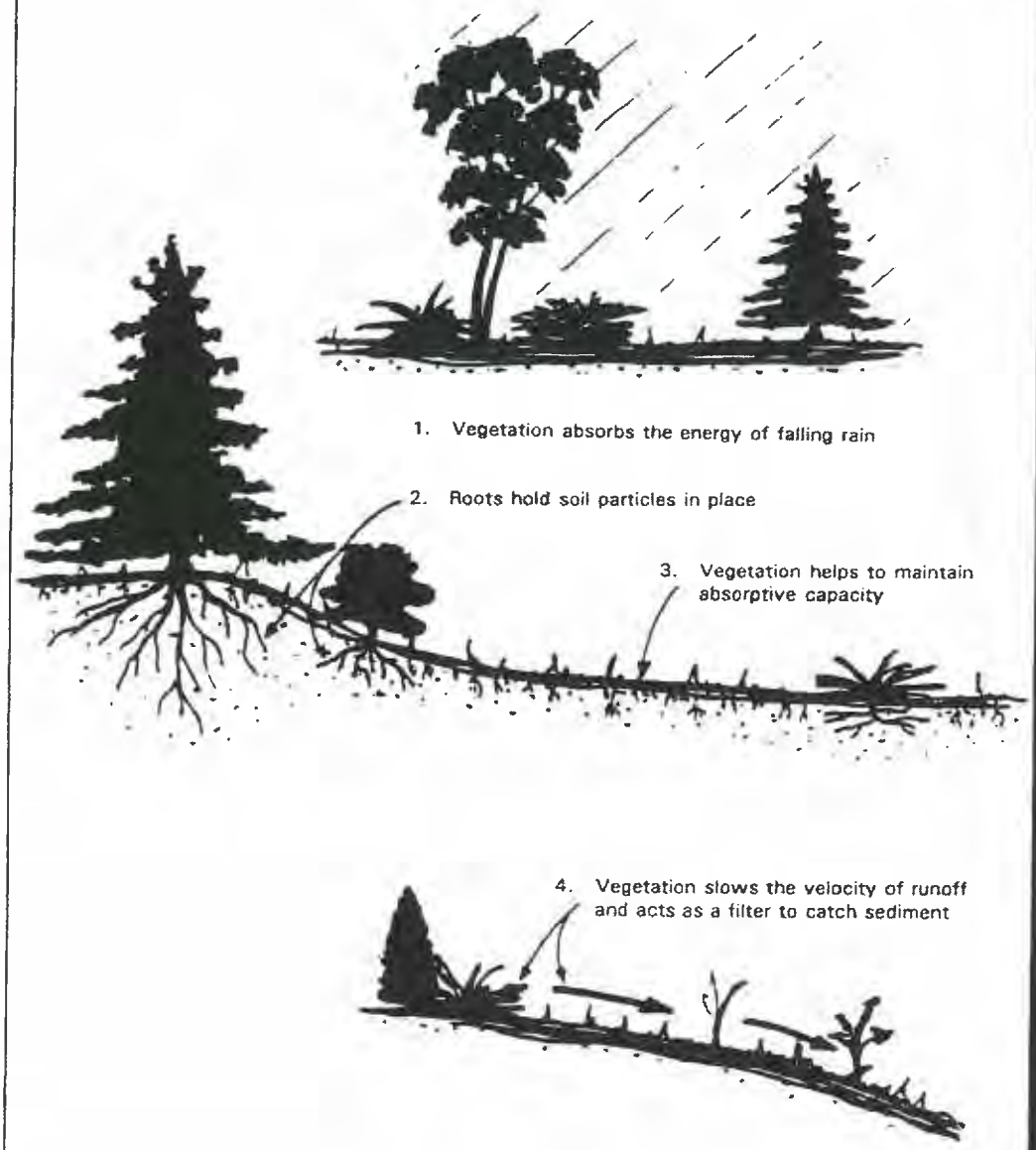
When and Where to Use It

This technique is applicable to all types of sites. Areas where preserving vegetation can be particularly beneficial are floodplains, wetlands, stream banks, steep slopes, and other areas where erosion controls would be difficult to establish, install, or maintain.

What to Consider

Preservation of vegetation on a site should be planned before any site disturbance begins. Preservation requires good site management to minimize the impact of construction activities on existing vegetation. Clearly mark the trees to be preserved and protect them from ground disturbances around the base of the tree. Proper maintenance is important to ensure healthy vegetation that can control erosion. Different species, soil types, and climatic conditions will require different maintenance activities such as mowing, fertilizing, liming, irrigation, pruning, and weed and pest control. Some State/local regulations require natural vegetation to be preserved in sensitive areas; consult the appropriate State/local agencies for more information on their regulations. Maintenance should be performed regularly, especially during construction.

Advantages of Preservation of Natural Vegetation
• Can handle higher quantities of storm water runoff than newly seeded areas
• Does not require time to establish (i.e., effective immediately)
• Increases the filtering capacity because the vegetation and root structure are usually denser in preserved natural vegetation than in newly seeded or base areas
• Enhances aesthetics
• Provides areas for infiltration, reducing the quantity and velocity of storm water runoff
• Allows areas where wildlife can remain undisturbed
• Provides noise buffers and screens for onsite operations.
• Usually requires less maintenance (e.g., irrigation, fertilizer) than planting new vegetation
Disadvantages of Preservation of Natural Vegetation
• Requires planning to preserve and maintain the existing vegetation
• May not be cost effective with high land costs
• May constrict area available for construction activities



Construction Operations Relative to Location of Protected Trees

FIGURE 3.6 BENEFITS OF PRESERVING NATURAL VEGETATION (Modified from Washington State, 1992)

Sod Stabilization

What Is It

Sodding stabilizes an area by immediately covering the surface with vegetation and providing areas where storm water can infiltrate into the ground.

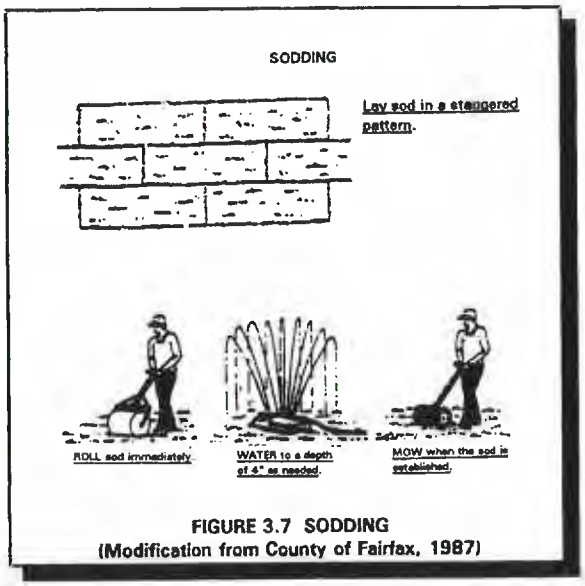


FIGURE 3.7 SODDING
(Modification from County of Fairfax, 1987)

When and Where to Use It

Sodding is appropriate for any graded or cleared area that might erode and where a permanent, long-lived plant cover is needed immediately. Examples of where sodding can be used are buffer zones, stream banks, dikes, swales, slopes, outlets, level spreaders, and filter strips.

What to Consider

The soil surface should be fine-graded before laying down the sod. Topsoil may be needed in areas where the soil textures are inadequate (see topsoil discussion in section on Permanent Seeding and Planting). Lime and fertilizers should be added to the soil to promote good growth conditions. Sodding can be applied in alternating strips or other patterns, or alternate areas can be seeded to reduce expense. Sod should not be planted

during very hot or wet weather. Sod should not be placed on slopes that are greater than 3:1 if they are to be mowed. If placed on steep slopes, sod should be laid with staggered joints and/or be pegged. In areas such as steep slopes or next to running waterways, chicken wire, jute, or other netting can be placed over the sod for extra protection against lifting (see Mulching and Geotextiles). Roll or compact immediately after installation to ensure firm contact with the underlying topsoil. Inspect the sod frequently after it is first installed, especially after large storm events, until it is established as permanent cover. Remove and replace dead sod. Watering may be necessary after planting and during periods of intense heat and/or lack of rain (drought).

Advantages of Sod Stabilization
• Can provide immediate vegetative cover and erosion control
• Provides more stabilizing protection than initial seeding through dense cover formed by sod
• Produces lower weed growth than seeded vegetation
• Can be used for site activities within a shorter time than can seeded vegetation
• Can be placed at any time of the year as long as moisture conditions in the soil are favorable
Disadvantage of Sod Stabilization
• Purchase and installation costs are higher than for seedings
• May require continued irrigation if the sod is place during dry seasons or on sandy soils

Stream Bank Stabilization

What Is It

Stream bank stabilization is used to prevent stream bank erosion from high velocities and quantities of storm water runoff. Typical methods include the following:

- **Riprap**—Large angular stones placed along the stream bank or lake
- **Gabion**—Rock-filled wire cages that are used to create a new stream bank
- **Reinforced Concrete**—Concrete bulkheads and retaining walls that replace natural stream banks and create a nonerosive surface
- **Log Cribbing**—Retaining walls built of logs to anchor the soils against erosive forces. Usually built on the outside of stream bends
- **Grid Pavers**—Precast or poured-in-place concrete units that are placed along stream banks to stabilize the stream bank and create open spaces where vegetation can be established

When and Where to Use It

Steam bank stabilization is used where vegetative stabilization practices are not practical and where the stream banks are subject to heavy erosion from increased flows or disturbance during construction. Stabilization should occur before any land development in the watershed area. Stabilization can also be retrofitted when erosion of a stream bank occurs.

What to Consider

Stream bank stabilization structures should be planned and designed by a professional engineer licensed in the State where the site is located. Applicable Federal, State and local requirements should be followed, including Clean Water Act Section 404 regulations. An important design feature of stream bank stabilization methods is the foundation of the structure; the potential for the stream to erode the sides and bottom of the channel should be considered to make sure the stabilization measure will be supported properly. Structures can be designed to protect and improve natural wildlife habitats; for example, log structures and grid pavers can be designed to keep vegetation. Only pressure-treated wood should be used

in log structures. Permanent structures should be designed to handle expected flood conditions. A well-designed layer of stone can be used in many ways and in many locations to control erosion and sedimentation. Riprap protects soil from erosion and is often used on steep slopes built with fill materials that are subject to harsh weather or seepage. Riprap can also be used for flow channel liners, inlet and outlet protection at culverts, stream bank protection, and protection of shore lines subject to wave action. It is used where water is turbulent and fast flowing and where soil may erode under the design flow conditions. It is used to expose the water to air as well as to reduce water energy. Riprap and gabion (wire mesh cages filled with rock) are usually placed over a filter blanket (i.e., a gravel layer or filter cloth). Riprap is either a uniform size or graded (different sizes) and is usually applied in an even layer throughout the stream. Reinforced concrete structures may require positive drainage behind the bulkhead or retaining wall to prevent erosion around the structure. Gabion and grid pavers should be installed according to manufacturers' recommendations.

Stream bank stabilization structures should be inspected regularly and after each large storm event. Structures should be maintained as installed. Structural damage should be repaired as soon as possible to prevent further damage or erosion to the stream bank.

Advantages of Stream Bank Stabilization
• Can provide control against erosive forces caused by the increase in storm water flows created during land development
• Usually will not require as much maintenance as vegetative erosion controls
• May provide wildlife habitats
• Forms a dense, flexible, self-healing cover that will adapt well to uneven surfaces (riprap)
Disadvantages of Steam Bank Stabilization
• Does not provide the provide the water quality or aesthetic benefits that vegetative practices could
• Should be designed by qualified professional engineers, which may increase project costs
• May be expensive (materials costs)
• May require additional permits for structure
• May alter stream dynamics which cause changes in the channel downstream
• May cause negative impacts to wildlife habitats

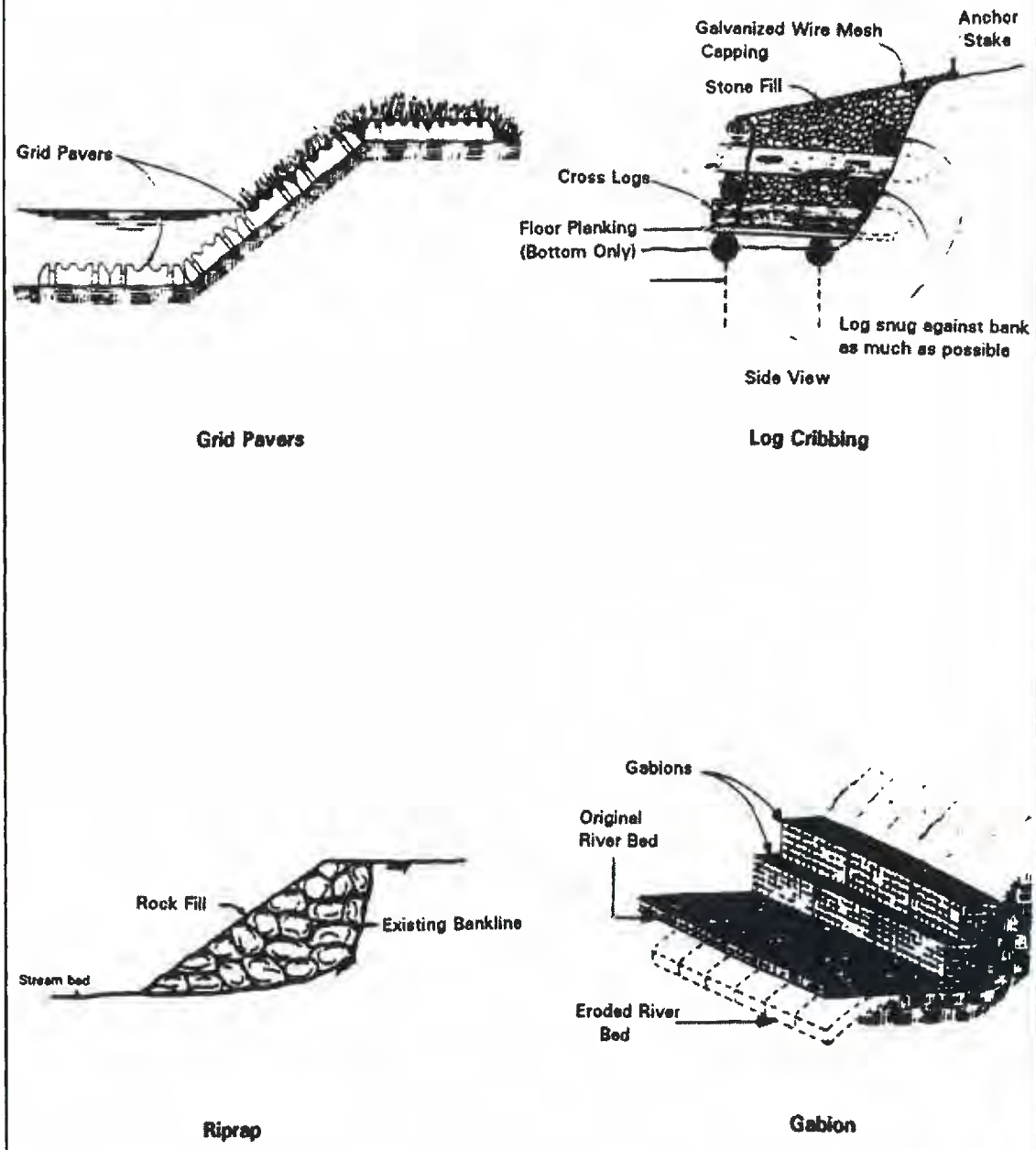


FIGURE 3.8 EXAMPLES OF STREAM BANK STABILIZATION PRACTICES
(Modified from Commonwealth of Virginia, 1980, and Commonwealth of Pennsylvania, 1990)

Soil Retaining Measures

What Are They

Soil retaining measures refer to structures or vegetative stabilization practices used to hold the soil firmly to its original place or to confine as much as possible within the site boundary. There are many different methods for retaining soil; some are used to control erosion while others are used to protect the safety of the workers (i.e., during excavations). Examples of soil retaining measures include reinforced soil retaining systems, wind breaks, and stream bank protection using shrubs and reeds.

Reinforced soil retaining measures refer to using structural measures to hold in place loose or unstable soil. During excavation, for example, soil tiebacks and retaining walls are used to prevent cave-ins and accidents. But these same methods can be used to retain soils and prevent them from moving. While detailed discussion of soil retaining methods is beyond the scope of this manual, several are briefly described.

- **Skeleton Sheeting**—Skeleton sheeting, the least expensive soil bracing system, requires the soil to be cohesive (i.e., like clay). Construction grade lumber is used to brace the excavated face of the slope.

- **Continuous Sheeting**—Continuous sheeting involves using a material that covers the face of the slope in a continuous manner. Struts and boards are placed along the slope which provide continuous support to the slope face. The material used can be steel, concrete, or wood.

- **Permanent Retaining Walls**—Permanent construction walls may be necessary to provide support to the slope well after the construction is complete. In this instance, concrete masonry or wood (railroad tie) retaining walls can be constructed and left in place.

When and Where to Use Them

Use reinforced soil retaining methods where using other methods of soil retention (e.g., vegetation) is not practical. Some sites may have slopes or soils that do not lend themselves to ordinary practices of soil retention. In these instances, a reinforced soil retaining measure should be considered.

What to Consider

As emphasized earlier, the use of reinforced soil retaining practices serve both safety and erosion control purposes. Since safety is the first concern, the design should be performed by qualified and certified engineers. Such design normally involves understanding the nature of soil, location of the ground water table, the expected loads, and other important design considerations.

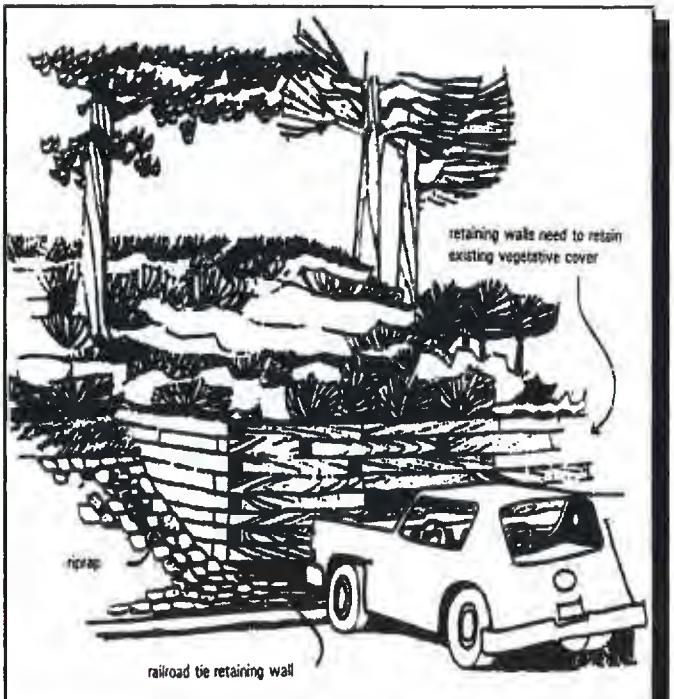


FIGURE 3.9 USE OF RETAINING WALLS
(Modification from Washington State, 1992)

Advantages of Soil Retaining Measures
• Provide safety to workers, and some types of reinforced retention can be left as permanent structures
• Prevent erosion of soil difficult to stabilize using conventional methods
Disadvantages of Soil Retaining Measures
• Require the expertise of a professional engineer and may be expensive to design and install

Dust Control

What Is It

Wind is capable of causing erosion, particularly in dry climates or during the dry season. Wind erosion can occur wherever the surface soil is loose and dry, vegetation is sparse or absent, and the wind is sufficiently strong. Wind erodes soils and transports the sediments offsite, where they may be washed into the receiving water by the next rainstorm. Therefore, various methods of dust control may need to be employed to prevent dust from being carried away from the construction site. There are many ways to accomplish this and some are described below:

- **Vegetative Cover**—For disturbed areas not subject to traffic, vegetation provides the most practical method of dust control (see Temporary Seeding and Permanent Seeding and Planting).

- **Mulch (Including Gravel Mulch)**—When properly applied, mulch offers a fast, effective means of controlling dust (see Mulching).

- **Spray-on Adhesive**—Asphalt emulsions, latex emulsions, or resin in water can be sprayed onto mineral soil to prevent their blowing away (see Chemical Stabilization).

- **Calcium Chloride**—Calcium chloride may be applied by mechanical spreader as loose, dry granules or flakes at a rate that keeps the surface moist but not so high as to cause water pollution or plant damage.

- **Sprinkling**—The site may be sprinkled until the surface is wet. Sprinkling is especially effective for dust control on haul roads and other traffic routes.

- **Stone**—Used to stabilize construction roads; can also be effective for dust control.

- **Barriers**—A board fence, wind fence, sediment fence, or similar barrier can control air currents and blowing soil. All of these fences are normally constructed of wood and they prevent erosion by obstructing the wind near the ground and preventing the soil from blowing offsite.

  Barriers can be part of long-term dust control strategy in arid and semiarid areas; however, they are not a substitute for permanent stabilization. A wind barrier generally protects soil downward for a distance of 10 times the height of the

barrier. Perennial grass and stands of existing trees may also serve as wind barriers.

When and Where to Use It

The above measures for dust control should be used when open dry areas of soil are anticipated on the site. Clearing and grading activities create the opportunity for large amounts of dust to be blown, therefore, one or several dust control measures should be considered prior to clearing and grading. One should also note that many of the water erosion control measures indirectly prevent wind erosion.

As the distance across bare soil increases, wind erosion becomes more and more severe. In arid and semiarid regions where rainfall is insufficient to establish vegetative cover, mulching may be used to conserve moisture, prevent surface crusting, reduce runoff and erosion, and help establish vegetation. It is a critical treatment on sites with erosive slopes.

What to Consider

The direction of the prevailing winds and careful planning of clearing activities are important considerations. As a standard practice, any exposed area should be stabilized using vegetation to prevent both wind and water erosion. If your site is located in an arid or semiarid area, you may wish to contact the USDA Soil Conservation Service representative in your area or the appropriate State/local government agency for additional information.

Advantages of Dust Control
• Reduces movement of soil to offsite areas
Disadvantages of Dust Control
• Excessive sprinkling may result in non-storm water discharges from the site

Earth Dike

What Is It

An earth dike is a ridge or ridge and channel combination used to protect work areas from upslope runoff and to divert sediment-laden water to appropriate traps or stable outlets. The dike consists of compacted soil and stone, riprap, or vegetation to stabilize the channel.

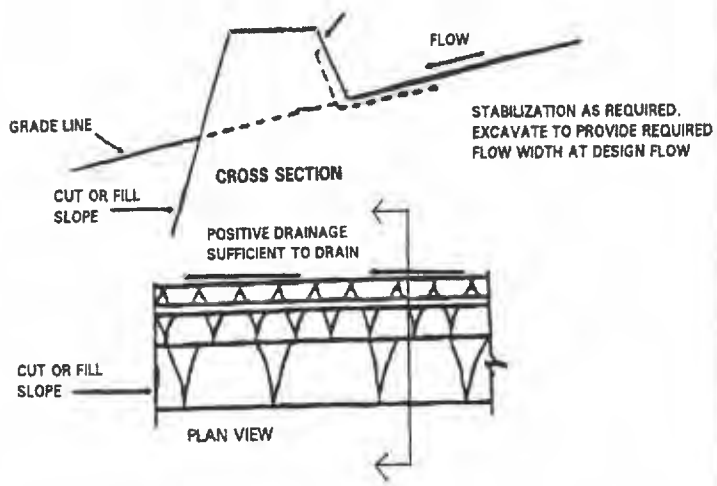


FIGURE 3.10 EARTH DIKE
(Modified from Maryland Department of the Environment, 1991)

When and Where to Use It

Earth dikes are used in construction areas to control erosion, sedimentation, or flood damage. Earth dikes can be used in the following situations:

- Above disturbed existing slopes and above cut or fill slopes to prevent runoff over the slope
- Across unprotected slopes, as slope breaks, to reduce slope length
- Below slopes to divert excess runoff to stabilized outlets
- To divert sediment laden water to sediment traps

- At or near the perimeter of the construction area to keep sediment from leaving the site

- Above disturbed areas before stabilization to prevent erosion and maintain acceptable working conditions

- Temporary diversions may also serve as sediment traps when the site has been overexcavated on a flat grade or in conjunction with a sediment fence.

What to Consider

Despite an earth dike's simplicity, improper design can limit its effectiveness; therefore, the State or local requirements should be consulted. Some general considerations include proper compaction of the earth dike, appropriate location to divert the intercepted runoff, and properly design ridge height and thicknesses. Earth dikes should be constructed along a positive grade. There should be no dips or low points in an earth dike where the storm water will collect (other than the discharge point). Also, the intercepted runoff from disturbed areas should be diverted to a sediment-trapping device. Runoff from undisturbed areas can be channeled to an existing swale or to a level spreader. Stabilization for the dike and flow channel of the drainage swale should be accomplished as soon as possible. Stabilization materials can include vegetation or stone/riprap.

Advantages of an Earth Dike
• Can be constructed from materials and equipment which are typically already present on a construction site
Disadvantages of an Earth Dike
• Frequent inspection and maintenance required

Drainage Swale

What Is It

A drainage swale is a channel with a lining of vegetation, riprap, concrete, or other material. It is constructed by excavating a channel and applying the appropriate stabilization.

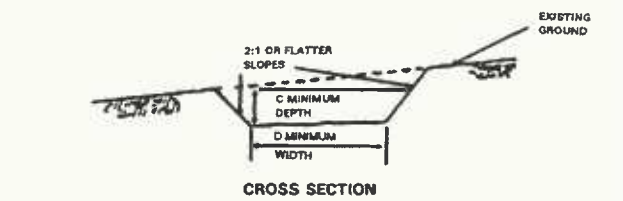


FIGURE 3.11 TEMPORARY SWALE
(Modified from Maryland Department of the Environment, 1991)

When and Where to Use It

A drainage swale applies when runoff is to be conveyed without causing erosion. Drainage swales can be used to convey runoff from the bottom or top of a slope. Drainage swales accomplish this by intercepting and diverting the flow to a suitable outlet. For swales draining a disturbed area, the outlet can be to a sediment trapping device prior to its release.

What to Consider

Since design flows, channel linings, and appropriate outlet devices will need to be considered, consult your State's requirements on such erosion control measures prior to constructing a drainage swale. General considerations include:

- Divert the intercepted runoff to an appropriate outlet.

- The swale should be lined using geotextiles, grass, sod, riprap, asphalt, or concrete. The selection of the liner is dependent upon the volume and the velocity of the anticipated runoff.

- The swale should have a positive grade. There should be no dips or low points in the swale where the storm water will collect.

Advantages of a Drainage Swale
• Excavation of swale can be easily performed with earth moving equipment • Can transport large volumes of runoff
Disadvantages of a Drainage Swale
• Stabilization and design costs can make construction expensive • Use is restricted to areas with relatively flat slopes

Interceptor Dikes and Swales

What Are They

Interceptor dikes (ridges of compacted soil) and swales (excavated depressions) are used to keep upslope runoff from crossing areas where there is a high risk of erosion. They reduce the amount and speed of flow and then guide it to a stabilized outfall (point of discharge) or sediment trapping area (see sections on Sediment Traps and Temporary Sediment Basins). Interceptor dikes and swales divert runoff using a combination of earth dike and vegetated swale. Runoff is channeled away from locations where there is a high risk of erosion by placing a diversion dike or swale at the top of a sloping disturbed area. Dikes and swales also collect overland flow, changing it into concentrated flows. Interceptor dikes and swales can be either temporary or permanent storm water control structures.

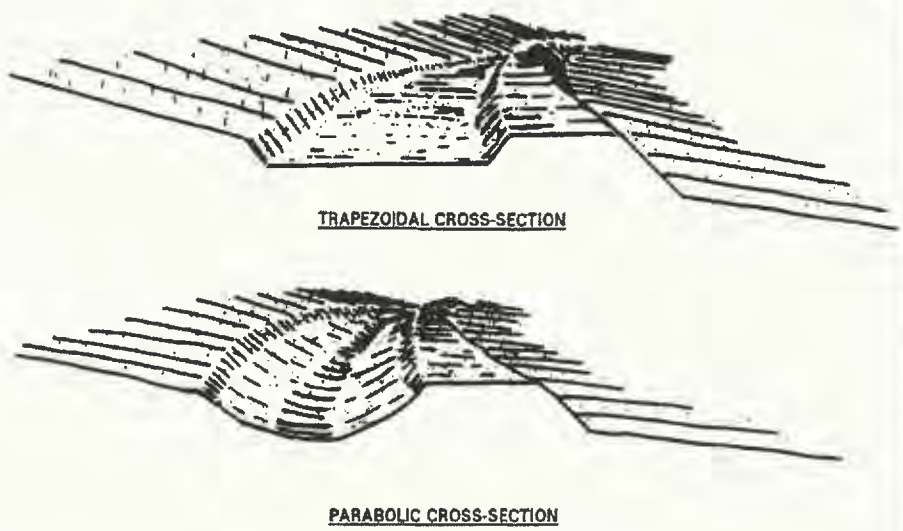


FIGURE 3.12 TYPICAL INTERCEPTOR DIKES AND SWALES
(Modified from State of Maryland, 1983)

When and Where to Use Them

Interceptor dikes and swales are generally built around the perimeter of a construction site before any major soil disturbing activity takes place. Temporary dikes or swales may also be used to protect existing buildings; areas, such as stockpiles; or other small areas that have

not yet been fully stabilized. When constructed along the upslope perimeter of a disturbed or high-risk area (though not necessarily all the way around it), dikes or swales prevent runoff from uphill areas from crossing the unprotected slope. Temporary dikes or swales constructed on the down slope side of the disturbed or high-risk area will prevent runoff that contains sediment from leaving the site before sediment is removed. For short slopes, a dike or swale at the top of the slope reduces the amount of runoff reaching the disturbed area. For longer slopes, several dikes or swales are placed across the slope at intervals. This practice reduces the amount of runoff that accumulates on the face of the slope and carries the runoff safely down the slope. In all cases, runoff is guided to a sediment trapping area or a stabilized outfall before release.

What to Consider

Temporary dikes and swales are used in areas of overland flow; if they remain in place longer than 15 days, they should be stabilized. Runoff channeled by a dike or swale should be directed to an adequate sediment trapping area or stabilized outfall. Care should be taken to provide enough slope for drainage but not too much slope to cause erosion due to high runoff flow speed. Temporary interceptor dikes and swales may remain in place as long as 12 to 18 months (with proper stabilization) or be rebuilt at the end of each day's activities. Dikes or swales should remain in place until the area they were built to protect is permanently stabilized. Interceptor dikes and swales can be permanent controls. However, permanent controls: should be designed to handle runoff after construction is complete; should be permanently stabilized; and should be inspected and maintained on a regular basis. Temporary and permanent control measures should be inspected once each week on a regular schedule and after every storm. Repairs necessary to the dike and flow channel should be made promptly.

Advantages of Interceptor Dikes and Swales
• Are simple and effective for channeling runoff away from areas subject to erosion
• Can handle flows from large drainage areas
• Are inexpensive because they use materials and equipment normally found onsite
Disadvantages of Interceptor Dikes and Swales
• If constructed improperly, can cause erosion and sediment transport since flows are concentrated
• May cause problems to vegetation growth if water flow is too fast
• Require additional maintenance, inspections, and repairs

Temporary Stream Crossing

What Is It

A temporary stream crossing is a bridge or culvert across a stream or watercourse for short-term use by construction vehicles or heavy equipment. Vehicles moving over unprotected stream banks will damage the bank, thereby releasing sediments and degrading the stream bank. A stream crossing provides a means for construction vehicles to cross streams or watercourses without moving sediment to streams, damaging the streambed or channel, or causing flooding.

When and Where to Use It

A temporary stream crossing is used when heavy equipment should be moved from one side of a stream channel to another, or where light-duty construction vehicles have to cross the stream channel frequently for a short period of time. Temporary stream crossings should be constructed only when it is necessary to cross a stream and a permanent crossing is not yet constructed.

- **Bridges**—Where available materials and designs are adequate to bear the expected loadings, bridges are preferred as a temporary stream crossing.

- **Culverts**—Culverts are the most common type of stream crossings and are relatively easy to construct. A pipe, which is to carry the flow, is laid into the channel and covered by gravel.

What to Consider

When feasible, one should always attempt to minimize or eliminate the need to cross streams. Temporary stream crossings are a direct source of pollution; therefore, every effort should be made to use an alternate method (e.g., longer detour), when feasible. When it becomes necessary to cross a stream, a well planned approach will minimize the damage to the stream bank and reduce erosion. The design of temporary stream crossings requires knowledge of the design flows and other information; therefore, a professional engineer and specific State and local requirements should be consulted. State/local jurisdictions may require a separate permit for temporary stream crossings; contact them directly to learn about their exact requirements.

The specific loads and the stream conditions will dictate what type of stream crossing to employ. Bridges are the preferred method to cross a stream as they provide the least obstruction to flows and fish migration.

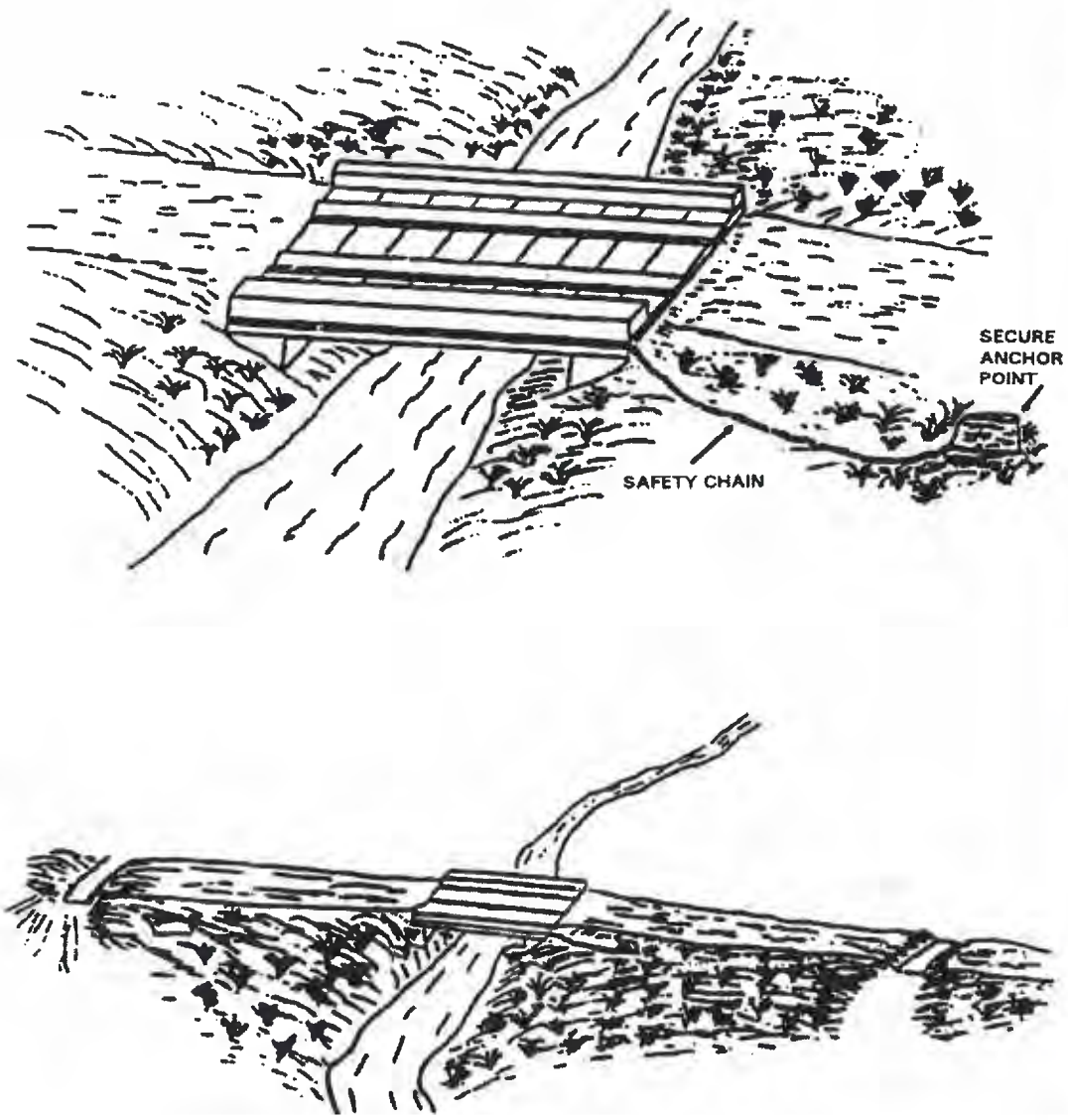


FIGURE 3.13 TEMPORARY ACCESS BRIDGE
(Modified from Maryland Department of the Environment, 1991)

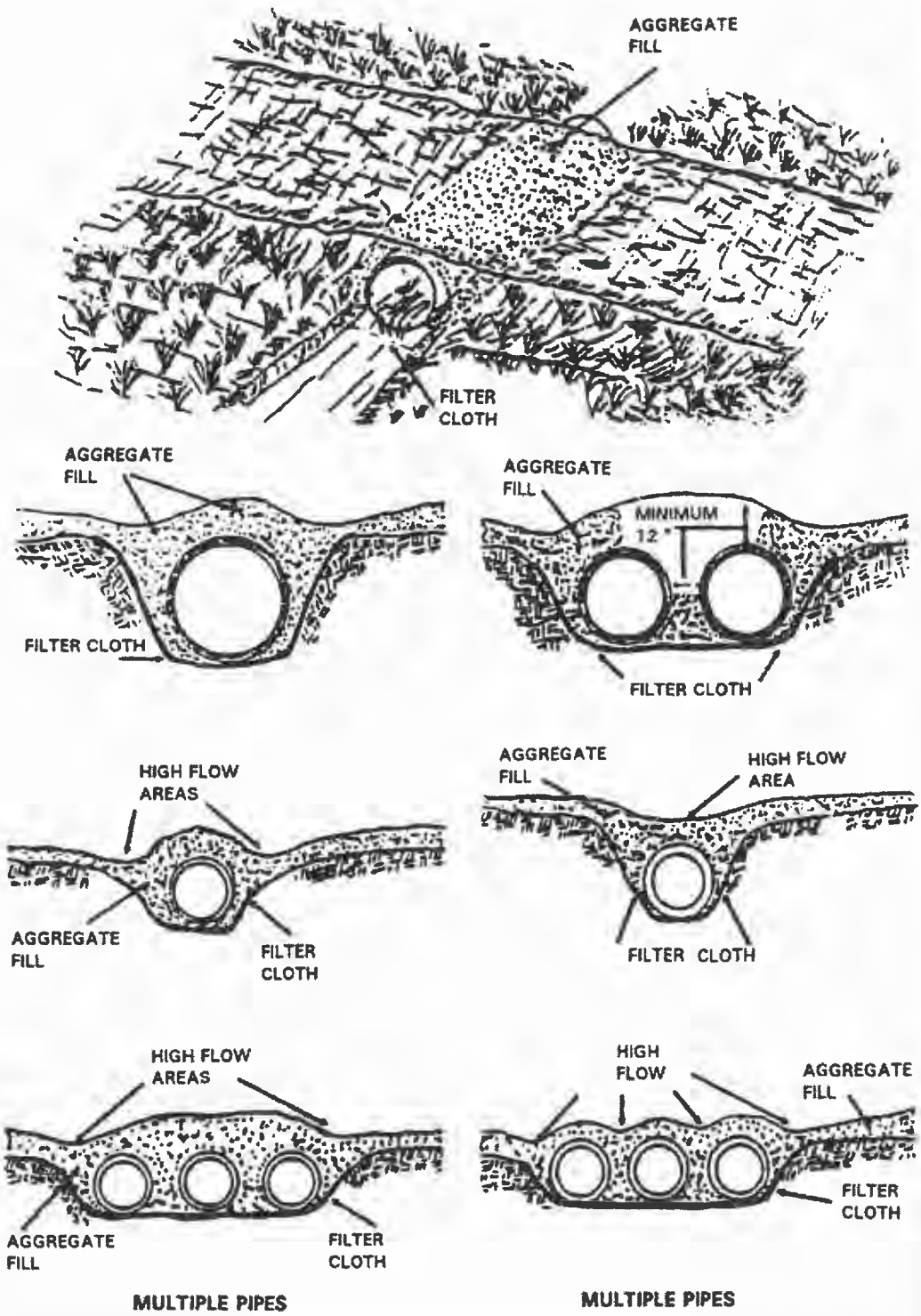


FIGURE 3.14 TEMPORARY ACCESS CULVERT
(Modified from Maryland Department of the Environment, 1991)

Advantages of a Temporary Stream Crossing
• Bridges provide the least obstruction to flow and fish migration and the construction material can be salvaged • Culverts are inexpensive and easily installed structures
Disadvantages of a Temporary Stream Crossing
• Bridges are expensive to design and install • Culverts cause greater disturbances during installation and removal

Temporary Storm Drain Diversion

What Is It

A temporary storm drain is a pipe which redirects an existing storm drain system or outfall channel to discharge into a sediment trap or basin.

When and Where to Use It

Use storm drain diversions to temporarily divert flow going to a permanent outfall. This diverted flow should be directed to a sediment-trapping device. A temporary storm drain diversion should remain in place as long as the area draining to the storm sewer remains disturbed. Another method is to delay completion of the permanent outfall and instead using temporary diversions to a sediment trapping device before discharge. Finally, a sediment trap or basin can be constructed below a permanent storm drain outfall. The basin would be designed to trap any sediment before final discharge.

What to Consider

Since the existing storm draining systems will be modified, careful consideration to piping configuration and resulting impact of installing a temporary storm drain diversion should be given. The temporary diversions will also need to be moved, once the construction has ceased and it is necessary to restore the original storm drainage systems. Therefore, appropriate restoration measures such as flushing the storm drain prior to removal of the sediment trap or basin, stabilizing the outfall, restoration of grade areas, etc. should be taken. And finally, the State or local requirements should be consulted for detailed requirements.

Advantages of a Temporary Storm Drain Diversion
• Requires little maintenance once installed
Disadvantages of a Temporary Storm Drain Diversion
• Disturbs existing storm drainage patterns

Pipe Slope Drains

What Are They

Pipe slope drains reduce the risk of erosion by discharging runoff to stabilized areas. Made of flexible or rigid pipe, they carry concentrated runoff from the top to the bottom of a slope that has already been damaged by erosion or is at high risk for erosion. They are also used to drain saturated slopes that have the potential for soil slides. Pipe slope drains can be either temporary or permanent depending on the method of installation and material used.

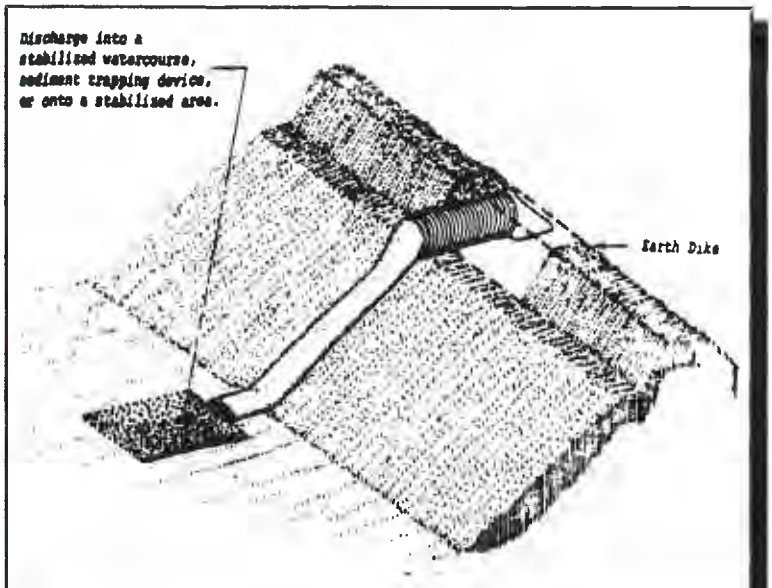


FIGURE 3.15 FLEXIBLE PIPE SLOPE DRAIN
(Modified from State of Maryland, 1983)

When and Where to Use Them

Pipe slope drains are used whenever it is necessary to convey water down a slope without causing erosion. They are especially effective before a slope has been stabilized or before permanent drainage structures are ready for use. Pipe slope drains may be used with other devices, including diversion dikes or swales, sediment traps, and level spreaders (used to spread out storm water runoff uniformly over the surface of the ground). Temporary pipe slope drains, usually flexible tubing or conduit, may be installed prior to the construction of

permanent drainage structures. Permanent slope drains may be placed on or beneath the ground surface; pipes, sectional downdrains, paved chutes, or clay tiles may be used.

Paved chutes may be covered with a surface of concrete or other impenetrable material. Subsurface drains can be constructed of concrete, PVC, clay tile, corrugated metal, or other permanent material.

What to Consider

The drain design should be able to handle the volume of flow. The inlets and outlets of a pipe slope drain should be stabilized. This means that a flared end section should be used at the entrance of the pipe. The soil around the pipe entrance should be fully compacted. The soil at the discharge end of the pipe should be stabilized with riprap (a combination of large stones, cobbles, and boulders). The riprap should be placed along the bottom of a swale which leads to a sediment trapping structure or another stabilized area.

Pipe slope drains should be inspected on a regular schedule and after any major storm. Be sure that the inlet from the pipe is properly installed to prevent bypassing the inlet and undercutting the structure. If necessary, install a headwall, riprap, or sandbags around the inlet. Check the outlet point for erosion and check the pipe for breaks or clogs. Install outlet protection if needed and promptly clear breaks and clogs.

Advantages of Pipe Slope Drains
• Can reduce or eliminate erosion by transporting runoff down steep slopes or by draining saturated soils • Are easy to install and require little maintenance
Disadvantages of Pipe Slope Drains
• Require that the area disturbed by the installation of the drain should be stabilized or it, too, will be subject to erosion • May clog during a large storm

Subsurface Drains

What Are They

A subsurface drain is a perforated pipe or conduit placed beneath the surface of the ground at a designed depth and grade. It is used to drain an area by lowering the water table. A high water table can saturate soils and prevent the growth of certain types of vegetation. Saturated soils on slopes will sometimes "slip" down the hill. Installing subsurface drains can help prevent these problems.

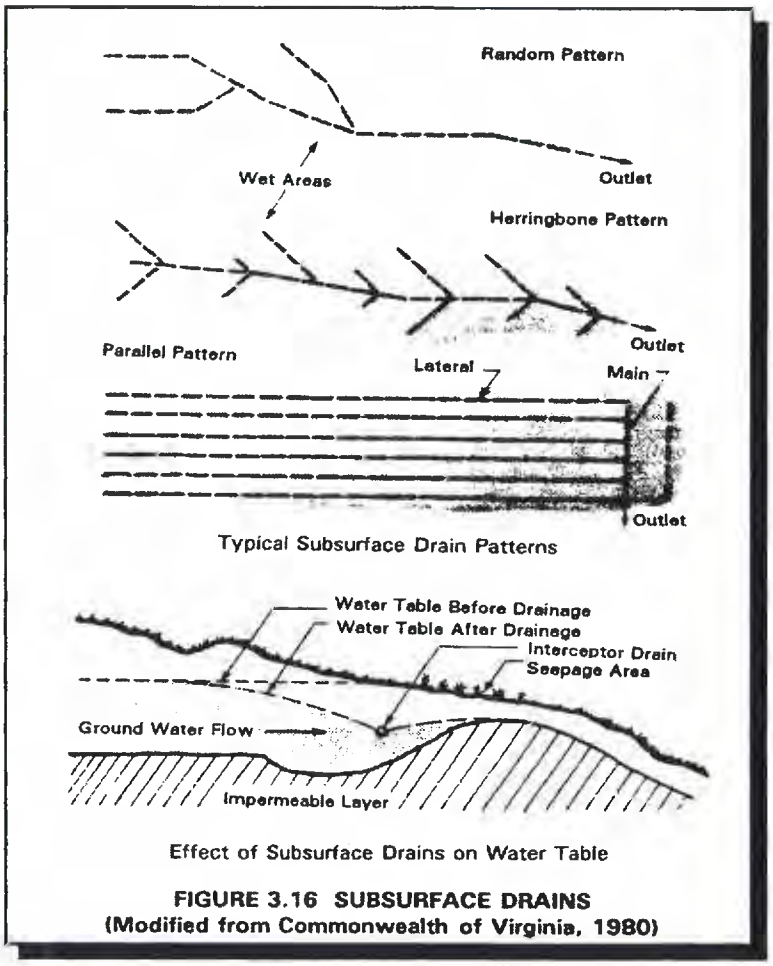


FIGURE 3.16 SUBSURFACE DRAINS
(Modified from Commonwealth of Virginia, 1980)

When and Where to Use Them

There are two types of subsurface drains: relief drains and interceptor drains. Relief drains are used to dewater an area where the water table is high. They may be placed in a gridiron, herringbone, or random pattern. Interceptor drains are used to remove water where sloping soils are excessively wet or subject to slippage. They are usually placed as single pipes instead of in patterns. Generally, subsurface drains are suitable only in areas where the soil is deep enough for proper installation. They are not recommended where they pass under heavy vehicle crossings.

What to Consider

Drains should be place so that tree roots will not interfere with drainage pipes. The drain design should be adequate to handle the volume of flow. Areas disturbed by the installation of a drain should be stabilized or they, too, will be subject to erosion. The soil layer must be deep enough to allow proper installation.

Backfill immediately after the pipe is place. Material used for backfill should be open granular soil that is highly permeable. The outlet should be stabilized and should direct sediment-laden storm water runoff to a sediment trapping structure or another stabilized area.

Inspect subsurface drains on a regular schedule and check for evidence of pipe breaks or clogging by sediment, debris, or tree roots. Remove blockage immediately, replace any broken sections, and restabilize the surface. If the blockage is from tree roots, it may be necessary to relocate the drain. Check inlets and outlets for sediment or debris. Remove and dispose of these materials properly.

Advantages of Subsurface Drains
• Provide an effective method for stabilizing wet sloping soils
• Are an effective way to lower the water table
Disadvantages of Subsurface Drains
• May be pierced and clogged by tree roots
• Should not be installed under heavy vehicle crossings
• Cost more than surface drains because of the expenses of excavation for installation

Silt Fence

What Is It

A silt fence, also called a "filter fence," is a temporary measure for sedimentation control. It usually consists of posts with filter fabric stretched across the posts and sometimes with a wire support fence. The lower edge of the fence is vertically trenched and covered by backfill. A silt fence is used in small drainage areas to detain sediment. These fences are most effective where there is overland flow (runoff that flows over the surface of the ground as a thin, even layer) or in minor swales or drainageways. They prevent sediment from entering receiving waters. Silt fences are also used to catch wind blown sand and to create an anchor for sand dune creation. Aside from the traditional wooden post and filter fabric method, there are several variations of silt fence installation including silt fence which can be purchased with pockets presewn to accept use of steel fence posts.

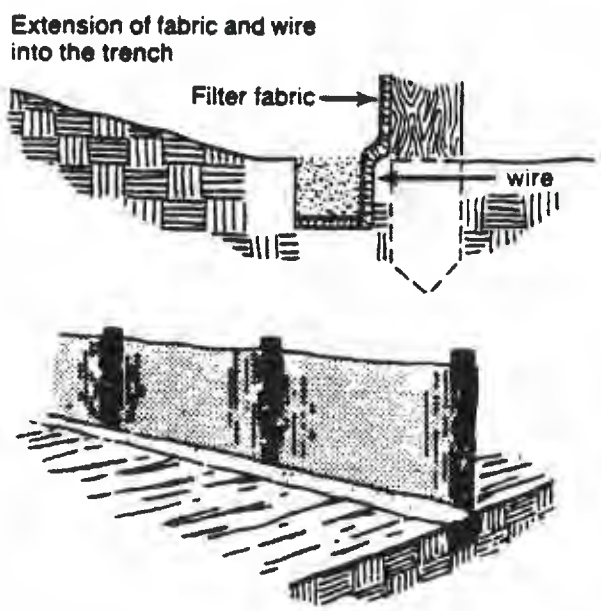


FIGURE 3.17 SILT FENCE DETAILS
(Modified from State of North Carolina, 1988; and State of Wisconsin, 1988)

When and Where to Use It

A silt fence should be installed prior to major soil disturbance in the drainage area. The fence should be placed across the bottom of a slope along a line of uniform elevation (perpendicular to the direction of flow). It can be used at the outer boundary of the work area. However, the fence does not have to surround the work area completely. In addition, a silt fence is effective where sheet and rill erosion may be a problem. Silt fences should not be constructed in streams or swales.

What to Consider

A silt fence is not appropriate for controlling runoff from a large area. This type of fence can be more effective than a straw bale barrier if properly installed and maintained. It may be used in combination with other erosion and sediment practices.

The effective life span for a silt fence depends upon the material of construction and maintenance. The fence requires frequent inspection and prompt maintenance to maintain its effectiveness. Inspect the fence after each rainfall. Check for areas where runoff eroded a channel beneath the fence, or where the fence was caused to sag or collapse by runoff flowing over the top. Remove and properly dispose of sediment when it is one-third to one-half the height of the fence or after each storm.

Advantages of a Silt Fence
• Removes sediments and prevents downstream damage from sediment deposits
• Reduces the speed of runoff flow
• Minimal clearing and grubbing required for installation
• Inexpensive
Disadvantages of a Silt Fence
• May result in failure from improper choice of pore size in the filter fabric or improper installation
• Should not be used in streams
• Is only appropriate for small drainage areas with overland flow
• Frequent inspection and maintenance is necessary to ensure effectiveness

Gravel or Stone Filter Berm

What Is It

A gravel or stone filter berm is a temporary ridge constructed of loose gravel, stone, or crushed rock. It slows and filters flow, diverting it from an exposed traffic area. Diversions constructed of compacted soil may be used where there will be little or no construction traffic within the right-of-way. They are also used for directing runoff from the right-of-way to a stabilized outlet.

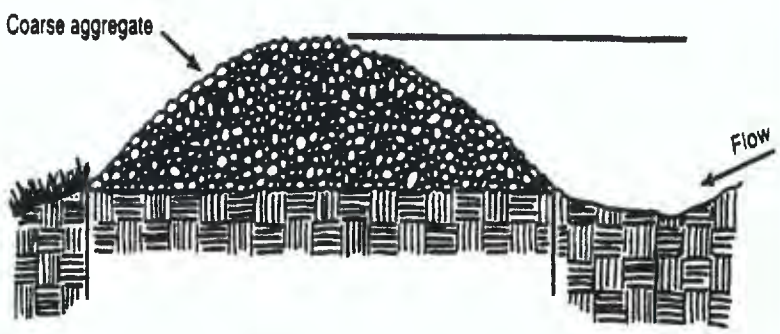


FIGURE 3.18 TYPICAL GRAVEL FILTER BERM
(Modified from Commonwealth of Virginia, 1980)

When and Where to Use It

This method is appropriate where roads and other rights-of-way under construction should accommodate vehicular traffic. Berms are meant for use in areas with gentle slopes. They may also be used at traffic areas within the construction site.

What to Consider

Berm material should be well graded gravel or crushed rock. The spacing of the berms will depend on the steepness of the slope: berms should be placed closer together as the slope increases. The diversion should be inspected regularly after each rainfall, or if breached by

construction or other vehicles. All needed repairs should be performed immediately. Accumulated sediment should be removed and properly disposed of and the filter material replaced, as necessary.

Advantages of a Gravel or Stone Filter Berm
• Is a very efficient method of sediment control • Reduces the speed of runoff flow
Disadvantages of a Gravel or Stone Filter Berm
• Is more expensive than methods that use onsite materials • Has a very limited life span • Can be difficult to maintain because of clogging from mud and soil on vehicle tires

Storm Drain Inlet Protection

What Is It

Storm drain inlet protection is a filtering measure placed around any inlet or drain to trap sediment. This mechanism prevents the sediment from entering inlet structures. Additionally, it serves to prevent the silting-in of inlets, storm drainage systems, or receiving channels. Inlet protection may be composed of gravel and stone with a wire mesh filter, block and gravel, filter fabric, or sod.

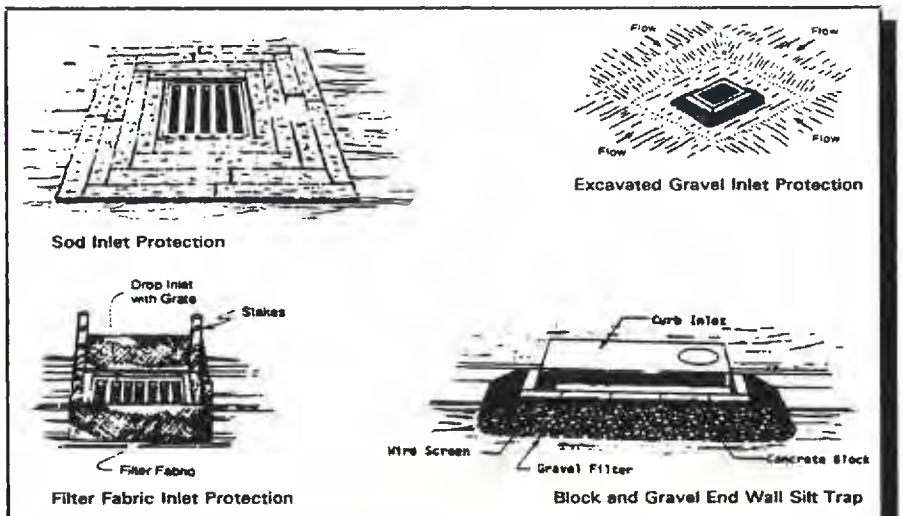


FIGURE 3.19 EXAMPLES OF STORM DRAIN INLET PROTECTION
(Modified from State of North Carolina, 1988; Washington State, 1992; and County of Fairfax, 1987)

When and Where to Use It

This type of protection is appropriate for small drainage areas where storm drain inlets will be ready for use before final stabilization. Storm drain inlet protection is also used where a permanent storm drain structure is being constructed onsite. Straw bales are not recommended for this purpose. Filter fabric is used for inlet protection when storm water flows are relatively small with low velocities. This practice cannot be used where inlets are paved because the filter fabric should be staked. Block and gravel filters can be used where velocities are higher. Gravel and mesh filters can be used where flows are higher and subject to disturbance by site traffic. Sod inlet filters are generally used where sediments in the storm water runoff are low.

What to Consider

Storm drain inlet protection is not meant for use in drainage areas exceeding 1 acre or for large concentrated storm water flows. Installation of this measure should take place before any soil disturbance in the drainage area. The type of material used will depend on site conditions and the size of the drainage area. Inlet protection should be used in combination with other measures, such as small impoundments or sediments traps, to provide more effective sediment removal. Inlet protection structures should be inspected regularly, especially after a rainstorm. Repairs and silt removal should be performed as necessary. Storm drain inlet protection structures should be removed only after the disturbed areas are completely stabilized.

Advantages of Storm Drain Inlet Protection
• Prevents clogging of existing storm drainage systems and the siltation of receiving waters • Reduces the amount of sediment leaving the site
Disadvantages of Storm Drain Inlet Protection
• May be difficult to remove collected sediment • May cause erosion elsewhere if clogging occurs • Is practical only for low sediment, low volume flows (disturbed areas less than one acre)

Sediment Trap

What Is It

A sediment trap is formed by excavating a pond or by placing an earthen embankment across a low area or drainage swale. An outlet or spillway is constructed using large stones or aggregate to slow the release of runoff. The trap retains the runoff long enough to allow most of the silt to settle out.

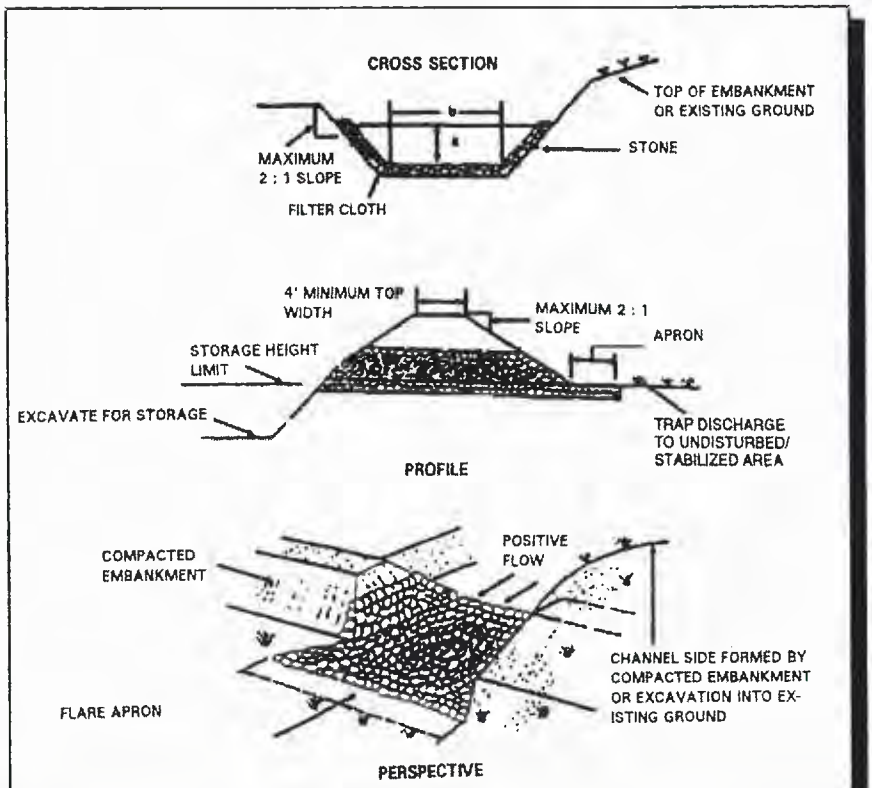


FIGURE 3.20 TYPICAL SEDIMENT TRAP
(Modified from State of Maryland, 1991)

When and Where to Use It

A temporary sediment trap may be used in conjunction with other temporary measures, such as gravel construction entrances, vehicle wash areas, slope drains, diversion dikes and swales, or diversion channels.

What to Consider

Sediment traps are suitable for small drainage areas, usually no more than 10 acres. The trap should be large enough to allow the sediments to settle and should have a capacity to store the collected sediment until it is removed. The volume of storage required depends upon the amount and intensity of expected rainfall and on estimated quantities of sediment in the storm water runoff. Check your Permit to see if it specifies a minimum storage volume for sediment traps.

The effective life of a sediment trap depends upon adequate maintenance. The trap should be readily accessible for periodic maintenance and sediment removal. Traps should be inspected after each rainfall and cleaned when no more than half the design volume has been filled with collected sediment. The trap should remain in operation and be properly maintained until the site area is permanently stabilized by vegetation and/or when permanent structures are in place.

Advantages of a Temporary Sediment Trap
• Protects downstream areas from clogging or damage due to sediment deposits • Is inexpensive and simple to install • Can simplify the design process by trapping sediment at specific spots onsite
Disadvantages of a Temporary Sediment Trap
• Is suitable only for a limited area • Is effective only if properly maintained • Will not remove very fine silts and clays

Temporary Sediment Basin

What Is It

A temporary sediment basin is a setting pond with a controlled storm water release structure used to collect and store sediment produced by construction activities. A sediment basin can be constructed by excavation and/or by placing an earthen embankment across a low area or drainage swale. Sediment basins can be designed to maintain a permanent pool or to drain completely dry. The basin detains sediment-laden runoff from larger drainage areas long enough to allow most of the sediment to settle out.

The pond has a riser and pipe outlet with a gravel outlet or spillway to slow the release of runoff and provide some sediment filtration. By removing sediment, the basin helps prevent clogging of offsite conveyance systems and sediment-loading of receiving waterways. In this way, the basin helps prevent destruction of waterway habitats.

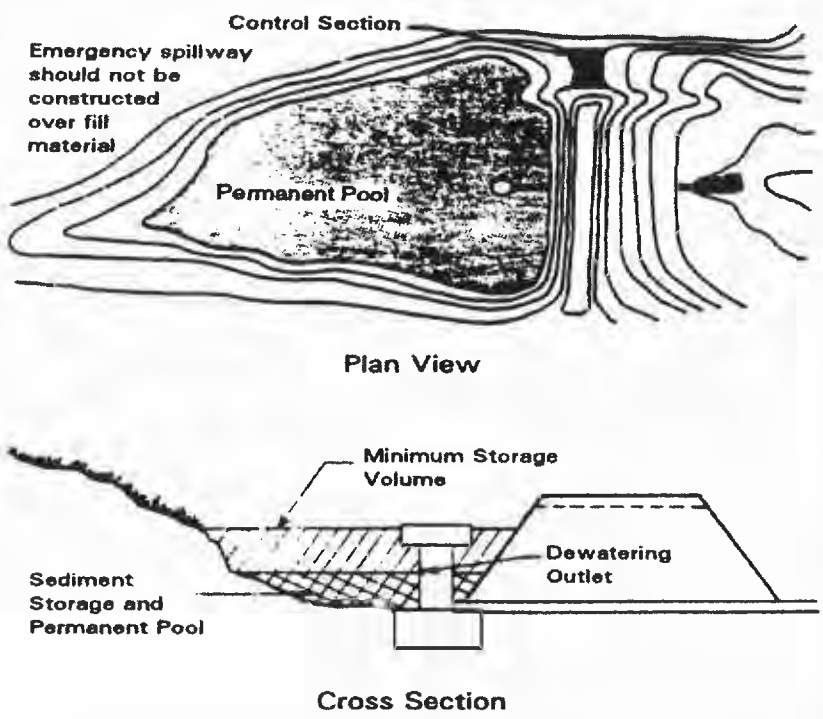


FIGURE 3.21 TEMPORARY SEDIMENT BASIN
(Modified from Commonwealth of Virginia, 1980)

When and Where to Use It

A temporary sediment basin should be installed before clearing and grading is undertaken. It should not be built on an embankment in an active stream. The creation of a dam in such a site may result in the destruction of aquatic habitats. Dam failure can also result in flooding. A temporary sediment basin should be located only if there is sufficient space and appropriate topography. The basin should be made large enough to handle the maximum expected amount of site drainage. Fencing around the basin may be necessary for safety or vandalism reasons.

A temporary sediment basin used in combination with other control measures, such as seeding or mulching, is especially effective for removing sediments.

What to Consider

Temporary sediment basins are usually designed for disturbed areas larger that 5 acres. The pond should be large enough to hold runoff long enough for sediment to settle. Sufficient space should be allowed for collected sediments. Check the requirements of your permit to see if there is a minimum storage requirement for sediment basins. The useful life of a temporary sediment basin is dependent upon adequate maintenance.

Sediment trapping efficiency is improved by providing the maximum surface area possible. Because finer silts may not settle out completely, additional erosion control measures should be used to minimize release of fine silt. Runoff should enter the basin as far from the outlet as possible to provide maximum retention time.

Sediment basins should be readily accessible for maintenance and sediment removal. They should be inspected after each rainfall and be cleaned out when about half the volume has been filled with sediment. The sediment basin should remain in operation and be properly maintained until the site area is permanently stabilized by vegetation and/or when permanent structures are in place. The embankment forming the sedimentation pool should be well compacted and stabilized with vegetation. If the pond is located near a residential area, it is recommended for safety reasons that a sign be posted and that the area be secured by a fence. A well built temporary sediment basin that is large enough to handle the post construction runoff volume may later be converted to use as a permanent storm water management structure.

The sediment basins outlet pipe and spill way should be designed by an engineer based upon an analysis of the expected runoff flow rates from the site. Consult your state/local requirements to determine the frequency of the storm for which the outlet must be designed.

EPA BASELINE GENERAL PERMIT REQUIREMENTS
Sediment Basin Requirements Part IV.D.2.a.(2).(a). For common drainage locations that serve an area with 10 or more disturbed acres at one time, a temporary (or permanent) sediment basin providing 3,600 cubic feet of storage per acre drained, or equivalent control measures, shall be provided where attainable until final stabilization of the site. The 3,600 cubic feet of storage area per acre drained does not apply to flows from offsite areas and flows from onsite areas that are either undisturbed or have undergone final stabilization where such flows are diverted around the sediment basin. For drainage locations which serve 10 or more disturbed acres at one time and where a temporary sediment basin providing 3,600 cubic feet of storage per acre drained, or equivalent controls is not attainable, sediment traps, silt fences, or equivalent sediment controls are required for all sideslope and downslope boundaries of the construction area.

Advantages of a Temporary Sediment Basin
• Protects downstream areas from clogging or damage due to sediment deposits generated during construction activities
• Can trap smaller sediment particles than sediment traps can because of the longer detention time
• Can be converted to a permanent storm water detention structure, once construction is complete
Disadvantages of a Temporary Sediment Basin
• Is generally suitable for small areas
• Requires regular maintenance and cleaning
• Will not remove very fine silts and clays unless used in conjunction with other measures
• Is a more expensive way to remove sediment than several other methods
• Requires careful adherence to safety practices since ponds are attractive to children

Outlet Protection

What Is It

Outlet protection reduces the speed of concentrated storm water flows and therefore it reduces erosion or scouring at storm water outlets and paved channel sections. In addition, outlet protection lowers the potential for downstream erosion. This type of protection can be achieved through a variety of techniques, including stone or riprap, concrete aprons, paved sections and settling basins installed below the storm drain outlet.

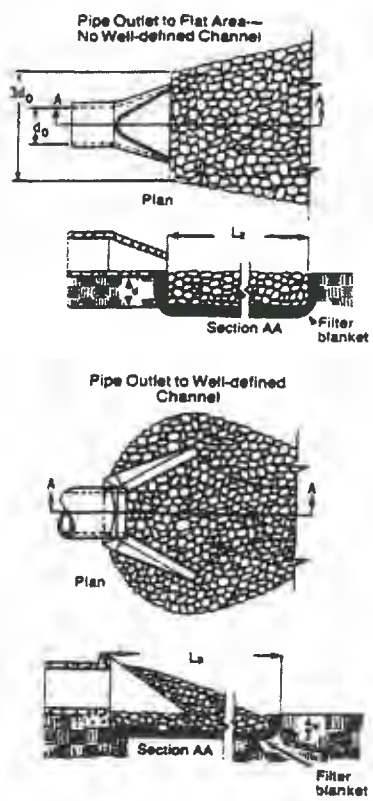


FIGURE 3.22 TYPICAL DETAILS FOR ROCK OUTLET PROTECTION
(Modified from State of North Carolina, 1988)

When and Where to Use It

Outlet protection should be installed at all pipe, interceptor dike, swale, or channel section outlets where the velocity of flow may cause erosion at the pipe outlet and in the receiving channel. Outlet protection should also be used at outlets where the velocity of flow at the design capacity may result in plunge pools (small permanent pools located at the inlet to or the outfall from B.M.P.'s). Outlet protection should be installed early during construction activities, but may be added at any time, as necessary.

What to Consider

The exit velocity of the runoff as it leaves the outlet protection structure should be reduced to levels that minimize erosion. Outlet protection should be inspected on a regular schedule to look for erosion and scouring. Repairs should be made promptly.

Advantages of Outlet Protection
• Provides, with riprap-line apron (the most common outlet protection), a relatively low cost method that can be installed easily on most sites
• Removes sediment in addition to reducing flow speed
• Can be used at most outlets where the flow speed is high
• Is an inexpensive but effective measure
• Requires less maintenance than many other measures
Disadvantages of Outlet Protection
• May be unsightly
• May cause problems in removing sediment (without removing and replacing the outlet protection structure itself)
• May require frequent maintenance for rock outlets with high velocity flows

Check Dams

What Are They

A check dam is a small, temporary or permanent dam constructed across a drainage ditch, swale, or channel to lower the speed of concentrated flows. Reduced runoff speed reduces erosion and gullying in the channel and allows sediments to settle out.

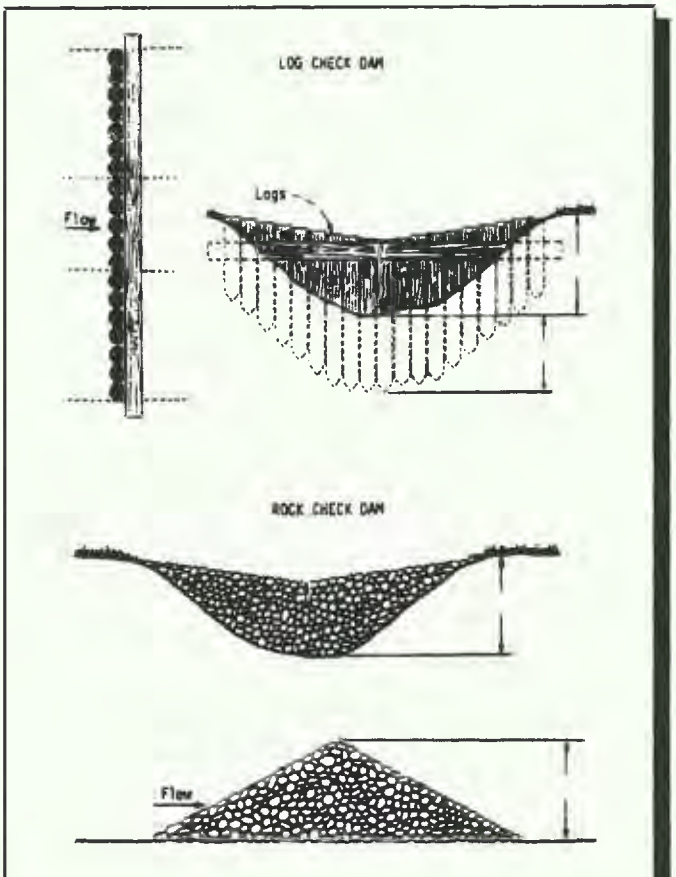


FIGURE 3.23 TYPICAL CHECK DAMS
(Modified from Commonwealth of Virginia, 1980)

When and Where to Use Them

A check dam should be installed in steeply sloped swales, or in swales where adequate vegetation cannot be established. A check dam may be built from logs, stone, or pea gravel-filled sandbags.

What to Consider

Check dams should be used only in small open channels which will not be overtopped by flow once the dams are considered. The dams should not be placed in streams (unless approved by appropriate State authorities). The center section of the check dam should be lower than the edges. Dams should be spaced so that the toe of the upstream dam is at the same elevation as the top of the downstream dam.

After each significant rainfall, check dams should be inspected for sediment and debris accumulation. Sediment should be removed when it reaches one half the original dam height. Check for erosion at edges and repair promptly as required. After construction is complete, all stone and riprap should be removed if vegetative erosion controls will be used as a permanent erosion control measure. It will be important to know the expected erosion rates and runoff flow rate for the swale in which this measure is to be installed. Contact the State/local storm water program agency or a licensed engineer for assistance in designing this measure.

Advantages of Check Dams
• Are inexpensive and easy to install
• May be used permanently if designed properly
• Allow a high proportion of sediment in the runoff to settle out
• Reduce velocity and may provide aeration of the water
• May be used where it is not possible to divert the flow or otherwise stabilize the channel
Disadvantages of Check Dams
• May kill grass linings in channels if the water level remains high after it rains or if there is significant sedimentation
• Reduce the hydraulic capacity of the channel
• May create turbulence which erodes the channel banks

Surface Roughening

What Is It

Surface roughening is a temporary erosion control practice. The soil surface is roughened by the creation of horizontal grooves, depressions, or steps that run parallel to the contour of the land. Slopes that are not fine-graded and that are left in a roughened condition can also control erosion. Surface roughening reduces the speed of runoff, increase infiltration, and traps sediment. Surface roughening also helps establish vegetative cover by reducing runoff velocity and giving seed an opportunity to take hold and grow.

FIGURE 3.24 SURFACE ROUGHENING
(Modified from Washington State, 1992)

When and Where to Use It

Surface roughening is appropriate for all slopes. To slow erosion, roughening should be done as soon as possible after the vegetation has been removed from the slope. Roughening can be used with both seeding and planting and temporary mulching to stabilize an area. For steeper slopes and slopes that will be left roughened for longer periods of time, a combination of surface roughening and vegetation is appropriate. Surface roughening should be performed immediately after grading activities have ceased (temporarily or permanently) in an area.

What to Consider

Different methods can be used to roughen the soil surface on slopes. They include stair-step grading, grooving (using disks, spring harrows, or teeth on a front-end loader), and tracking (driving a crawler tractor up and down a slope, leaving the cleat imprints parallel to the slope contour). The selection of an appropriate method depends on the grade of the slope, mowing requirements after vegetative cover is established, whether the slope was formed by cutting or filling, and type of equipment available.

Cut slopes with a gradient steeper than 3:1 but less than 2:1 should be stair-step graded or groove cut. Stair-step grading works well with soils containing large amounts of small rock. Each step catches material discarded from above and provides a level site where vegetation can grow. Stairs should be wide enough to work with standard earth moving equipment. Grooving can be done by any implement that can be safely operated on the slope, including those described above. Grooves should not be less than 3 inches deep nor more than 15 inches apart. Fill slopes with a gradient steeper than 3:1 but less than 2:1 should be compacted every 9 inches of depth. The face of the slope should consist of loose, uncompacted fill 4 to 6 inches deep that can be left rough or can be grooved as described above, if necessary.

Any cut or filled slope that will be mowed should have a gradient less than 3:1. Such a slope can be roughened with shallow grooves parallel to the slope contour by using normal tilling. Grooves should be close together (less than 10 inches) and not less than 1 inch deep. Any gradient with a slope greater than 2:1 should be stair-stepped.

It is important to avoid excessive compacting of the soil surface, especially when tracking, because soil compaction inhibits vegetation growth and causes higher runoff speed. Therefore, it is best to limit roughening with tracked machinery to sandy soils that do not compact easily and to avoid tracking on clay soils. Surface roughened areas should be seeded as quickly as possible. Also, regular inspections should be made of all surface roughened areas, especially after storms. If rills, (small watercourses that have steep sides

and are usually only a few inches deep) appear, they should be filled, graded again, and reseeded immediately. Proper dust control procedures should be followed when surface roughening.

Advantages of Surface Roughening
• Provides a degree of instant erosion protection for bare soil while vegetative cover is being established • Is inexpensive and simple for short-term erosion control
Disadvantages of Surface Roughening
• Is of limited effectiveness in anything more than a gentle rain • Is only temporary; if roughening is washed away in a heavy storm, the surface will have to be re-roughened and new seed laid

Gradient Terraces

What Are They

Gradient terraces are earth embankments or ridge-and-channels constructed along the face of a slope at regular intervals. Gradient terraces are constructed at a positive grade. They reduce erosion damage by capturing surface runoff and directing it to a stable outlet at a speed that minimizes erosion.

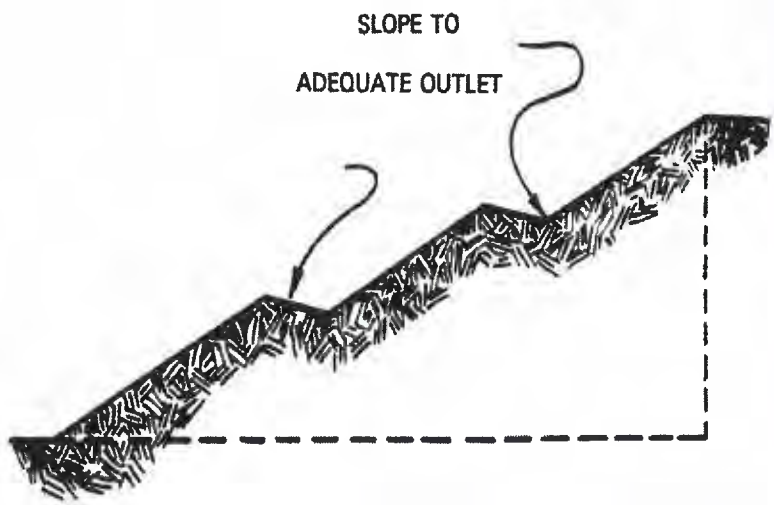


FIGURE 3.25 GRADIENT TERRACE
(Washington State, 1992)

When and Where to Use Them

Gradient terraces are usually limited to use on long, steep slopes with a water erosion problem, or where it is anticipated that water erosion will be a problem. Gradient terraces should not be constructed on slopes with sandy or rocky soils. They will be effective only where suitable runoff outlets are or will be made available.

What to be Consider

Gradient terraces should be designed and installed according to a plan determined by an engineering survey and layout. It is important that gradient terraces are designed with

adequate outlets, such as a grassed waterway, vegetated area, or tile outlet. In all cases, the outlet should direct the runoff from the terrace system to a point where the outflow will not cause erosion or other damage. Vegetative cover should be used in the outlet where possible. The design elevation of the water surface of the terrace should not be lower than the design elevation of the water surface in the outlet at their junction, when both are operating at design flow. Terraces should be inspected regularly at least once a year and after major storms. Proper vegetation/stabilization practices should be followed while constructing these features.

Advantages of Gradient Terraces
• Reduce runoff speed and increase the distance of overland runoff flow • Hold moisture better than do smooth slopes and minimize sediment loading of surface runoff
Disadvantages of Gradient Terraces
• May significantly increase cut and fill costs and cause sloughing if excessive water infiltrates the soil • Are not practical for sandy, steep, or shallow soils

Right-of-Entry Provisions

A. Treat each and every citizen/property owner with respect and decency.

B. When a citizen requests the name and/or identification number of any inspector, he/she is required to tell the citizen his/her first name, last name, and ID number.

C. Be attentive to complaints and/or requests by citizens, and take action on them, or refer the person(s) to the proper agencies or individuals.

D. Before entering onto any private property for the purpose of inspection, your City ID badge should be clearly displayed by being pinned or clipped to exterior clothing in a clearly visible manner.

E. Introduction Speech:

Hello, my name is _____. I am an inspector with the _____ Department of the City of Wichita. I am performing inspections regarding the discharge of storm water from your property. I would like permission to inspect your storm water drainage facilities (or sample storm water).

F. Clearly identify yourself by name, position and employer. Show the occupant or owner your City Identification.

G. Attempt to ascertain whether the resident, builder, developer, owner/manager or other individual in charge of the property is present prior to beginning any inspection.

H. Ascertain the relationship of the individual to the structure. If the person is anyone other than the owner, manager, builder, developer, job foreman or adult tenant, do not enter the structure for an inspection. Leave your card and attempt to find out when the person in charge might return to the premises.

I. Clearly state the purpose of your visit:

1. Why are you there?
   To discover and verify storm water drainage or compliance with Best Management Practice standards

J. Explain to the individual the inspection procedures.

1. What are you going to be doing?

K. If the person is the appropriate person in charge, ask for permission to inspect. Permission must be given before entering the structure or private portion of a business.

L. If the individual refuses permission to enter the premises for inspection or testing, the inspector will politely thank the resident and leave the premises. Do not attempt entry or argue with any uncooperative occupant. The inspector may inform the occupant of the inspector's right to enter to inspect, and examine records. Additionally, the inspector may inform the occupant of his/her right to request an administrative search warrant, if access is denied. If there is a refusal to permit entry, however, the inspector must leave the private portion of the premises.

M. Once entry has been denied, you may request that an administrative search warrant be prepared. You may make an exterior inspection of the premises which are in plain view and can be noted from public property.

N. If the property is unoccupied, and if the property or structure is clearly marked with "No Trespassing" signs, you may proceed to make an exterior inspection of the premises which are in plain view and can be noted from public property.

O. If the property is vacant and is not posted with a "No Trespassing" sign, you may proceed to make an exterior inspection by walking around the property. If however, there is a locked fence, or gate, you should not attempt to open the gate or fence and should not climb the fence. You may make whatever exterior inspection from areas outside the fence, on public property, or on adjoining private properties where proper permission has been obtained.

P. Protection of Private Property:

> Damage to private property must be avoided at all times. Great care should be exercised to avoid damage to yard, trees, bushes, flowers, etc.

Q. Unless specifically allowed by the Code of the City of Wichita or emergency circumstances exist, all inspections are to be made during regular and usual business hours.

R. All inspections shall be conducted in a reasonable manner and be concluded with a reasonable period of time.

S. Inspections should be conducted only as are necessary to enforce the provisions of the City codes regarding the discharge of storm water.

Enforcement Mechanisms

The Ordinance generally provides for the following enforcement mechanisms:

1. Criminal Penalty
2. Stop Work Order
3. Administrative Penalty

These will generally apply as follows:

1. Criminal Penalty:
   A. Illegal Dumping
   B. Individual Building Sites
   C. Illegal Connections
   D. Subdivision developers on sites disturbing less than five acres
   E. City contractors and Utility Companies on sites disturbing less than five acres

2. Stop Work Orders:
   A. Individual Building Sites
   B. Subdivision developers on sites disturbing less than five acres

3. Administrative Penalty:
   A. Subdivision developers on sites disturbing five acres or more
   B. Subdivision developers and contractors with multiple Criminal Penalties
   C. Industrial Violations
   D. Individual building sites disturbing five (5) acres or more
   E. Illegal Connections
   F. City contractors and Utility Companies on sites disturbing five acres or more

The Ordinance also provides for some additional enforcement mechanisms that are implemented at the discretion of the Public Works Director, including performance bonds and insurance requirements.

The Criminal Penalty and Stop Work Order mechanisms will generally be the same as what City Inspectors currently use. Separate "Notice of Violation" and "Citation" forms will be provided by the Storm Water Management Office, for use with this Ordinance.

Illegal Dumping

The Storm Water Pollution Prevention Ordinance defines permissible and illegal discharges. Illegal dumping occurs any time a substance is dumped or discharged into a lake, drain, or storm sewer that is not a permitted discharge. These violations will generally be found by citizen complaint or by field crews.

The procedures to be used in dealing with illegal dumping situations are as follows:

1. Fill out a "Incident Report" form to document the occurrence.

2. Determine what the substance is. Call the Storm Water Specialist, if necessary, for an analysis. Take pictures of the violation for later court documentation, if possible.

3. Determine the responsible party, if possible. Should this not be possible, it may be necessary to do additional site monitoring in an effort to determine who is responsible. If the party responsible cannot be determined, the situation should be called into the Storm Water Utility Field Office so that it can be cleaned up.

4. If the responsible party can be determined, issue a "Notice of Violation" and send a copy to the Storm Water Management Office. On the "Notice of Violation", inform the responsible party that it is their duty to clean up the situation. Use judgement on the amount of time you give them to complete this. A minimum time of 24 hours and possibly three to four days for larger infractions is recommended. Reinspect violation for compliance within five days of remediation date in the "Notice of Violation".

5. If the responsible party cleans up the situation, this would end the enforcement activity but the site should be monitored periodically for any additional reoccurrences. A citation is not issued at this point.

6. If the site is not cleaned up or the responsible party fails to bring the property into compliance, a citation should be issued. Send Storm Water Management a copy of the citation.

7. If necessary, call the Storm Water Utility Field Office to have the situation cleaned up. Storm Water Utility will bill the responsible party.

8. Complete the "Incident Report" form. Send to the Storm Water Management Office.

9. Monitor the site periodically to watch for any reoccurrences. If a reoccurrence occurs, issue a citation immediately.

Illegal Connections

An illegal connection is defined as any connection to a storm sewer or outfall to a ditch or pond that discharges any prohibited substance. These connections can be reported by citizens or found by field employees. Typically, the work dealing with illegal connections will be done by the Storm Water Management Office, the Storm Water Utility Field Office, the City-County Health Department, and the Storm Water Specialist.

The process to use on illegal connections is generally as follows:

1. Report all illegal connections to the Storm Water Specialist.

2. The Storm Water Specialist will fill out the appropriate "Incident Report" and determine the nature of the substance being discharged as well as the responsible party. Pictures shall be taken for court documentation, if possible.

3. If the substance is not a prohibited discharge, the investigation will end. Submit a completed "Incident Report" to the Storm Water Management Office.

4. If the substance is determined to be a prohibited discharge, the Storm Water Specialist will notify the Storm Water Management Office. If the substance is found to be a hazardous substance, the Storm Water Specialist will also notify the City-County Health Department immediately.

5. The Storm Water Specialist will contact the owner, issue a "Notice of Violation", explain the problem, and set a date by which we expect the connection to be eliminated. If any subsequent clean up is warranted, the time frame for that to be completed should be established in the "Notice of Violation". Use your judgement on the amount of time you give them. A minimum time of 24 hours and possibly several weeks for longer infractions is recommended. If deadlines are established in the "Notice of Violation", a reinspection must be made within 5 days of said deadline.

6. Follow the procedure as outlined for Industrial Violations on page 98. Take photographs of the violation for later use in Court, if necessary.

7. If the clean up of the substance is not completed upon reinspection, call the Storm Water Utility Field Office to make arrangements to have the substance cleaned up. The Storm Water Utility will bill the responsible party for the cost of the clean up.

8. When the situation is resolved, complete the "Incident Report" and file it with the Storm Water Management Office.

Industrial Violations

These violations will occur at industrial sites and will usually involve illegal connections or discharges. Enforcement in this area will be the responsibility of the Storm Water Management Office and the Storm Water Specialist, although either the Health Department, O.C.I., or the Storm Water Utility Office could receive the complaint or find the violation.

The procedures to follow in dealing with industrial violations is as follows:

1. Report all possible violations to the Storm Water Specialist.

2. The Storm Water Specialist will determine the responsible party and the nature of the substance being discharged. Fill out the "Incident Report". Take photos of the violation for court documentation, if possible.

3. If the substance is a permissible discharge, terminate the investigation and complete the "Incident Report". Send the "Incident Report" to the Storm Water Management Office.

4. If the discharge constitutes an Ordinance violation, report it to the Storm Water Management Office. If the discharge is a hazardous material, also notify the City-County Health Department immediately for assistance.

5. The Storm Water Management Office will follow the process in the Ordinance for industrial violations. A "Notice of Violation" will be issued to the owner stating whether or not a clean up will be required and establishing deadlines for same. Reinspect within five days of deadline.

6. If a clean-up is required but the owner refuses to do so, contact the Storm Water Utility Field Office to have the situation cleaned up. The Storm Water Utility Office will bill the responsible party for the cost of the clean up.

7. When the situation is resolved, the Storm Water Management Office will complete the "Incident Report".

Individual Building Sites

Individual building sites must also comply with the Storm Water Management provisions. On these sites, the Office of Central Inspection personnel will be the front line inspectors. Remember that ALL construction sites are required to use BMP devices to prevent pollutants from entering storm sewers, drains, and streets. In addition, for construction that disturbs five acres or more, the site must have its own State NPDES permit and storm water pollution prevention plan, in which case all BMP devices must be as specified in said plan.

Inspection procedures at individual building sites should be as follows:

1. Do not conduct NPDES inspections for 24 hours following a rain of 0.25 inches or more.

2. Examine the perimeter of the construction site. Determine if eroded soil or any other pollutant has entered into any storm sewer, drain, or street. If it has not, look to see if any BMP devices are present at the site. If these devices are present and there is no evidence of any pollutant being discharged, no violation has occurred, document and end the inspection. If pollutants have been discharged and/or if BMP devices are not being used, a violation has occurred.

3. Issue a "Notice of Violation" to the owner and contractor immediately, with a copy to the Storm Water Management Office. Give them 48 hours to come into compliance. Compliance will be realized when effective BMP devices are installed to solve the problem. Reinspect the site within five days of any deadline established in the "Notice of Violation" to determine compliance.

4. If, using your judgement, the pollutants need to be cleaned up, the "Notice of Violation" shall also state a specific deadline for that to occur. Reinspect in accordance with paragraph 3., above.

5. If a contractor or utility company fails to comply with the stipulation in any "Notice of Violation", a citation will be issued. A copy of the citation shall be sent to the Storm Water Management Office. Photographs should be taken of all violations for later court documentation.

6. Notify the Storm Water Utility Field Office if a clean up is needed. The Storm Water Utility will bill the contractor or utility company for the cost of the clean up.

7. If any particular contractor or utility company continues to violate the terms and condition of the Ordinance and receives multiple citations (3 or more per

year), the administrative penalty process shall also apply. Contact the Storm Water Management Office if that occurs.

8. On individual building sites that disturb five acres or more, the owner/contractor is also subject to the administrative penalty clause in the Ordinance. In all likelihood, this would be invoked only in cases of repeated violations by the same owner/contractor. Also, on those sites, the site is required to have a State NPDES permit and a Storm Water Pollution Prevention Plan(SWP3). When violations occur on these larger sites, the inspector should ask to see the pollution prevention plan and self-inspection reports. If these do not exist, additional violations have occurred for which a citations can be issued, after issuing the appropriate "Notice of Violation".

SUBDIVISIONS

Inspection in subdivisions can be quite complicated due to the number of people involved. The Storm Water Pollution Prevention Ordinance generally outlines the various responsibilities as follows:

1. Owner (Subdivider or Developer): The owner is required to get a State NPDES permit if the project will disturb five acres or more, and must prepare and implement a storm water pollution prevention plan that would address overall construction in the subdivision as well as construction on individual lots. The owner is also responsible to insure that all those working in the subdivision are familiar with the BMP requirements, the SWP3, and that they use BMP devices where called for. All contractors working on a permitted site are required to sign a certification statement agreeing to comply with the owners plan.

2. General Contractors - Individual Building Sites: Any contractor working on a building site must always comply with the owner's storm water pollution prevention plan, if one was prepared, and install minimum BMP devices on site. Best management practice (BMP) devices must be effective. If the construction disturbs five acres or more, the owner must obtain a State NPDES permit and prepare an individual storm water pollution prevention plan for that particular site.

3. City Contractors: Often times, contractors working for the City will be involved in installing public infrastructure at the site. They must agree to comply with the owner's storm water pollution prevention plan and, where applicable, utilize BMP's. City contractors may be required to obtain an individual State NPDES permit and prepare a separate storm water pollution prevention plan if the construction will disturb five acres or more.

4. Utility Companies: Utility companies are often times involved in installing public infrastructure at the site. They must also agree to comply with the owners storm water pollution prevention plan, where applicable, and always utilize best management practices. They may also be required to obtain a State NPDES permit and prepare a storm water pollution prevention plan if the project will disturb five acres or more.

Different people in the City's organizational structure will be involved in the enforcement work at the subdivision. Usually, the first stage in subdivision development is the installation of streets and public utilities. Since the Office of Central Inspection is not involved at this point, primary enforcement will be through the Public Works personnel

(Inspectors and Storm Water Management Staff). The developer also has a responsibility to insure that the work at this point complies with his NPDES permit and storm water pollution prevention plan.

SUBDIVISION STREET AND UTILITY CONSTRUCTION

Inspection procedures for street and utility construction will be a follows:

1. Do not conduct NPDES inspections for 24 hours following a rain of 0.25 inches or more.

2. Examine the perimeter of the construction site. Determine if eroded soil or any other pollutant has entered into any storm sewer, drain, or street. Determine if BMP devices are present at the site. If BMP devices are not present or if the discharge of a pollutant has occurred, a violation exists. Photos of the violation should be taken for later court documentation.

3. Issue a "Notice of Violation" to the contractor or utility company immediately, with a copy to the Storm Water Management Office. Give them 48 hours to come into compliance. Compliance will be realized when BMP devices are installed to solve the problem.

4. If, using your judgement, the pollutants needs to be cleaned up, the "Notice of Violation" shall also state a specific deadline for that to occur. This deadline should be 24 hours to 3 days from the inspection date. If any deadlines are established in said "Notice", reinspect the site within five days of the deadline to determine compliance.

5. If a contractor or utility company fails to comply with the conditions of the "Notice of Violation", a citation should be issued. A copy of the citation shall be sent to the Storm Water Management Office.

6. Notify the Storm Water Utility Field Office if a clean-up is needed. The Storm Water Utility Office will bill the contractor or utility company for the cost of the clean up.

7. If any particular contractor or utility company continues to violate the terms and condition of the Ordinance and receives multiple citations (3 or more per year), and on construction sites disturbing five acres or more, the administrative penalty process shall also apply. Contact the Storm Water Management Office if that occurs.

Once streets and public utilities are installed, building construction begins. During the building phase, the Office of Central Inspection personnel will become the principal inspectors. Each individual building site is to be looked at separately. <u>ALL</u> building sites

in Wichita are required to use BMP devices to prevent pollutants from entering storm sewers, drains, and streets. In addition, for construction that disturbs five acres or more, the site must have its own State NPDES permit and storm water pollution prevention plan, in which case all BMP devices would be as specified in said plan. In all cases, work in subdivisions must comply with owners State NPDES permit and storm water pollution prevention plan, as applicable.

SUBDIVISION BUILDING SITES

Inspection procedures for building sites in subdivisions should be as follows:

1. Do not conduct NPDES inspections for 24 hours following a rain of 0.25 inches or more.

2. Inspect individual construction sites periodically as other building code inspections are made.

3. Examine the perimeter of the site. Determine if eroded soil or any other pollutant has entered into any storm sewer, ditch, pond, or street. Determine if BMP devices are being used. If no BMP devices are present or if pollutants have been discharged, a violation has occurred. Get photos of the violation for later court documentation.

4. Issue the "Notice of Violation" to the builder immediately sending a copy to the Storm Water Management Office. Allow the builder 24 to 48 hours to come into compliance. Compliance will be achieved when BMP devices are installed that will solve the problem. Reinspect site within five days of any deadline established in the "Notice".

5. If, using your judgement, the pollutants need to be cleaned up, the "Notice of Violation" shall so state and specify a deadline for that to occur.

6. If the builder fails to comply with any condition of the "Notice of Violation", issue a citation. A copy of the citation must be sent to the Storm Water Management Office.

7. Notify the Storm Water Utility Field Office if a clean-up is needed. The Storm Water Utility Office will bill the builder for the cost of the clean-up.

8. If any particular builder or contractor continues to violate the terms of the Ordinance and receives multiple citations (3 or more per year), administrative penalties shall also apply. Contact the Storm Water Management Office if this occurs.

9. Each owner/developer is responsible for all construction that occurs in the subdivision and we expect him/her to be active in this process by ensuring that people working in the subdivision are aware of the NPDES requirements and are complying with them. Should this not occur, the owner or developer is also subject to administrative penalties. If, in any given subdivision, you notice less than 70% of the construction sites thereon are utilizing BMP's and, in fact, pollution has resulted, contact the Storm Water Management Office immediately. The administrative penalty process will be started by the Storm Water Management Office against the developer.

10. Do not forget that, in any subdivision in which five acres or more of land is disturbed, a State NPDES permit and a SWP3 is required. In subdivisions where there are a large number of violations, ask the owner to see a copy of his pollution prevention plan and self-inspection reports. If they do not exist, notify the Storm Water Management Office and the administrative penalty process will be started.

Sites of Earthwork Activity

Earthwork activities can often occur at sites not involving building construction. Since building permits may not be required in these cases, all inspection employees should watch for these sites. The enforcement procedures will be as follows:

1. Notify Storm Water Management Office of the location of work.

2. Storm Water Management will determine responsible party and whether or not the activity has been permitted.

3. If unpermitted, Storm Water Management will issue a "Stop Work Order" to responsible party demanding that all work cease until the proper permit is obtained. If work is not stopped, a citation will be issued.

4. If the site has been permitted, Storm Water Management will conduct periodic inspections of the site perimeter to determine whether or not BMP devices are installed and/or pollutants have entered any drain, storm sewer, or street. If BMP devices are present and no pollutants have been discharged, no violation has occurred and the inspection will end. If no BMP devices are being used or pollutants have been discharged, a violation has occurred. Get photos of the violation for later court documentation.

5. If a violation has occurred, ask the owner to see a copy of the site pollution prevention plan and self inspection documentation. If these do not exist, issue a citation for failure to prepare and implement a pollution prevention plan. Require that the responsible party clean up the pollutants and install BMP devices within a specified time frame. The deadline should be 24 hours to 3 days from the inspection date. Re-inspect the site at the end of said period. If not cleaned up, notify the Storm Water Utility Field Office that a clean up is needed. The field office will bill the responsible party for the clean-up.

6. If a violation has occurred and a pollution prevention plan exists, issue a "Notice of Violation" for failure to implement the plan or failure to maintain BMP devices, whichever is the case. Provide a certain amount of time for the responsible party to clean-up the problem. Reinspect. If the clean-up has been done and effective BMP devices installed, end inspection. If the clean-up has not been done or if BMP devices have not been installed, issue a citation and report to the Storm Water Utility Field Office that a clean up is needed. The field office will bill the responsible party for the clean-up cost.

7. If continued violations occur at the site, issue citations immediately.

Courtroom Procedures for Storm Water Investigations

Court Considerations:

I. File Documentation:

File documentation is very important, especially if you are ever required to testify regarding your inspection and the handling of a case.

A. In addition to information about each scheduled re-inspection, entries should also be made to document the following:

1. Any verbal or written acknowledgments by the owner or person in control of the property that they are the owner or person in control, and that the Notice was received.

2. Names, dates, and places concerning individuals spoken to concerning the case, both over the phone and out in the field.

3. The date of any time extensions, and the reason for any extensions.

4. Any progress in bringing the property into compliance and the extent of the progress made.

5. Any other significant events surrounding the case.

6. Always avoid any prejudicial or irrelevant remarks.

7. Entries in cryptic shorthand are not acceptable and should be avoided.

II. Pre-Court Preparation:

If you receive a subpoena, your case has been scheduled for a trial. These cases will be scheduled at one of the police substations. The location of the trail will be determined by the location of the citation. Below is an outline of the current locations.

East:	Thursday
West:	Tuesday
South:	Monday
North:	Wednesday

All trial dockets begin at 6:00 p.m..

Prior to court, an additional inspection should be completed to determine the status of the property. If not in compliance, additional photographs should be taken. These should be completed as closely to the trial date as possible.

After court, the inspector should enter the results of each of their cases in their files. If court action taken requires a follow-up inspection by the inspector in order to continue court activity, the inspector should enter a re-inspection date for approximately 30 days from the date of the court hearing.

III. Trial Date and Court Procedure:

A. Preparation for testimony:

1. The following is testimony that will be required of the inspector in court at the time of trial:

    a. Name of inspector and position and department;
    b. Address of property;
    c. Initial date violations were observed;
    d. Relationship of person charged to property; contractor, sub, developer;
    e. Owner of property and how ownership determined;
    f. Date notice of violation served;
    g. Time stated in the order for compliance with the violations;
    h. Dates of re-inspections after time of compliance with the violations remaining;
    i. General description of violations;
    j. Statements (admissions) by owner or responsible party as to ownership or control, or agreement that violations exists;
    k. Agreement for Compliance;

2. Review your file and photographs so that you can testify as much as possible without reference to documents.

3. Always inspect the location to get pictures and current status of improvements, if any, on the day of or a few days before trial.

4. Be prepared to discuss case with the prosecutor. You will be asked about the status of the property and what actions you want the court to take regarding the property.

B. Testimony:

1. Outside the courtroom:

   a. Do not discuss the case with the defendant or the defense attorney outside the presence or without the permission of the City Attorney.

   b. Observe the proper rules of decorum.

2. Direct examination by the City Attorney:

   a. Speak distinctly.
   b. Answer questions precisely and to the point.
   c. If you do not understand the question or know the answer, say so.
   d. Be impartial and fair.
   e. Do not volunteer information or opinions.
   f. Avoid hearsay testimony (out of court statements made by someone who is not in court).
   g. Do not testify in a conclusionary manner.

3. Cross examination:

   a. Do not argue or get angry.
   b. Do not volunteer information.
   c. Try to answer questions precisely; if you can answer by "yes" or " no", do so. If you don't know, say so.
   d. Listen to the questions carefully before answering; don't let the attorney or defendant misstate your testimony as part of a question.
   e. If the City Attorney objects to a question, do not answer until the judge rules on the objection.
   f. Do not make objections to the questions, let the City Attorney make any appropriate objections.

IV. Sample Questions:

1. What is your name:
2. What is your occupation and how long have you been so employed?
3. In your official capacity, did you inspect a property at (address)?
4. What was the date of that inspection?
5. Is this property in the corporate city limits of the City of Wichita?
6. What type of property/structure is at location?
7. Size of property i.e. less than five acres?

7. Size of property i.e. less than five acres?
8. What was the purpose of the initial inspection (citizen's complaint/routine inspection)?
9. Was there a written notice of violation issued to correct the condition? Date of notice? Compliance Date?
10. Was a determination made as to the ownership of the property in questions? How was this done? (Personal check of County tax records, city building records, or personal admission of defendant to you.)
11. Who was the notice of violation issued to: owner, contractor, developer?
12. How and when was the notice served?
13. Any conversations with defendant regarding responsibility for the property in question?
14. Can you identify the defendant?
15. What was the time in the notice in which to correct the violation?
16. Were any further extensions of time granted? (Yes or No)
17. Any conversation with defendant or representative regarding compliance?
18. Did you make a re-inspection of the property prior to issuing criminal complaint? What was the date?
19. Describe the condition of the property? Photographs?
20. How many inspections were made of the property in question in regard to this notice prior to filing UCC?
21. Any conversation with defendant regarding the violations?
22. Any attempts/efforts to bring property into compliance?

STORM WATER MANAGEMENT
INCIDENT REPORT

Location

Name of Caller	**Address**	**Telephone**

Complaint

Date: **Time:**

How Received:
- **Mail:** ☐
- **Phone:** ☐
- **Personal:** ☐

Received By:

Referred To:

Investigation Remarks:

Signature: **Date:**

Disposition:

Signature: **Date**

Notice of Violation
Storm Water Pollution Prevention
City Code Chapter 16.32

To:_____ Date:_____
Address:_____ Zip Code: _____

An inspection of property located at _____ detected the following violations of Chapter 16.32 of the Code of the City of Wichita, Kansas:

A. General Violations:

- ❑ Section 16.32.020 (A) Illegal Discharge/Illegal Dumping into storm sewer system

B. Construction Site Violations:

- ❑ Section 16.32.050 B(2) Failure to prepare or implement a Pollution Prevention Plan
- ❑ Section 16.32.050 A(1) Failure to use Best Management Practices (owner)
- ❑ Section 16.32.050 A(6) Failure to use Best Management Practices (contractor)
- ❑ Section 16.32.050 A(7) Malicious destruction of Best Management Practice devices
- ❑ Section 16.32.050 A(7) Failure to repair Best Management Practice devices

C. Industrial Sites:

- ❑ Section 16.32.060 A(2) Failure to prepare or implement a Pollution Prevention Plan
- ❑ Section 16.32.060 A(12) Failure to implement a sampling or testing program as required by N.P.D.E.S. Permit

D. Private Ditches or Ponds:

- ❑ Section 16.32.070 (A) Failure to use Best Management Practice devices to minimize pollutant levels down stream

E. Other Violations:

- ❑ Section _____

Violation Details:_____
_____
_____

You must take corrective action to bring this property into compliance before _____.

Clean-up: ❑ If this box is checked, you are hereby directed to cleanup the pollution which has resulted from this violation by _____.

Additional Remarks: _____
_____

Failure to comply with any requirements of this Notice can result in the issuance of a criminal citation to you or subject you to administrative penalties pursuant to Section 16.32.100 of The Code of the City of Wichita.

Please contact me at _____ between the hours of _____, should you have any further questions.

This Notice of Violation issued this _____ day of _____, _____at _____ A.M./P.M..

By: _____ _____ _____
Signature I.D. Number Telephone Number

_____
Certified Mail Receipt Number

Order for Compliance
City of Wichita, Kansas
Department of Public Works

Date: _____

To: _____ Address: _____

_____

_____

Whereas, on _____, you were issued a "**Notice of Violation**" for violating certain sections of Chapter 16.32 of the Code of the City of Wichita, Kansas, dealing with storm water pollution at _____, to wit:

Section	Violation

The time period specified in said Notice for corrective action and/or cleanup has now expired. Further inspection of the property indicates that:

- ❑ No action has been taken to correct the violation, and/or
- ❑ Cleanup has not been accomplished as directed.

Now, therefore, the following order is hereby issued relative to the above noted violation(s):

_____

_____

_____

_____

_____

_____

_____

_____

_____

Should you fail to comply with this Order, you will be subject to administrative penalties in the amount of $1000 to $2,500 per day for each continuing violation. Should you wish to appeal this Order, you must submit a written appeal to the Director of Public Works, within 7 days of the date of this order, at City Hall, 455 North Main, 8th Floor, Wichita, Kansas 67202.

_____ _____

Steve Lackey P.E., Director of Public Works Certified Mail Receipt Number

STORMWATER POLLUTION PREVENTION PLAN

K-96 & Hillside Reclamation Site

Prepared by

CITY OF WICHITA

November 2013

Management Commitment of Resources

The City of Wichita is committed to the implementation of the procedures outlined in this SWPPP and the prevention of pollutants to navigable waters of the United States. This Plan has the full approval of management at a level of authority to commit the resources necessary to implement the SWPP Plan. A copy of this SWPP Plan shall be maintained at the facility at all times and will be made available to the EPA or State of Kansas for on-site review during normal working hours.

Authorized Management Representative Name: _____

Signature: _____

Title: _____

Date: _____

TABLE OF CONTENTS

1 INTRODUCTION 4
1.1 SWPPP Pollution Prevention Team 4

2 FACILITY DESCRIPTION AND STORMWATER DRAINAGE 6
2.1 Facility Drainage 6
2.2 Inventory of Exposed Materials 7
2.3 Significant Spills and Leaks 7

3 OUTFALL INVENTORY 8
3.1 Non-Stormwater Discharges 10
3.2 Description of Potential Pollution Sources 10
3.2.1 Fueling Area 10
3.3 Existing Stormwater Sampling Data 11

4 POLLUTION PREVENTION MEASURES AND CONTROLS (BMPs) 12
4.1 Good Housekeeping 12
4.2 Spill Prevention and Response Procedures 12
4.3 Inspections 12
4.4 Employee Training 13
4.5 Erosion Control Measures 13
4.6 Record Keeping and Internal Reporting Procedures 13

5 MONITORING, REPORTING, AND RECORD KEEPING REQUIREMENTS 14
5.1 Sampling Requirements 14
5.2 Comprehensive Site Compliance Evaluation and Report 14

6 REFERENCES 16

APPENDIX A. SWPPP Development Worksheets
APPENDIX B. Monthly Site Inspections
APPENDIX C. Comprehensive Site Compliance Evaluation Reports
APPENDIX D. Employee Training
APPENDIX E. Significant Spills and Leaks
APPENDIX F. KDHE Stormwater Pollution Prevention Plan Requirements and Guidelines
APPENDIX G. Extra SWPPP Worksheets
APPENDIX H. Original Permit Application and SWPPP

LIST OF TABLES

Table 1-1 Requirements of the SWPPP 5

LIST OF FIGURES

Figure 3-1. Inlet No 1 and No 2 8

Figure 3-2. Site Map 9

1 INTRODUCTION

The purpose of this Stormwater Pollution Prevention Plan (SWPPP) is to prevent contamination of stormwater runoff as a result of industrial activities conducted at the K-96 & Hillside Reclamation Site. The City of Wichita owns and operates this facility ¼ mile west of K-96 & Hillside in Wichita, Kansas. The goals of this SWPPP are as follows:

1. Identify potential sources of pollution that may reasonably be expected to contribute to the contamination of stormwater runoff.
2. Establish Best Management Practices (BMP) that eliminate or effectively reduce the routes for contamination to enter stormwater runoff.

The United States Environmental Protection Agency (USEPA) has developed regulations to reduce the introduction of pollutants into stormwater from industrial sites. These regulations have been delegated to the Kansas Department of Health and Environment (KDHE) to administer. Currently, KDHE considers an industrial facility to be in compliance if the owner has submitted a Notice of Intent (NOI) for Stormwater Discharges Associated with Industrial Activity under the General Permit and has developed a SWPPP. This SWPPP was prepared according to the requirements stated within the USEPA and the KDHE guidance documents (Appendix F).

1.1 SWPPP Pollution Prevention Team

The members of the K-96 & Hillside Reclamation Site Pollution Prevention Team (Appendix A, Worksheet #1) are responsible for the day-to-day tasks related to stormwater runoff pollution prevention. The members of the SWPPP Pollution Prevention Team will conduct employee training programs, ensure implementation of BMPs, complete all site inspections, and supervise day-to-day operations at the site which negatively affect stormwater quality. Collectively, the SWPPP Pollution Prevention Team is responsible for the following tasks:

- Performing scheduled inspections.
- Training facility personnel.
- Ensuring that the BMPs in the plan are being implemented.
- Maintaining records.
- Revising the SWPPP to reflect changes to the BMPs employed and to the applicable regulations.
- Preparing the Comprehensive Site Compliance Evaluation for insertion into Appendix C, Worksheet #11 of this document once each year.

The following individuals are designated as the primary members of the SWPPP Pollution Prevention Team at the K-96 & Hillside Reclamation Site:

Individual: Aaron Henning, PE
Title: Maintenance Engineer
Phone: (316) 268-4087

Individual: Mark Wilson
Title: Maintenance Coordinator, NE Substation
Phone: (316) 838-9670

Individual: Donald Cradduck
Title: Street Maintenance Supervisor
Phone: (316) 268-4091

These individuals (or persons in their position) must maintain and update this SWPPP. The Pollution Prevention Team must also coordinate between 'front line' employees and management concerning pollution prevention issues. The Pollution Prevention Team is responsible for carrying out the requirements of the SWPPP as summarized in Table 1-1.

Table 1-1 Requirements of the SWPPP

Activity	Frequency
1. Site Inspections	Monthly, records in Appendix B, Worksheet #13, recordkeeping requirement of 3 years. Inspections shall take place monthly, and/or within 24 hours following a ½" or greater rain event.
2. Comprehensive Site Compliance Evaluation	Annually
3. Comprehensive Site Compliance Evaluation Report	Completed within 2 weeks following Evaluation and inserted in Appendix C, Worksheet #11
4. Comprehensive Site Compliance Evaluation Report Implementation	Performed within 12 weeks of the Evaluation Report
5. Visual Inspection of Stormwater	Results included in Comprehensive Site Compliance Evaluation Report
6. Employee Training	Annually, keep record of training in Appendix D, Worksheet #10 Employee Training
7. Spill Reporting	If spill occurs, documented in Appendix E, Worksheet #4 Significant Spills and Leaks
8. SWPPP Recertification	Once every five years by a Kansas P.E., Appendix F

2 FACILITY DESCRIPTION AND STORMWATER DRAINAGE

2.1 Facility Description

The K-96 & Hillside Reclamation Site is located immediately south of K-96 & ¼ mile west of Hillside in Wichita, Kansas. The K-96 & Hillside Reclamation Site is owned by the City of Wichita, and is located in the northeastern portion of Wichita.

The Reclamation Site is approximately 36 acres, and is a clean rubble/C&D landfill that will be utilized only by, and accessible to, City of Wichita employees or their approved contractors. A clean rubble landfill requires local zoning approval, which has been obtained, but does not require a permit from the Kansas Department of Health and Environment (KDHE). Therefore, the site will initially be utilized for disposal of clean rubble. Disposal of C&D material on the site will occur only after receiving an appropriate C&D landfill license from Sedgwick County and permit from KDHE.

2.2 Facility Drainage

Stormwater runoff from the entire site will drain towards the berm surrounding the sedimentation pond. Runoff will collect in the ditch formed by the outside of the berm and drain to discharge points into the sedimentation pond. Two discharge points drain into the finger-like section of the pond (Inlet No. 01). Inlet 01 drains the southwestern portion of the site from the south and the northwestern portion of the site from the north. Runoff from the site east of the pond will discharge into the pond through Inlet No. 2. Silt carried by the runoff will be settled out in the perimeter ditch and in the sedimentation pond. The pond provides approximately 8 acre-ft of sediment storage over 2.75 ft of pond height. For the 25-year, 24-hour rainfall event, the maximum flow into the pond is about 120 cfs, the maximum discharge is 6 cfs, and the centroid (outflow) to centroid (inflow) detention time is 26.4 hours. The pond discharge is through a 24-inch CMP culvert located on the west end of the finger-like section of the pond.

2.3 Inventory of Exposed Materials

Materials which could potentially come into contact with precipitation and contaminate stormwater runoff have been summarized in the Material Inventory worksheet presented in Appendix A, Worksheet #3. Currently, there are not any significant quantities of materials exposed to stormwater, and there is no storage of chemicals at this site.
If during the Comprehensive Site Compliance Evaluation (Section 5.2), it is determined that any material has been added to K-96 & Hillside Reclamation Site, the Materials Inventory worksheet should be updated. New worksheets should be added to the SWPPP when a new material is introduced to the site. If the use of a material is discontinued, it should be crossed out on the worksheet, and the date its use was discontinued should be noted. The changes should be initialed by the appropriate member of the SWPPP Pollution Prevention Team.

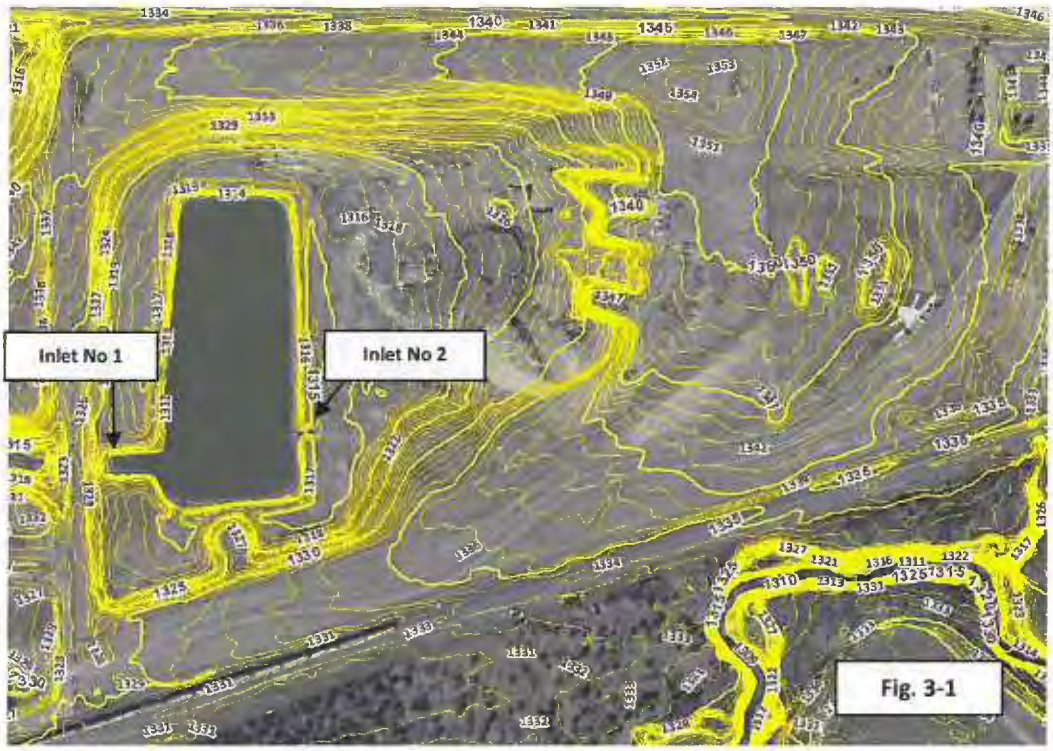
2.4 Significant Spills and Leaks

According to facility personnel there have been no spills or leaks of toxic or hazardous pollutants in reportable quantities for the previous three years (Appendix A, Worksheet #4). In Appendix G, a blank Worksheet #4 should be completed and included in Appendix E if any spills occur in the future.

3 INLET INVENTORY

Two stormwater inlets convey drainage from the Reclamation Site to the sedimentation pond.

Figure 3-1. Inlets No 1 and No 2



3.1 Non-Stormwater Discharges

The K-96 & Hillside Reclamation Site was inspected October 8, 2013, for the presence of non-stormwater discharges, (Appendix A, Worksheets #5 & #6). A visual inspection of the site revealed no non-stormwater discharges; however, the facility should be inspected periodically to verify this conclusion is valid throughout the year. It is most convenient to conduct these inspections concurrently with the routine monthly inspections of the facilities. The inspector should walk the site and trace the sources of any flows leaving the site that occur during dry weather. Non-stormwater flows may result from illicit connections to the sanitary sewer system or from overland flow of process water.

3.2 Description of Potential Pollution Sources

There are 2 locations of activity, where potential contaminants could come in contact with stormwater and are shown on the site map Figure 3-2. Those areas are the rock crusher and the rock construction entrance. There are occasional piles of crushed debris, street sweepings, etc., on site, if left in place for over 7 days, they will be covered, removed, or seeded. If post-rainfall inspections reveal sedimentation entering at Inlet 1 or Inlet 2, a BMP, such as silt fence, will be added.

Figure 3-2. Site Map

3.2.1 Fueling Area

No chemicals or petroleum products will be stored on-site. All fueling of equipment will be completed by mobile fueling vehicles that are equipped with spill control and clean up materials and staffed by trained spill control personnel.

3.3 Existing Stormwater Sampling Data

There is no known storm event sampling data for this site.

4 POLLUTION PREVENTION MEASURES AND CONTROLS (BMPs)

The following section identifies BMPs that will be implemented as part of this SWPPP (Appendix A, Worksheet #8).

4.1 Good Housekeeping

The most elementary, yet one of the most effective, of all BMPs is the practice of good housekeeping. For the K-96 & Hillside Reclamation Site, this consists of the following:

(1) Debris exposed to stormwater should be collected and removed from the site.
(2) Work area cleanup should follow any task, no matter how small.

The site Maintenance Coordinator has casually conducted site inspections at this site, but these inspections have not been documented. That documentation will commence with completion of this document. Good housekeeping will be stressed to the employees during their annual employee training.

4.2 Spill Prevention and Response Procedures

If spills occur, having proper procedures in place can prevent a spill from becoming a potentially large environmental problem. There has not been a spill of any significant amount of material in the past three years. Despite this excellent performance, spill prevention and response procedures must be followed in the event that a spill occurs in the future. Worksheet #4 in Appendix E can be used to record the date and time of any future spills.

4.3 Inspections

Inspections involve visually checking the potential sites of pollution on a periodic basis to confirm that good housekeeping procedures are being followed. The inspection will occur monthly by the site Maintenance Coordinator. Inspections will also occur, and be documented, within 24 hours of a ½" or greater rain event. To comply with KDHE Stormwater Pollution Prevention Plan guidelines, a monthly record of the inspections should be kept for a period of three years in Appendix B, and a set of follow-up procedures should be in place so that corrective actions can occur if needed (A blank inspection form is included at the end of Appendix G).

4.4 Employee Training

All K-96 & Hillside Reclamation Site employees that are responsible for stormwater pollution prevention at the facility will receive training, and this training will be thoroughly documented. Training will address the following subjects:

(1) Familiarization with all BMPs in place and ensuring that employees understand the requirements and contents of the SWPPP.
(2) Proper handling of all materials used or commonly encountered at the facility.

Employee training will be conducted initially when the SWPPP is presented to the facility. Annual refresher and new hire training will be conducted by the SWPPP Pollution Prevention Team. Worksheet #10 included in Appendix D can be used to document training.

4.5 Erosion Control Measures

For sites that are largely unpaved without adequate ground cover, soil erosion can transport large quantities of suspended sediment into the downstream waterways. However, during the site visit, it was not apparent that soil erosion is a significant problem at the K-96 & Hillside Reclamation Site. The relatively small areas without vegetation and the mild slopes keep erosion from becoming a significant problem. However, future Comprehensive

Site Compliance Evaluations by the Pollution Prevention Team should include looking for signs of erosion and assess the need for implementation of erosion-control BMPs.

4.6 Record Keeping and Internal Reporting Procedures

Accurate and thorough records of all activities are essential to maintaining the SWPPP and stormwater quality. Records of the monthly inspections (Appendix B), the Comprehensive Site Compliance Evaluation Reports (Appendix C), employee training records (Appendix D), and any future spills or leaks that occur (Appendix E) will be kept on site with the SWPPP. These records will be readily available for review by regulatory agencies.

5 MONITORING, REPORTING, AND RECORD KEEPING REQUIREMENTS

5.1 Sampling Requirements

At this time, KDHE is not requiring that quantitative chemical analysis be conducted on the stormwater leaving the site; however, periodically during wet weather events, stormwater should be visually inspected for the presence of pollutants. It is recommended that the visual inspection of the stormwater be conducted periodically during the spring when wet weather events are typically frequent. Each of the two stormwater inlets identified in Section 3 should be observed. The inspection should indicate whether an oil sheen, foam, suspended solids, or floating solids are present and the color and clarity of the stormwater.

5.2 Comprehensive Site Compliance Evaluation and Report

A Comprehensive Site Compliance Evaluation inspection should be conducted on an annual basis to determine whether site conditions have changed, whether the SWPPP needs to be revised, and whether the SWPPP procedures are effective. The SWPPP should be modified if any deficiencies are identified based on the evaluation or additional BMPs could be implemented. If a BMP is identified that will be implemented, Worksheet #9 (a blank form is included in Appendix G) should be utilized and included with the Comprehensive Site Compliance Evaluation Report. Examples of changes that would result in a revision are, re-grading of the existing site, any additional material added to the site that could contribute to stormwater pollution, or a request for chemical analysis of stormwater by KDHE. The inspection should target the two stormwater inlets. In addition, the inspection should look for signs of erosion around the site.

It is recommended that the K-96 & Hillside Reclamation Site develop a report format for this inspection or utilize Worksheet #11 in Appendix C. The report should contain the following information: the cleanliness of the areas, a visual inspection of the stormwater inlets, confirming that non-stormwater discharges are not present, and if there were any changes to the site map. These changes should be identified and the site map updated. The report must be included in Appendix C within two weeks of the Comprehensive Site Compliance Evaluation inspection.

If the report identifies additional measures that should be taken to reduce stormwater pollution, the measures must be implemented within 12 weeks, and the update recorded on Worksheet #12 (a blank form is included in Appendix G). The updated worksheet should be included with the Comprehensive Site Compliance Evaluation Report.

6 REFERENCES

USEPA, Stormwater Management for Industrial Activities – Developing Pollution Prevention Plans and Best Management Practices, 1992

KDHE, Stormwater Pollution Prevention Plan Requirements and Guidelines, Appendix F, no date.

Worksheet #1 POLLUTION PREVENTION TEAM MEMBER ROSTER	Facility name: K-96 & Hillside Reclamation Site Completed by: Jim Hardesty Title: Stormwater Specialist Date: Novemebr 1, 2013

Leader: Aaron Henning

Title: Maintenance Engineer

Office Phone: 316-268-4087

Responsibilities:

1) Signatory authourity; 2) Coordinate employee training program; 3) Ensure that all SWPPP requirements are performed

Members:

(1) Don Cradduck

Title: Street Maintenance Supervisor

Office Phone: 316-268-4091

Responsibilities:

1) Conduct annual site evaluations; 2) Perform employee training; 3) Conduct monthly site inspections

(2) Mark Wilson

Title: Maintenance Coordinator

Office Phone: 316-838-9670

Responsibilities:

Supporting role for the above requirements.

(3) _____

Title: _____

Office Phone: _____

Responsibilities:

(4) _____

Title: _____

Office Phone: _____

Responsibilities:

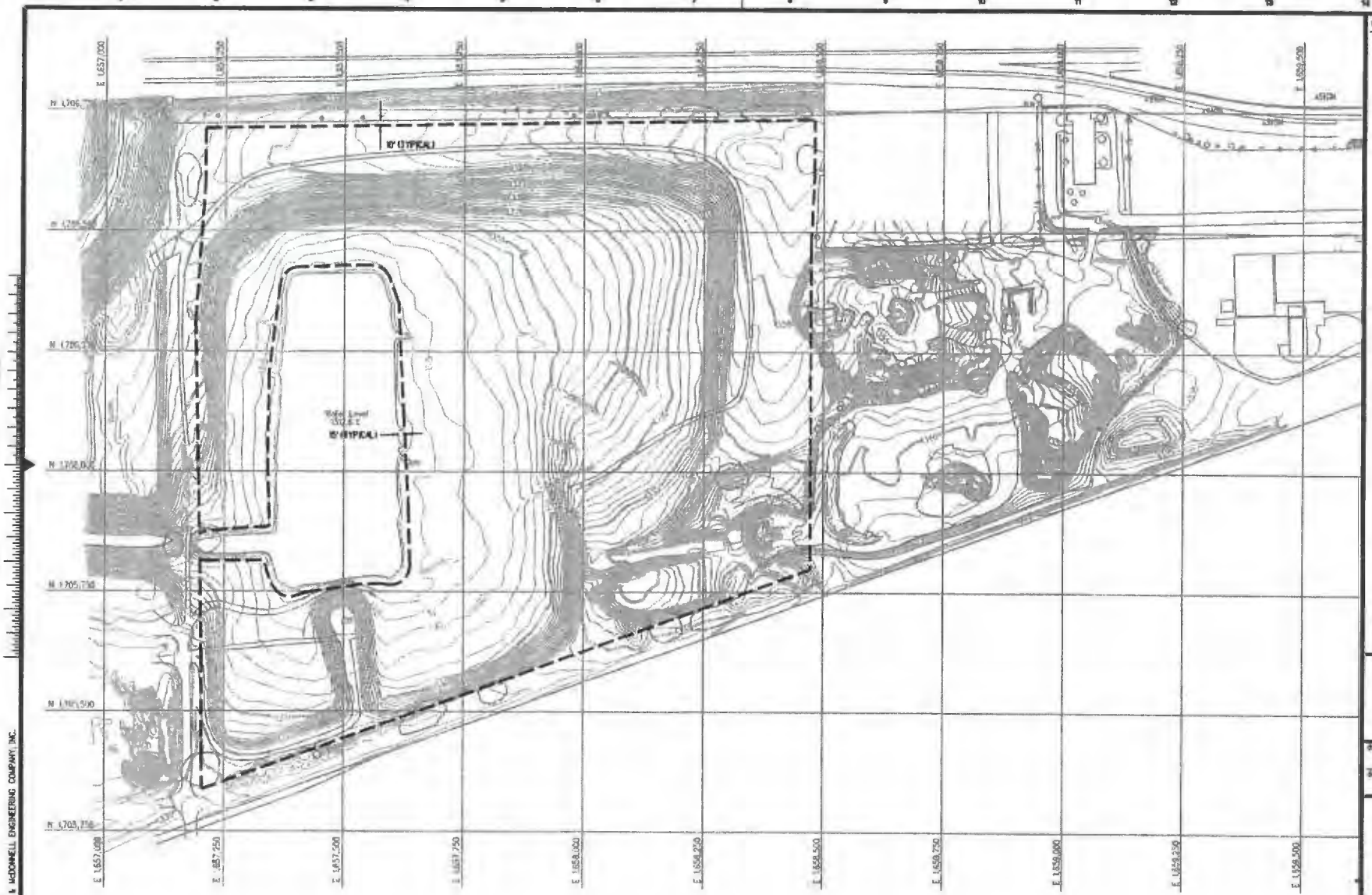
Worksheet #2 DEVELOPING A SITE MAP	Facility name: K-96 & Hillside Reclamation Site Completed by: Jim Hardesty Title: Stormwater Specialist Date: November 1, 2013

Instructions: Draw a map of your site including a footprint of all buildings, structures, paved areas, and parking lots. The information below describes additional elements required by EPA's General Permit.

EPA's General Permit requires the following features on the site map:

- All outfalls and storm water discharges
- Drainage areas of each storm water outfall
- Structural storm water pollution control measures, such as:
  - Flow diversion structures
  - Retention/detention ponds
  - Vegetative swales
  - Sediment traps
- Name of receiving waters (or if through a Municipal Separate Storm Sewer System)
- Locations of exposed significant materials
- Locations of past spills and leaks
- Locations of high-risk, waste-generating areas and activities common on industrial sites such as:
  - Fueling stations
  - Vehicle/equipment washing and maintenance areas
  - Area for unloading/loading materials
  - Above-ground tanks for liquid storage
  - Industrial waste management areas (landfills, waste piles, treatment plants, disposal areas)
  - Outside storage areas for raw materials, by-products, and finished products
  - Outside manufacturing areas
  - Other areas of concern (specify: _____)

COLEMAN COMPANY INC
PEARSON, ADDIE E
MC CLISH, DONNA ELESSA
LUTHER, LORE TRUST
WEDEL GROUP XII LP
KOCH
33RD ST N
FARHA, ZACK & JEANNETTE L REV TRS
WICHITA, CITY OF
CITY OF WICHITA
K-96
HILLSIDE
WICHITA, CITY OF
WICHITA, CITY OF
WICHITA, CITY OF
C & M
CITY OF WICHITA
CITY OF WICHITA
CONCRETE PLACEMENT INC
CONCRETE PLACEMENT INC
CITY OF WICHITA
CITY OF WICHITA
CENTER FOR THE IMPROVEMENT OF HUMAN
CITY OF WICHITA
CITY OF WICHITA
CITY OF WICHITA
CITY OF WICHITA
CITY OF WICHITA
CITY OF WICHITA
CITY OF WICHITA
CITY OF WICHITA
NORTH HEIGHTS CHRIST
CENTER FOR THE IMPROV
BD OF PARK COMM
BOARD OF PARK COMM
CITY OF WICHITA
CITY OF WICHITA
CITY OF WICHITA
Parcel Boundaries
City Limits
Site
1000' Radius
WICHITA-SEDGWICK COUNTY
W-SC
Metropolitan Area Planning Department
100 0 100 200 300 400 Feet
Printed 9/19/2001
N



LEGEND

— — BOUNDARY OF PI FILL AREA

NORTH

SCALE IN FEET

no.	date	by	re

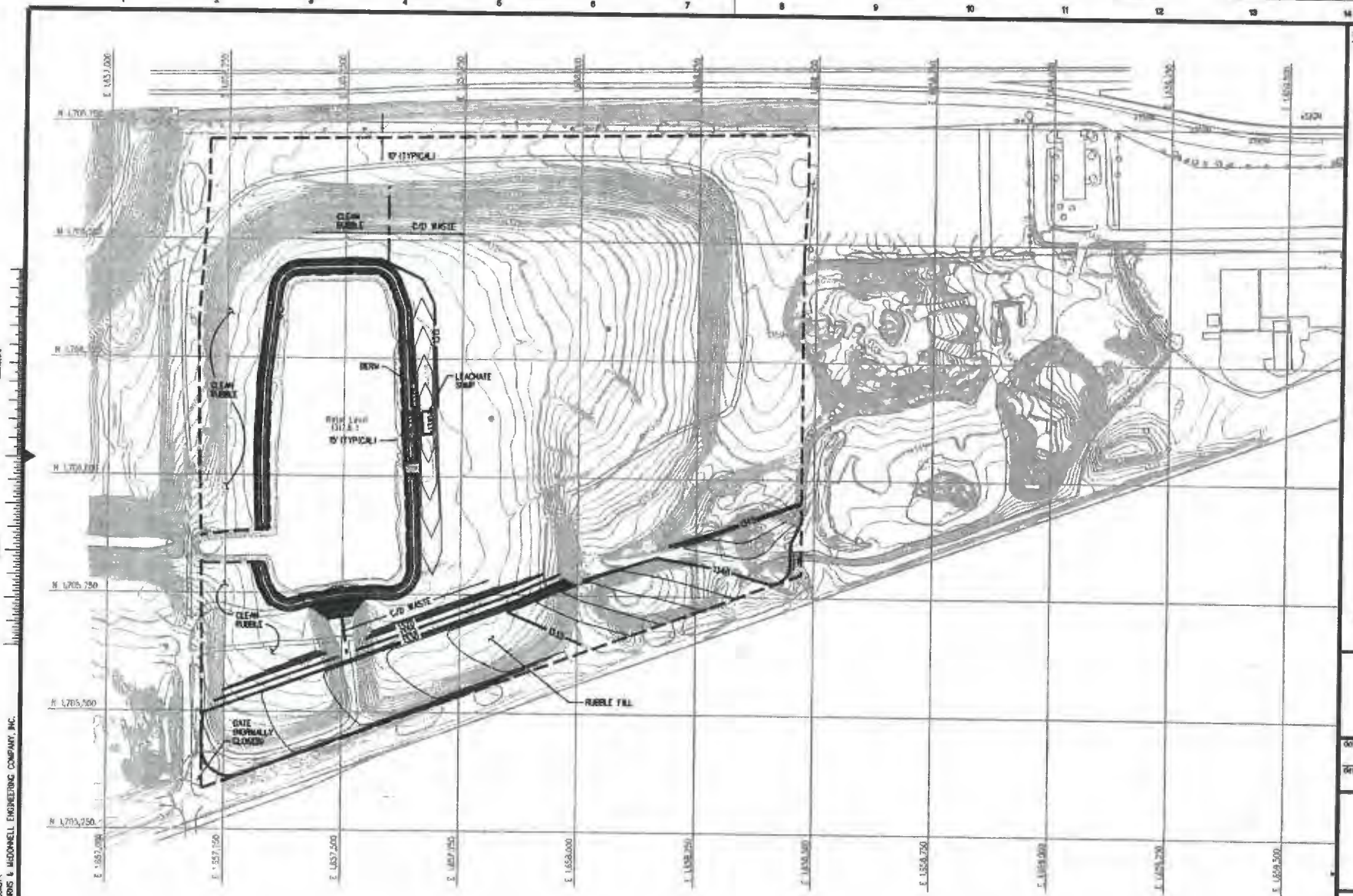
date: MARCH 2002
detailed: M.
designed: T. BROWN
checked: R.

CITY OF WICHI
K-96 AND HILLSIDE
RECLAMATION

FIGURE 1
SITE PLAN

project: 20525
contract:
drawing: C1
sheet: of

COPYRIGHT © 2002 BY BURNS & MCDONNELL ENGINEERING COMPANY, INC.



no.	date	by	rev

LEGEND

BOUNDARY OF POTENTIAL FILL

NOTE:

1. MAXIMUM SLOPES IN AREAS WILL BE 3:1 O

NORTH

SCALE IN FEET

Burns & McDonnell

date MARCH 2002	detailed M.
designed T. BROWN	checked

CITY OF WICHI
K-96 AND HILLSIDE
RECLAMATION

FIGURE 2
INITIAL DEVELOPMENT

project 29525	contract
drawing C2	—
sheet	of

file KM-02C2.DWG 3-8-2002 10:15AM

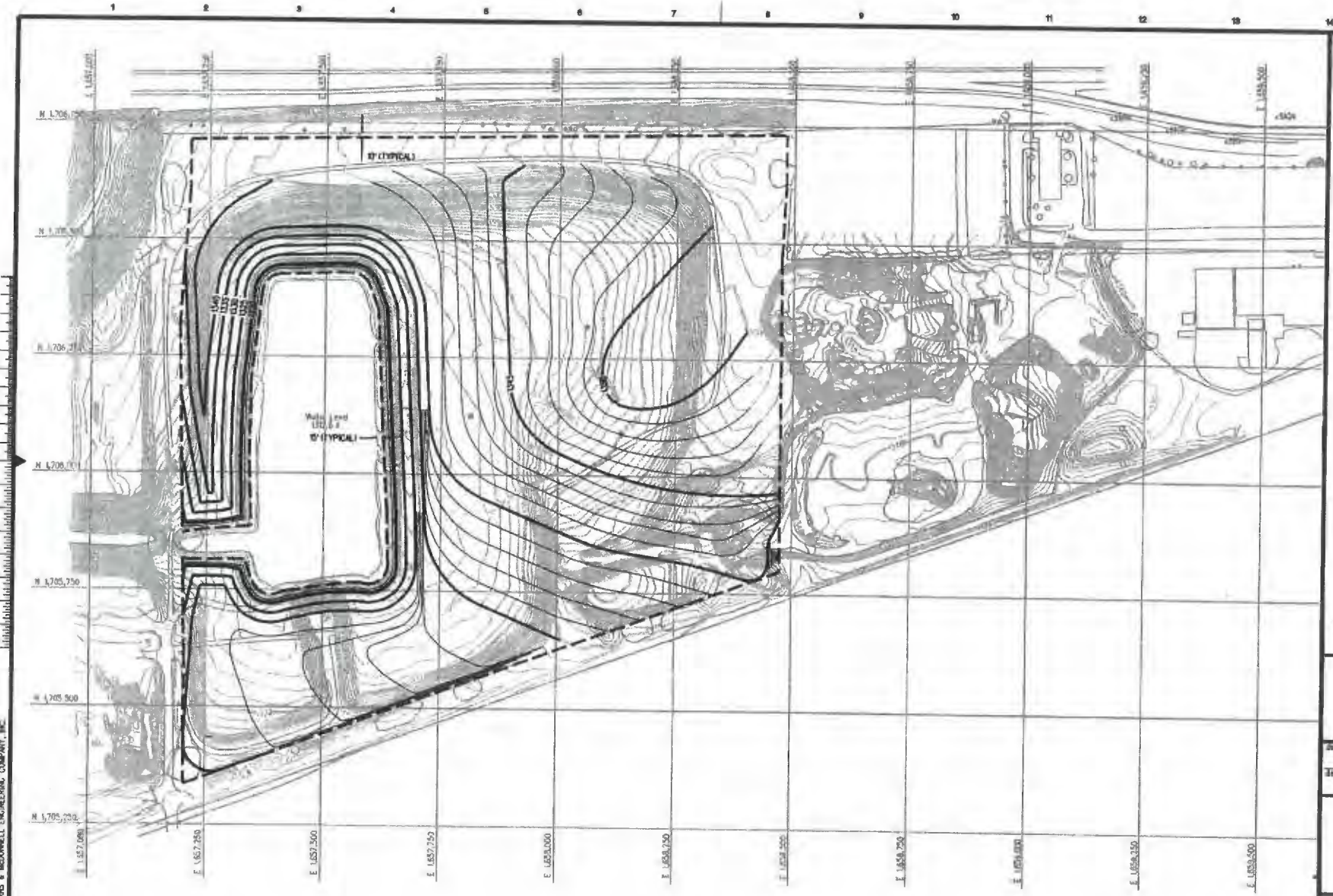
K:\WORKSP\USTK 2002\KM-02C2\
COPYRIGHT © 2002 BY BURNS & MCDONNELL ENGINEERING COMPANY, INC.

KS-0001.DWG(DRAWING) (44+33.5-43

Scale For Microfilming

Inches

Millimeters



no. | date | by | rem

LEGEND

— — BOUNDARY OF PO
FILL AREA

NOTE:

1. MAXIMUM SLOPES IN F
AREAS WILL BE 3:1 OR

NORTH

SCALE IN FEET

Burns & McDonnell

date MARCH 2002	detailed M.
designed T. BROWN	checked RJ

CITY OF WICHI
K-96 AND HILLSIDE
RECLAMATION

FIGURE 8
FINAL DEVELOPMENT

project 29525	contract
drawing C3	rev
sheet	of

COPYRIGHT © 2002 BY BURNS & MCDONNELL ENGINEERING COMPANY, INC.

Worksheet #3 MATERIAL INVENTORY	Facility name: K-96 & Hillside Reclamation Site Completed by: Jim Hardesty Title: Stormwater Specialist Date: November 1, 2013

Instructions: List all materials used, stored, or produced onsite. Assess and evaluate these materials for their potential to contribute pollutants to storm water runoff. Also complete Worksheet 3A if the material has been exposed during the last 3 years.

Material	Purpose/Location	Quantity (gallons)			Quantity Exposed in Last 3 Years	Likelihood of contact with storm water. If yes, describe reason.	Past Significant Spill or Leak	
		Used	Produced	Stored			Yes	No
Asphalt millings				Approx. 1250 cu ft	Varies	Yes, but caught in sedimentation pond		X
Dirt spoils				Approx . 700 cu. ft	Varies	Yes, but caught in sedimentation pond		X
Rock				Approx. 980 cu ft	Varies	Yes, but caught in sedimentation pond		X

Worksheet #4

LIST OF SIGNIFICANT SPILLS AND LEAKS

Facility name: K-96 & Hillside Reclamation Site
Completed by: Jim Hardesty
Title: Stormwater Specialist
Date: November 1, 2013

Directions: Record below all significant spills and significant leaks of toxic or hazardous pollutants that have occurred at the facility in the three years prior to the effective date of the permit.

Definitions: Significant spills include, but are not limited to, releases of oil or hazardous substances in excess of reportable quantities.

1st Year Prior

Date (month/day/year)	Spill	Leak	Location (as indicated on site map)	Description				Response Procedure		Preventive Measures Taken
				Type of Material	Quantity	Source, if Known	Reason	Amount of Material Recovered	Material No Longer Exposed to Storm Water (True/False)	
None										

2nd Year Prior

Date (month/day/year)	Spill	Leak	Location (as indicated on site map)	Description				Response Procedure		Preventive Measures Taken
				Type of Material	Quantity	Source, if Known	Reason	Amount of Material Recovered	Material No Longer Exposed to Storm Water (True/False)	

3rd Year Prior

Date (month/day/year)	Spill	Leak	Location (as indicated on site map)	Description				Response Procedure		Preventive Measures Taken
				Type of Material	Quantity	Source, if Known	Reason	Amount of Material Recovered	Material No Longer Exposed to Storm Water (True/False)	

Worksheet #5 NON-STORM WATER DISCHARGE ASSESSMENT AND CERTIFICATION	Facility name: K-96 & Hillside Reclamation Site Completed by: Jim Hardesty Title: Stormwater Specialist Date: November 1, 2013

Date of Test or Evaluation	Outfall Directly Observed During the Test (identify as indicated on the site map)	Method Used to Test or Evaluate Discharge	Describe Results from Test for the Presence of Non-Storm Water Discharge	Identify Potential Significant Sources	Name of Person Who Conducted the Test or Evaluation
10/8/13	Sedimentation Pond Inlet 1	Visual	No discharge observed		Jim Hardesty
10/8/13	Sedimentation Pond Inlet 2	Visual	No discharge observed		Jim Hardesty

CERTIFICATION

I, (responsible corporate official), certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

A. Name & Official Title (type or print)	B. Area Code and Telephone No.
C. Signature	D. Date Signed

Worksheet #6

NON-STORM WATER DISCHARGE ASSESSMENT AND FAILURE TO CERTIFY NOTIFICATION

Facility name: K-96 & Hillside Reclamation Site
Completed by: Jim Hardesty
Title: Stormwater Specialist
Date: November 1, 2013

Directions: If you cannot feasibly test or evaluate an outfall, fill in the table below with the appropriate information and sign this form to certify the accuracy of the included information.

List all outfalls not tested or evaluated, describe any potential sources of non-storm water pollution from listed outfalls, and state the reason(s) why certification is not possible. Use the key from your site map to identify each outfall.

Important Notice: A copy of this notification must be signed and submitted to the Director within 180 days of the effective date of this permit.

Identify Outfall Not Tested/Evaluated	Description of Why Certification Is Infeasible	Description of Potential Sources of Non-Storm Water Pollution
All sedimentation pond inlets evaluated		

CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations, and that such notification has been made to the Director within 180 days of (date permit was issued), the effective date of this permit.

A. Name & Official Title (type or print)	B. Area Code and Telephone No.
C. Signature	D. Date Signed

Worksheet #7	Facility:	K-96 & Hillside Reclamation Site
	Completed By:	Jim Hardesty
Pollutant Source Identification	Title:	Stormwater Specialist
	Date:	November 1, 2013

Instructions: List all identified stormwater pollutant sources and describe existing management practices that address those sources. In the third column, list Best Management Practice (BMP) options that can be incorporated into the plan to address remaining sources of pollutants.

Storm Water Pollutant Sources	Existing Management Practices	Description of New BMP Options
1 Mobile Fueling Vehicles	Absorbent materials and trained personnel on board	None required
2 There is potential contamination from crushed debris, street sweeping piles, etc.,	Grass waterway and sedimentation pond	If left exposed for 7 days or more, or if evidence of sedimentation is seen at the sedimentation pond inlets, additional BMPs will be utilized.
3 Potential for wind erosion		If seen, dust control watering will occur.
4		

Worksheet #8	Facility:	K-96 & Hillside Reclamation Site
	Completed By:	Jim Hardesty
BMP Identification	Title:	Stormwater Specialist
	Date:	November 1, 2013 (pg 1)

Instructions: Describe the Best Management Practices (BMP's) that have been selected to be included in the plan. For each of the baseline BMP's, describe actions that will be incorporated into facility operations. Also describe any additional BMP's (activity-specific and site-specific BMP's) that have been selected. Attach additional sheets if necessary.

BMP's	Brief Description of Activities
Good Housekeeping	1) Debris should be collected and removed from the site 2) Work area cleanup should follow any task, no matter how small
Inspections	1) Monthly visual inspection of Potential Pollution sources and Stormwater Inlets. Additional inspections within 24 hours of 1/2" or greater rain events.
Employee Training	1) Familiarization with all BMPs in place and ensuring that employees understan the requirements and contents of the SWPPP 2) Proper handling of all materials used or commonly encountered at the facility. 3) Must be conducted annually

Worksheet #8	Facility:	K-96 & Hillside Reclamation Site
	Completed By:	Jim Hardesty
BMP Identification	Title:	Stormwater Specialist
	Date:	November 1, 2013 (page 2)

Instructions: Describe the Best Management Practices (BMP's) that have been selected to be included in the plan. For each of the baseline BMP's, describe actions that will be incorporated into facility operations. Also describe any additional BMP's (activity-specific and site-specific BMP's) that have been selected. Attach additional sheets if necessary.

BMP's	Brief Description of Activities
Record Keeping and Internal Reporting Procedures	1) Keep records of revisions to the SWPPP, inspection reports, employee training records, and any spills or leaks that occur onsite.
Rock Construction Entrance	Inspection and maintenance of rock construction entrance to insure proper function

Worksheet #9	Facility: _____
BMP Implementation	Completed By: _____ Title: _____ Date: _____

Instructions: Develop a schedule for implementing each BMP. Provide a description of each BMP, the steps necessary to implement the BMP, (i.e., any construction or design), the schedule for completing those steps (list dates) and person(s) responsible for implementation.

BMP's	Description of Action(s) Required for Implementation	Scheduled Completion Date(s)	Person Responsible	Notes

Worksheet #10	Facility: _____
Employee Training Record	Completed By: _____ Title: _____ Date: _____

Instructions: Describe the employee training program for the facility below. The program should, at a minimum, address spill prevention and response, good housekeeping, and material management practices. Provide a schedule for the training program and list the employees who attend training sessions.

Training Topics	Brief Description of Training Program/Materials (e.g., film, newsletter course)	Schedule of Training (list dates)	Attendees

Worksheet #11	Facility: _____
Site Compliance Inspection Report	Completed By: _____ Title: _____ Date _____

Instructions: Complete the following form in order to properly assess and evaluate changes at the facility, including assessing compliance with the SWPPP. Use to certify the annual site inspection and compliance with SWPPP, or any time a violation of the SWPPP is known or suspected.

Compliance Assessment

	Observations	Compliance with SWPPP ?
1		
2		
3		
4		

Response Actions

Actions Needed	Proposed Completion Date	Actual Completion Date
1		
2		
3		
4		

Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person(s) who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine or imprisonment for knowing violations.

A. Name & Official Title (Type or Print)	B. Area Code and Telephone No.
C. Signature	D. Date Signed

Worksheet #12	Facility: _____
Plan Updates	**Completed By:** _____ **Title:** _____ **Date:** _____

Instructions: Provide information concerning proposed SWPPP modifications including: description of the change, reason for the change, date of the change, date the change was implemented, and the person making the change. The SWPPP modification should also be certified on Worksheet # 1 by the same person to ensure compliance with General Permit requirements.

Description of the Change to the SWPPP	Reason for Change	Date of Change	Date of Implementation	Change Made By

Monthly Site Inspections	**Facility:** _____ **Completed By:** _____ **Title:** _____ **Date:** _____

Instructions: Inspect the site for potential storm water pollutants. Attention should be paid to whether good housekeeping procedures are being practiced. Specifically, the potential pollutant sources should be checked for the presence of storm water pollutants and the storm water outfalls for the presence of non-storm water discharges.

Date of Inspection	Inspector	Notes

KARL'S TIRE DOWNTOWN, INC.
401 S. MARKET
WICHITA, KS 67202
PHONE (316) 264-5385

January 15, 2016

Mark A. Hall, CISEC
Compliance Officer
Stormwater Management and Compliance
455 N. Main 8th Floor
Wichita Ks. 67202

RE: December 2015 Stormwater Pollution meeting

Dear Mark:

I am enclosing copies of meeting notes for the December, 2015 stormwater awareness meeting we have held. I used information from a resource I found online, prepared a questionnaire, held a meeting to cover the information and held a short discussion of the importance of always being aware of what could end up in our stormwater, and the negative effects it will cause. Our next meeting will be in March, 2016.
If you ever have other information you feel would be helpful for future meetings, I'll always be open to suggestions. Thanks, again.

Sincerely,

Joseph Doubrava
General Manager

jrd

Karl's Tire & Auto Service, Inc.
Stormwater Pollution Employee Meeting
DATE: 12/29/15

(EAST STORE
4195 E. HARRY)

Attendance:

Leader- JOE DOUBRAVA

TIM BRIGGS

JIM PLYMPTON

LARRY MCNEILL

YAMIL BALDWIN

Activities:

REVIEWED "STORMWATER POLLUTION AWARENESS AND PREVENTION TRAINING" HANDOUT. DISCUSSED CAUSES THAT APPLY TO OUR DAILY OPERATIONS. ADMINISTERED FOLLOWUP TEST.

Completion Certified:

Leader _____ 12/29/15 **Date**

Karl's Tire & Auto Service, Inc.
Stormwater Pollution Employee Meeting
DATE: 12/29/15

(DOWNTOWN STORE
401 S MARKET)

Attendance:

Leader- JOE DOUBRAVA

MARCO DUNN

TERRY WILKINS

THOMAS McGUIRE

ALEXANDER MESSICK

Activities:

Reviewed "Stormwater Pollution Awareness and Prevention Training" Handout. Discussed causes that apply to our daily operations. Administered follow up testing.

Completion Certified:

Leader 12/29/15 **Date**

Stormwater Pollution Awareness and Prevention Training

Training Purpose

This training was developed for the purpose of providing greater community awareness and understanding of the causes and effects of stormwater pollution; and provide guidance on how to manage stormwater appropriately, in an effort to reduce or eliminate the pollution within our water ways.

What is Storm Water?

• Stormwater is untreated water, created from rain or melting snow, that does not soak into the ground, but runs into nearby waterways.
• Stormwater does not flow into a wastewater treatment system, it flows directly into our surface waters.
• What we do on the land affects the water quality and the habitat of our creeks, lakes, and rivers. It also affects our quality of life, our wildlife, and our recreation.

What is an Illicit Discharge?

• Illicit Discharge is any discharge of pollutants or non-storm water materials allowed to enter the storm sewer systems from overland flows or direct dumping of materials into a catch basin.
• Examples of Illicit Discharge: Sand and Dirt from construction sites washing into drains, Dumping Toxic Chemicals into drain, Chemical and Fuel Spills, overuse of Fertilizers and Pesticides, and Trash not picked up allowed to go into drains.

Possible Sources of Pollution

• Sediment generated by construction activities that can be washed into the storm drains.
• Sediment is the number one source of pollution to our rivers and streams.
• Construction waste and litter that can be washed into the storm drains if not picked up on a regular basis.
• Improper disposal of liquids such as cleaning solutions, chemicals, or other types of liquid waste drain into storm drains.
• Chemicals that may spill during shipping and receiving operations as a result of an accident.
•Spills of fuel that can occur during the filling of equipment or storage tanks.

•Fertilizers and pesticides used in agriculture, if application rates and timing of applications are inappropriate, or if spills of these chemicals occur and are not properly contained and cleaned up.

•Chemicals, salt, and sand used on the streets and parking areas to melt snow during the winter months may be carried to the storm drains.

•Spills and leaks on parking lots from parked vehicles flowing into storm drains during rain storms.

Outdoor Storage

•Examine your parked vehicle for leaks. If a leak is discovered place absorbent material under the leak or a bucket of some type.

•Fuel and chemical storage tanks should be inspected periodically for the presence of leaks. If a leak of fuel is discovered, place absorbent or a bucket under the leak. If the leak is chemical, contact a professional to inspect and contain the leak.

•Sand and Soil stockpiles should be kept far away from storm drains to prevent rain and snow from melting and washing particulates into the storm system.

Waste Container Management

•Trash cans and dumpsters should be periodically checked to prevent overfilling and possible trash washing into a drain. Trash should never be piled outside any trash receptacle.

•Water from rinsing out dirty trashcans is an Illicit Discharge and should not be allowed to enter storm drains. Rinse in a cleaning pit area that allows for appropriate discharge of dirty water (i.e. Janitor Closet).

•Regularly check dumpster to ensure that the lids are closed and the dumpsters are in good condition.
•If dumpsters are found that have leaks or do not close properly, waste removal contractors must be notified that repair or replacement of the damaged items is necessary.
•Chemical storage drums (empty and full) should be properly sealed with covers to prevent leaks. Preferably stored in a secondary containment area.

Vehicle Parking Lots

Parking lots are a major contributor of storm water pollution. Mainly because sand, dirt, oil and other chemicals from cars are washed off the parking lot and into the storm drain after rainfall.

What can I do?

•Construction, business, and civilian personnel; if you see possible illicit discharges from your car, inform your manager and/or take necessary measures by containing it, preventing it from going into a storm drain.

•Parking lots need to be periodically swept to prevent the buildup of sand, dirt and other debris. Care must also be taken while sweeping to ensure materials are not swept into the

storm drains.

•Snow needs to be placed in locations that are far away from storm drains as possible, preferably on dirt or grassy surfaces.

•This allows the snow to melt and soak into the ground rather then melt and wash sand, dirt, oils, and other toxins into the storm drain.

Grass and Tree Care

•Do not over water grass surfaces. Use only the amount of water needed. Over watering is wasteful and could lead to erosion of the soil into our drains.

•Ensure sprinklers are properly adjusted to only water grass and other vegetation. Watering the sidewalks and streets can lead to sediments and or chemicals flowing into storm drains.

•Pickup grass clippings. Do not sweep them into a storm drain or allow them to be washed in after rainfall.

•Clean fallen leaves from gutters and around storm drains before they enter into the storm drain.

Good Housekeeping

•Make sure that no stormwater discharges from a building's gutters directly into a storm drain.

•Make sure that spill response equipment is prepared and readily available in areas where a spill or leak might occur.

•Report spills Immediately.

•Clean up any spills quickly.

•Clean the floors and do not allow the wash water to discharge outside

•Use biodegradable cleaning solvents whenever practical.

Preventive Maintenance

•Routine sediment/debris removal and surface cleaning of storm water inlet grates.
•Inlets require a monthly documented inspection to ensure that they are not plugged up with debris, and there is not the potential for an illicit discharge down them

•If a plugged storm inlet is discovered document the problem and use the map to identify the location of the offense. If the problem is small like trash, pick it up. For large problems inform your supervisor.
•Routine inspection of storm water outlets for dry weather discharges

•Routine inspections of equipment and chemical storage

•Regular maintenance of equipment to prevent leaks from occurring

•If you see the potential for an illicit discharge down one of our storm drains do what you can to help prevent it. Whether that's picking up trash you see on the ground or informing management about a spill.

Spill Prevention and Response

•Clean all small spills and leaks ,and report significant spills immediately!

•Always document spills and the location of the occurrence.

•If spill is found entering a storm drain, document the drain number and report it for quicker location response.

•When transporting potentially hazardous liquids use caution.

•Make sure the lid is on and tightened on chemical and fuel containers.

•Keep a vigilant eye for possible spills.

•REMEMBER, spills are caused, they do not just happen!

Prevention & Cleanup Procedure

•1.In the event of a large spill or illicit discharge: **Notify** proper local and state authorities.
•2.**Contain**

•3.**Locate and Stop the Source**

•4.**Clean Up**

•5.**Dispose of Properly**

•6.**Document Release** and/or Report if over the applicable threshold

•7.**Follow Up:**
•Implement changes to prevent re-occurrence
•Replace spill response equipment used

QUIZ TIME

1. What is Stormwater?

A) Water from your hose.
B) Untreated water created by rain or melting snow that runs into nearby waterways or storm drains.
C) Waste water that is allowed to flow into our creeks and rivers.
D) Flows from sinks and toilets inside buildings into the storm water system.

2. What is the first thing you should do if you see a storm inlet plugged on the surface with grass clippings?

A) Go get a broom and sweep it out.
B) Document the location and problem, and report it.
C) Ignore it.
D) Block off the inlet completely to prevent additional pollution into drain.

3. What is an Illicit Discharge?

A) Any discharge of pollutants or non-stormwater materials that is allowed to enter the storm drain.
B) Any pollution discharge that is not authorized.
C) Snow melting
D) Uncontaminated pumped groundwater

4. True or False

Storm drains flow directly to a sanitary sewer system that go to a treatment plant?

5.True or False

Used motor oil is the number one pollution source for our water ways.

6.True or False

Stormwater is natural and harmless because it consists of just rain water and melting snow.

7.How can you cut down on stormwater pollution from lawn care?

A) Don't over water

B) Cut back on pesticide and fertilizer use

C) Pickup and dispose of grass clippings and leave

D) Cover piles of dirt being used in landscaping projects, and ensure that they are away from drain

E) All of the Above

Answers:

1. B
2. A
3. B (A ALSO ACCEPTABLE)
4. B, FALSE –Storm drains flow directly into our lakes, rivers, and streams.
5. B, FALSE –Though motor oil is a serious source of pollution to area waterways, sediment is actually the #1 source of pollution to our water ways.
6. B, FALSE –Rain and snow melt by itself are natural and harmless. But what they can pick up as they flow over impervious surfaces is not so harmless.

*Starting to see a pattern?

7. E

CONSTRUCTION PLANS FOR PROPOSED

STORM WATER SEWER COLLECTION

SYSTEM IMPROVEMENTS

MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT

FOR

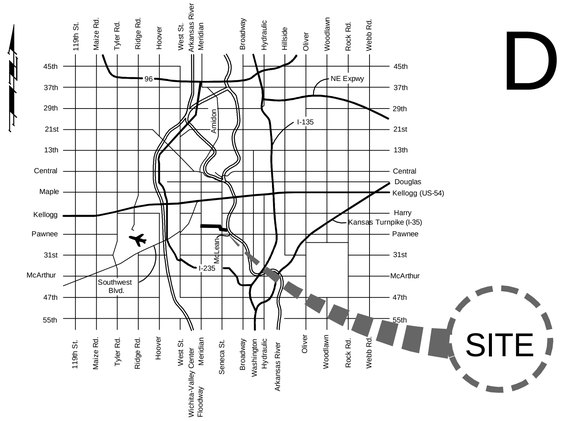
THE CITY OF WICHITA, KANSAS

Gary Janzen, P.E., City Engineer

Project No. 468-____
O.C.A. No. _____

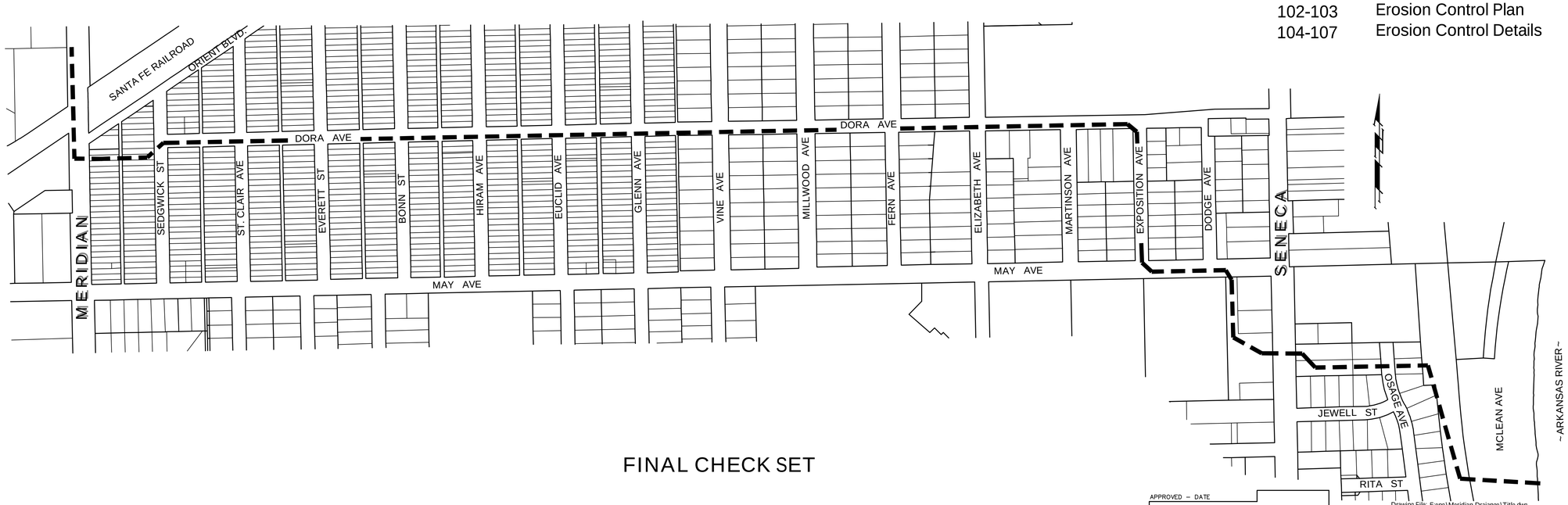
DECEMBER 2012

VICINITY MAP



Index

1	Title Sheet
2	Keysheet
3	Notepage
4-18	SWS Line 1 Plan/Profile
19-26	SWS Lines 1a-10 Plan/Profile
27	SWS Line 2 Plan/Profile
28-29	SWS Lines 2a-2e Plan/Profile
30	SWS Line 3 Plan/Profile
31	RCP Connection Details
32-35	SS Line Plan/Profiles
36-40	Water Line Plan/Profiles
41	Water Detail Sheet
42	Water Meter & Valve Adjustment Table
43-45	Pavement Typical Sections & Details
46-48	Pavement Details
49-51	Paving Keysheet
52-60	Paving Plans
61-67	Paving Joint Plans
68-75	Intersection Joint & Grading Plans
76	Valley Gutter Details
77-79	Pavement Marking Plan
80	Signing Details
81	Flap Gate Replacement Details
82-92	Storm Water Sewer Details
93	Recapitulations of Quantities
94-95	Detour Plans
96-99	Traffic Control Details
100-101	Seeding/Sodding Restoration Plan
102-103	Erosion Control Plan
104-107	Erosion Control Details



FINAL CHECK SET

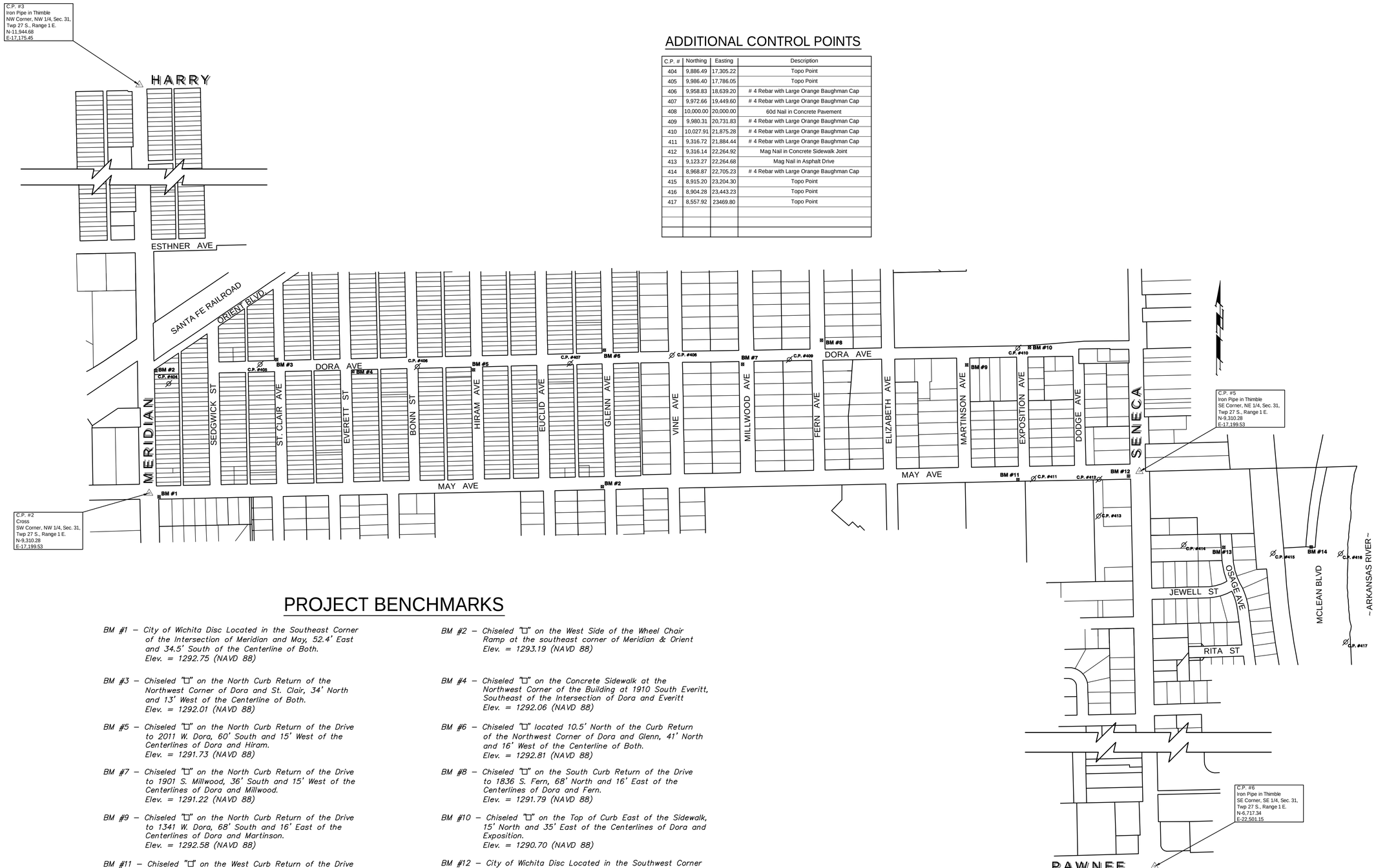
APPROVED – DATE

GARY JANZEN, P.E., CITY ENGINEER
CITY OF WICHITA, KANSAS

Drawing File: E:eng\Meridian Draiange\Title.dwg

December 2012

Baughman Company, P.A.
315 Ellis St. Wichita, KS 67211 P 316.262.7271 F 316.262.0149
ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE



ADDITIONAL CONTROL POINTS

C.P. #	Northing	Easting	Description
404	9,886.49	17,305.22	Topo Point
405	9,986.40	17,786.05	Topo Point
406	9,958.83	18,639.20	# 4 Rebar with Large Orange Baughman Cap
407	9,972.66	19,449.60	# 4 Rebar with Large Orange Baughman Cap
408	10,000.00	20,000.00	60d Nail in Concrete Pavement
409	9,980.31	20,731.83	# 4 Rebar with Large Orange Baughman Cap
410	10,027.91	21,875.28	# 4 Rebar with Large Orange Baughman Cap
411	9,316.72	21,884.44	# 4 Rebar with Large Orange Baughman Cap
412	9,316.14	22,264.92	Mag Nail in Concrete Sidewalk Joint
413	9,123.27	22,264.68	Mag Nail in Asphalt Drive
414	8,968.87	22,705.23	# 4 Rebar with Large Orange Baughman Cap
415	8,915.20	23,204.30	Topo Point
416	8,904.28	23,443.23	Topo Point
417	8,557.92	23469.80	Topo Point

PROJECT BENCHMARKS

BM #1 – City of Wichita Disc Located in the Southeast Corner of the Intersection of Meridian and May, 52.4' East and 34.5' South of the Centerline of Both.
Elev. = 1292.75 (NAVD 88)

BM #2 – Chiseled "□" on the West Side of the Wheel Chair Ramp at the southeast corner of Meridian & Orient
Elev. = 1293.19 (NAVD 88)

BM #3 – Chiseled "□" on the North Curb Return of the Northwest Corner of Dora and St. Clair, 34' North and 13' West of the Centerline of Both.
Elev. = 1292.01 (NAVD 88)

BM #4 – Chiseled "□" on the Concrete Sidewalk at the Northwest Corner of the Building at 1910 South Everitt, Southeast of the Intersection of Dora and Everitt
Elev. = 1292.06 (NAVD 88)

BM #5 – Chiseled "□" on the North Curb Return of the Drive to 2011 W. Dora, 60' South and 15' West of the Centerlines of Dora and Hiram.
Elev. = 1291.73 (NAVD 88)

BM #6 – Chiseled "□" located 10.5' North of the Curb Return of the Northwest Corner of Dora and Glenn, 41' North and 16' West of the Centerline of Both.
Elev. = 1292.81 (NAVD 88)

BM #7 – Chiseled "□" on the North Curb Return of the Drive to 1901 S. Millwood, 36' South and 15' West of the Centerlines of Dora and Millwood.
Elev. = 1291.22 (NAVD 88)

BM #8 – Chiseled "□" on the South Curb Return of the Drive to 1836 S. Fern, 68' North and 16' East of the Centerlines of Dora and Fern.
Elev. = 1291.79 (NAVD 88)

BM #9 – Chiseled "□" on the North Curb Return of the Drive to 1341 W. Dora, 68' South and 16' East of the Centerlines of Dora and Martinson.
Elev. = 1292.58 (NAVD 88)

BM #10 – Chiseled "□" on the Top of Curb East of the Sidewalk, 15' North and 35' East of the Centerlines of Dora and Exposition.
Elev. = 1290.70 (NAVD 88)

BM #11 – Chiseled "□" on the West Curb Return of the Drive to the Seneca Village Townhouses, 15' South and 52' West of the Centerlines of May and Exposition.
Elev. = 1291.76 (NAVD 88)

BM #12 – City of Wichita Disc Located in the Southwest Corner of the Intersection of Seneca and May, 77.2' West and 23.5' South of the Centerline of Both.
Elev. = 1289.23 (NAVD 88)

BM #13 – Chiseled "□" on the Top of Curb at the South Lot Line of Lot 2, Van McNew Addition on the West Side of Osage.
Elev. = 1287.70 (NAVD 88)

BM #14 – Chiseled "□" on the Top of Curb at the South Property Line of MTA Addition on the West Side of McLean.
Elev. = 1290.66 (NAVD 88)

Drawing File: E:\eng\Meridian Drainage\Keysheet.dwg

December 2012

Design: TPV
Drawn: TPV
Approved: TPV
Scale: NONE

Project No. 08-02-E018 CAPITAL IMPROVEMENT PROJECT

PROJECT KEYSHEET

MERIDIAN - PAWNEE TO ORIENT DRAINAGE PROJECT

Baughman Company , P.A.
315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149
Baughman
ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

SHEET
OF

GENERAL NOTES

1. The Contractor shall give all property owners and/or tenants of developed property abutting the project limits a minimum of ten (10) days advance notice prior to start of construction. See Project Special Provisions for additional notification requirements.

2. Contractor will be required to provide a minimum advance notice of seventy–two (72) hours to utility companies prior to excavation or working adjacent to utilities. Kansas One–Call 687–2470

3. Existing utilities and their locations, as shown on the plan, represent the best information obtainable at the time of design. The Contractor shall be aware that construction will occur in close proximity to existing utilities, and any conflicts with such utilities shall be reported to the Engineer. Contractor should also be aware that some utility lines within the Project corridor may have been abandoned in place as new lines are installed. Contractor shall be responsible for notifying the affected utility to determine the status of said lines.

4. The Water Department shall field locate water valves one time during construction when requested by the Contractor. It shall be the Contractor's responsibility to preserve such field locations during the construction process. Water valves, water valve boxes or fire hydrant damaged during construction shall be repaired by the Contractor at his own expense.

5. All project waste including any trees, milled asphalt, rubble from miscellaneous structures, abandoned pipes, excess excavation & etc. shall be disposed of on sites to be provided by the Contractor. These sites shall be approved by the Engineer as to suitability, appearance and site location. Locations that, in the opinion of the Engineer, will leave an unsightly appearance will not be approved. All disposal sites must be approved by the Kansas Department of Health and Environment. Material either stockpiled or disposed of in a flood plain would require a Kansas State Board of Agriculture permit. Any material dumped in waters of the United States or wetlands is subject to U.S. Corps. of Engineers permitting regulations. Any material buried or stockpiled beyond approved construction limits would require additional archaeological investigations unless buried in a previously approved borrow location.

6. Prior to bidding the project, each bidder shall visit the site and satisfy himself of surface & subsurface conditions. Each bidder shall also fully inform himself as to the extent of the scope of work to be performed. Each bidder shall also be aware that no additional compensation will be awarded for extra work that should have been evaluated prior to bidding.

7. All Reinforced Concrete Box Culverts (RCBC), transition structures, & manholes shall be pre–cast, unless otherwise noted. The RCBC shall conform to ASTM C–789 Standards for loading unless otherwise noted in the plans. The bedding shall be crushed rock conforming to ASTM C–33, Gradation No. 67, and shall meet all requirements for Portland Cement Concrete Pavement Course Aggregate, Section 406.2, City of Wichita Standard Specifications.

8. All Pre–cast RCB Sections shall have filter fabric wrapped at each joint to prevent infiltration of fines and other material into the conduit. Reinforced Concrete Pipe with a diameter of 48" or larger shall have filter fabric wrapped at each joint as well.

9. The Contractor shall be responsible for implementing erosion control methods during construction to prevent unnecessary silt/sediment discharge through downstream properties and/or storm sewer systems. The Contractor shall also submit a plan to implement Erosion Control measures on this Project. This plan shall be submitted prior to the pre–construction conference. These controls may include, but not limited to: hay bales; silt fences, temporary seeding, Excelsior I Erosion Control Blanket (Curlex), or approved equal, or other controls necessary to inhibit sediment runoff during construction.

10. Sewer Service shall not be interrupted throughout the length of the Project. The Contractor shall be responsible for maintaining continuous sewage flows. Cost for by–pass pumping at all sewer crossings shall be SUBSIDIARY to other items in the Project.

11. The Contractor shall not start work on the Project until the Project Inspector is assigned and is present on site. Any work done without inspection will be required to be uncovered for inspection. Staking and inspection for this Project will be the responsibility of the City of Wichita.

12. The Contractor shall comply with all applicable safety regulations and City of Wichita Specifications and Standards.

13. The Contractor shall be responsible for all traffic control measures to facilitate construction. All Construction Zone markings and signage shall conform to the latest version of the Manual on Uniform Traffic Control Devices (MUTCD) as published by the US Dept. of Transportation, Federal Highway Administration. All costs associated with construction markings and signage shall be SUBSIDIARY to the lump sum Bid Item "Traffic Control".

14. During Construction, Meridian Avenue and Seneca Street may closed to through traffic and detoured around the construction zone as detailed in this plan. See the Project Special Provisions for the maximum time allowed for the closure. Sections of Dora Avenue may be closed for a maximum of three consecutive blocks at a time. Exposition, May, and McLean may also be closed as necessary for construction. Side streets abutting Dora may also be closed, provided that no two successive side streets are closed at the same time. Access to residences & businesses shall be maintained at all times.

15. The Contractor shall protect utility lines that cross or abut the Project corridor. For larger lines, the Contractor's method of supporting the utility structure shall be provided to the Engineer, as well as the affected Utility Company's representative for review and approval. Any shutdown of a utility line that may be required by construction of this Project shall be coordinated with the said affected utility.

16. Adjacent Buildings, Structures, Parking Lots, Driveways, etc. other than those shown for replacement shall be protected from damage during construction of this Project.

17. All Tree Trimming/Removal Operations shall be considered as SUBSIDIARY to "R/W Clearing & Site Preparation." Trees that require removal are marked on the Plan.

18. Existing Traffic Control signs that conflict with Construction shall be removed, protected, and reinstalled following construction operations. Signs damaged by the Contractor shall be replaced at the Contractor's expense. All costs associated with removal and reinstallation of Traffic Signs shall be SUBSIDIARY to "Site Clearing."

19. Irons and monuments found are shown on the Plans. The Contractor shall be responsible for notifying the Engineer prior to excavation or clearing operations that will endanger said irons so that accurate ties can be determined for resetting.

20. The Contractor shall be responsible for installing Erosion Control Blanket (Curlex) at the back of curb (8' wide minimum) when the weather/season prevents the installation of sod. All costs for this work shall be SUBSIDIARY to "Site Restoration."

21. The Contractor shall be aware that certain utilities may be relocated during construction. It shall be the Contractor's responsibility to give advance notice to the utility companies in order that they may have sufficient time to complete the relocations without delaying the Project. Cost of the coordination with the utility companies shall be considered SUBSIDIARY to the Project.

22. All existing striping that is removed with this Project shall be replaced as shown in the Pavement Marking Plans. New Striping shall be Thermoplastic meeting the City of Wichita Specifications. Quantities for replacement striping are listed herein. The cost shall be SUBSIDIARY to the bid item "Pavement Markings" (L.S.)

23. A full depth saw cut of the existing surface courses or the existing total pavement thickness shall be provided at the locations where proposed construction abuts an existing surface course or pavement for which partial removal of that surface or pavement is required. Sawed joint to facilitate removal within three (3) feet of existing joints will not be permitted and for such instances the limits of removal shall extend to the existing joint. Such saw cuts will not be paid for directly and this cost shall be considered SUBSIDIARY to the pavement removal.

24. Geogrid Reinforcement for the rock base shall be Tensar BX1100 as manufactured by the Tensar Corporation, Geocon HP370 as manufactured by Mirafi Corporation or approved equal. Geogrid fabric shall be SUBSIDIARY to the installation of the Reinf. Crushed Rock Base.

25 All Elevations shown are based on Mean Sea Level (MSL) Datum.

26. The abandonment and/or plugging of existing sanitary sewers as required by the Project shall be considered SUBSIDIARY to the Project and shall done per City of Wichita Specifications. Abandoned sanitary sewer lines that are cut during the installation of the RCBC shall also be plugged per City Specs and considered SUBSIDIARY to the Project.

27. Existing Wheel Chair Ramps that are to be removed with the proposed construction shall be replaced according to Standard City of Wichita Specifications. Wheel Chair Ramps shall also be constructed where the existing sidewalk abuts the existing curb that is to be removed, but there is not currently a wheel chair ramp. Paid for as the measured quantity bid item "Wheel Chair Ramp w/ Detectable Warnings" (Each).

28. Pavement removed for the installation of sanitary sewers and water lines ahead of the RCBC construction shall be kept to a minimum and replaced with a 5" minimum thickness of temporary asphalt pavement if the replaced pavement will be removed later with the RCBC installation. Pavement cuts outside of the RCBC installation area shall be replaced in kind according to the City Specs. All pavement removal and replacement shall be paid for one time in the bid items for pavement removal and replacement, regardless of thickness. Installation and removal of temporary asphalt pavement shall be considered SUBSIDIARY to the Project.

29. Existing structures and pipes to be removed or abandoned in place per City of Wichita Specifications are listed in the "Structures to be Removed/ Abandoned" Table on Sheet __.

30. Valve Boxes and Water Meters within the Project Limits shall be adjusted to match Final Grade.

31. Existing Power & Light poles may require bracing or removal/replacement during certain phases of the Project. The Contractor shall be responsible for coordinating the pole bracing with Randy Truitt with Westar at 261–6521 at least 3 weeks prior to beginning construction.

32. The Contractor shall contact Gerald Lorimer with Westar Energy Transmission Engineering at (785) 575–1608 at least 30 days prior to excavating near the Westar Transmission poles along the south side of May Avenue.

LIST OF UTILITY COMPANIES

TYPE	OWNER	CONTACT	TELEPHONE	(ALT.)
Locator Service	Kansas One–Call		687–2470	800–344–7233
TV	Cox Communications (Cable)	Marc Henderson	260–7204	262–0661
Electric	Westar Energy – Distribution	Shane Price	261–6315	383–8600
Electric	Westar Energy – Transmission	Greg Roy	(785) 575–8167	
Gas	Kansas Gas Service	Jim Coe	831–3121	888–482–4950
Gas	Black Hills Energy	Daryl Keller	941–1608	832–3121
Telephone	AT&T	John Fagan	268–2102	800–344–7233
Water	Wichita Water Department	Greg Lolley	268–4555	268–4514
Storm Water Sewer	Wichita SWS Maintenance	Doug Arvidson	268–4095	
Sanitary Sewer	Wichita Sewer Maintenance	Calvin Fugit	268–4025	268–4071

Drawing File: E:\eng\Meridian Drainage\Notepage.dwg

December 2012

Design: TPV
Drawn: STAFF
Approved: TPV
Scale: None

Project No: 08-02-E038 CITY OF WICHITA, KANSAS

GENERAL NOTEPAGE

MERIDIAN DRAINAGE OUTFALL PROJECT

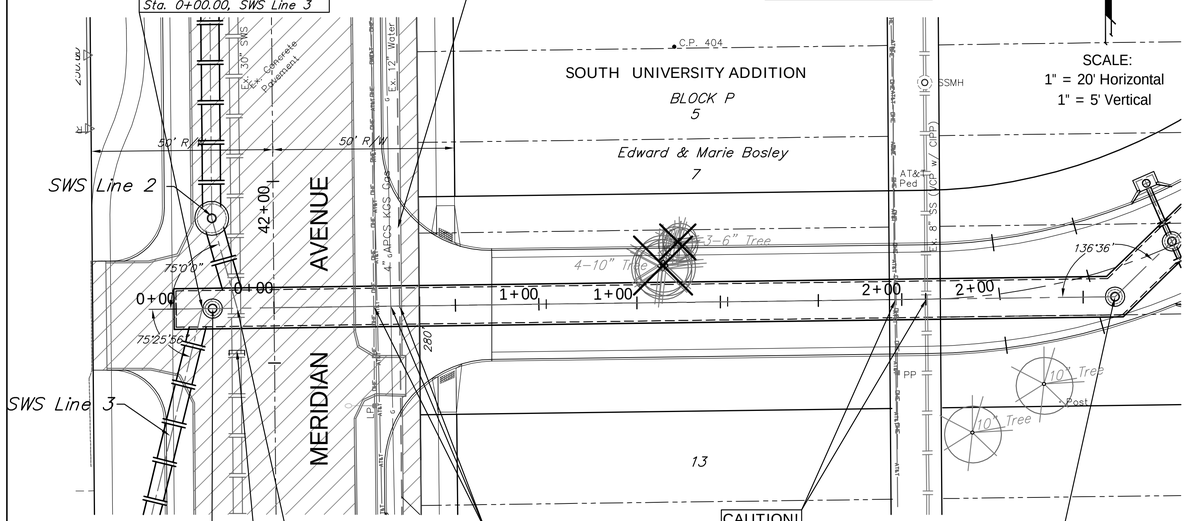
Baughman Company , P.A.
315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149
ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

SHEET
OF

BENCHMARK:
BM #2 – Chiseled "□" on the West Side of the Wheel Chair Ramp at the southeast corner of Meridian & Orient
Elev. = 1293.19 (NAVD 88)

Note:
Trees/Shrubs to be removed are marked thus:

SCALE:
1" = 20' Horizontal
1" = 5' Vertical

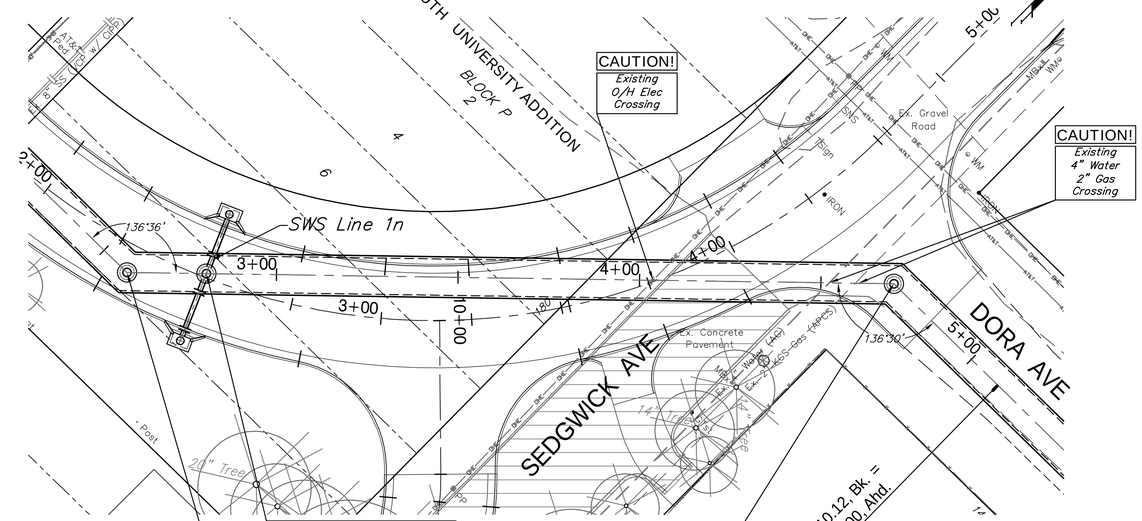


SWS LINE 1

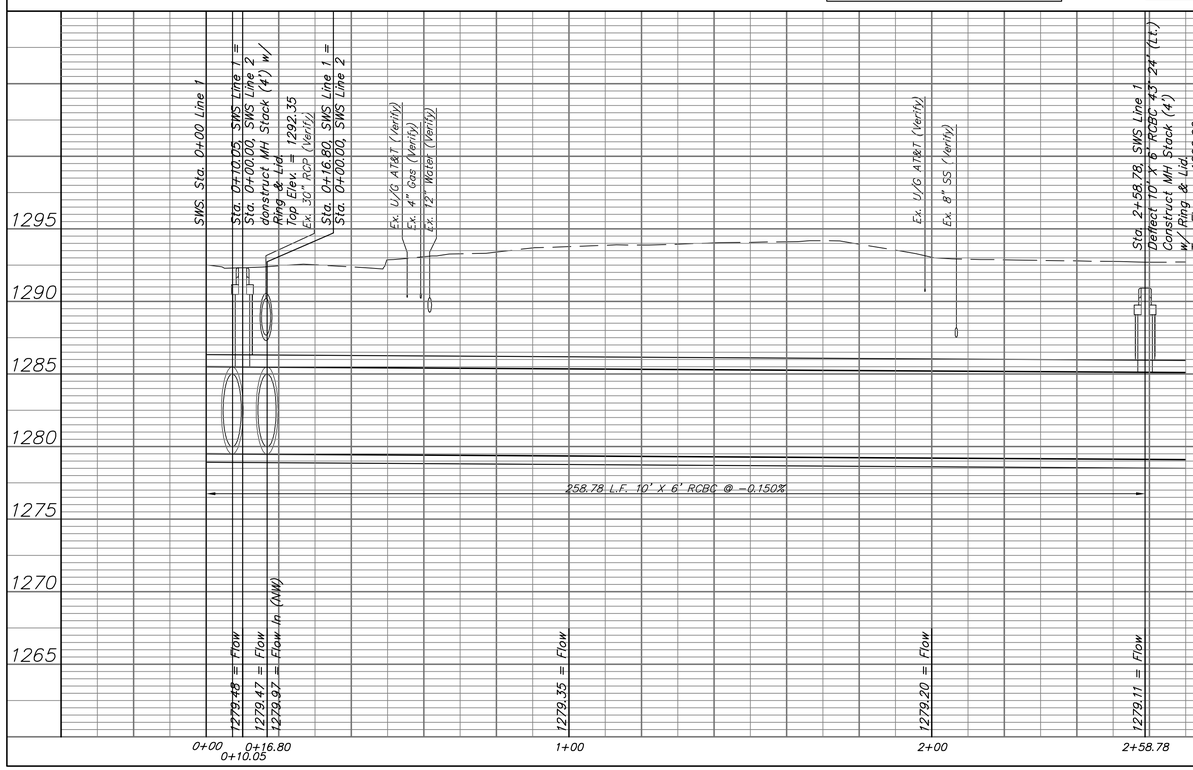
Areas of Full Pavement Removal & Replacement are Indicated By:

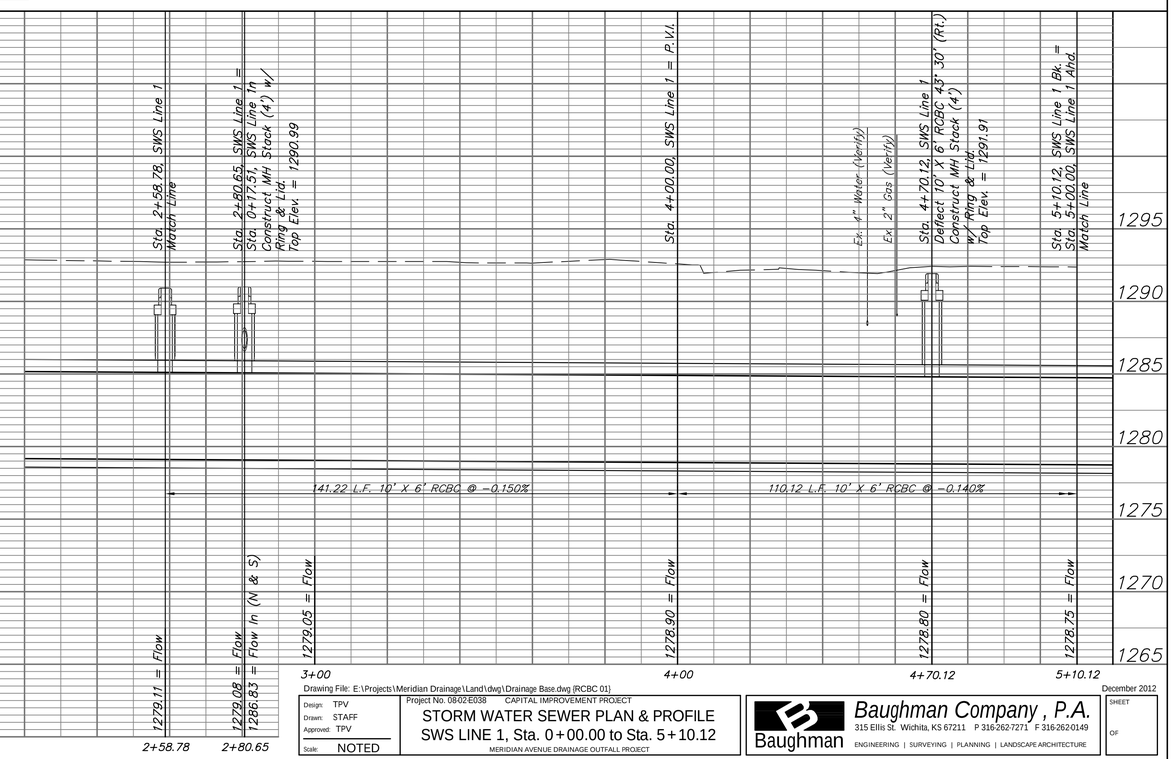
BENCHMARK:
BM #2 – Chiseled "□" on the West Side of the Wheel Chair Ramp at the southeast corner of Meridian & Orient
Elev. = 1293.19 (NAVD 88)

SCALE:
1" = 20' Horizontal
1" = 5' Vertical



SWS LINE 1





Drawing File: E:\Projects\Meridian Drainage\Land\dwg\Drainage Base.dwg [RCBC 01]

December 2012

Design: TPV
Drawn: STAFF
Approved: TPV
Scale: NOTED

Project No. 0802-E038 CAPITAL IMPROVEMENT PROJECT

STORM WATER SEWER PLAN & PROFILE
SWS LINE 1, Sta. 0+00.00 to Sta. 5+10.12

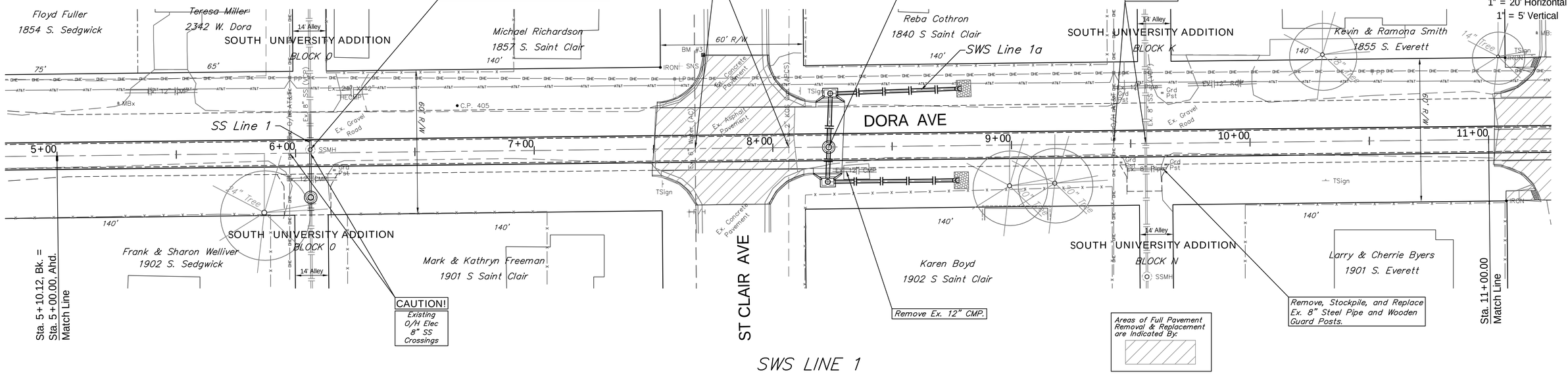
MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT

Baughman Company , P.A.
315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149
ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

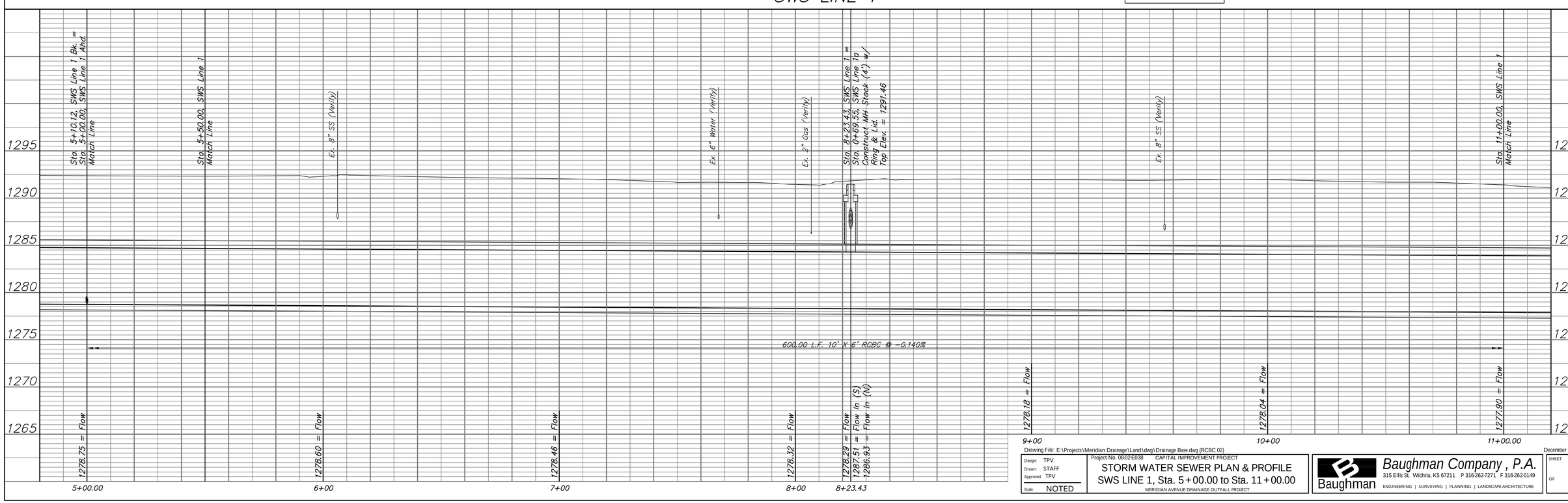
SHEET
OF

BENCHMARK:
BM #3 – Chiseled "□" on the North Curb Return of the Northwest Corner of Dora and St. Clair, 34' North and 13' West of the Centerline of Both. Elev. = 1292.01 (NAVD 88)

SCALE:
1" = 20' Horizontal
1" = 5' Vertical



SWS LINE 1



Drawing File: E:\Projects\Meridian Drainage\Land\dwg\Drainage Base.dwg {RCBC 02}

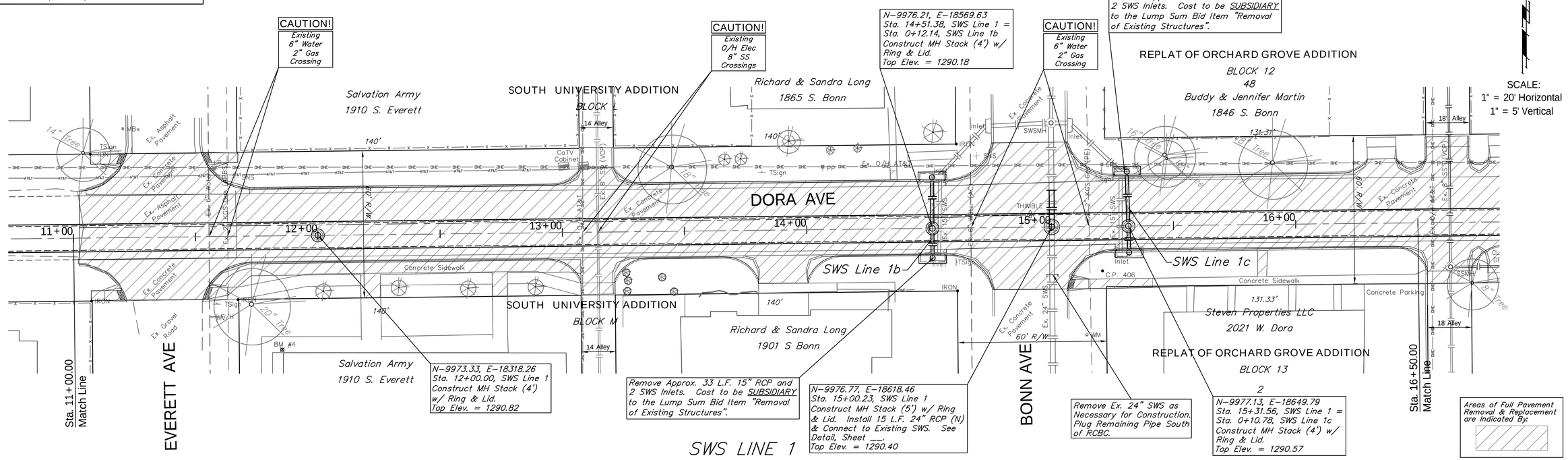
December 2012

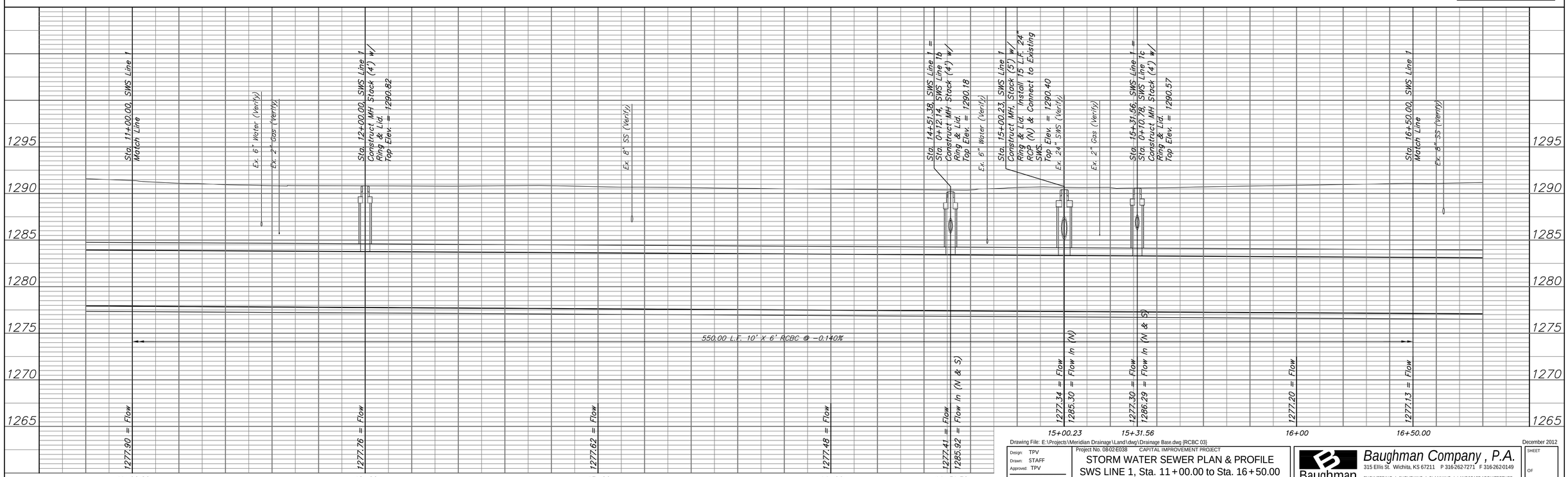
Design: TPV Drawn: STAFF Approved: TPV Scale: NOTED	Project No. 0802-E038 CAPITAL IMPROVEMENT PROJECT STORM WATER SEWER PLAN & PROFILE SWS LINE 1, Sta. 5+00.00 to Sta. 11+00.00 MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT	Baughman Company , P.A. 315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149 ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

SHEET
OF

BENCHMARK:

BM #4 – Chiseled "□" on the Concrete Sidewalk at the Northwest Corner of the Building at 1910 South Everitt, Southeast of the Intersection of Dora and Everitt Elev. = 1292.06 (NAVD 88)





Drawing File: E:\Projects\Meridian Drainage\Land\dwg\Drainage Base.dwg {RCBC 03}

December 2012

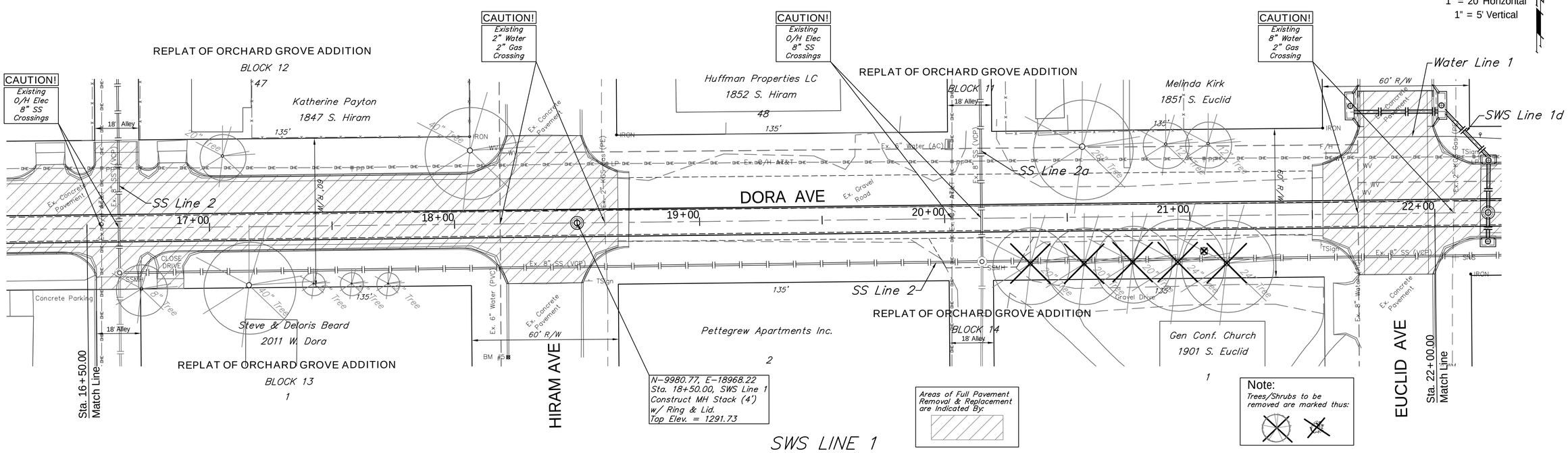
Design: TPV	Project No. 0802-E038 CAPITAL IMPROVEMENT PROJECT
Drawn: STAFF	STORM WATER SEWER PLAN & PROFILE
Approved: TPV	SWS LINE 1, Sta. 11+00.00 to Sta. 16+50.00
Scale: NOTED	MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT

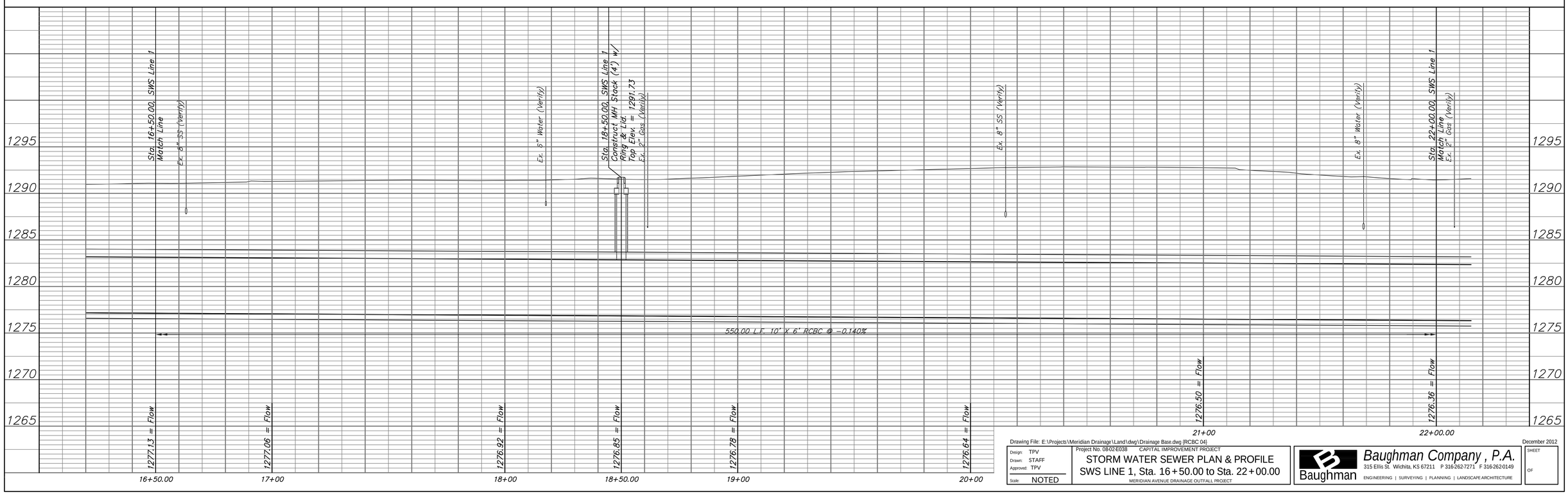
Baughman Company , P.A.
315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149
ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

SHEET ___ OF ___

BENCHMARK:
BM #5 – Chiseled "□" on the North Curb Return of the Drive to 2011 W. Dora, 60' South and 15' West of the Centerlines of Dora and Hiram.
Elev. = 1291.73 (NAVD 88)

SCALE:
1" = 20' Horizontal
1" = 5' Vertical





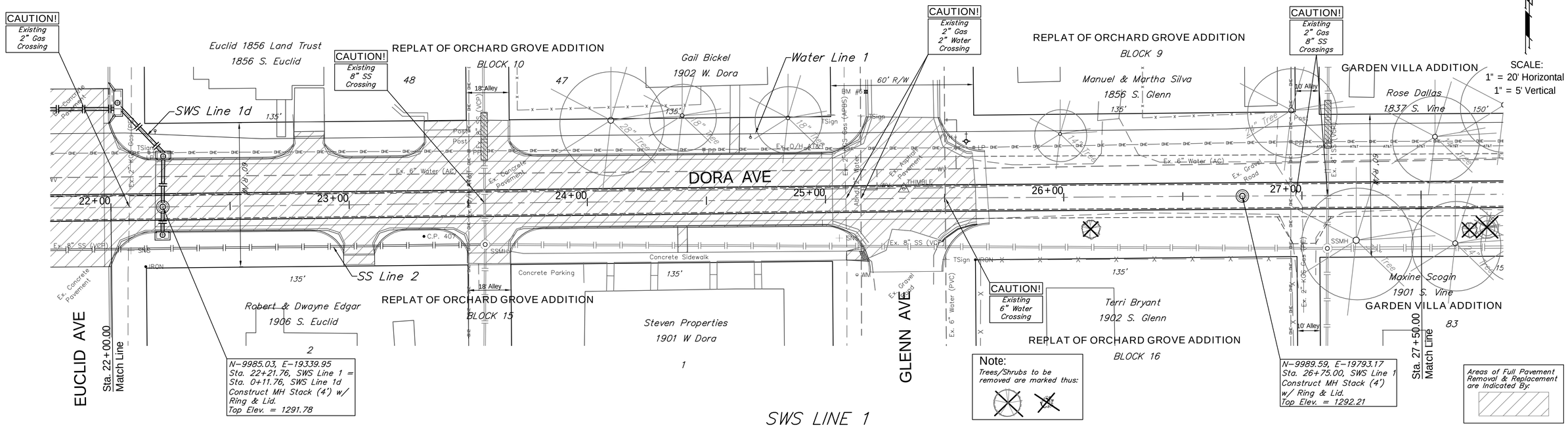
Drawing File: E:\Projects\Meridian Drainage\Land\dwg\Drainage Base.dwg [RCBC 04]
December 2012

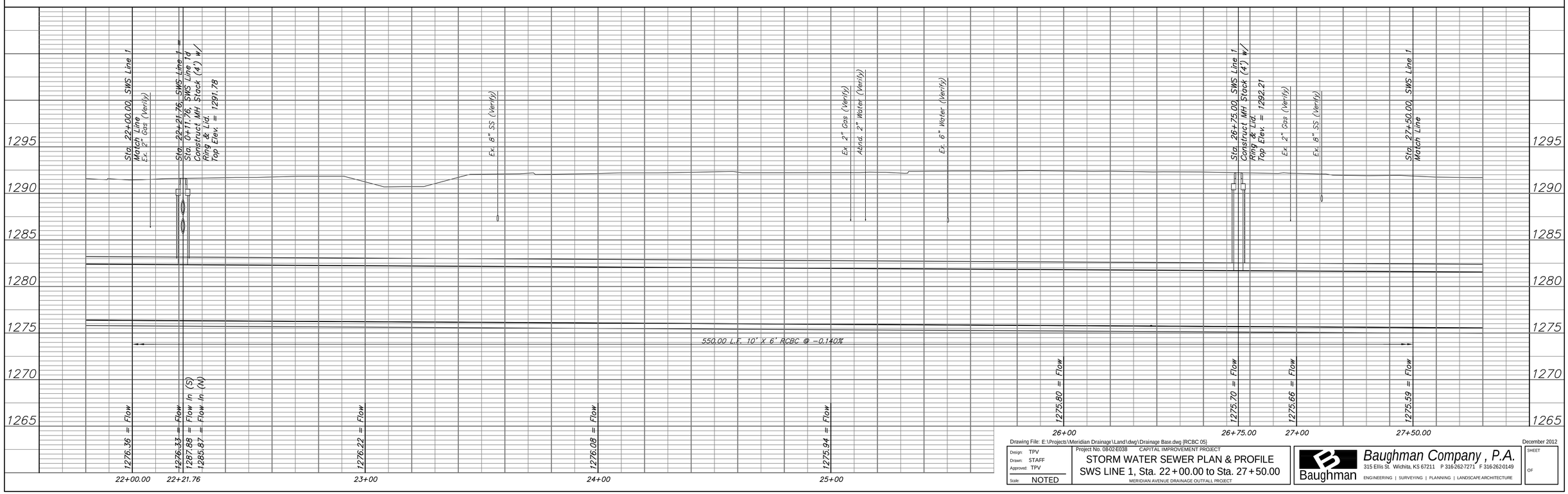
Design: TPV	Project No. 08-02-E038 CAPITAL IMPROVEMENT PROJECT
Drawn: STAFF	STORM WATER SEWER PLAN & PROFILE
Approved: TPV	SWS LINE 1, Sta. 16+50.00 to Sta. 22+00.00
Scale: NOTED	MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT

Baughman Company, P.A.
315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149
ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

SHEET
OF

BENCHMARK:
BM #6 – Chiseled "□" located 10.5' North of the Curb Return of the Northwest Corner of Dora and Glenn, 41' North and 16' West of the Centerline of Both. Elev. = 1292.81 (NAVD 88)





Drawing File: E:\Projects\Meridian Drainage\Land\dwg\Drainage Base.dwg (RCBC 05)

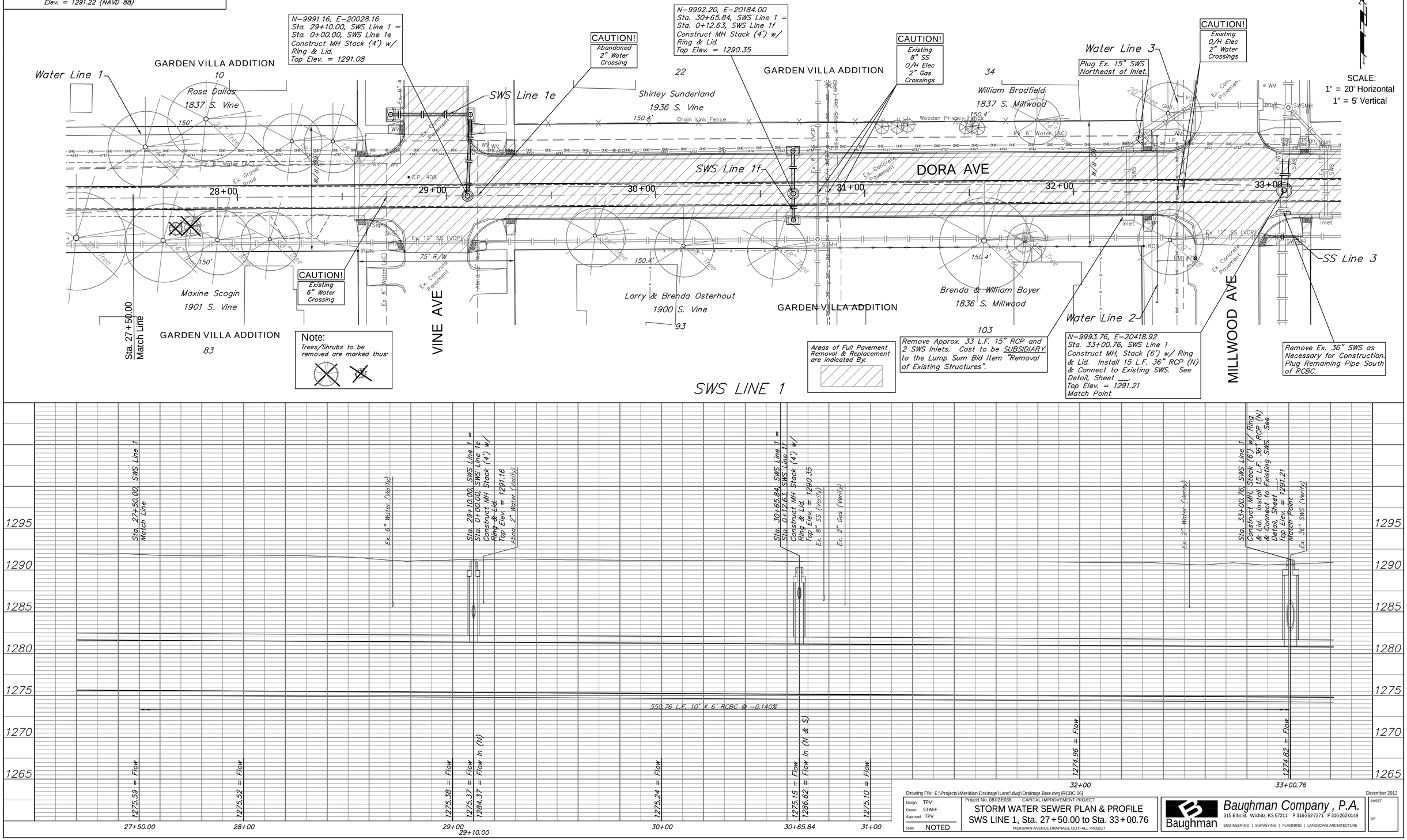
December 2012

Design: TPV Drawn: STAFF Approved: TPV Scale: NOTED	Project No. 08-02-E038 CAPITAL IMPROVEMENT PROJECT STORM WATER SEWER PLAN & PROFILE SWS LINE 1, Sta. 22+00.00 to Sta. 27+50.00 MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT	Baughman Company , P.A. 315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149 ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

SHEET
OF

BENCHMARK:
BM #7 – Chiseled "□" on the North Curb Return of the Drive to 1901 S. Millwood, 36' South and 15' West of the Centerlines of Dora and Millwood.
Elev. = 1291.22 (NAVD 88)

SCALE:
1" = 20' Horizontal
1" = 5' Vertical



Drawing File: E:\Projects\Meridian Drainage\Land\dwg\Drainage Base.dwg (RCBC 06)
December 2012

Design: TPV
Drawn: STAFF
Approved: TPV
Scale: NOTED

Project No. 0802E038 CAPITAL IMPROVEMENT PROJECT

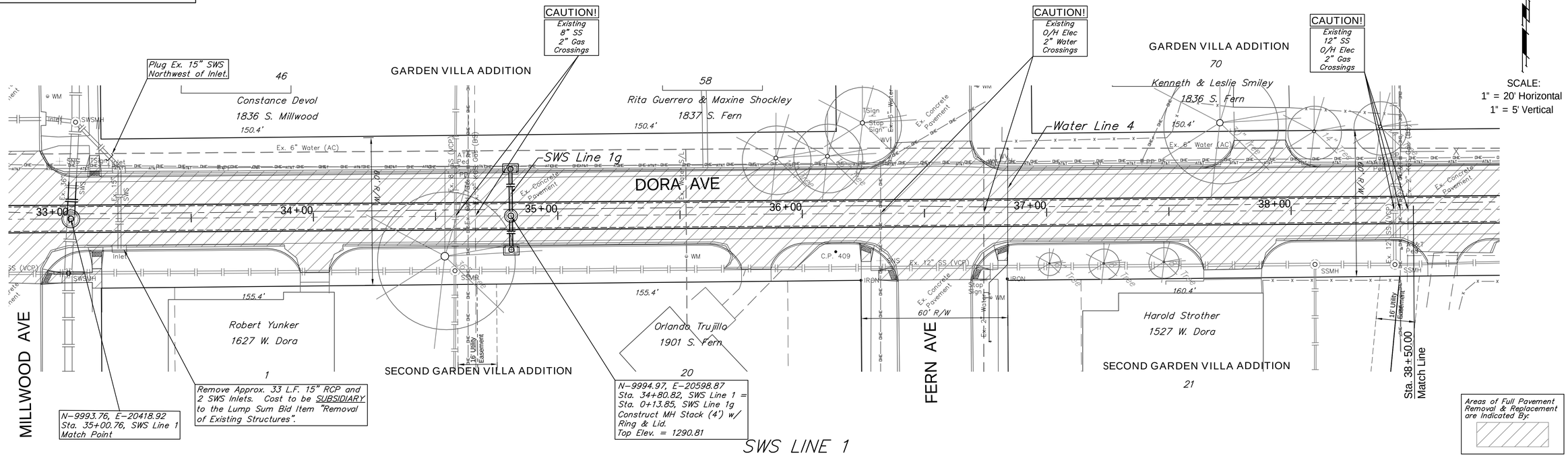
STORM WATER SEWER PLAN & PROFILE
SWS LINE 1, Sta. 27+50.00 to Sta. 33+00.76

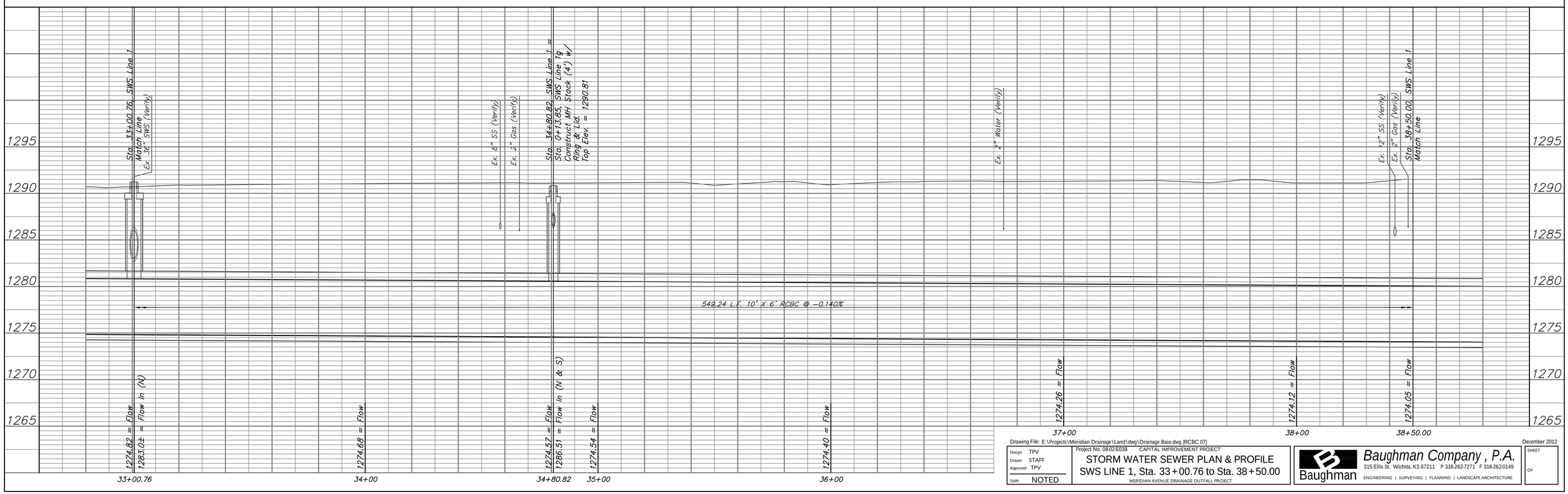
MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT

Baughman Company , P.A.
315 Ellis St Wichita, KS 67211 P 316-262-7271 F 316-262-0149
ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

SHEET
OF

BENCHMARK:
BM #8 – Chiseled "□" on the South Curb Return of the Drive to 1836 S. Fern, 68' North and 16' East of the Centerlines of Dora and Fern.
Elev. = 1291.79 (NAVD 88)





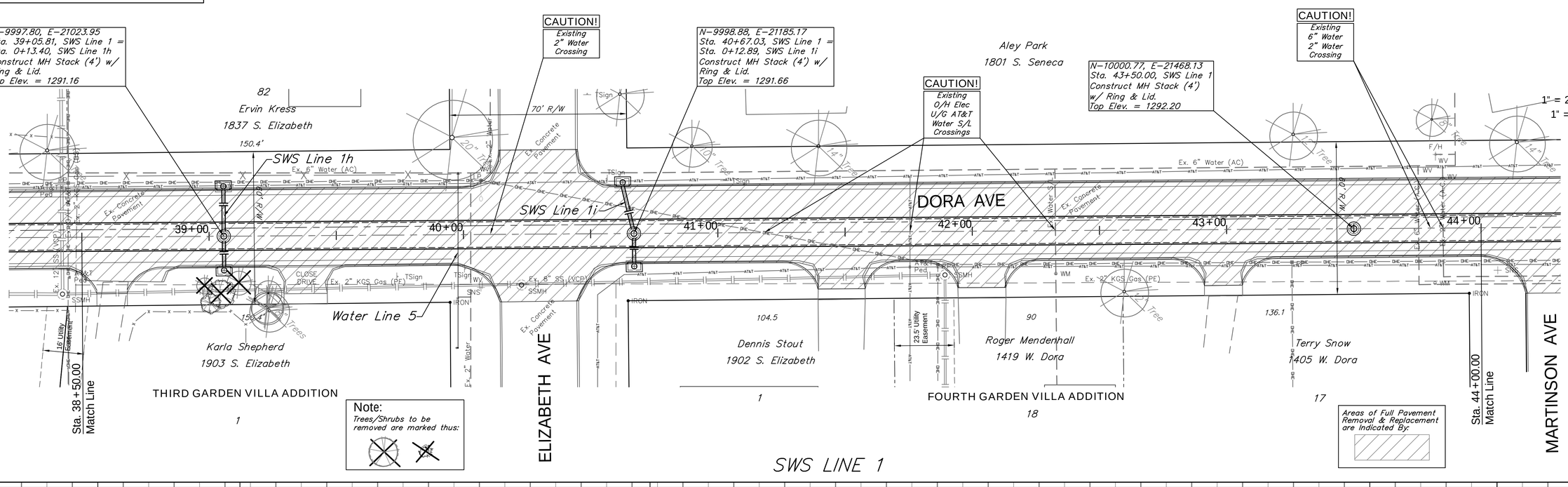
Drawing File: E:\Projects\Meridian Drainage\Land\dwg\Drainage Base.dwg (RCBC 07)

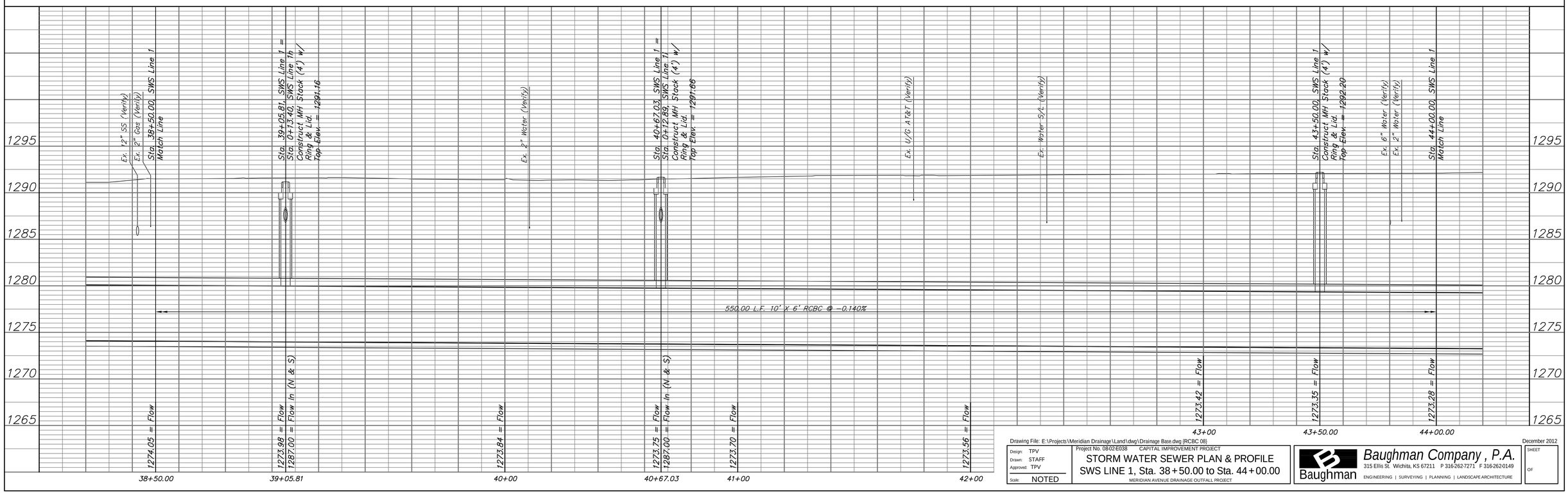
December 2012

Design: TPV Drawn: STAFF Approved: TPV Scale: NOTED	Project No. 08-02-E038 CAPITAL IMPROVEMENT PROJECT STORM WATER SEWER PLAN & PROFILE SWS LINE 1, Sta. 33+00.76 to Sta. 38+50.00 MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT	Baughman Company , P.A. 315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149 ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

SHEET
OF

BENCHMARK:
BM #9 – Chiseled "□" on the North Curb Return of the Drive to 1341 W. Dora, 68' South and 16' East of the Centerlines of Dora and Martinson. Elev. = 1292.58 (NAVD 88)





Drawing File: E:\Projects\Meridian Drainage\Land\dwg\Drainage Base.dwg [RCBC 08]

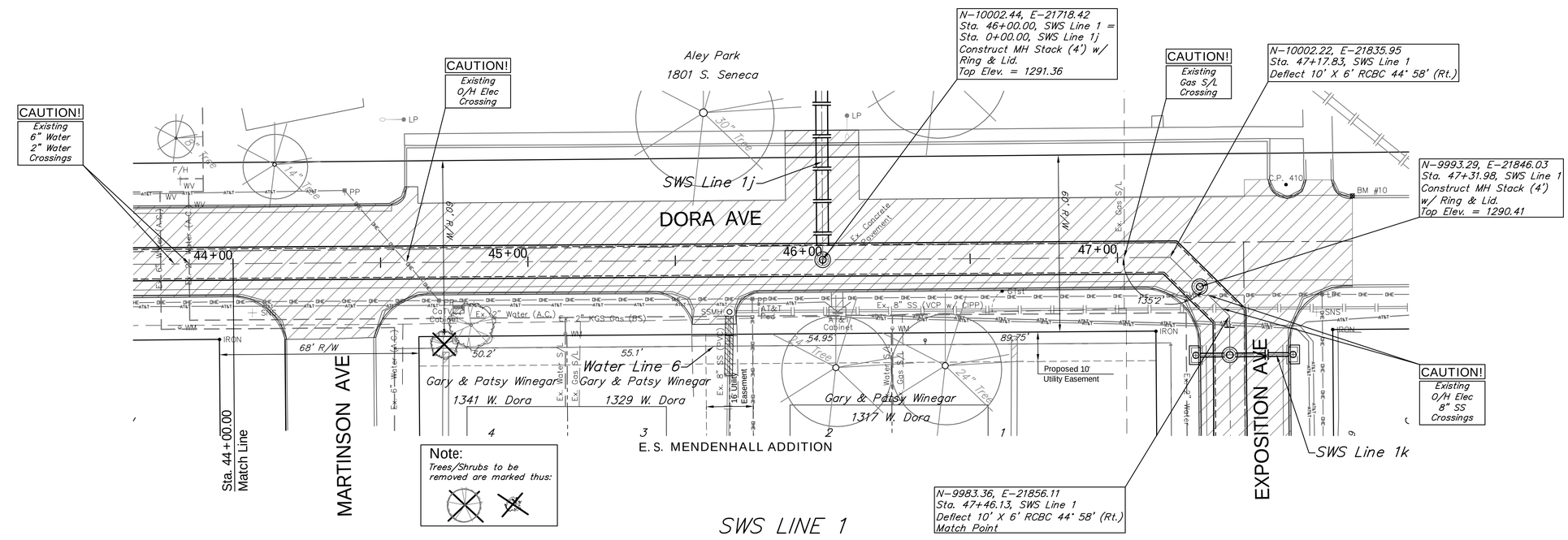
December 2012

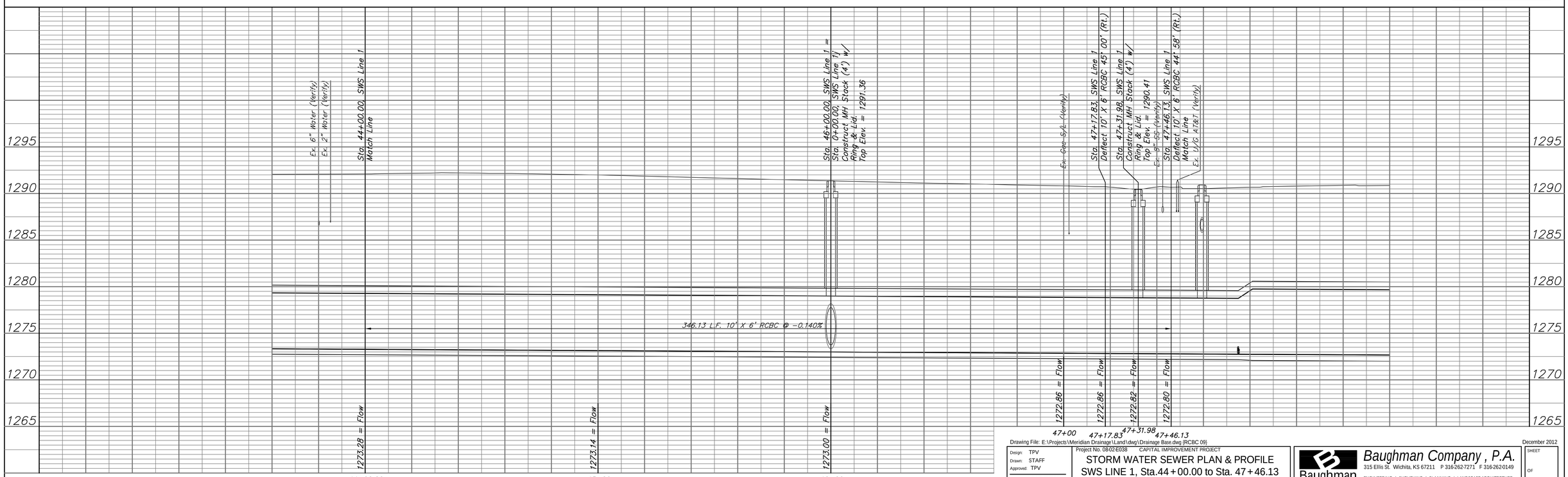
Design: TPV Drawn: STAFF Approved: TPV Scale: NOTED	Project No. 0802-E038 CAPITAL IMPROVEMENT PROJECT STORM WATER SEWER PLAN & PROFILE SWS LINE 1, Sta. 38+50.00 to Sta. 44+00.00 MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT	Baughman Company , P.A. 315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149 ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

SHEET
OF

BENCHMARK:
BM #9 – Chiseled "□" on the North Curb Return of the Drive to 1341 W. Dora, 68' South and 16' East of the Centerlines of Dora and Martinson. Elev. = 1292.58 (NAVD 88)

SCALE:
1" = 20' Horizontal
1" = 5' Vertical





Drawing File: E:\Projects\Meridian Drainage\Land\dwg\Drainage Base.dwg {RCBC 09}

December 2012

Design: TPV
Drawn: STAFF
Approved: TPV
Scale: NOTED

Project No. 0802-E038 CAPITAL IMPROVEMENT PROJECT

STORM WATER SEWER PLAN & PROFILE
SWS LINE 1, Sta.44+00.00 to Sta. 47+46.13

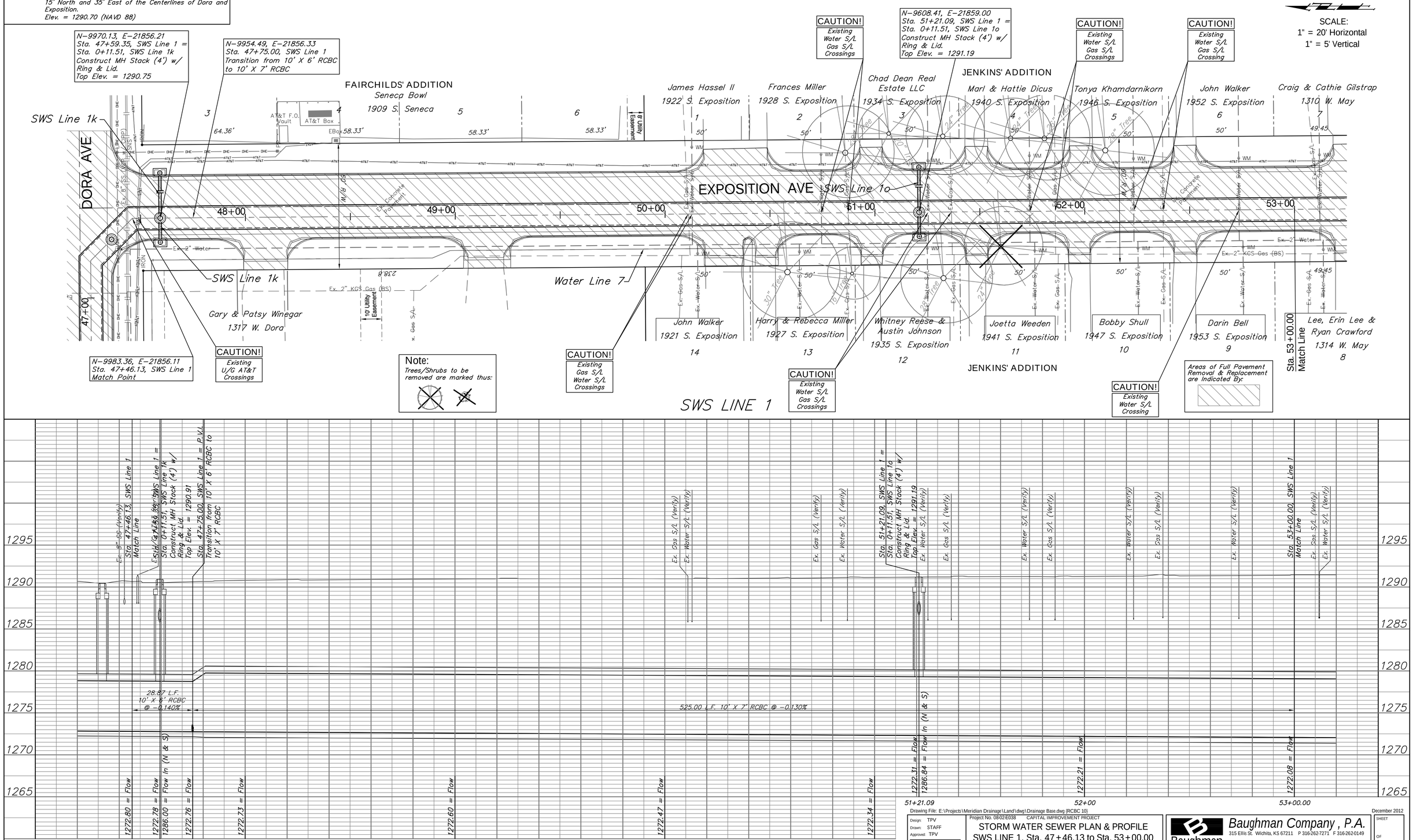
MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT

Baughman Company , P.A.
315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149
ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

SHEET
OF

BENCHMARK:
BM #10 – Chiseled "□" on the Top of Curb East of the Sidewalk, 15' North and 35' East of the Centerlines of Dora and Exposition.
Elev. = 1290.70 (NAVD 88)

SCALE:
1" = 20' Horizontal
1" = 5' Vertical



Drawing File: E:\Projects\Meridian Drainage\Land\dwg\Drainage Base.dwg [RCBC 10]

December 2012

Design: TPV
Drawn: STAFF
Approved: TPV
Scale: NOTED

Project No. 08-02-E038 CAPITAL IMPROVEMENT PROJECT

STORM WATER SEWER PLAN & PROFILE
SWS LINE 1, Sta. 47+46.13 to Sta. 53+00.00

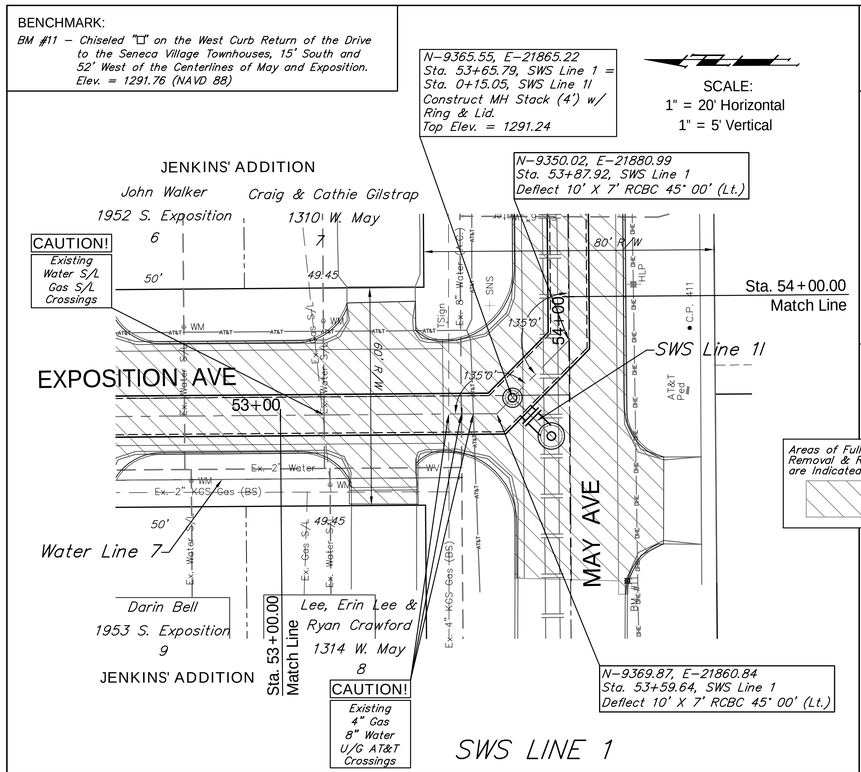
MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT

Baughman Company , P.A.
315 Ellis St Wichita, KS 67211 P 316-262-7271 F 316-262-0149
Baughman ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

SHEET
OF

BENCHMARK:
BM #11 – Chiseled "□" on the West Curb Return of the Drive to the Seneca Village Townhouses, 15' South and 52' West of the Centerlines of May and Exposition. Elev. = 1291.76 (NAVD 88)

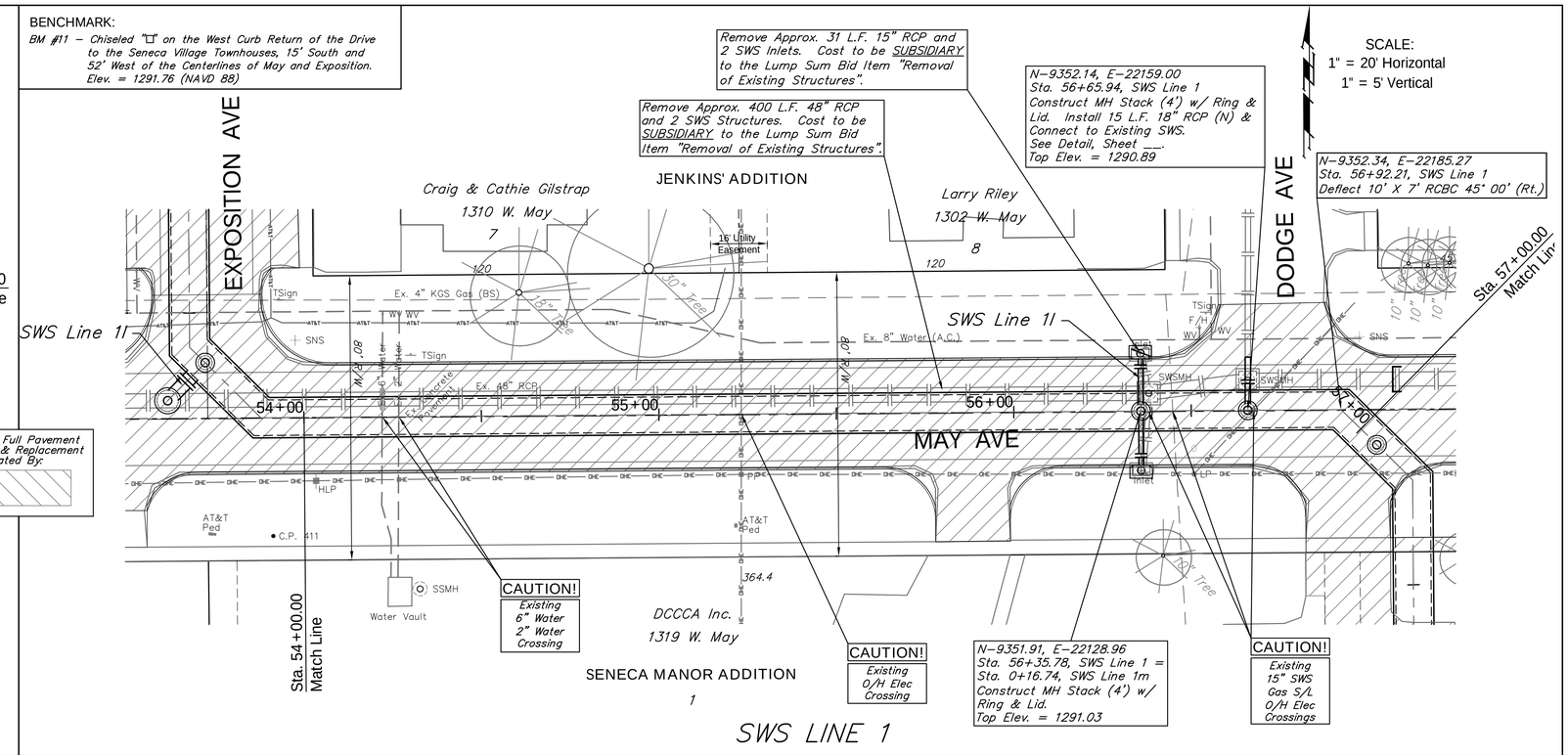
SCALE:
1" = 20' Horizontal
1" = 5' Vertical

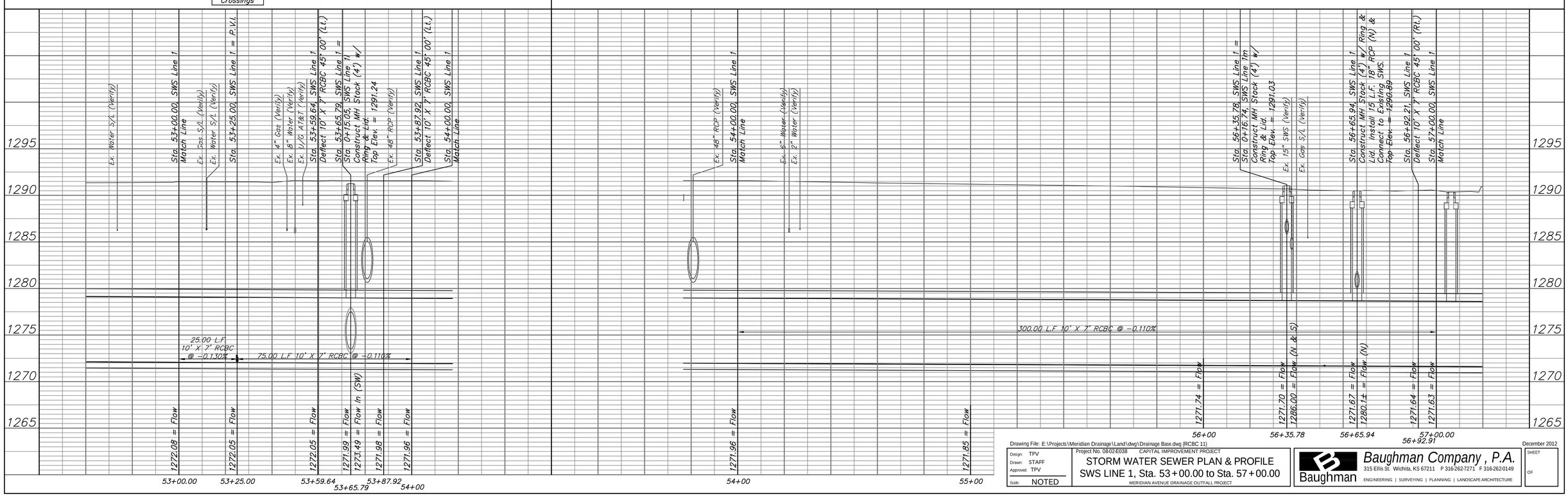


Areas of Full Pavement Removal & Replacement are Indicated By:

BENCHMARK:
BM #11 – Chiseled "□" on the West Curb Return of the Drive to the Seneca Village Townhouses, 15' South and 52' West of the Centerlines of May and Exposition. Elev. = 1291.76 (NAVD 88)

SCALE:
1" = 20' Horizontal
1" = 5' Vertical





Drawing File: E:\Projects\Meridian Drainage\Land\dwg\Drainage Base.dwg (RCBC 11)

Design: TPV
Drawn: STAFF
Approved: TPV
Scale: NOTED

Project No. 0802E038 CAPITAL IMPROVEMENT PROJECT

STORM WATER SEWER PLAN & PROFILE
SWS LINE 1, Sta. 53+00.00 to Sta. 57+00.00

MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT

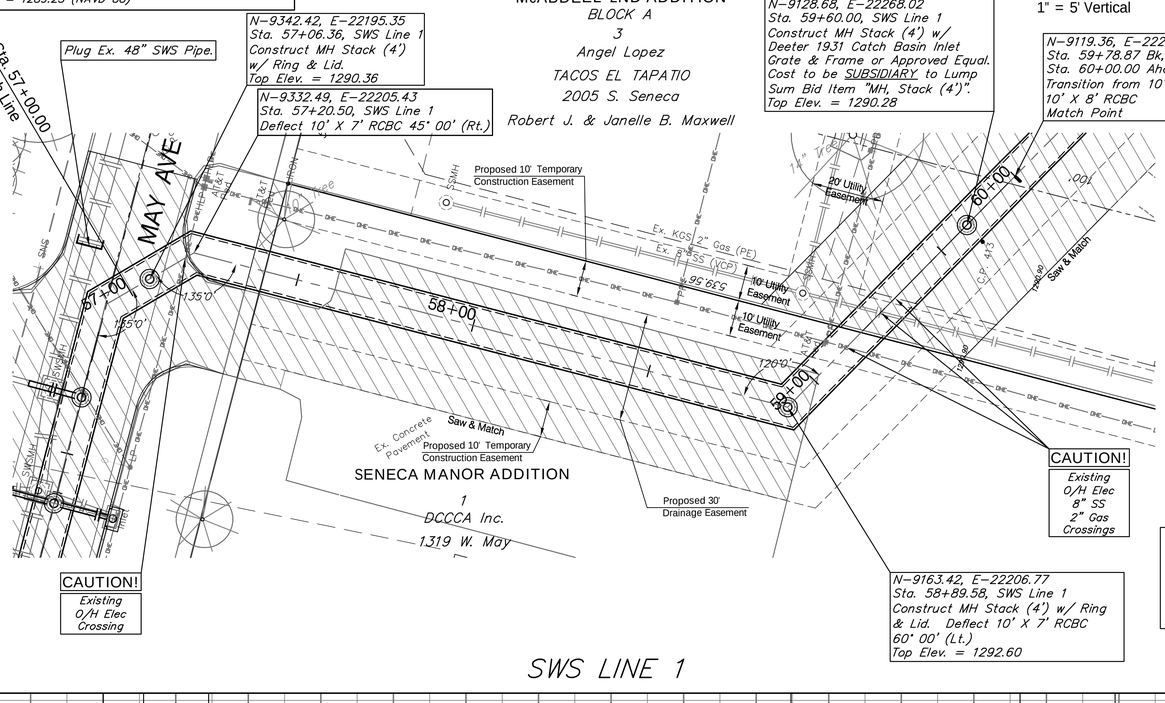
Baughman Company , P.A.
315 Ellis St. Wichita, KS 67211 P 316.262.7271 F 316.262.0149
ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

December 2012

SHEET
OF

BENCHMARK:
BM #12 – City of Wichita Disc Located in the Southwest Corner of the Intersection of Seneca and May, 77.2' West and 23.5' South of the Centerline of Both.
Elev. = 1289.23 (NAVD 88)

SCALE:
1" = 20' Horizontal
1" = 5' Vertical

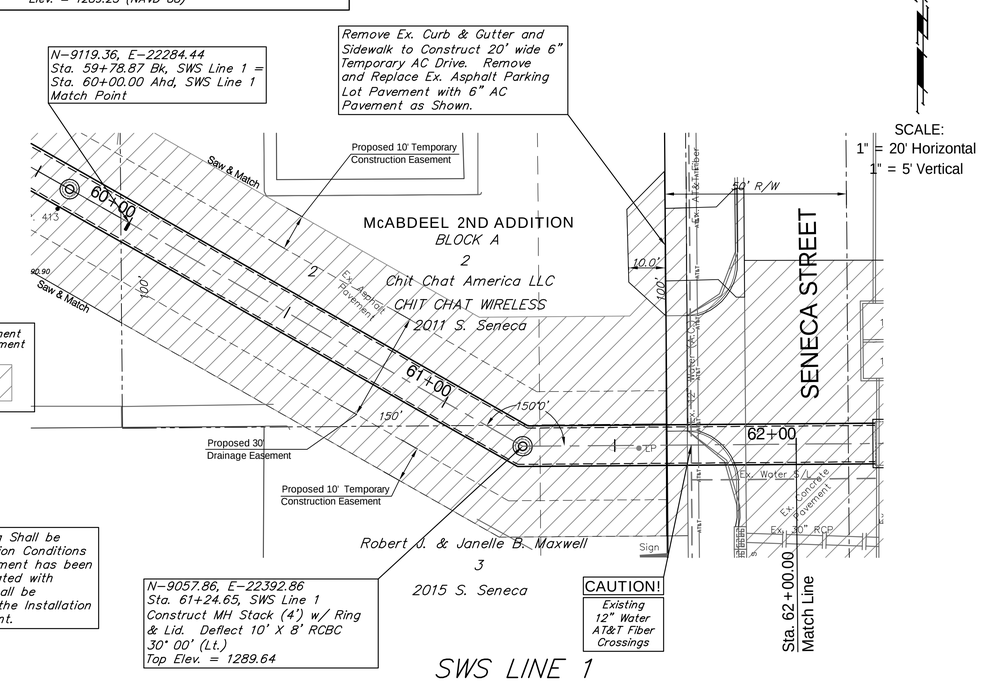


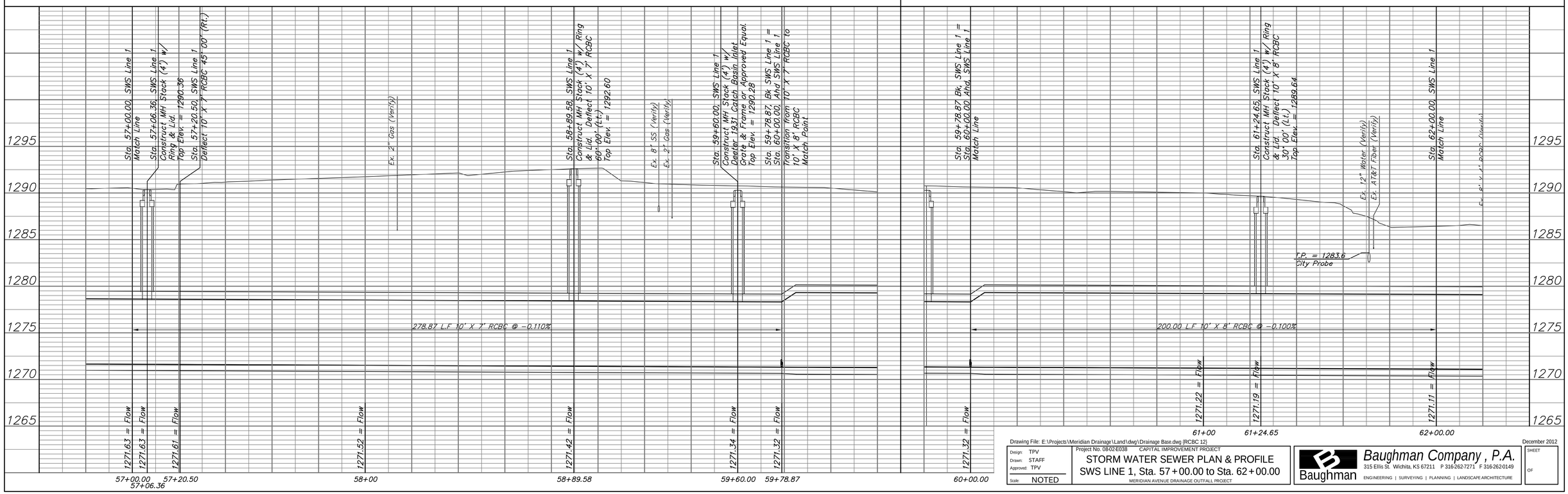
Areas of Full Pavement Removal & Replacement are Indicated By:

The Ex. Parking Lot Striping Shall be Returned to Pre-Construction Conditions after the Parking Lot Pavement has been Replaced. All Cost Associated with Striping the Parking Lot Shall be Considered SUBSIDIARY to the Installation of the Parking Lot Pavement.

BENCHMARK:
BM #12 – City of Wichita Disc Located in the Southwest Corner of the Intersection of Seneca and May, 77.2' West and 23.5' South of the Centerline of Both.
Elev. = 1289.23 (NAVD 88)

SCALE:
1" = 20' Horizontal
1" = 5' Vertical





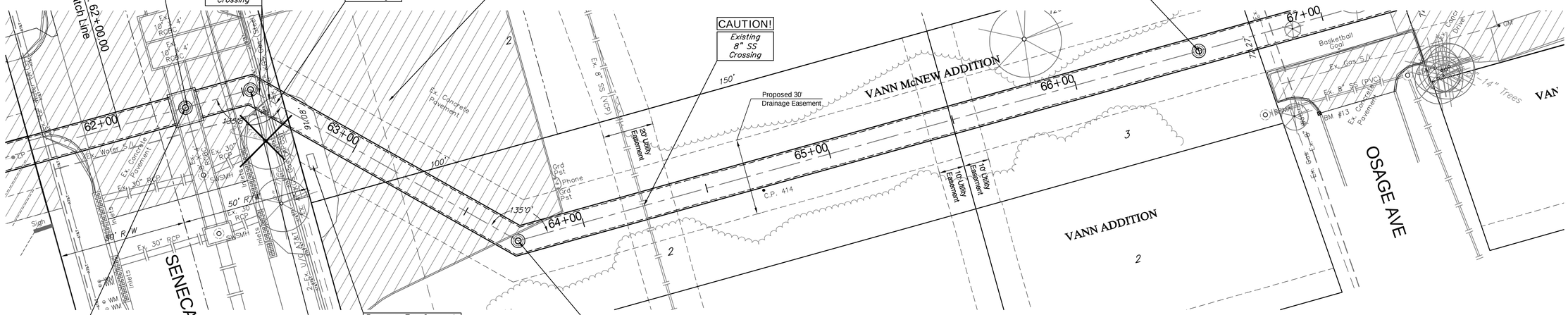
Drawing File: E:\Projects\Meridian Drainage\Land\dwg\Drainage Base.dwg {RCBC 12}

Design: TPV	Project No. 0802-E038 CAPITAL IMPROVEMENT PROJECT		December 2012
Drawn: STAFF	STORM WATER SEWER PLAN & PROFILE		SHEET
Approved: TPV	SWS LINE 1, Sta. 57+00.00 to Sta. 62+00.00		OF
Scale: NOTED	MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT		

Baughman Company , P.A.
315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149
ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

BENCHMARK:
BM #12 – City of Wichita Disc Located in the Southwest Corner of the Intersection of Seneca and May, 77.2' West and 23.5' South of the Centerline of Both. Elev. = 1289.23 (NAVD 88)

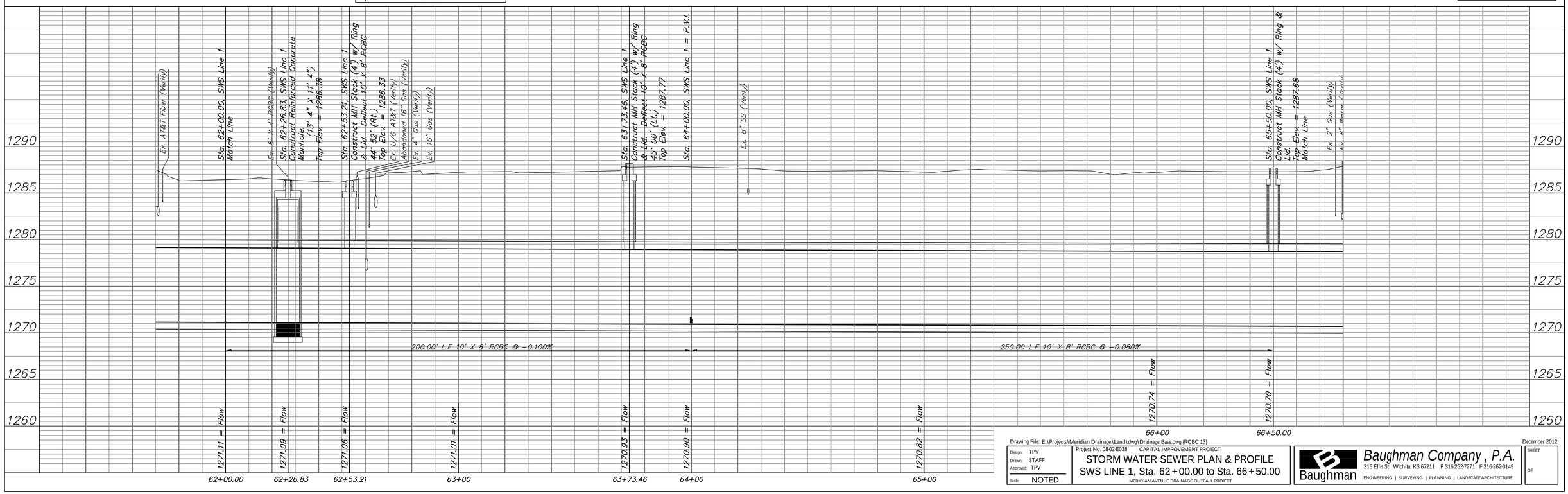
SCALE:
1" = 20' Horizontal
1" = 5' Vertical



SWS LINE 1

Note:
Trees/Shrubs to be removed are marked thus:

Areas of Full Pavement Removal & Replacement are Indicated By:



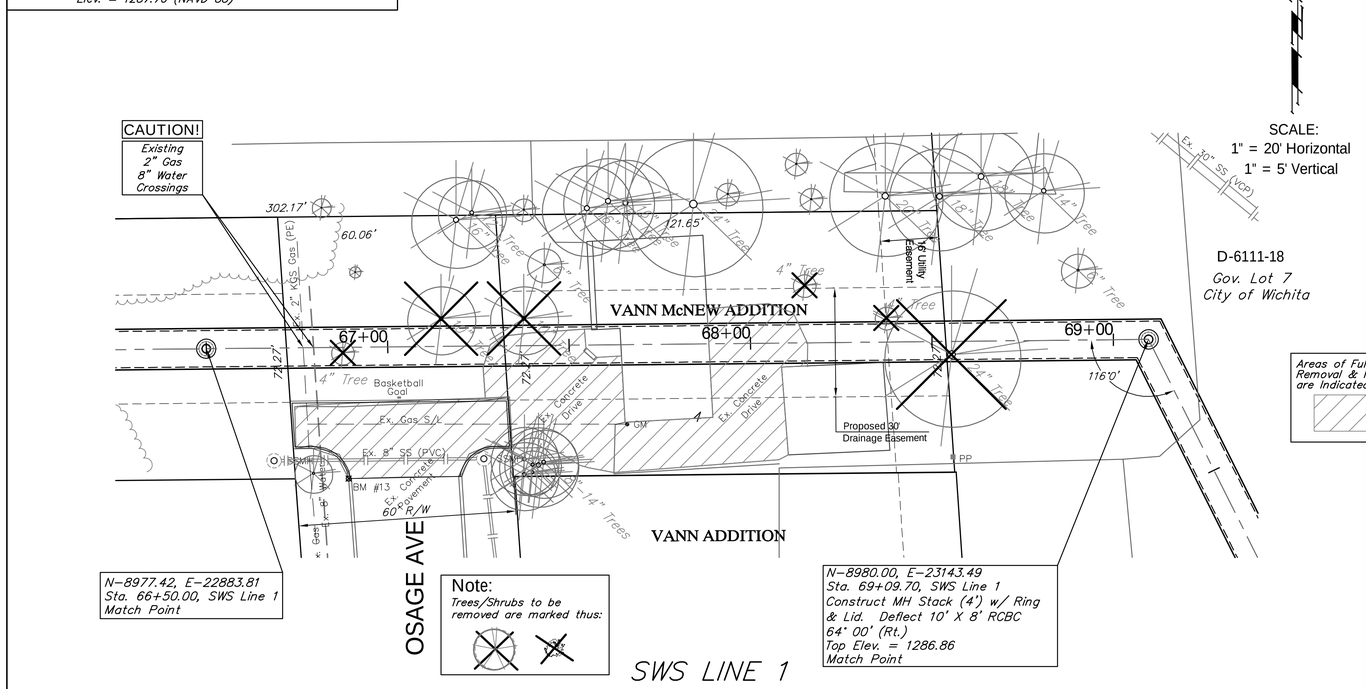
Drawing File: E:\Projects\Meridian Drainage\Land\dwg\Drainage Base.dwg (RCBC 13)

Design: TPV Drawn: STAFF Approved: TPV Scale: NOTED	Project No. 0802E038 CAPITAL IMPROVEMENT PROJECT STORM WATER SEWER PLAN & PROFILE SWS LINE 1, Sta. 62+00.00 to Sta. 66+50.00 MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT	Baughman Company , P.A. 315 Ellis St Wichita, KS 67211 P 316-262-7271 F 316-262-0149 ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

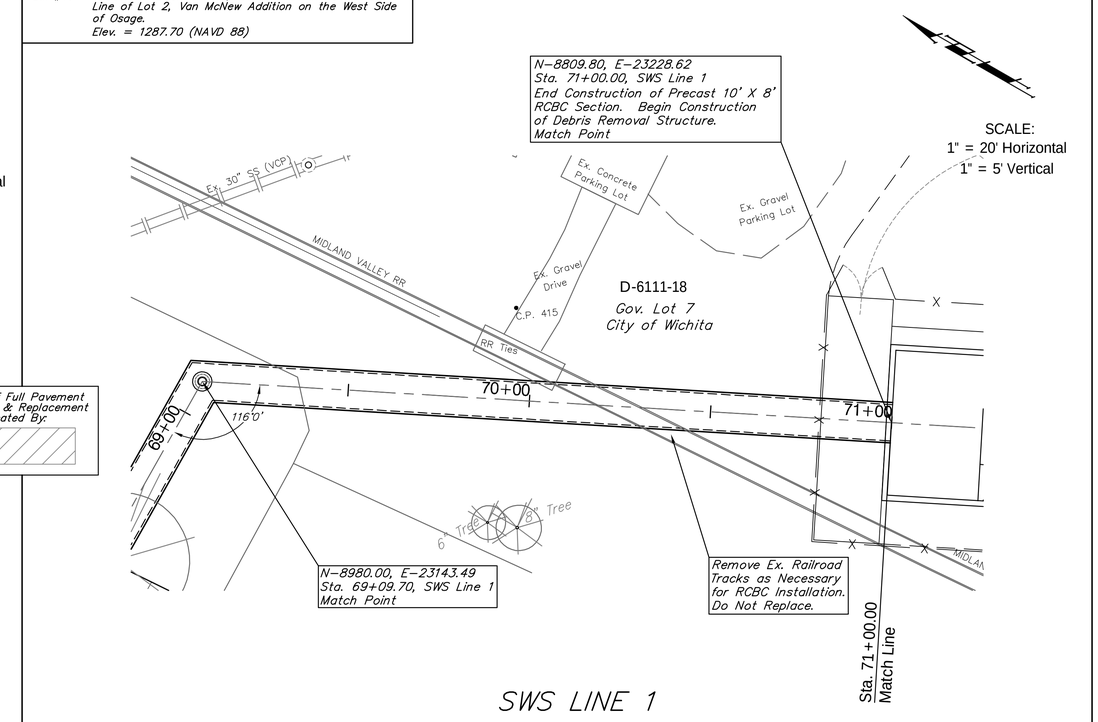
December 2012

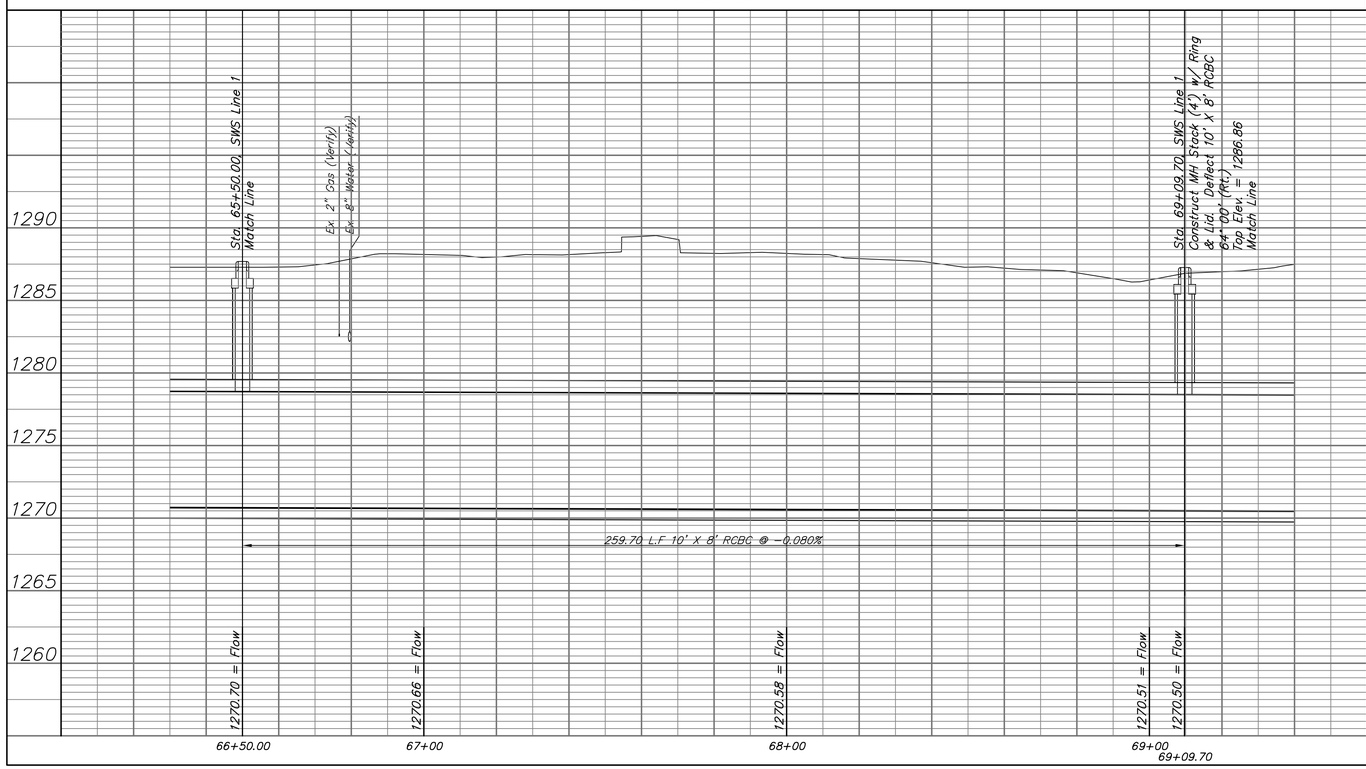
SHEET
OF

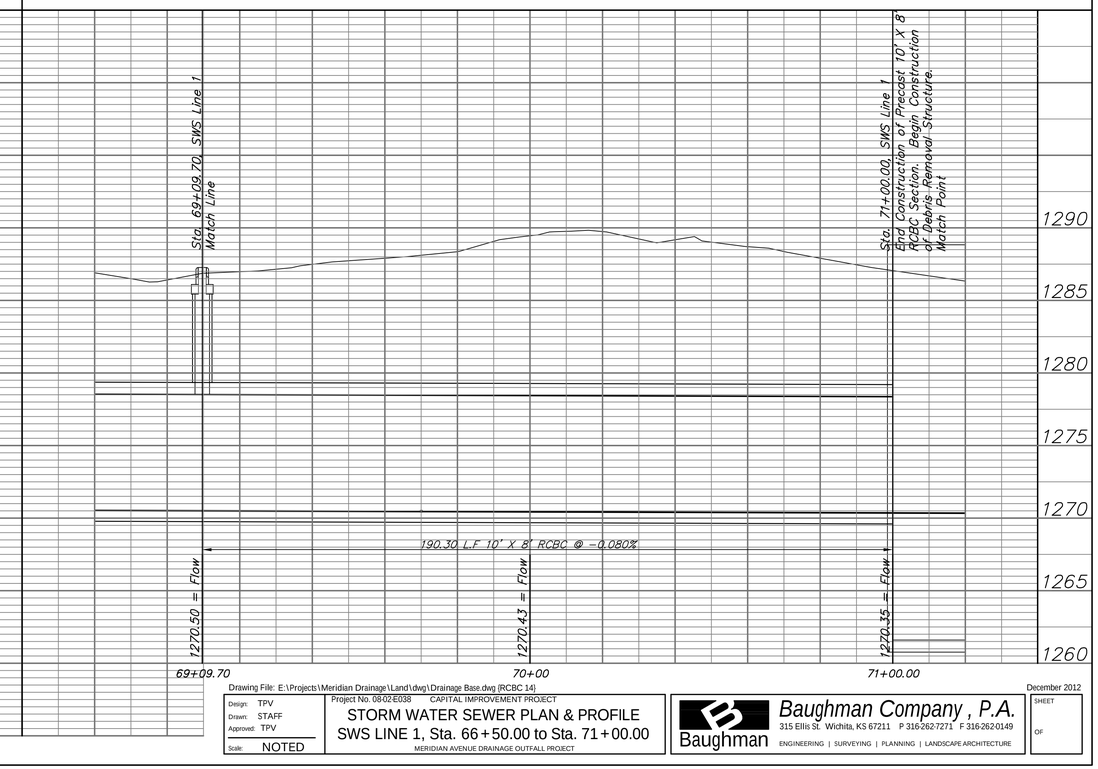
BENCHMARK:
BM #13 – Chiseled "□" on the Top of Curb at the South Lot Line of Lot 2, Van McNew Addition on the West Side of Osage.
Elev. = 1287.70 (NAVD 88)



BENCHMARK:
BM #13 – Chiseled "□" on the Top of Curb at the South Lot Line of Lot 2, Van McNew Addition on the West Side of Osage.
Elev. = 1287.70 (NAVD 88)







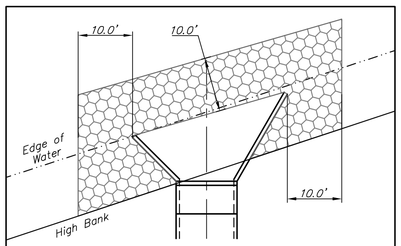
Drawing File: E:\Projects\Meridian Drainage\Land\dwg\Drainage Base.dwg [RCBC 14]

December 2012

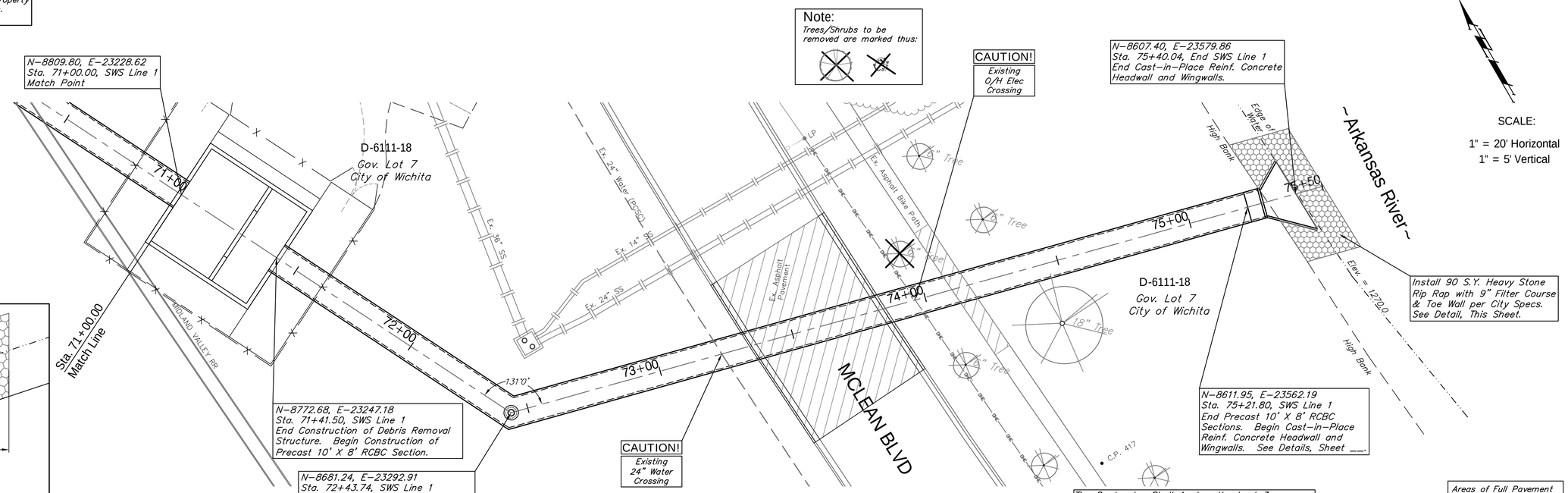
Design: TPV Drawn: STAFF Approved: TPV Scale: NOTED	Project No. 08-02-E038 CAPITAL IMPROVEMENT PROJECT STORM WATER SEWER PLAN & PROFILE SWS LINE 1, Sta. 66+50.00 to Sta. 71+00.00 MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT	Baughman Company , P.A. 315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149 ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

SHEET
OF

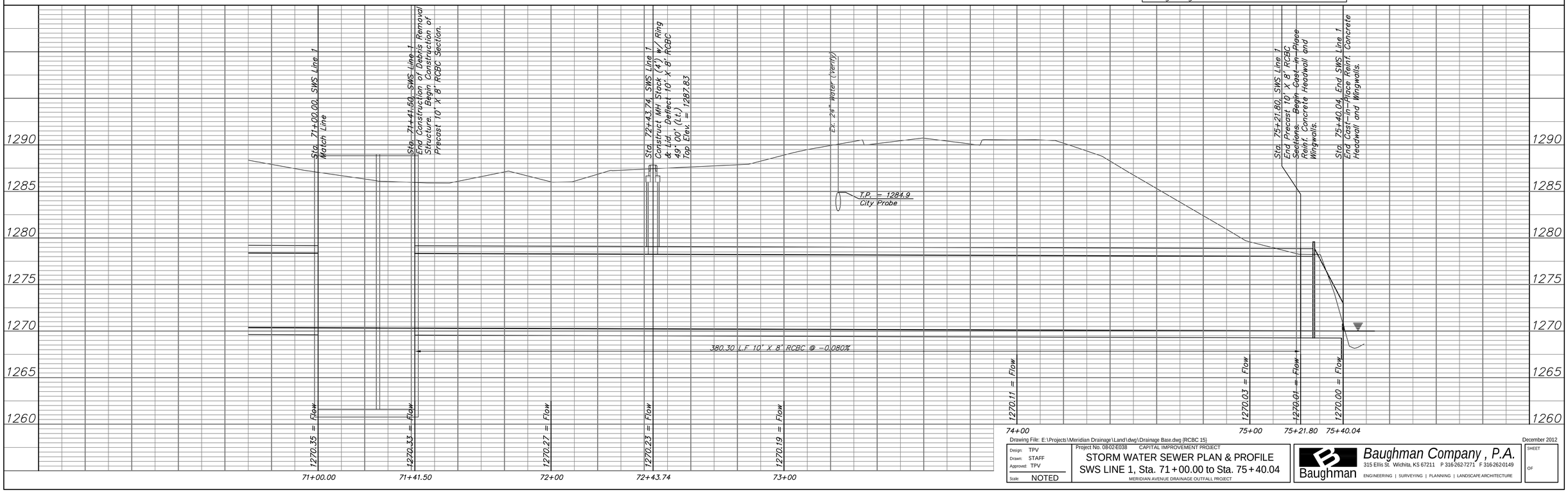
BENCHMARK:
BM #14 – Chiseled "□" on the Top of Curb at the South Property Line of MTA Addition on the West Side of McLean. Elev. = 1290.66 (NAVD 88)



Heavy Stone Rip Rap Detail



SWS LINE 1



Drawing File: E:\Projects\Meridian Drainage\Land\dwg\Drainage Base.dwg (RCBC 15)

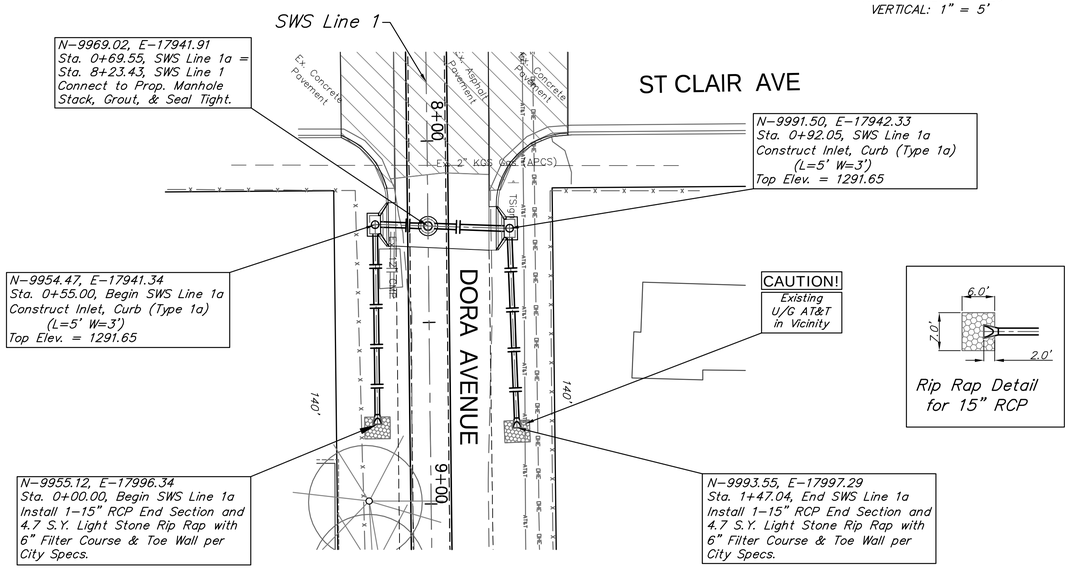
December 2012

Design: TPV Drawn: STAFF Approved: TPV Scale: NOTED	Project No. 0802E038 CAPITAL IMPROVEMENT PROJECT STORM WATER SEWER PLAN & PROFILE SWS LINE 1, Sta. 71+00.00 to Sta. 75+40.04 MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT	Baughman Company , P.A. 315 Ellis St Wichita, KS 67211 P 316-262-7271 F 316-262-0149 Baughman ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

SHEET
OF

BENCHMARK:
BM #3 – Chiseled "□" on the North Curb Return of the Northwest Corner of Dora and St. Clair, 34' North and 13' West of the Centerline of Both. Elev. = 1292.01 (NAVD 88)

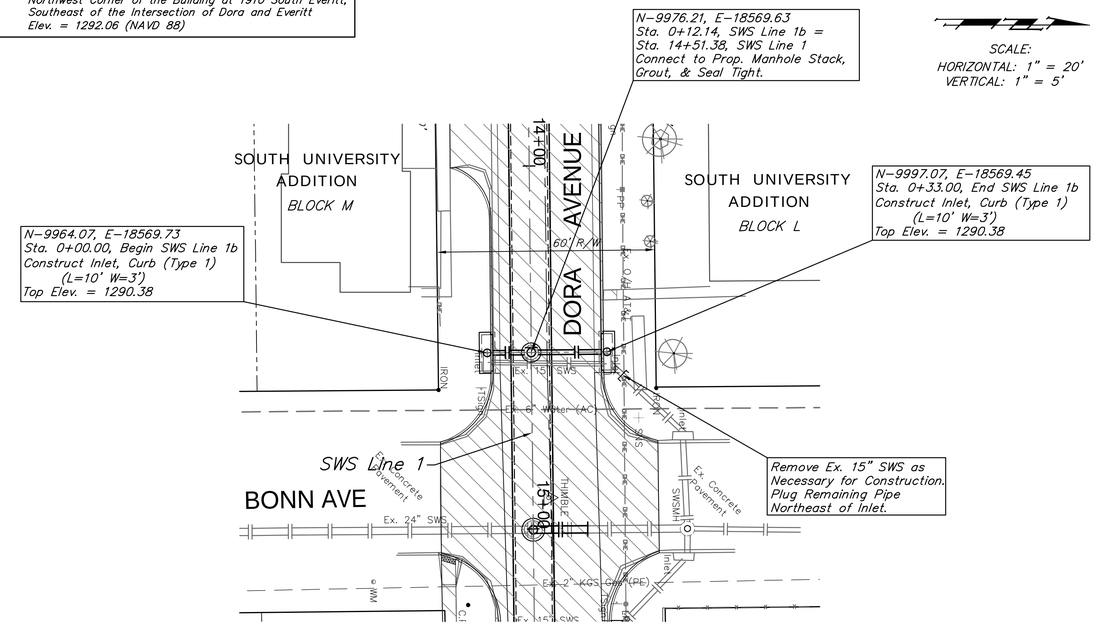
SCALE:
HORIZONTAL: 1" = 20'
VERTICAL: 1" = 5'



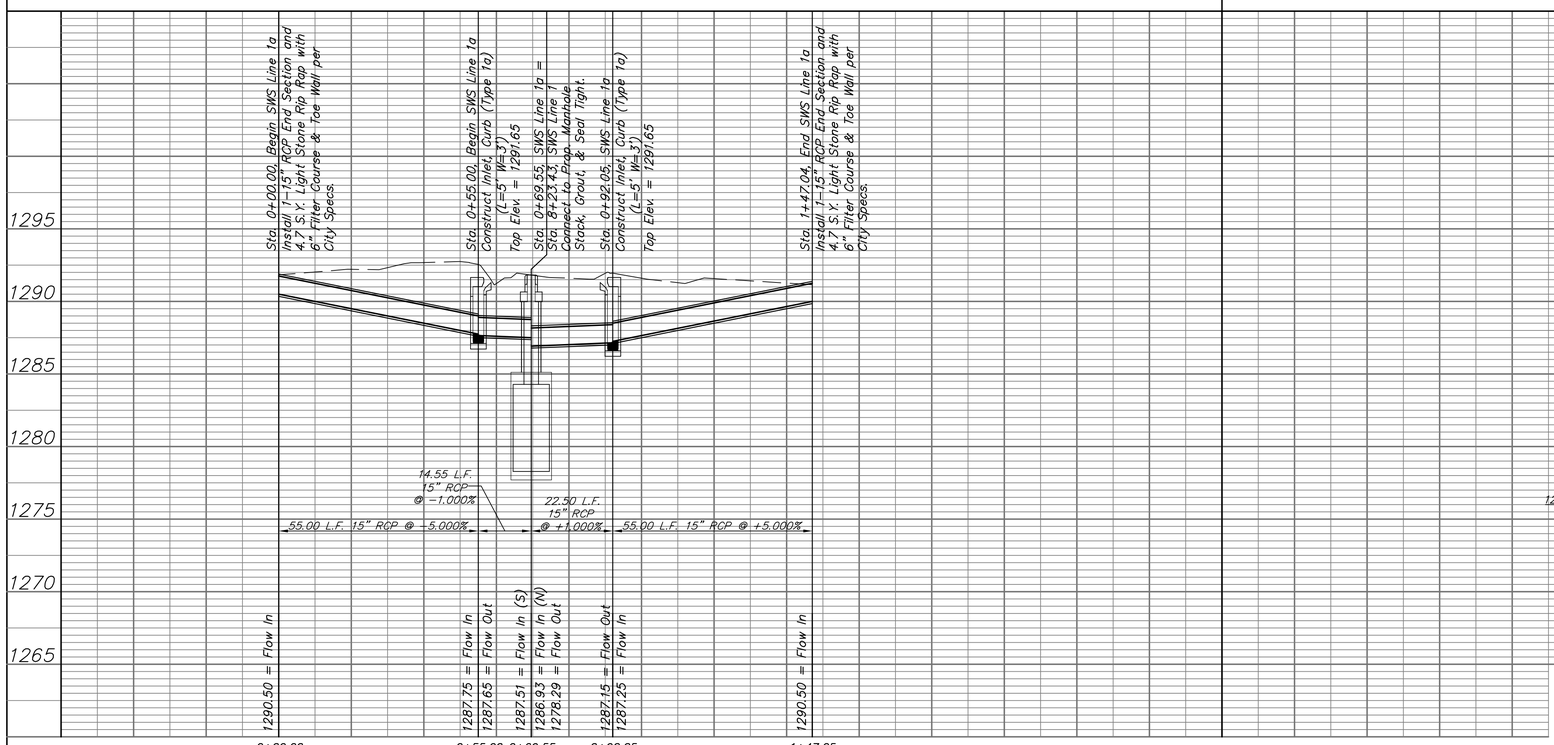
SWS Line 1a

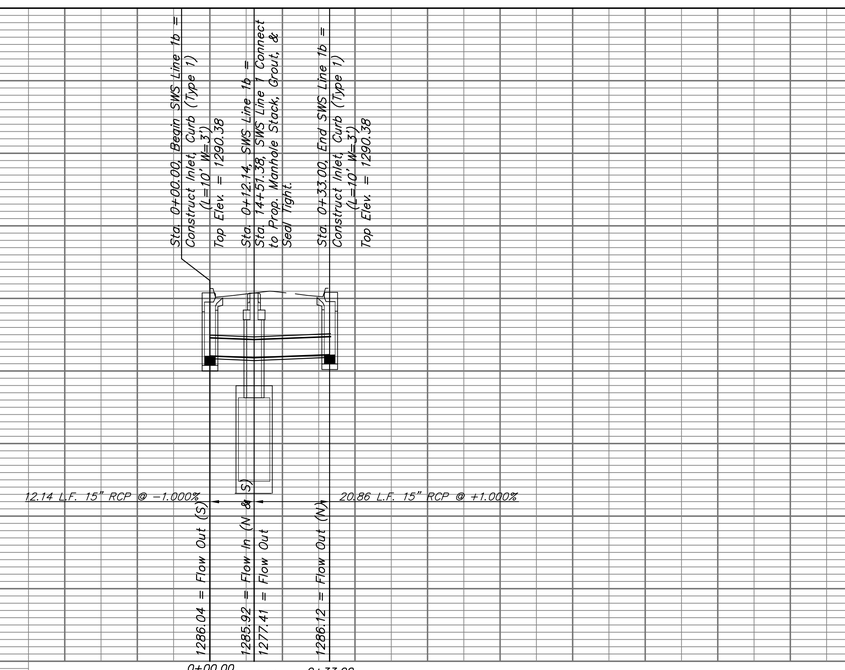
BENCHMARK:
BM #4 – Chiseled "□" on the Concrete Sidewalk at the Northwest Corner of the Building at 1910 South Everitt, Southeast of the Intersection of Dora and Everitt Elev. = 1292.06 (NAVD 88)

SCALE:
HORIZONTAL: 1" = 20'
VERTICAL: 1" = 5'



SWS Line 1b





Drawing File: E:\Projects\Meridian Drainage\Land\dwg\Drainage Base.dwg [SWS 01]

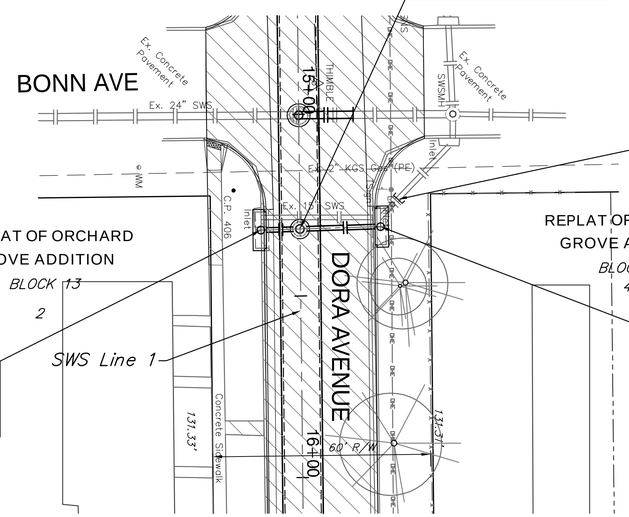
December 2012

Design: TPV Drawn: STAFF Approved: TPV Scale: NOTED	Project No. 0802-E038 CAPITAL IMPROVEMENT PROJECT STORM WATER SEWER PLAN & PROFILE SWS Line 1a & SWS Line 1b MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT	Baughman Company , P.A. 315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149 ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

SHEET
OF

BENCHMARK:
BM #5 – Chiseled "□" on the North Curb Return of the Drive to 2011 W. Dora, 60' South and 15' West of the Centerlines of Dora and Hiram.
Elev. = 1291.73 (NAVD 88)

SCALE:
HORIZONTAL: 1" = 20'
VERTICAL: 1" = 5'



N–9977.13, E–18649.79
Sta. 0+10.78, SWS Line 1c =
Sta. 15+31.56, SWS Line 1
Connect to Prop. Manhole
Stack, Grout, & Seal Tight.

Remove Ex. 15" SWS as Necessary for Construction. Plug Remaining Pipe Northwest of Inlet.

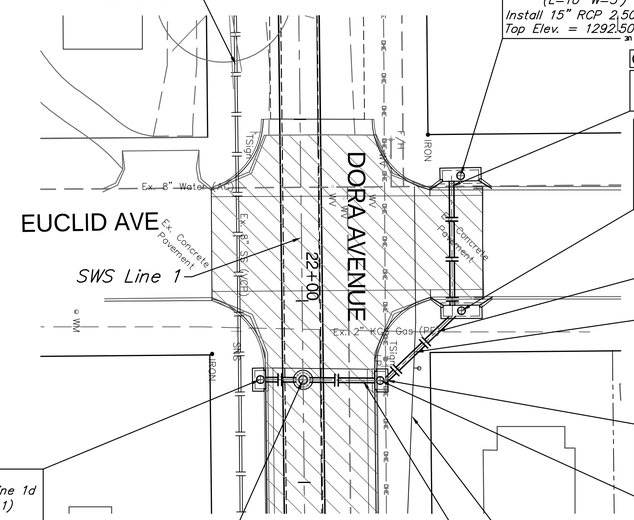
N–9999.34, E–18649.14
Sta. 0+33.01, End SWS Line 1c
Construct Inlet, Curb (Type 1)
(L=10' W=3')
Top Elev. = 1290.80

N–9966.35, E–18650.10
Sta. 0+00.00, Begin SWS Line 1c
Construct Inlet, Curb (Type 1)
(L=10' W=3')
Top Elev. = 1290.80

SWS Line 1c

BENCHMARK:
BM #6 – Chiseled "□" located 10.5' North of the Curb Return of the Northwest Corner of Dora and Glenn, 41' North and 16' West of the Centerline of Both.
Elev. = 1292.81 (NAVD 88)

SCALE:
HORIZONTAL: 1" = 20'
VERTICAL: 1" = 5'



N–10025.93, E–19283.75
Sta. 0+98.71, End SWS Line 1d
Construct Inlet, Curb (Type 1a)
(L=10' W=3')
Install 15" RCP 2.50' South of Center
Top Elev. = 1292.50

CAUTION!
Existing 8" Water Crossing

N–10026.18, E–19320.93
Sta. 0+61.53, SWS Line 1d
Construct Inlet, Curb (Type 1a)
(L=10' W=3')
Install 15" RCP 2.50' South of Center
Top Elev. = 1292.00

CAUTION!
Existing 2" Gas Crossing

CAUTION!
Proposed 8" Water Crossing

CAUTION!
Existing O/H Elec Crossing

N–9973.27, E–19339.88
Sta. 0+00.00, Begin SWS Line 1d
Construct Inlet, Curb (Type 1)
(L=5' W =3')
Top Elev. = 1292.00

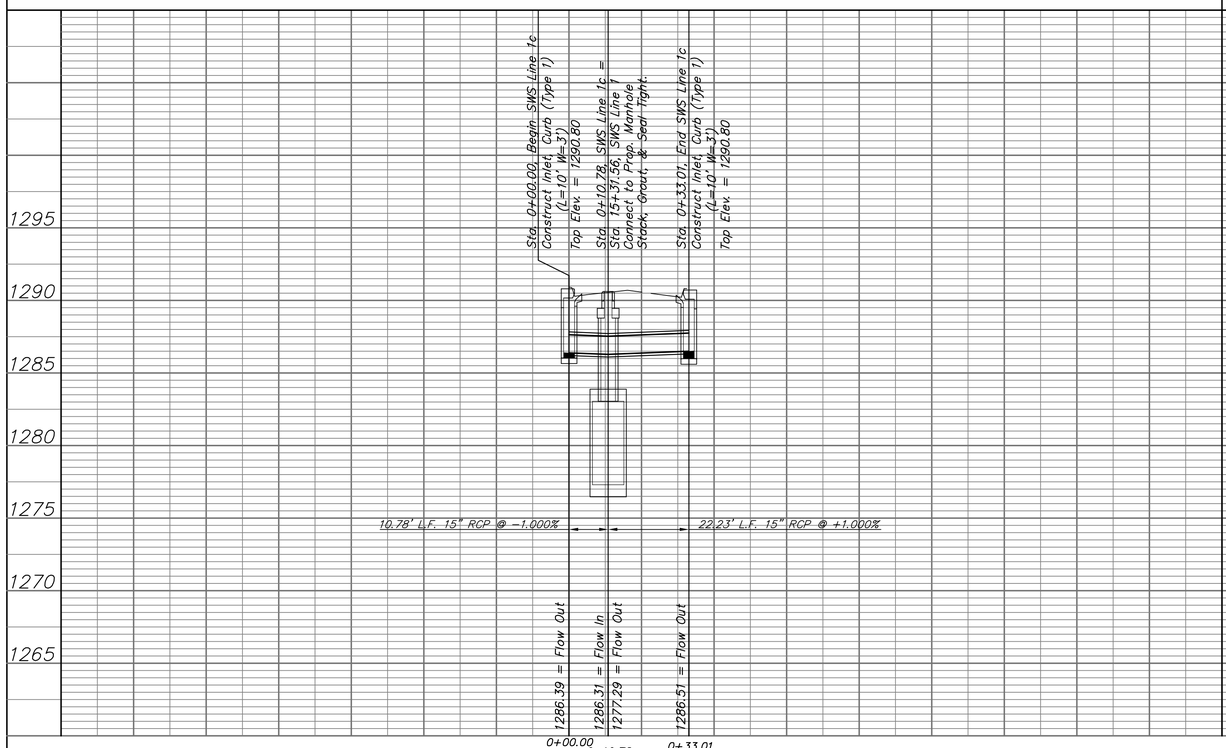
N–9985.03, E–19339.95
Sta. 0+11.76, SWS Line 1d =
Sta. 22+21.76, SWS Line 1
Connect to Prop. Manhole
Stack, Grout, & Seal Tight.

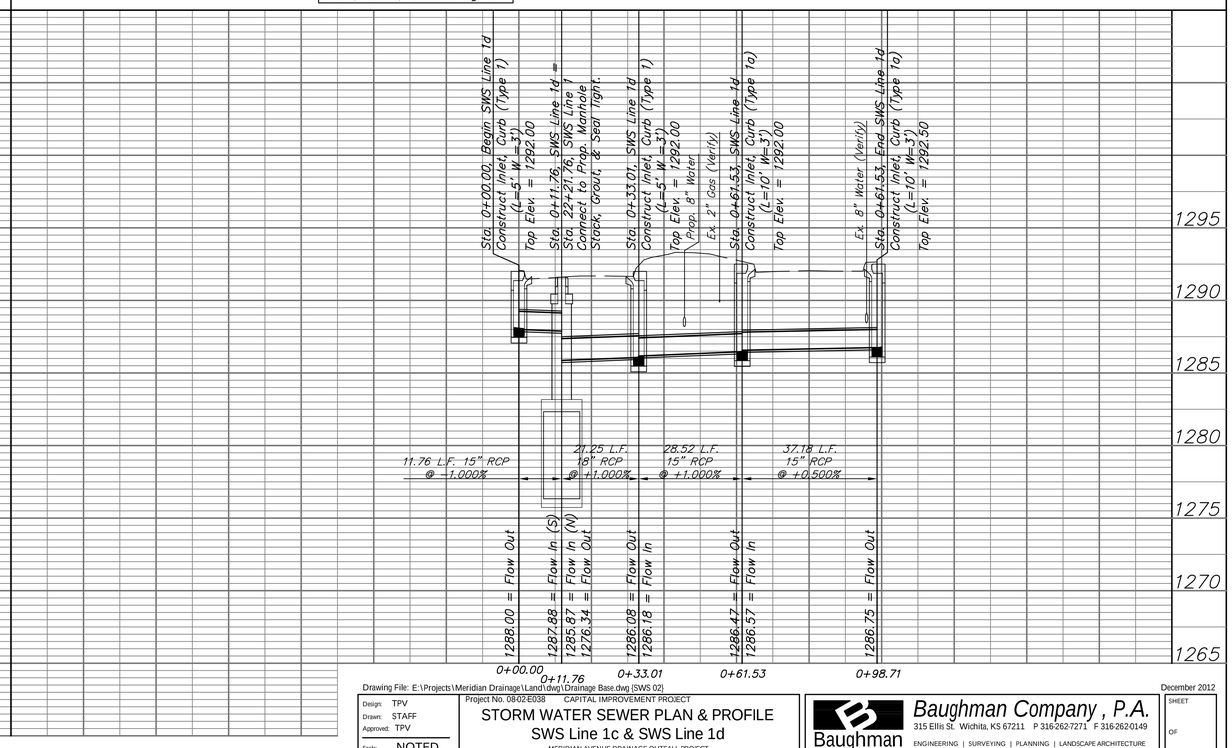
Water Line 1

CAUTION!
Existing 6" Water Crossing

N–10006.27, E–19340.11
Sta. 0+33.01, SWS Line 1d
Construct Inlet, Curb (Type 1)
(L=5' W =3')
Top Elev. = 1292.00

SWS Line 1d





Drawing File: E:\Projects\Meridian Drainage\Land\dwg\Drainage Base.dwg [SWS 02]

December 2012

Design:	TPV
Drawn:	STAFF
Approved:	TPV
Scale:	NOTED

Project No. 0802E038 CAPITAL IMPROVEMENT PROJECT

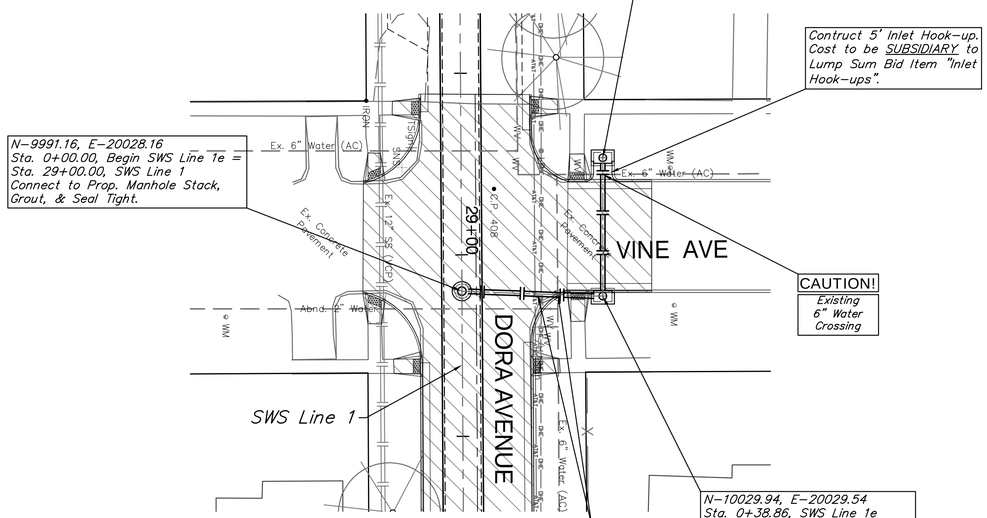
STORM WATER SEWER PLAN & PROFILE
SWS Line 1c & SWS Line 1d
MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT

Baughman
Baughman Company , P.A.
315 Ellis St Wichita, KS 67211 P 316-262-7271 F 316-262-0149
ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

SHEET
OF

BENCHMARK:
BM #7 – Chiseled "□" on the North Curb Return of the Drive to 1901 S. Millwood, 36' South and 15' West of the Centerlines of Dora and Millwood.
Elev. = 1291.22 (NAVD 88)

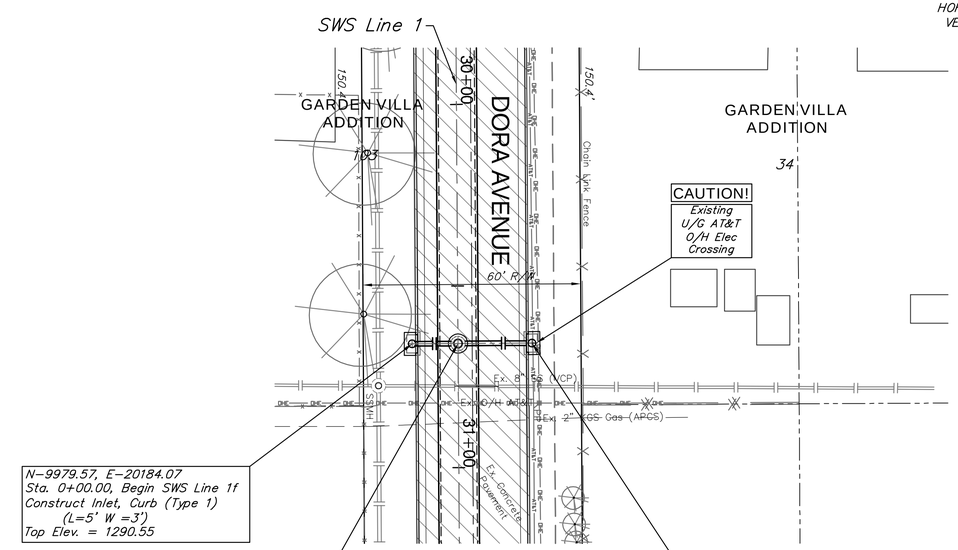
SCALE:
HORIZONTAL: 1" = 20'
VERTICAL: 1" = 5'



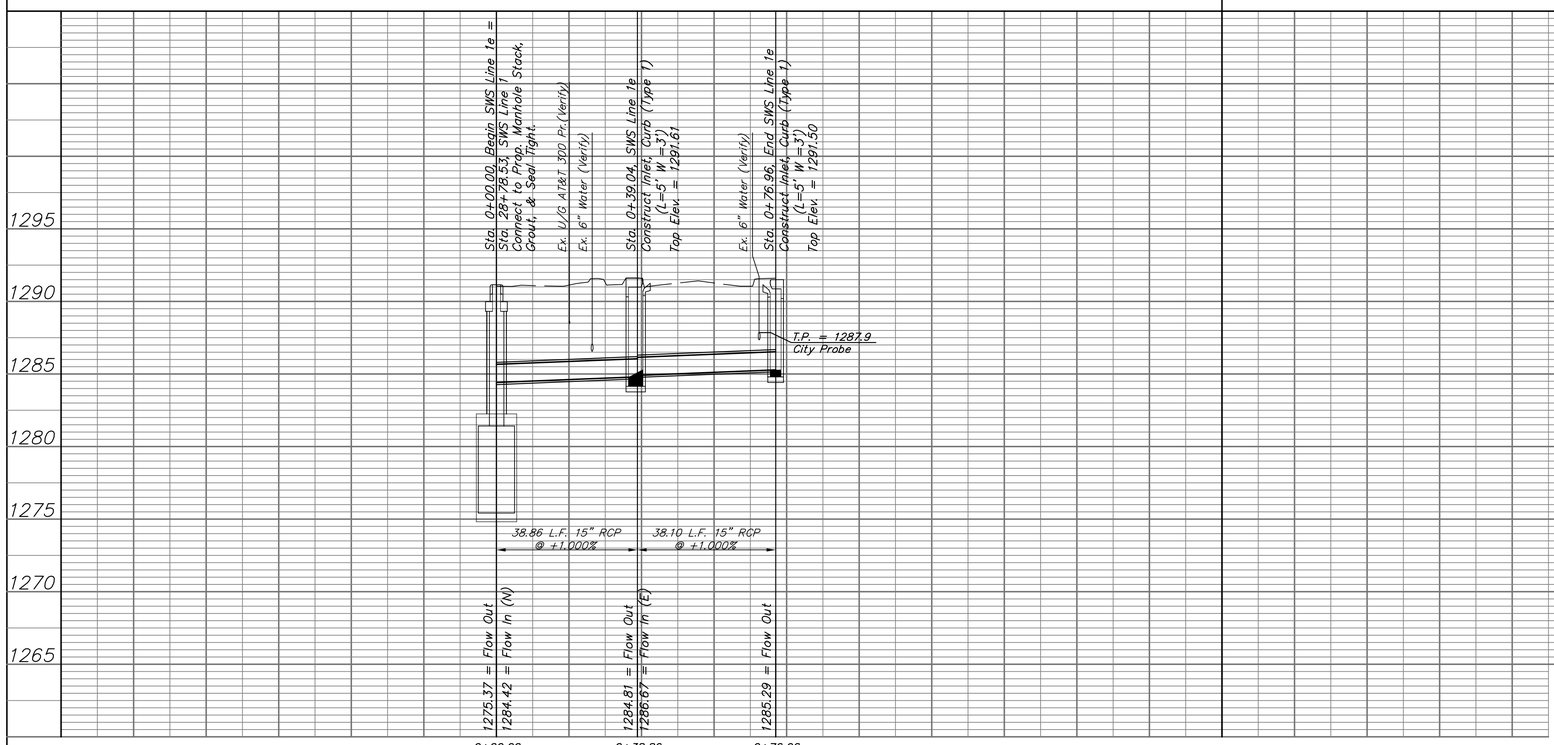
SWS Line 1e

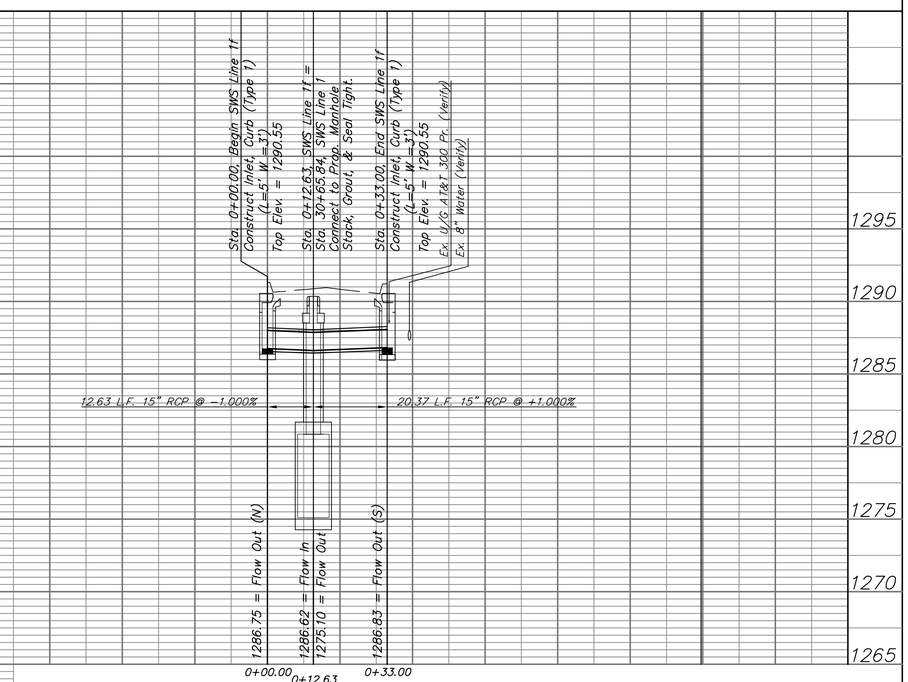
BENCHMARK:
BM #7 – Chiseled "□" on the North Curb Return of the Drive to 1901 S. Millwood, 36' South and 15' West of the Centerlines of Dora and Millwood.
Elev. = 1291.22 (NAVD 88)

SCALE:
HORIZONTAL: 1" = 20'
VERTICAL: 1" = 5'



SWS Line 1f





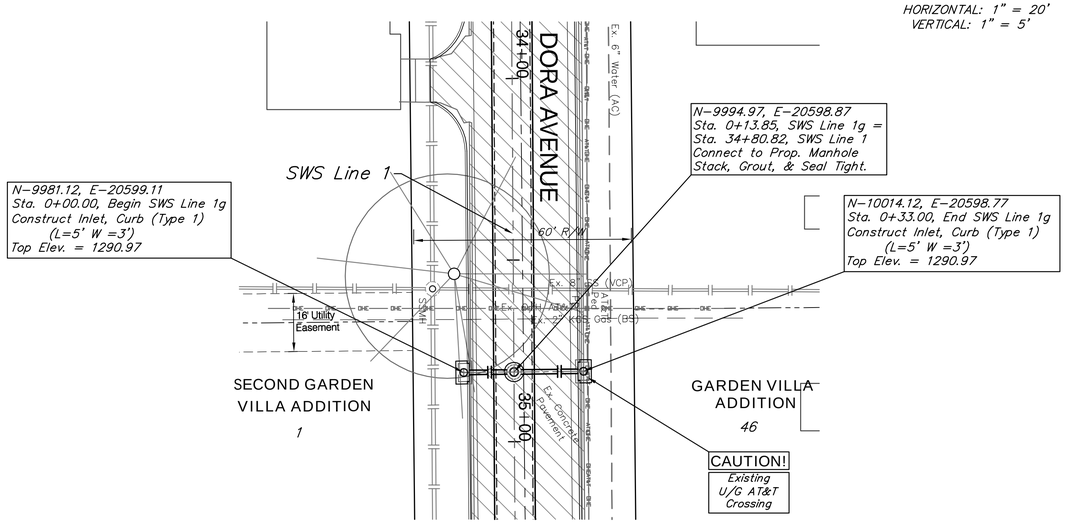
Drawing File: E:\Projects\Meridian Drainage\Land\dwg\Drainage Base.dwg [SWS 03]

December 2012

Design: TPV Drawn: STAFF Approved: TPV Scale: NOTED	Project No. 08-02-E038 CAPITAL IMPROVEMENT PROJECT STORM WATER SEWER PLAN & PROFILE SWS Line 1f & SWS Line 1g MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT	Baughman Company , P.A. 315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149 ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE SHEET OF

BENCHMARK:
BM #7 – Chiseled "□" on the North Curb Return of the Drive to 1901 S. Millwood, 36' South and 15' West of the Centerlines of Dora and Millwood. Elev. = 1291.22 (NAVD 88)

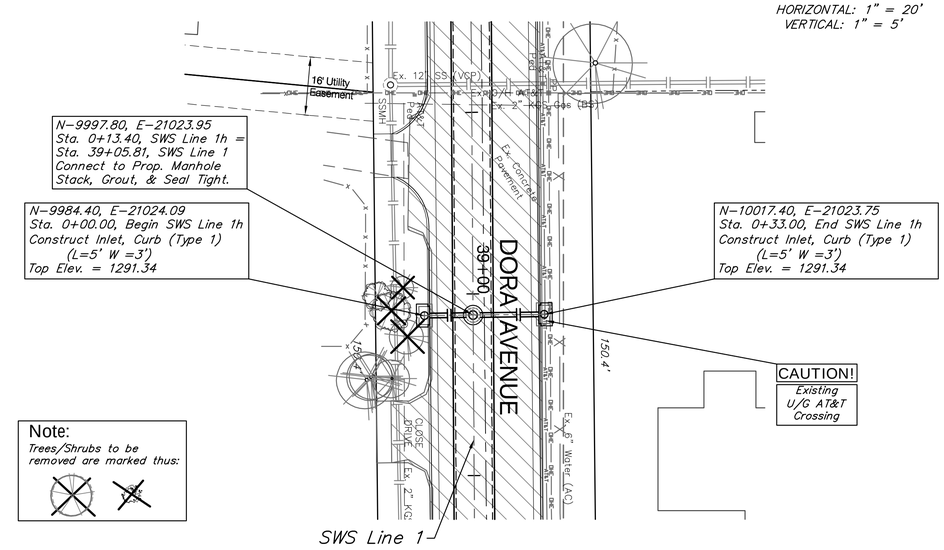
SCALE:
HORIZONTAL: 1" = 20'
VERTICAL: 1" = 5'



SWS Line 1g

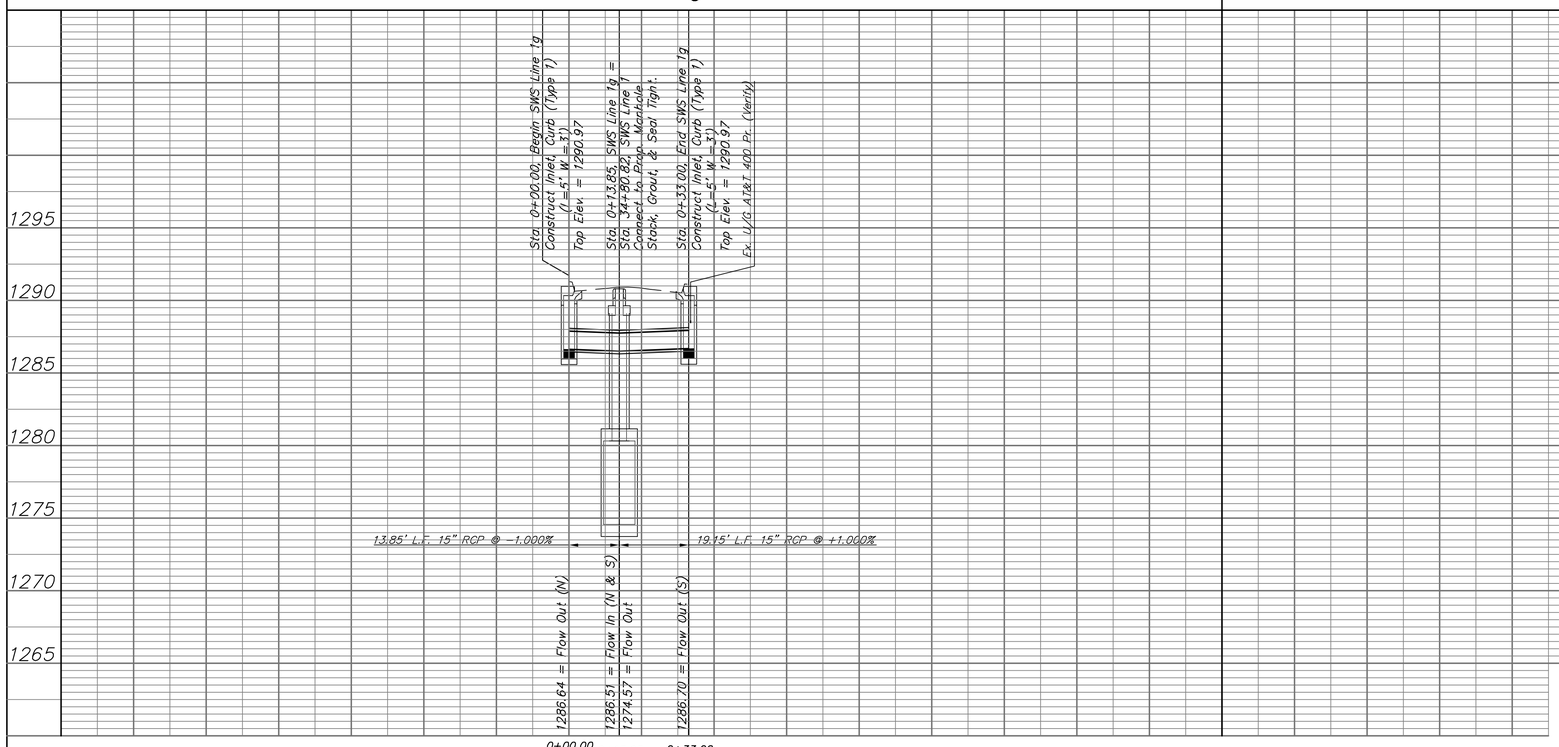
BENCHMARK:
BM #8 – Chiseled "□" on the South Curb Return of the Drive to 1836 S. Fern, 68' North and 16' East of the Centerlines of Dora and Fern. Elev. = 1291.79 (NAVD 88)

SCALE:
HORIZONTAL: 1" = 20'
VERTICAL: 1" = 5'

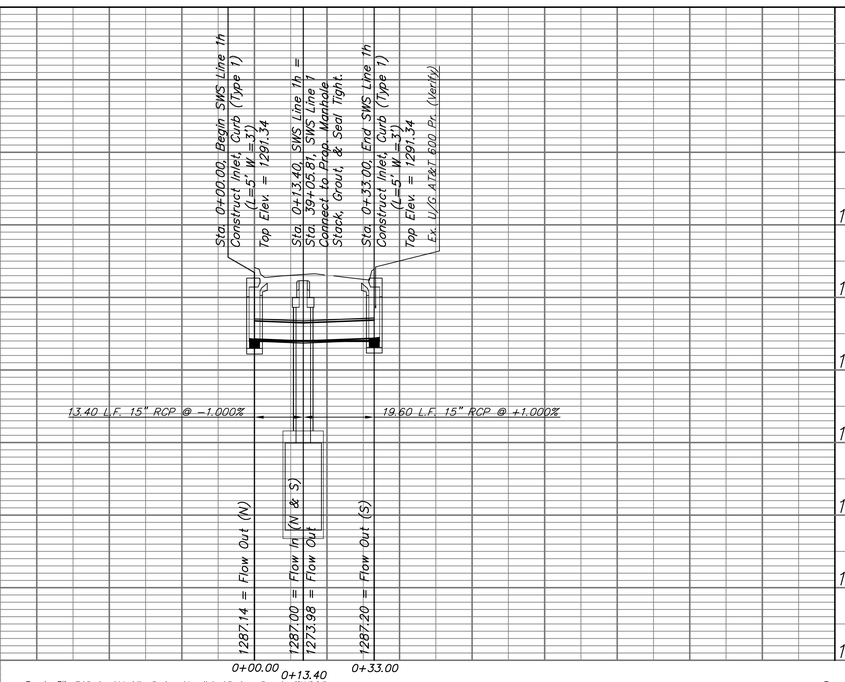


Note:
Trees/Shrubs to be removed are marked thus:

SWS Line 1h



SWS Line 1g



SWS Line 1h

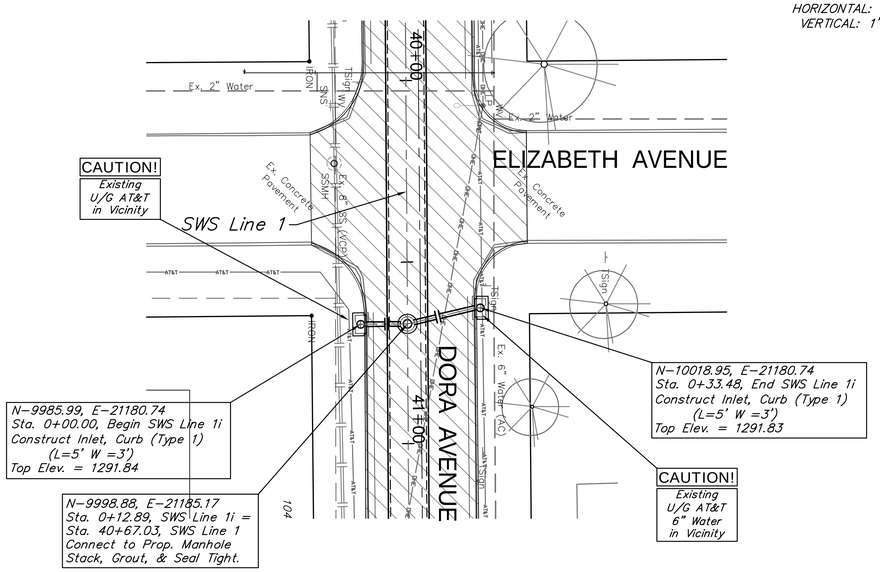
Drawing File: E:\Projects\Meridian Drainage\Land\dwg\Drainage Base.dwg [SWS 04]

December 2012

Design: TPV Drawn: STAFF Approved: TPV Scale: NOTED	Project No. 0802-E038 CAPITAL IMPROVEMENT PROJECT STORM WATER SEWER PLAN & PROFILE SWS Line 1g & SWS Line 1h MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT	Baughman Company , P.A. 315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149 ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE SHEET OF

BENCHMARK:
BM #9 – Chiseled "□" on the North Curb Return of the Drive to 1341 W. Dora, 68' South and 16' East of the Centerlines of Dora and Martinson.
Elev. = 1292.58 (NAVD 88)

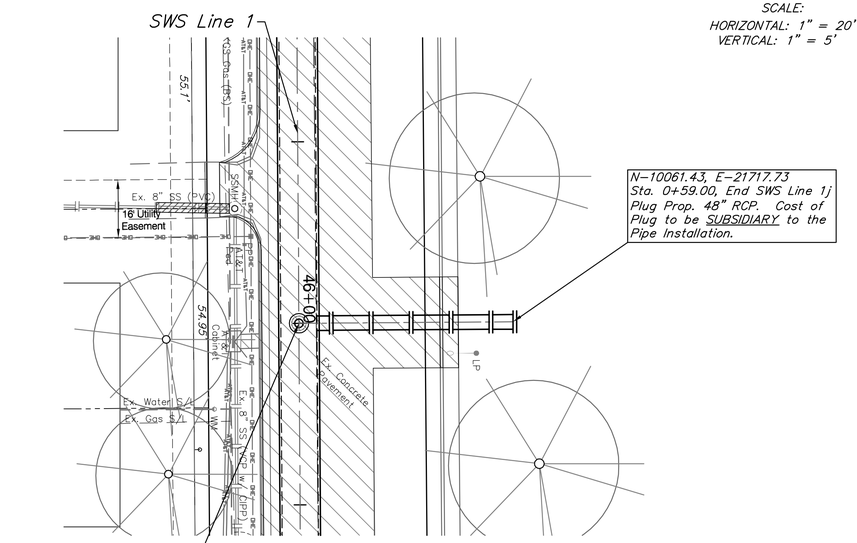
SCALE:
HORIZONTAL: 1" = 20'
VERTICAL: 1" = 5'



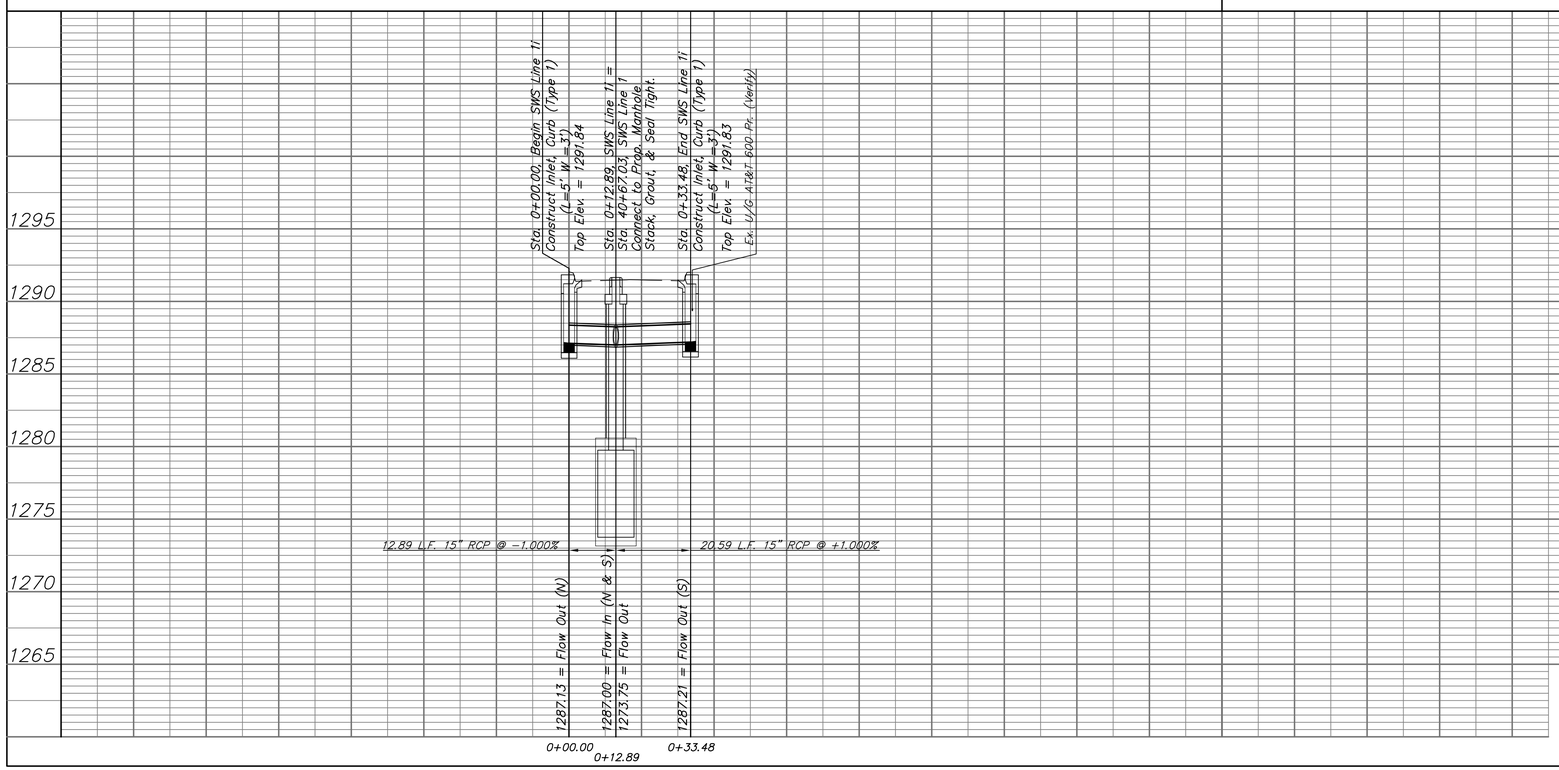
SWS Line 1i

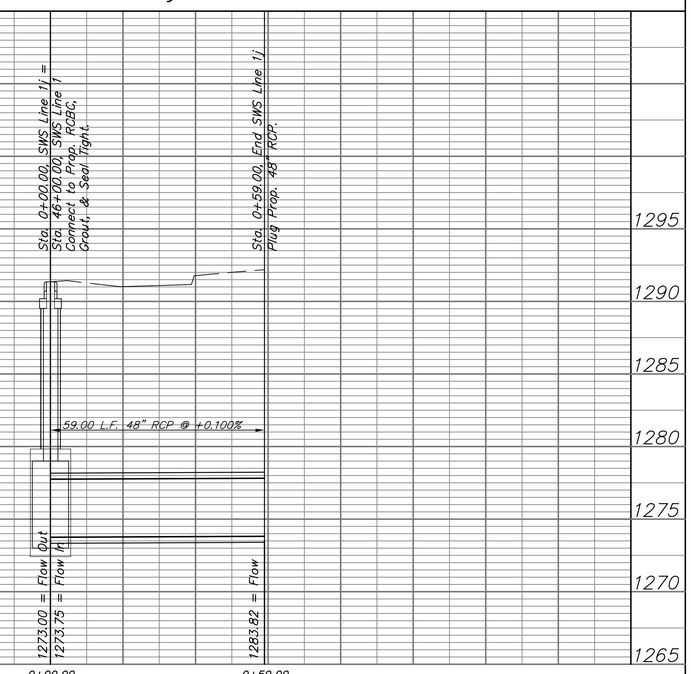
BENCHMARK:
BM #10 – Chiseled "□" on the Top of Curb East of the Sidewalk, 15' North and 35' East of the Centerlines of Dora and Exposition.
Elev. = 1290.70 (NAVD 88)

SCALE:
HORIZONTAL: 1" = 20'
VERTICAL: 1" = 5'



SWS Line 1j



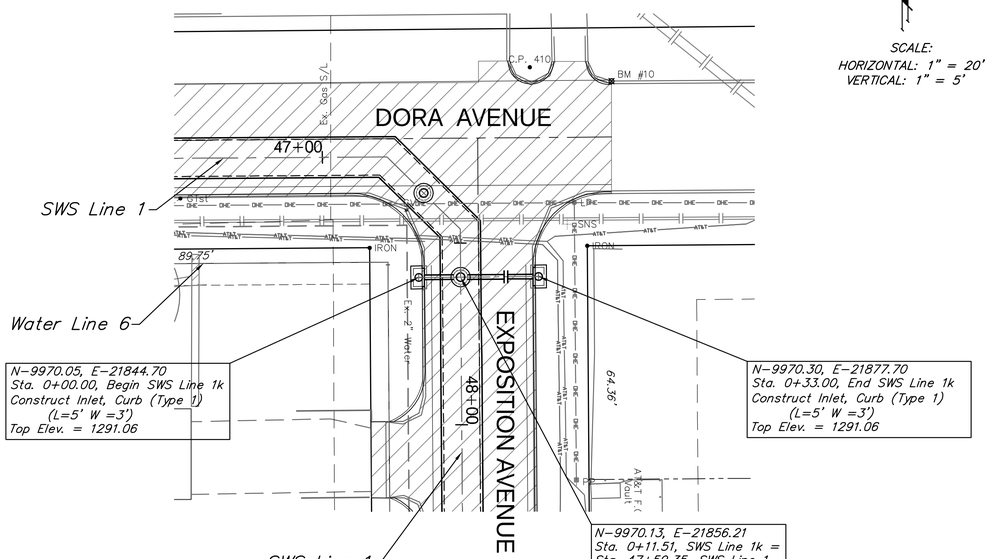


Drawing File: E:\Projects\Meridian Drainage\Land\dwg\Drainage Base.dwg [SWS 05]
December 2012

Design: TPV Drawn: STAFF Approved: TPV Scale: NOTED	Project No. 0802-E038 CAPITAL IMPROVEMENT PROJECT STORM WATER SEWER PLAN & PROFILE SWS Line 1i & SWS Line 1j MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT	Baughman Company , P.A. 315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149 ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE SHEET OF

BENCHMARK:
BM #10 – Chiseled "□" on the Top of Curb East of the Sidewalk, 15' North and 35' East of the Centerlines of Dora and Exposition.
Elev. = 1290.70 (NAVD 88)

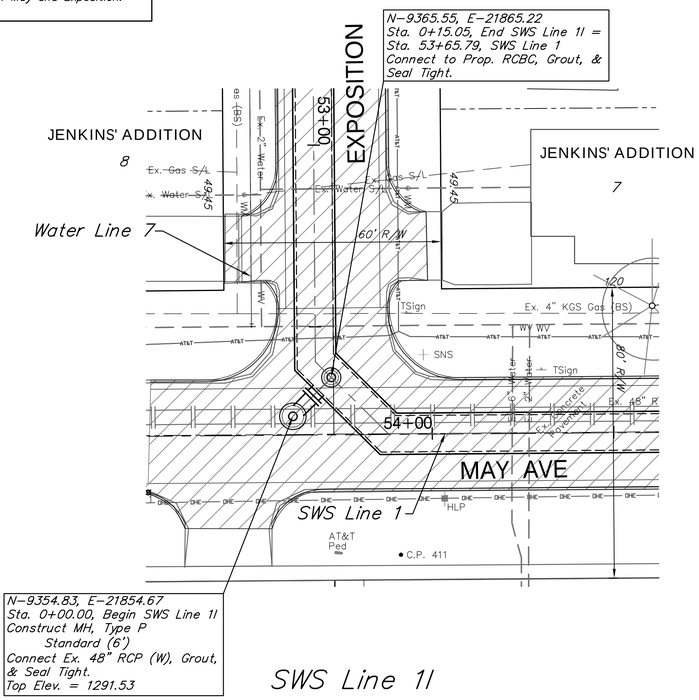
SCALE:
HORIZONTAL: 1" = 20'
VERTICAL: 1" = 5'



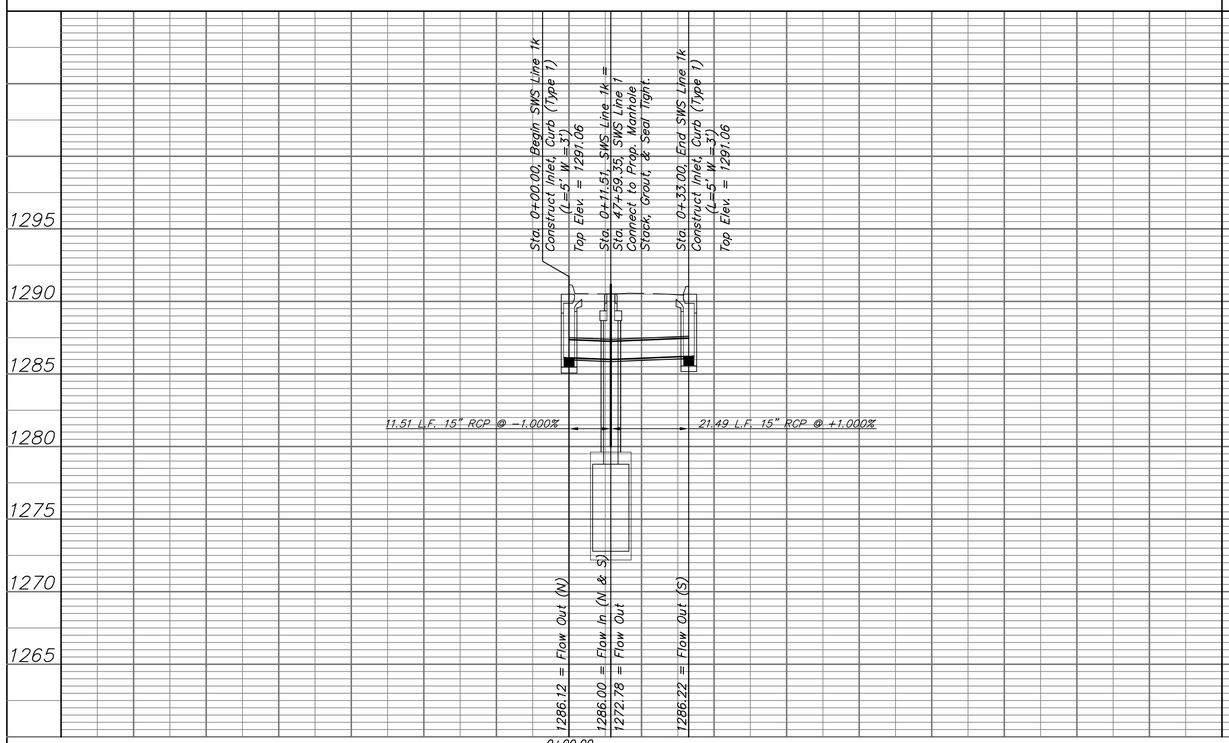
SWS Line 1k

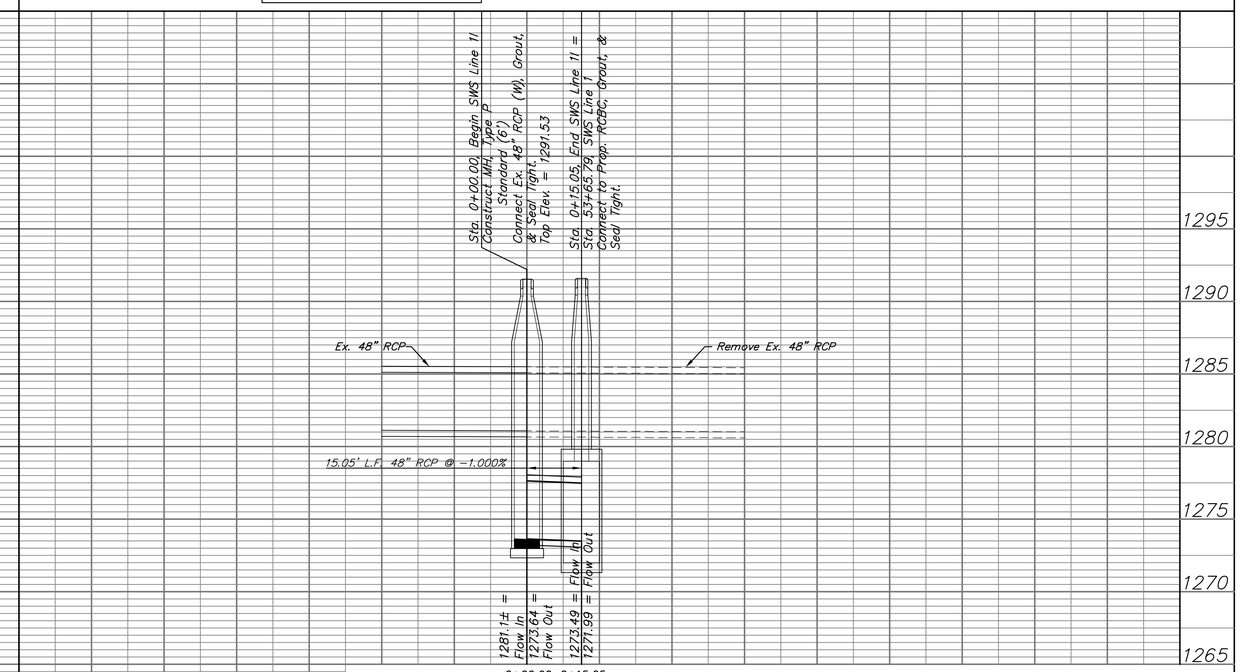
BENCHMARK:
BM #11 – Chiseled "□" on the West Curb Return of the Drive to the Seneca Village Townhouses, 15' South and 52' West of the Centerlines of May and Exposition.
Elev. = 1291.76 (NAVD 88)

SCALE:
HORIZONTAL: 1" = 20'
VERTICAL: 1" = 5'



SWS Line 1l





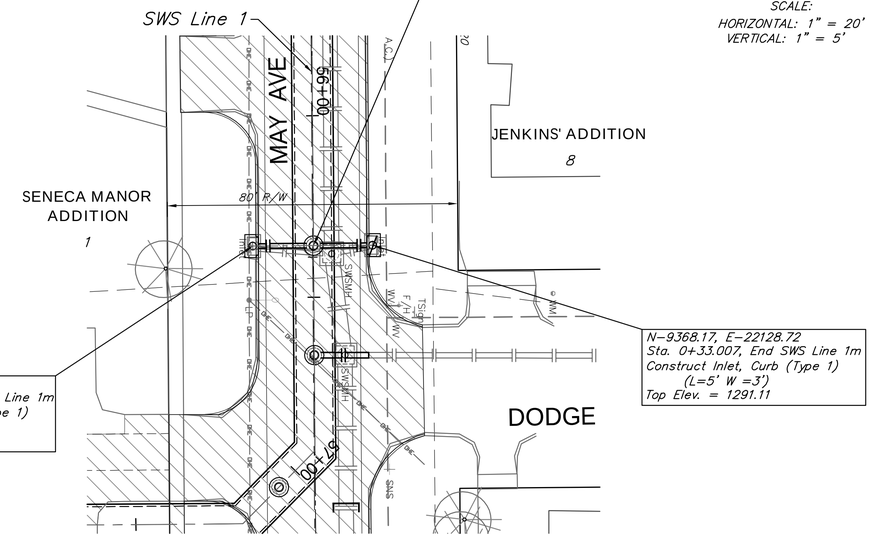
Drawing File: E:\Projects\Meridian Drainage\Land\dwg\Drainage Base.dwg [SWS 06]
December 2012

Design: TPV Drawn: STAFF Approved: TPV Scale: NOTED	Project No. 0802-E038 CAPITAL IMPROVEMENT PROJECT STORM WATER SEWER PLAN & PROFILE SWS Line 1k & SWS Line 1l MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT	Baughman Company , P.A. 315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149 ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE SHEET OF

BENCHMARK:
BM #11 – Chiseled "□" on the West Curb Return of the Drive to the Seneca Village Townhouses, 15' South and 52' West of the Centerlines of May and Exposition. Elev. = 1291.76 (NAVD 88)

N–9351.91, E–22128.96
Sta. 0+16.74, SWS Line 1m =
Sta. 56+35.78, SWS Line 1
Connect to Prop. Manhole
Stack, Grout, & Seal Tight.

SCALE:
HORIZONTAL: 1" = 20'
VERTICAL: 1" = 5'



N–9335.17, E–22128.96
Sta. 0+00.00, Begin SWS Line 1m
Construct Inlet, Curb (Type 1)
(L=5' W =3')
Top Elev. = 1291.11

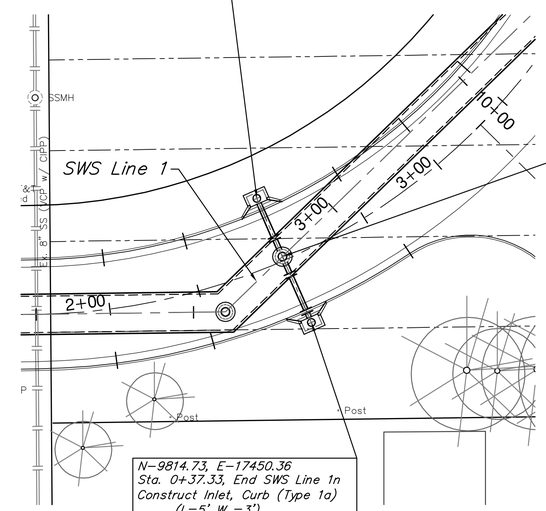
N–9368.17, E–22128.72
Sta. 0+33.007, End SWS Line 1m
Construct Inlet, Curb (Type 1)
(L=5' W =3')
Top Elev. = 1291.11

SWS Line 1m

BENCHMARK:
BM #2 – Chiseled "□" on the West Side of the Wheel Chair Ramp at the southeast corner of Meridian & Orient Elev. = 1293.19 (NAVD 88)

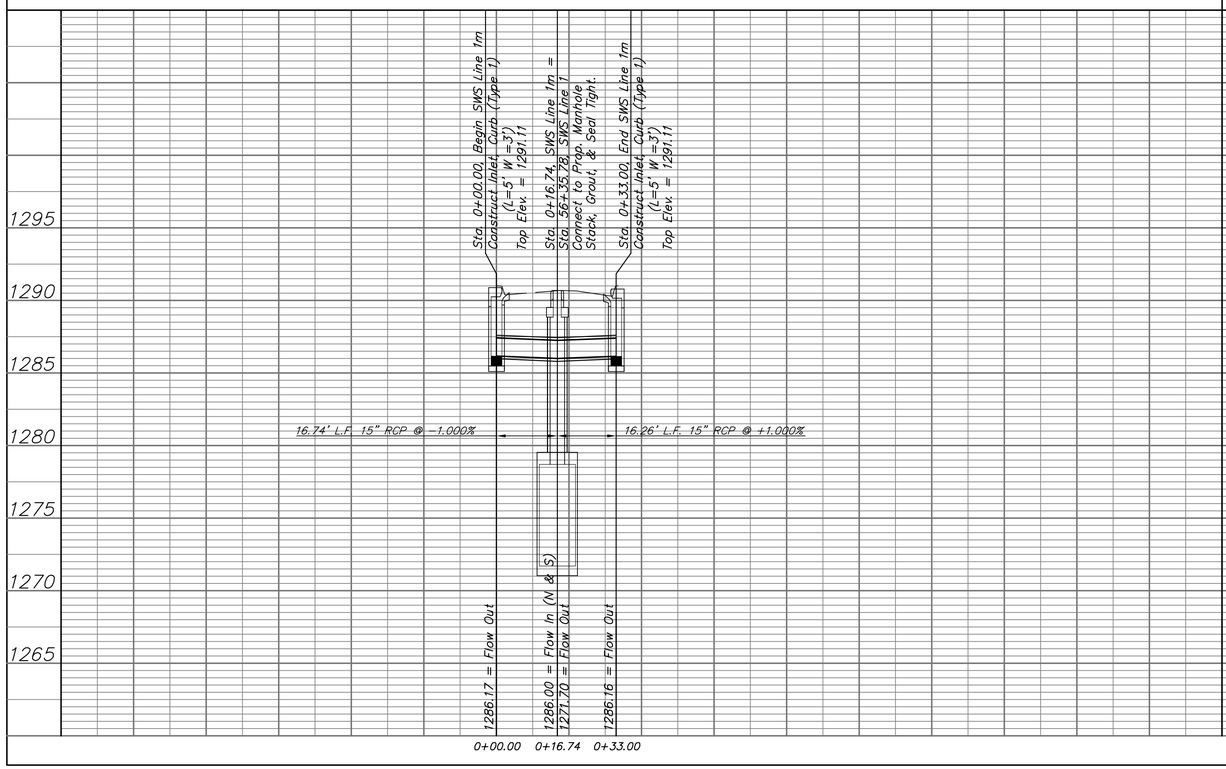
N–9848.90, E–17435.32
Sta. 0+00.00, Begin SWS Line 1n
Construct Inlet, Curb (Type 1a)
(L=5' W =3')
Top Elev. = 1291.11

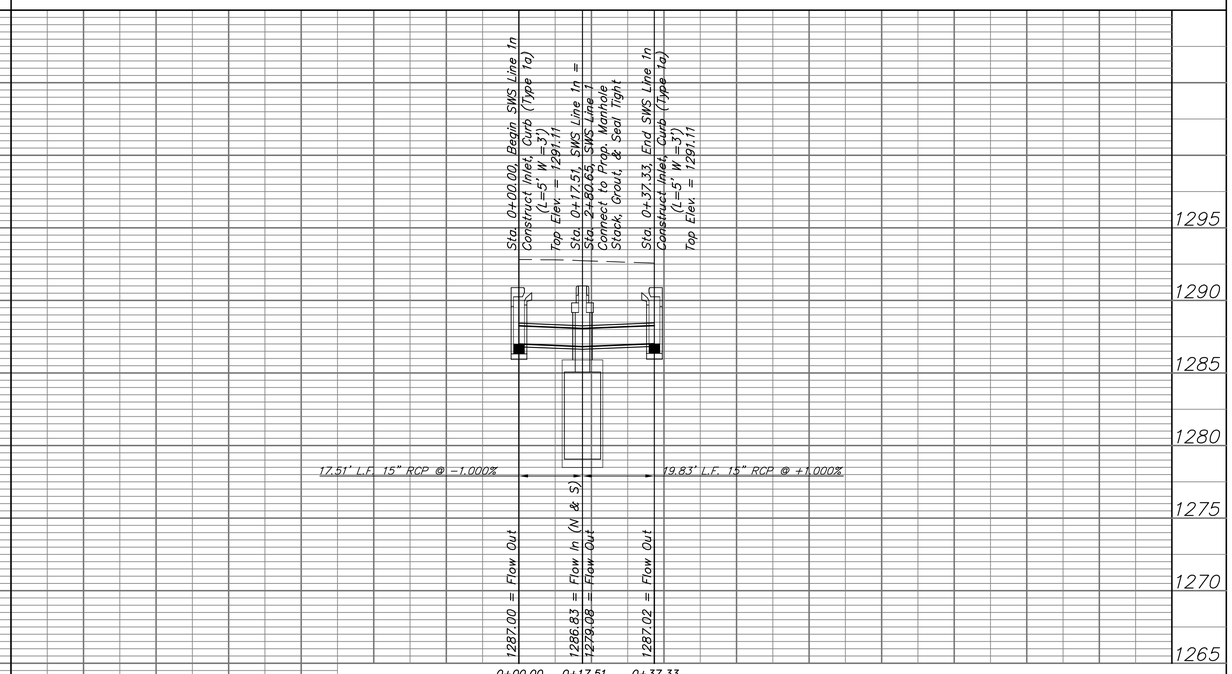
N–9832.87, E–17442.37
Sta. 0+17.51, SWS Line 1n =
Sta. 2+80.65, SWS Line 1
Connect to Prop. Manhole
Stack, Grout, & Seal Tight



N–9814.73, E–17450.36
Sta. 0+37.33, End SWS Line 1n
Construct Inlet, Curb (Type 1a)
(L=5' W =3')
Top Elev. = 1291.11

SWS Line 1n





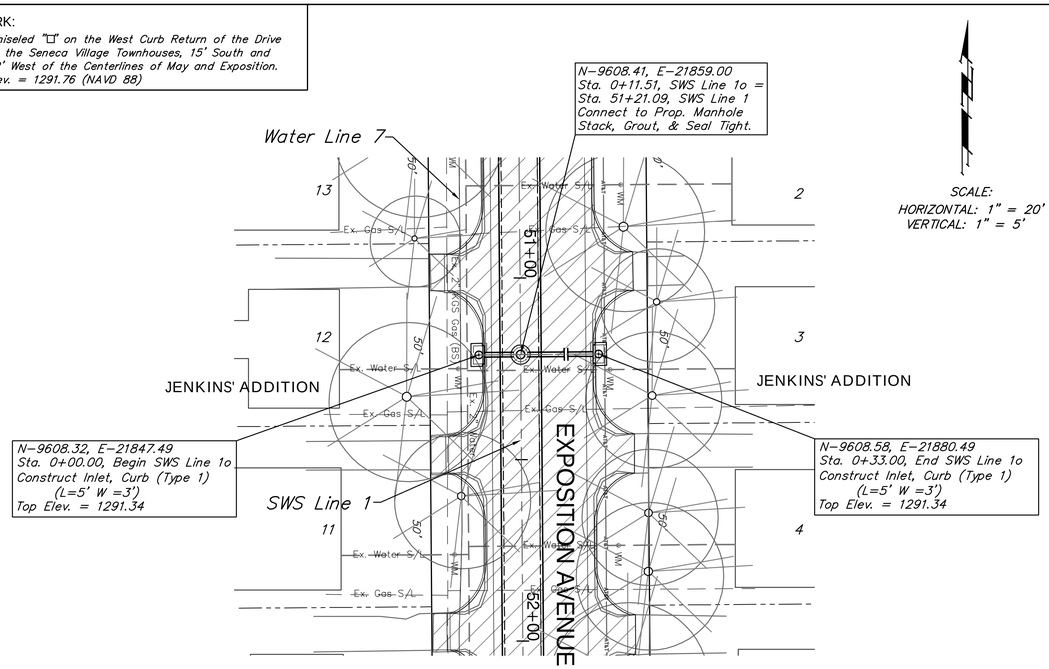
Drawing File: E:\Projects\Meridian Drainage\Land\dwg\Drainage Base.dwg [SWS 07]

December 2012

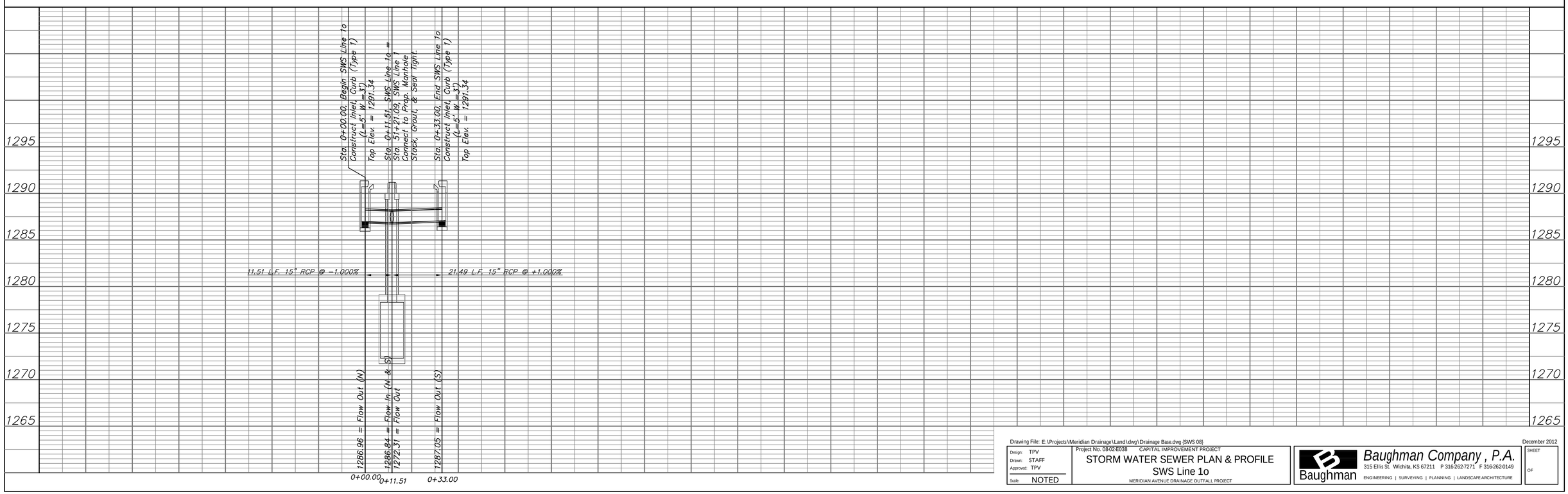
Design: TPV Drawn: STAFF Approved: TPV Scale: NOTED	Project No. 0802-E038 CAPITAL IMPROVEMENT PROJECT STORM WATER SEWER PLAN & PROFILE SWS Line 1m & SWS Line 1n MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT	Baughman Company , P.A. 315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149 ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

SHEET
OF

BENCHMARK:
BM #11 – Chiseled "□" on the West Curb Return of the Drive to the Seneca Village Townhouses, 15' South and 52' West of the Centerlines of May and Exposition. Elev. = 1291.76 (NAVD 88)



SWS Line 1o



Drawing File: E:\Projects\Meridian Drainage\Land\dwg\Drainage Base.dwg [SWS 08]

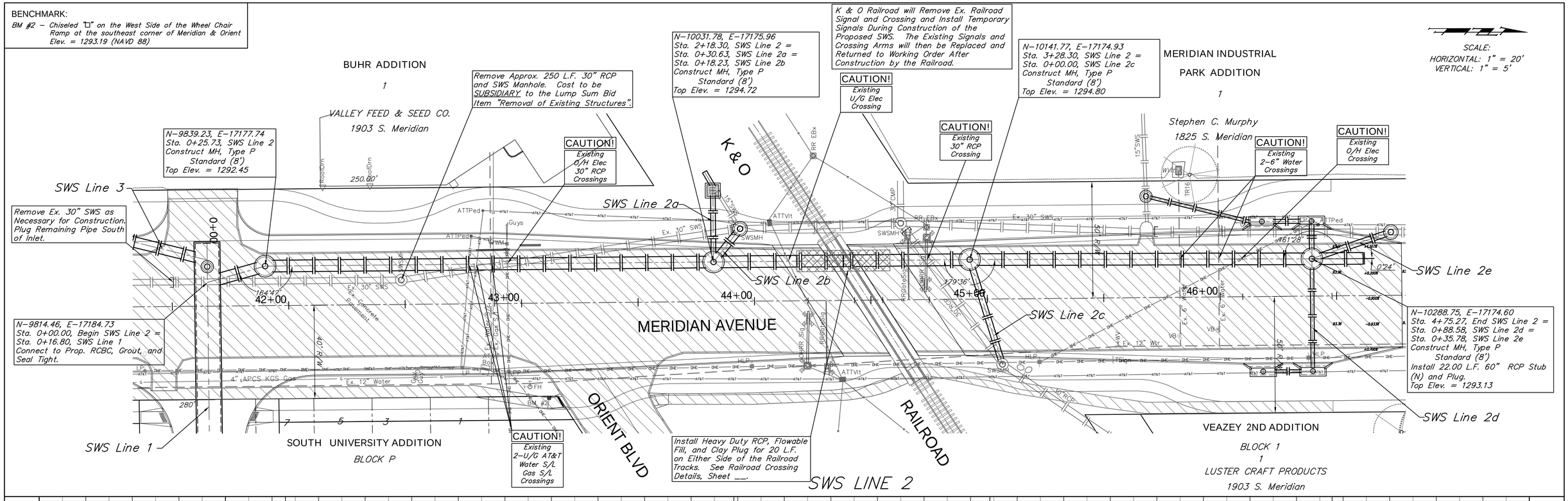
December 2012

Design: TPV Drawn: STAFF Approved: TPV Scale: NOTED	Project No. 08-02-E038 CAPITAL IMPROVEMENT PROJECT STORM WATER SEWER PLAN & PROFILE SWS Line 1o MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT	Baughman Company , P.A. 315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149 ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

SHEET
OF

BENCHMARK:
BM #2 – Chiseled "□" on the West Side of the Wheel Chair Ramp at the southeast corner of Meridian & Orient Elev. = 1293.19 (NAVD 88)

SCALE:
HORIZONTAL: 1" = 20'
VERTICAL: 1" = 5'



Drawing File: E:\Projects\Meridian Drainage\Land\dwg\Drainage Base.dwg [SWS 09]

Design: TPV
Drawn: STAFF
Approved: TPV
Scale: NOTED

Project No. 08-02-E038 CAPITAL IMPROVEMENT PROJECT

STORM WATER SEWER PLAN & PROFILE
SWS Line 2

MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT

Baughman Company , P.A.
315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149
ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

December 2012

SHEET
OF

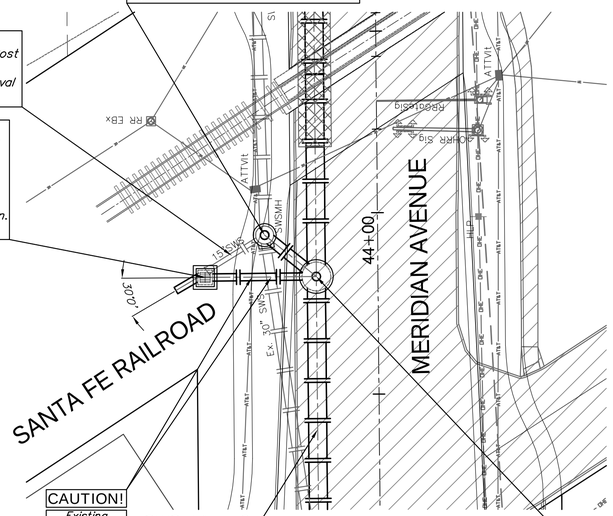
BENCHMARK:
BM #2 – Chiseled "□" on the West Side of the Wheel Chair Ramp at the southeast corner of Meridian & Orient
Elev. = 1293.19 (NAVD 88)

N–10043.18, E–17161.73
Sta. 0+00.00, Begin SWS Line 2b
Remove Ex. Manhole.
Construct MH, Type P
Standard (5')
Connect Ex. 30" RCP (N), Grout, and Seal Tight.
Top Elev. = 1295.60

Remove Approx. 17 L.F. Ex. 18" Pipe and Drop Inlet. Cost to be SUBSIDIARY to the Lump Sum Bid Item "Removal of Existing Structures".

N–10031.50, E–17145.34
Sta. 0+00.00, Begin SWS Line 2a
Construct Inlet, Drop (Single) w/ 9" Apron.
Install 8.50 L.F. 24" RCP Stub (SW) and Plug. Cost of Plug to be SUBSIDIARY to Pipe Installation.
Top Elev. = 1292.30

SCALE:
HORIZONTAL: 1" = 20'
VERTICAL: 1" = 5'



N–10031.78, E–17175.96
Sta. 0+30.63, End SWS Line 2a =
Sta. 0+18.23, End SWS Line 2b =
Sta. 2+18.30, SWS Line 2
Connect to Prop. Manhole, Grout, & Seal Tight.

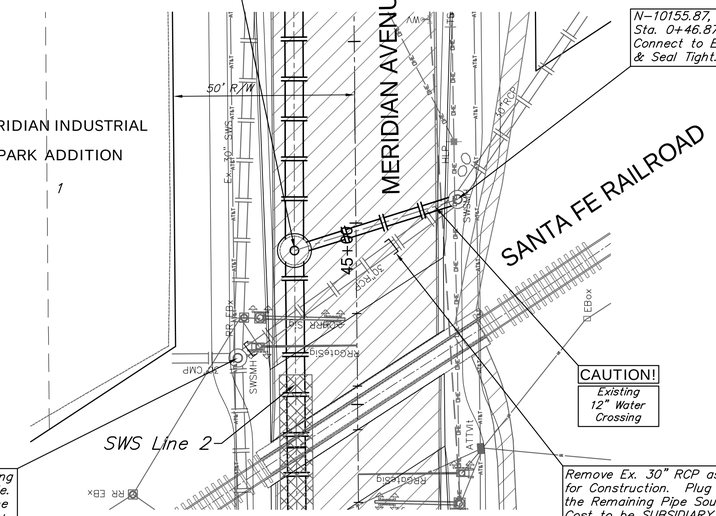
SWS LINE 2a & 2b

BENCHMARK:
BM #2 – Chiseled "□" on the West Side of the Wheel Chair Ramp at the southeast corner of Meridian & Orient
Elev. = 1293.19 (NAVD 88)

N–10142.53, E–17174.93
Sta. 0+00.00, Begin SWS Line 2c =
Sta. 3+28.30, SWS Line 2
Connect to Prop. Manhole, Grout, & Seal Tight.

SCALE:
HORIZONTAL: 1" = 20'
VERTICAL: 1" = 5'

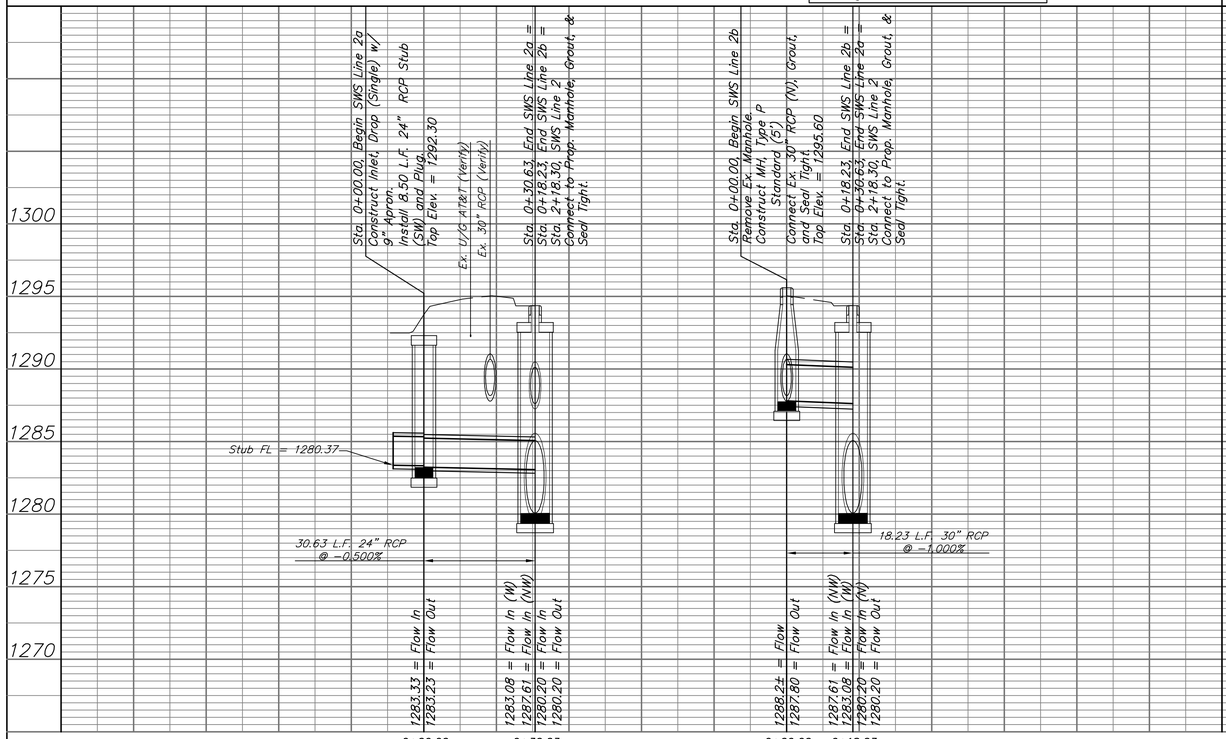
N–10155.87, E–17219.86
Sta. 0+46.87, End SWS Line 2c
Connect to Ex. Manhole, Grout, & Seal Tight.

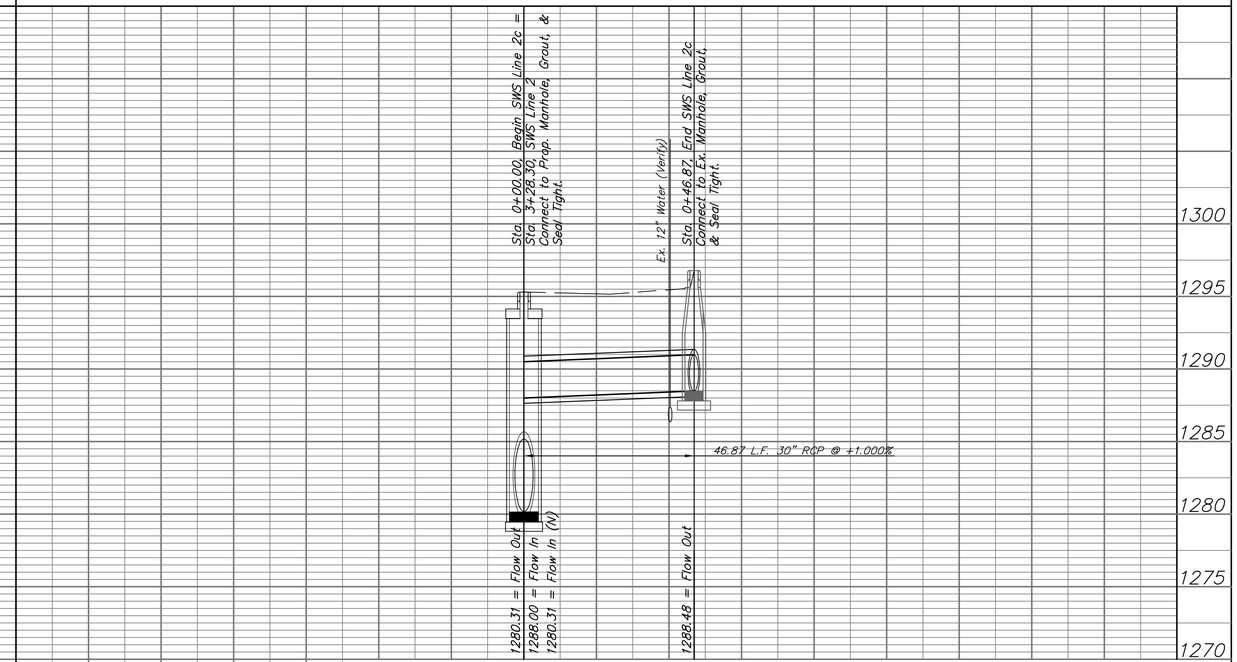


Plug & Abandon the Remaining Pipe Northeast of Ex. Manhole. Cost to be SUBSIDIARY to the Lump Sum Bid Item "Removal of Existing Structures".

Remove Ex. 30" RCP as Necessary for Construction. Plug & Abandon the Remaining Pipe Southwest. Cost to be SUBSIDIARY to the Lump Sum Bid Item "Removal of Existing Structures".

SWS Line 2c





Drawing File: E:\Projects\Meridian Drainage\Land\dwg\Drainage Base.dwg [SWS 10]

December 2012

Design: TPV
Drawn: STAFF
Approved: TPV
Scale: NOTED

Project No. 0802-E038 CAPITAL IMPROVEMENT PROJECT

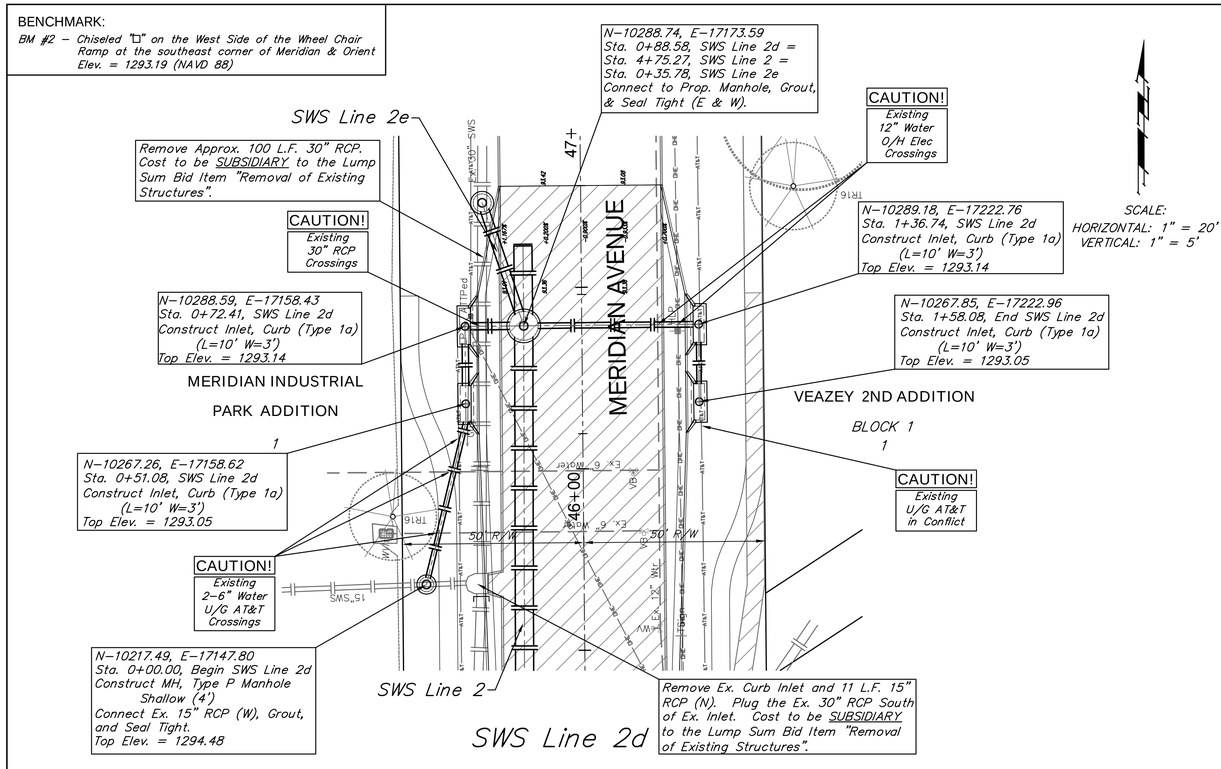
STORM WATER SEWER PLAN & PROFILE
SWS Line 2a, SWS Line 2b & SWS Line 2c

MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT

Baughman Company , P.A.
315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149
ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

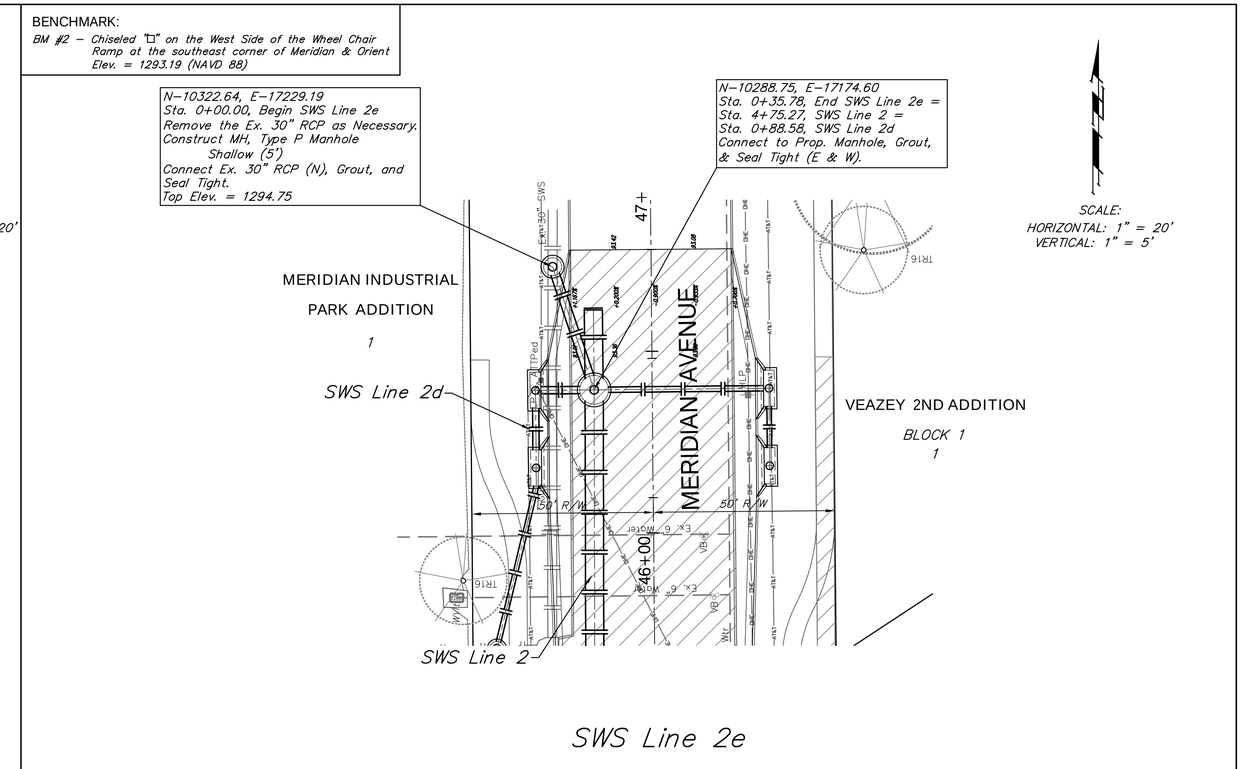
SHEET
OF

BENCHMARK:
BM #2 – Chiseled "□" on the West Side of the Wheel Chair Ramp at the southeast corner of Meridian & Orient Elev. = 1293.19 (NAVD 88)

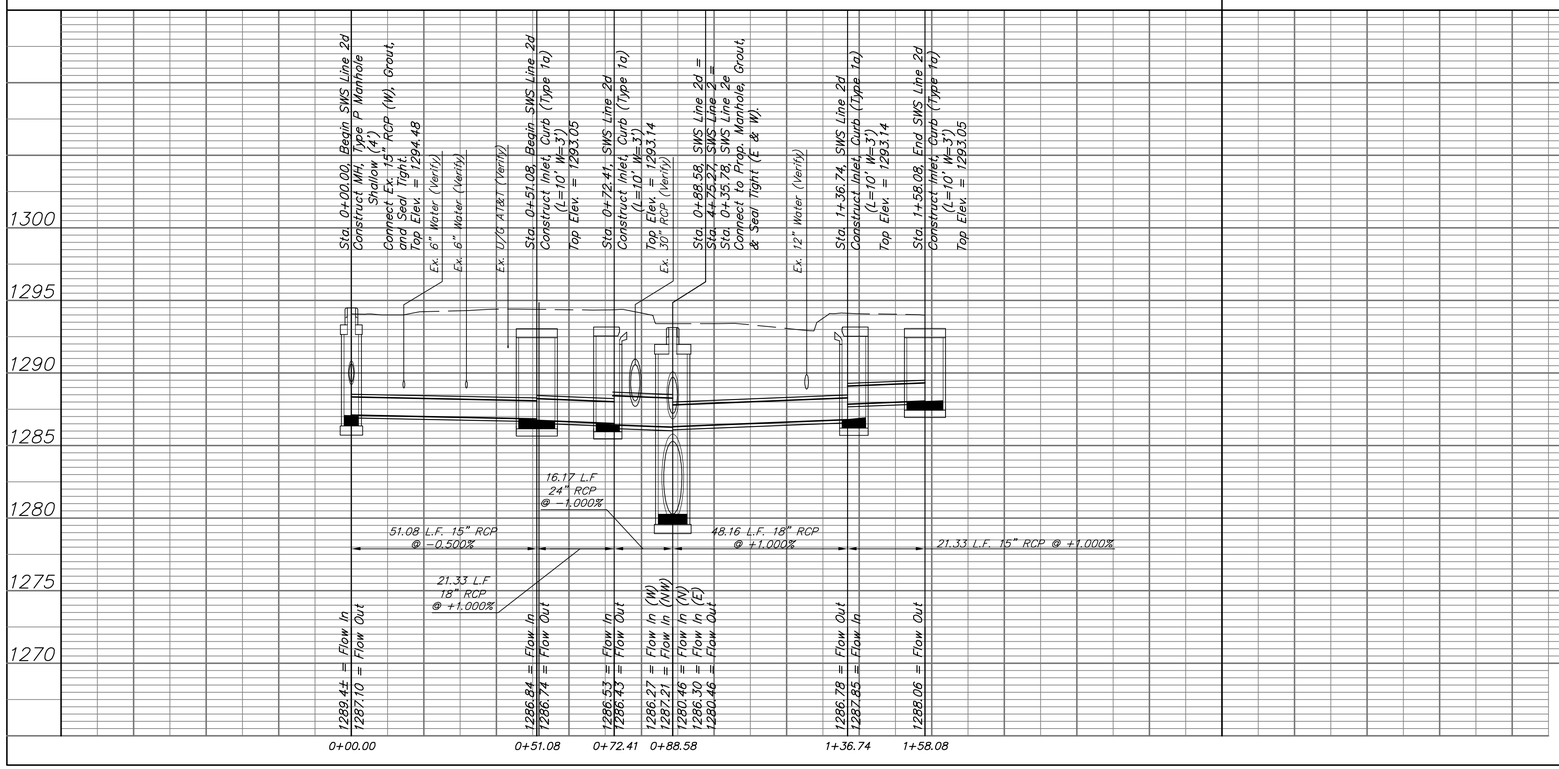


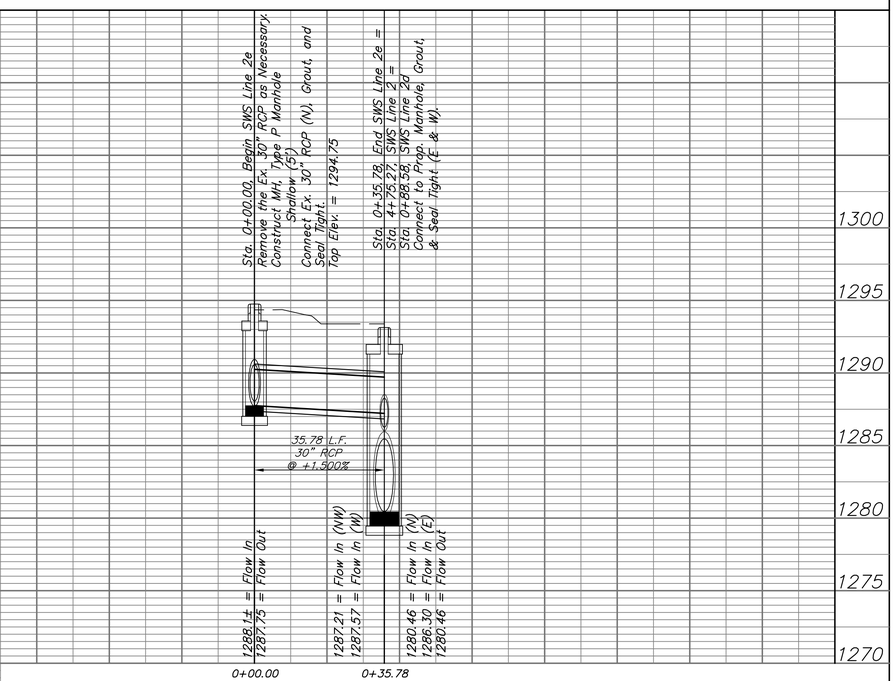
SWS Line 2d

BENCHMARK:
BM #2 – Chiseled "□" on the West Side of the Wheel Chair Ramp at the southeast corner of Meridian & Orient Elev. = 1293.19 (NAVD 88)



SWS Line 2e





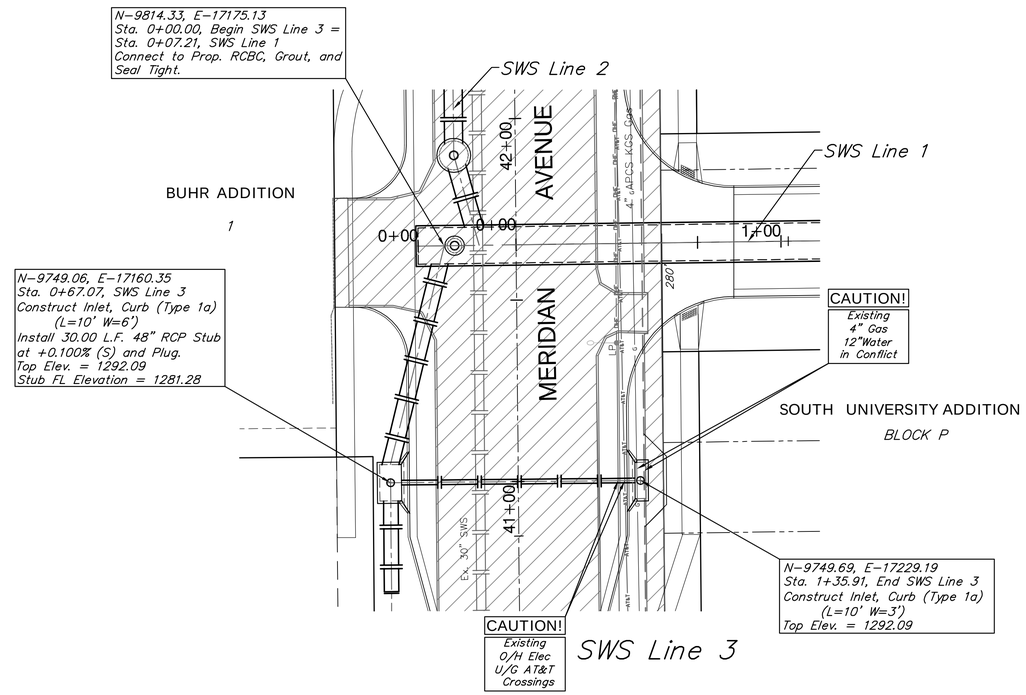
Drawing File: E:\Projects\Meridian Drainage\Land\dwg\Drainage Base.dwg [SWS 11]

December 2012

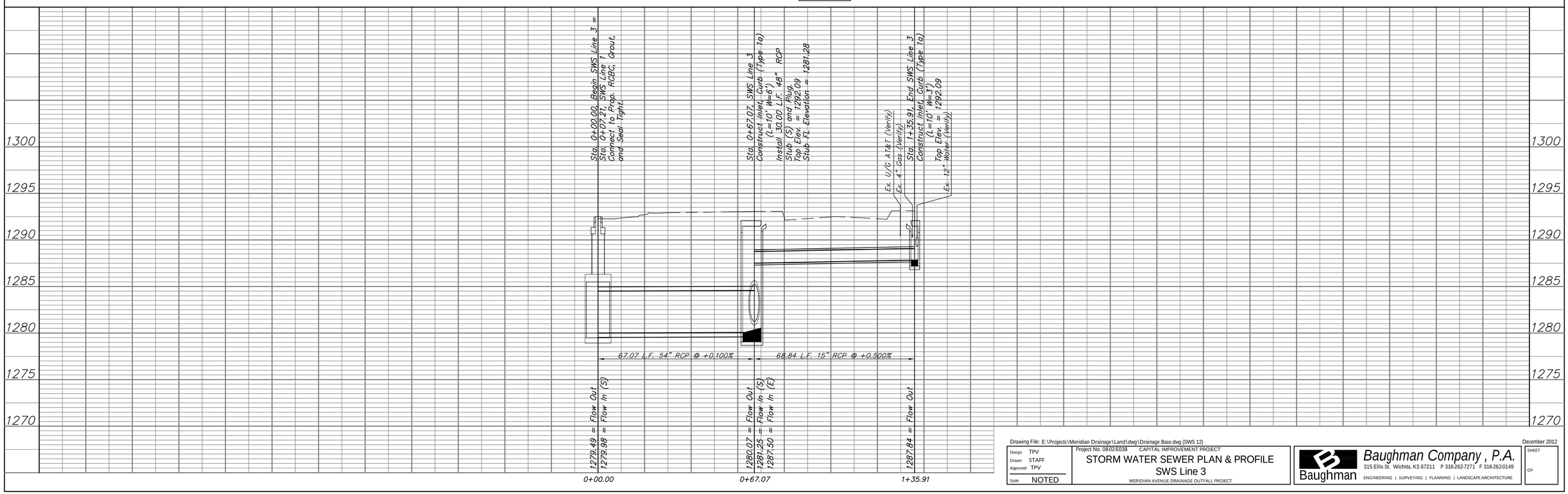
Design: TPV Drawn: STAFF Approved: TPV Scale: NOTED	Project No. 0802-E038 CAPITAL IMPROVEMENT PROJECT STORM WATER SEWER PLAN & PROFILE SWS Line 2d & SWS Line 2e MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT	Baughman Company , P.A. 315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149 ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

SHEET
OF

BENCHMARK:
BM #2 – Chiseled "□" on the West Side of the Wheel Chair Ramp at the southeast corner of Meridian & Orient Elev. = 1293.19 (NAVD 88)



SCALE:
HORIZONTAL: 1" = 20'
VERTICAL: 1" = 5'



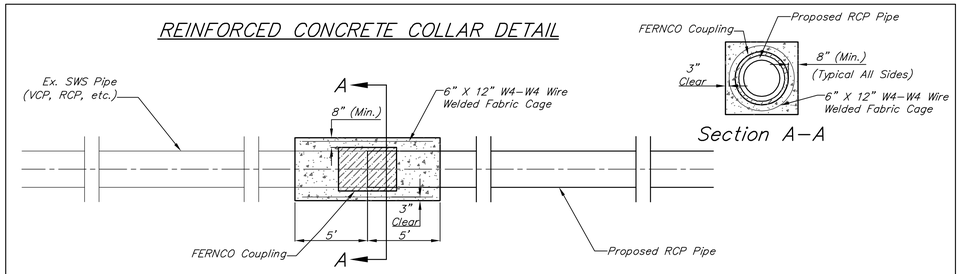
Drawing File: E:\Projects\Meridian Drainage\Land\dwg\Drainage Base.dwg [SWS 12]

December 2012

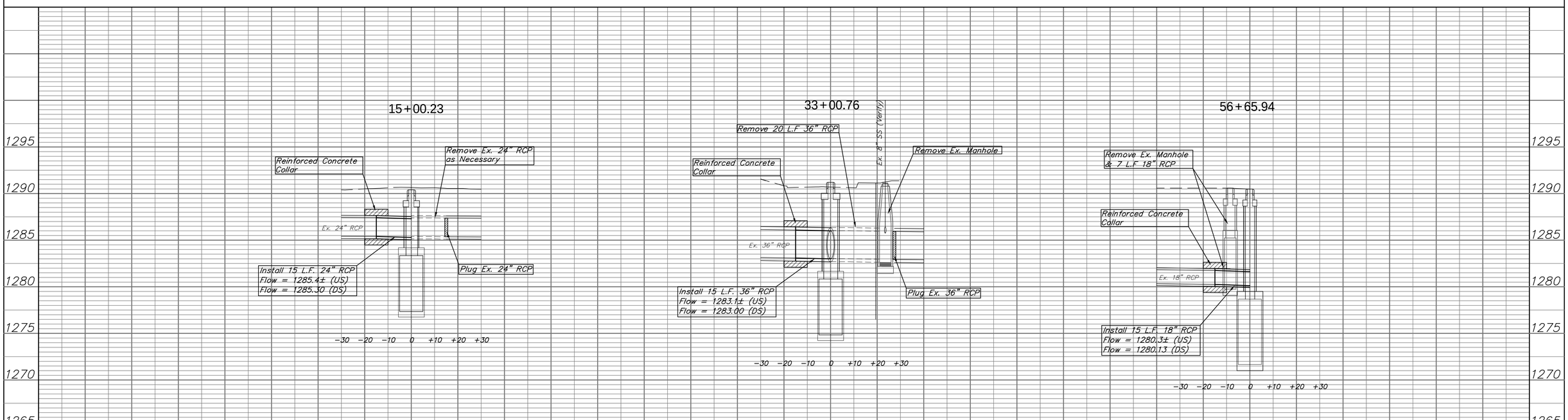
Design: TPV Drawn: STAFF Approved: TPV Scale: NOTED	Project No. 08-02-E038 CAPITAL IMPROVEMENT PROJECT STORM WATER SEWER PLAN & PROFILE SWS Line 3 MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT	Baughman Company , P.A. 315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149 ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

SHEET
OF

REINFORCED CONCRETE COLLAR DETAIL



The Connection from the Existing SWS Pipes to the Proposed RCP Pipes shall Require an Appropriately Sized FERNCO Coupling encased with a Minimum of 8" Thick Reinforced Concrete for 5' Either Side of the Proposed Connection. Cost to be SUBSIDIARY to the Project.



Drawing File: E:\Projects\Meridian Drainage\Land\dwg\Drainage Base.dwg (Connect Details)

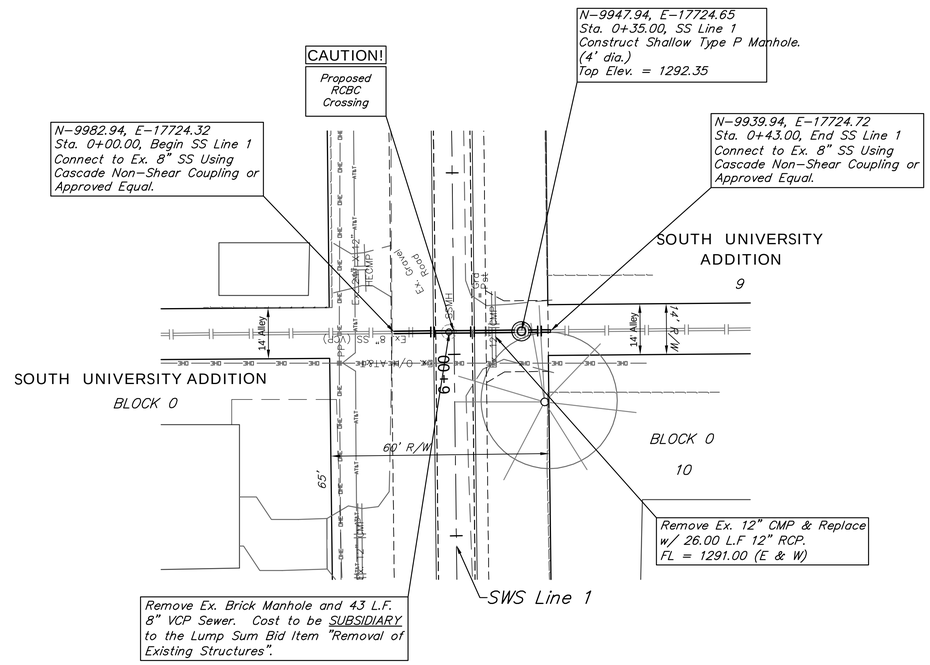
June 2009

Design: TPV Drawn: STAFF Approved: TPV Scale: NOTED	Project No. 08-02-E038 CAPITAL IMPROVEMENT PROJECT EX. PIPE CONNECTION DETAILS MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT	Baughman Company , P.A. 315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149 ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

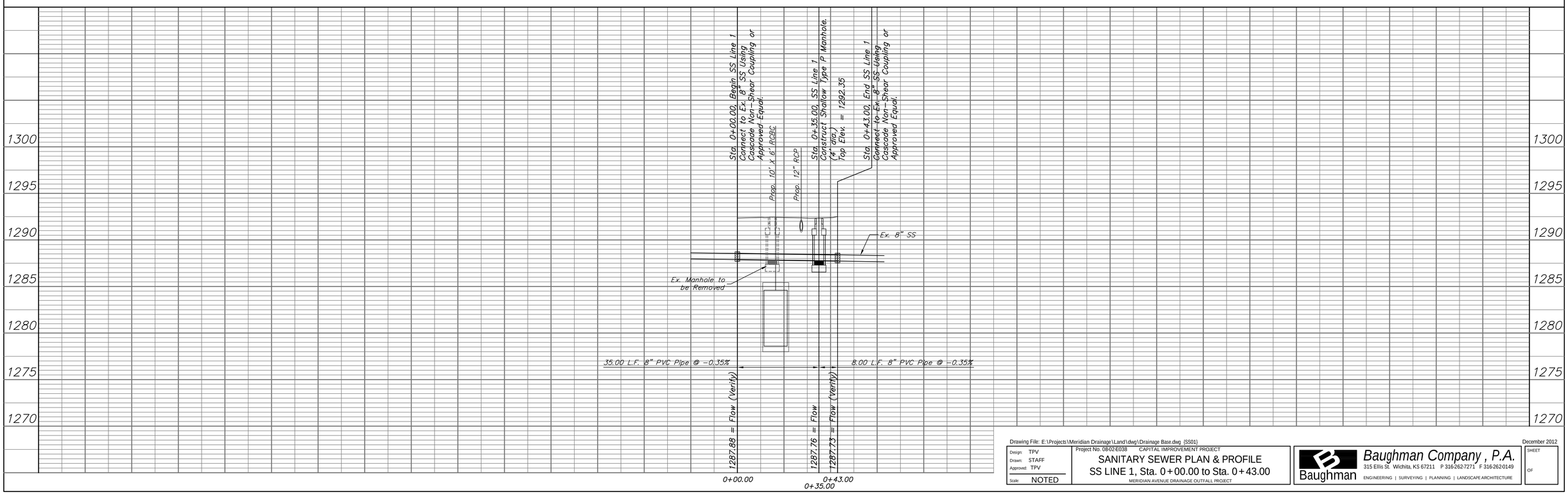
SHEET
OF

BENCHMARK:
BM #3 – Chiseled "□" on the North Curb Return of the Northwest Corner of Dora and St. Clair, 34' North and 13' West of the Centerline of Both. Elev. = 1292.01 (NAVD 88)

SCALE:
1" = 20' Horizontal
1" = 5' Vertical



SS Line 1



Drawing File: E:\Projects\Meridian Drainage\Land\dwg\Drainage Base.dwg {SS01}
December 2012

Design: TPV
Drawn: STAFF
Approved: TPV
Scale: NOTED

Project No. 0802-E038 CAPITAL IMPROVEMENT PROJECT

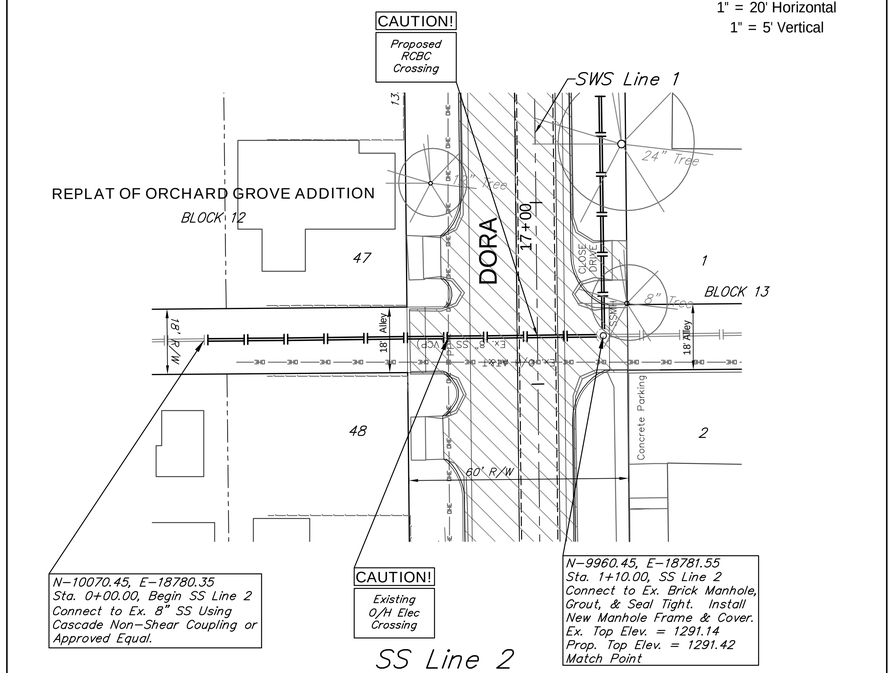
SANITARY SEWER PLAN & PROFILE
SS LINE 1, Sta. 0+00.00 to Sta. 0+43.00
MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT

Baughman Company , P.A.
315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149
ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

SHEET
OF

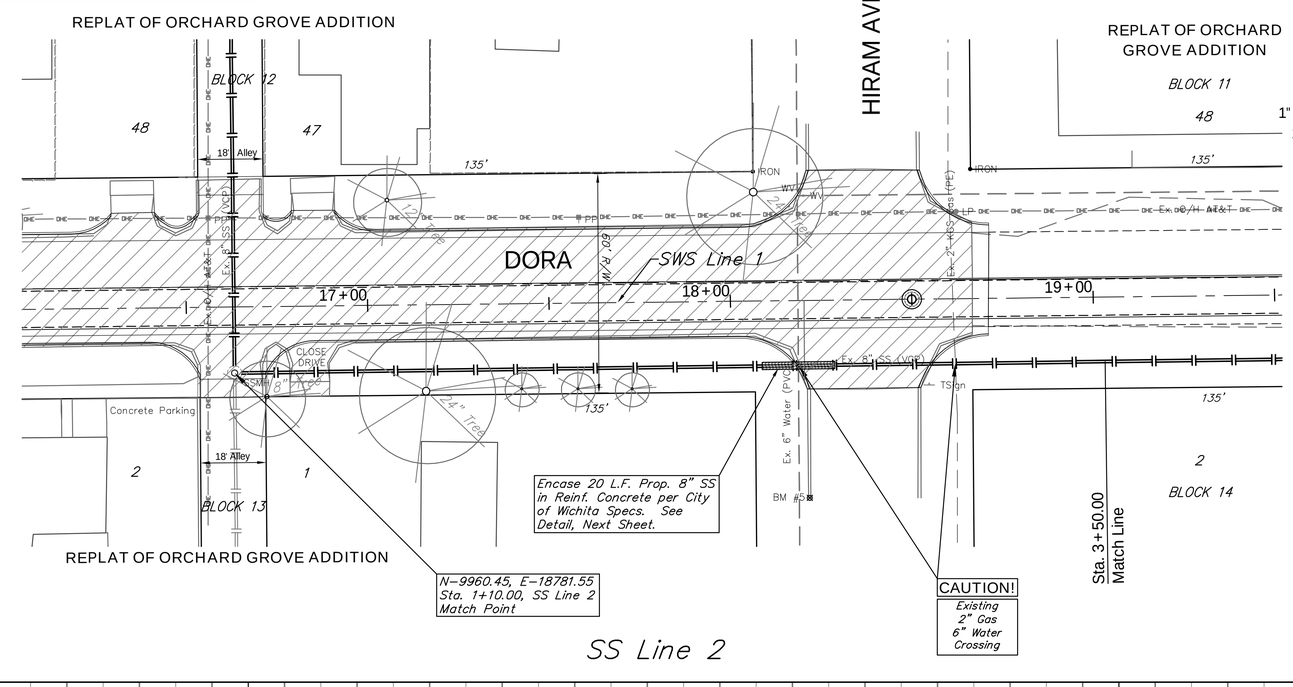
BENCHMARK:
BM #5 – Chiseled "□" on the North Curb Return of the Drive to 2011 W. Dora, 60' South and 15' West of the Centerlines of Dora and Hiram. Elev. = 1291.73 (NAVD 88)

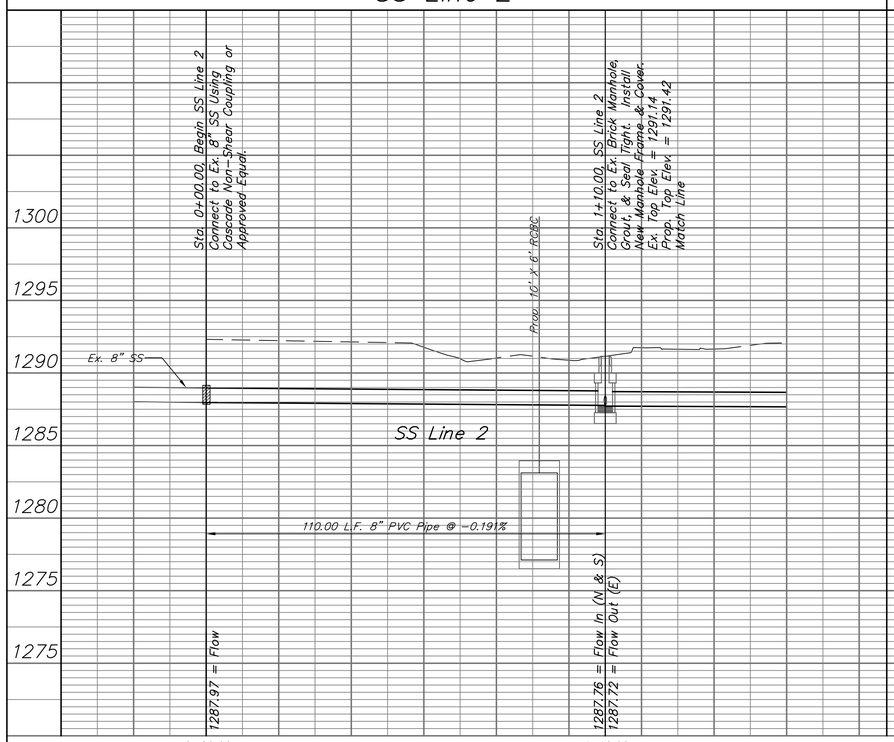
SCALE:
1" = 20' Horizontal
1" = 5' Vertical

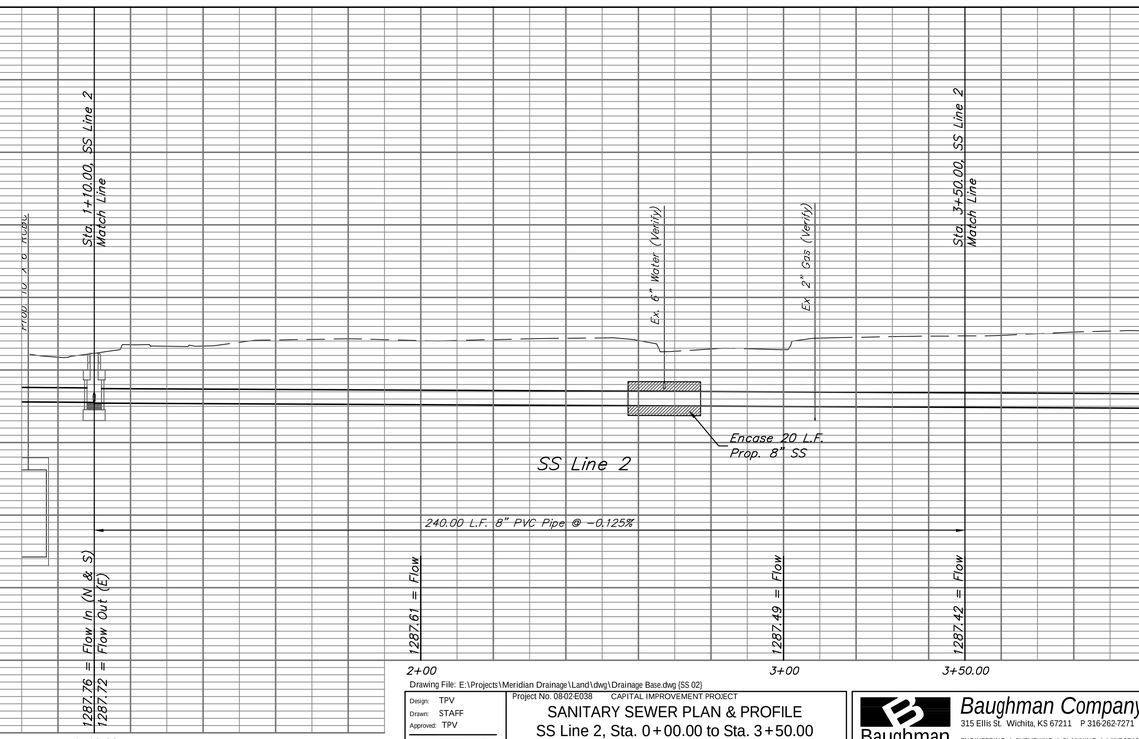


BENCHMARK:
BM #5 – Chiseled "□" on the North Curb Return of the Drive to 2011 W. Dora, 60' South and 15' West of the Centerlines of Dora and Hiram. Elev. = 1291.73 (NAVD 88)

SCALE:
1" = 20' Horizontal
1" = 5' Vertical







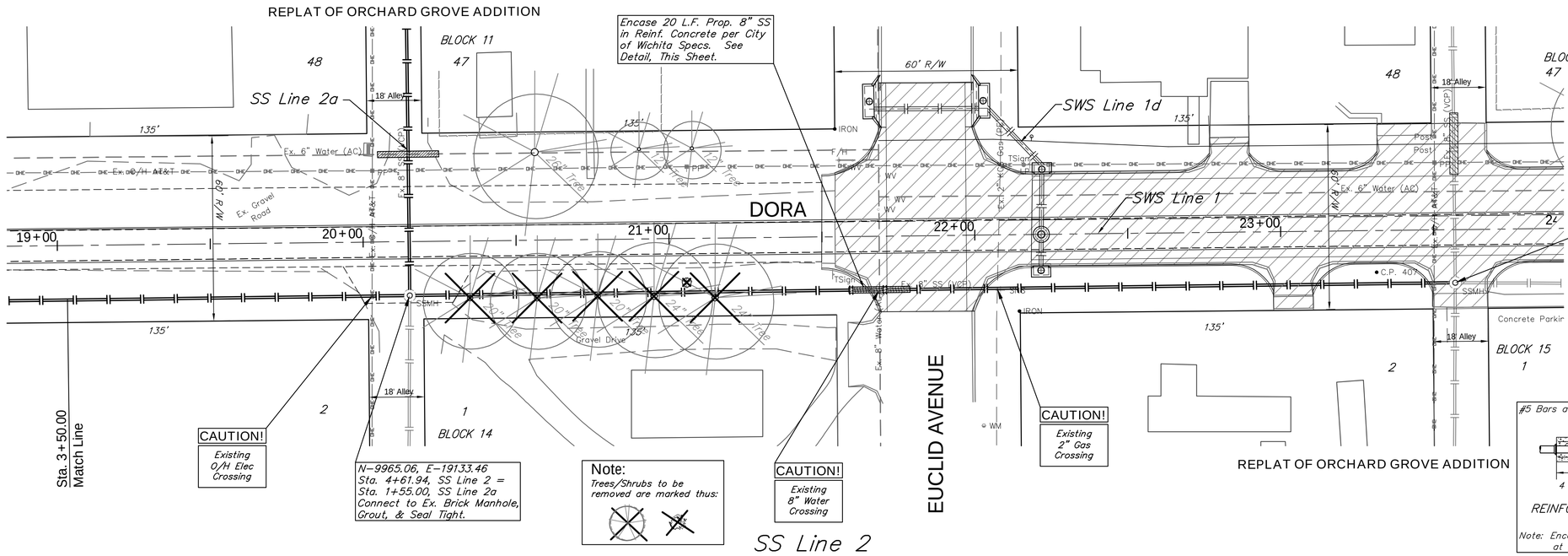
Drawing File: E:\Projects\Meridian Drainage\Land\dwg\Drainage Base.dwg [SS 02]

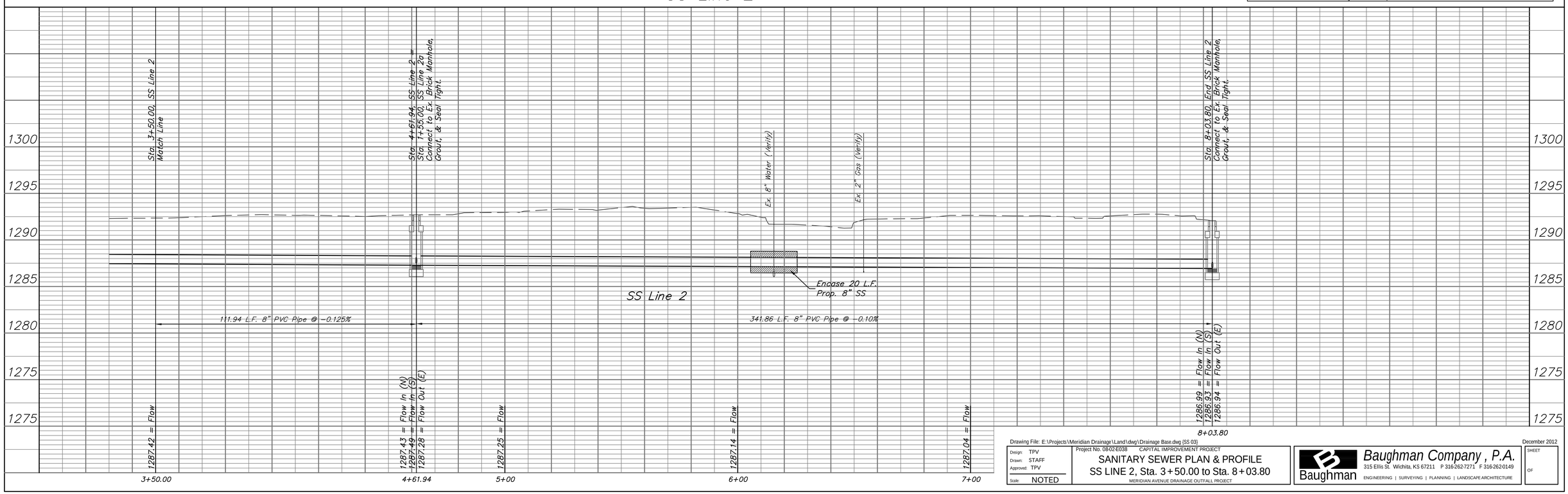
December 2012

Design: TPV Drawn: STAFF Approved: TPV Scale: NOTED	Project No. 0802-E038 CAPITAL IMPROVEMENT PROJECT SANITARY SEWER PLAN & PROFILE SS Line 2, Sta. 0+00.00 to Sta. 3+50.00 MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT	Baughman Company , P.A. 315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149 ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

SHEET
OF

BENCHMARK:
BM #5 – Chiseled "□" on the North Curb Return of the Drive to 2011 W. Dora, 60' South and 15' West of the Centerlines of Dora and Hiram. Elev. = 1291.73 (NAVD 88)





Drawing File: E:\Projects\Meridian Drainage\Land\dwg\Drainage Base.dwg [SS 03]

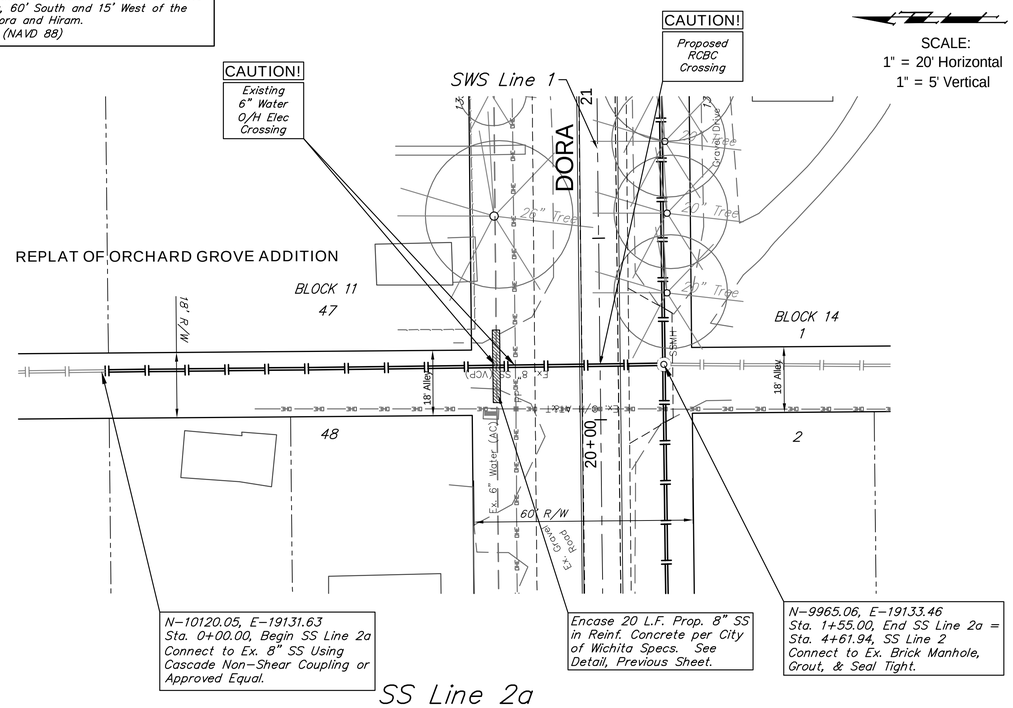
December 2012

Design: TPV Drawn: STAFF Approved: TPV Scale: NOTED	Project No. 0802-E038 CAPITAL IMPROVEMENT PROJECT SANITARY SEWER PLAN & PROFILE SS LINE 2, Sta. 3+50.00 to Sta. 8+03.80 MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT	Baughman Company , P.A. 315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149 ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

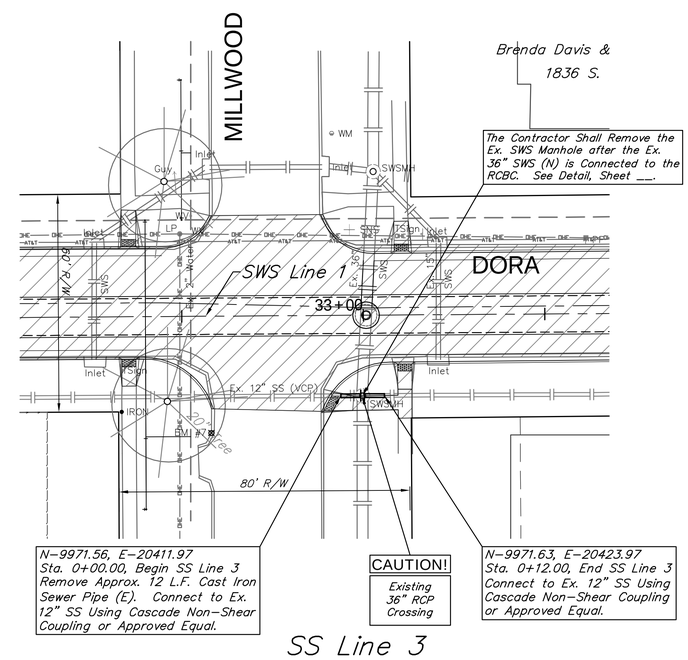
SHEET
OF

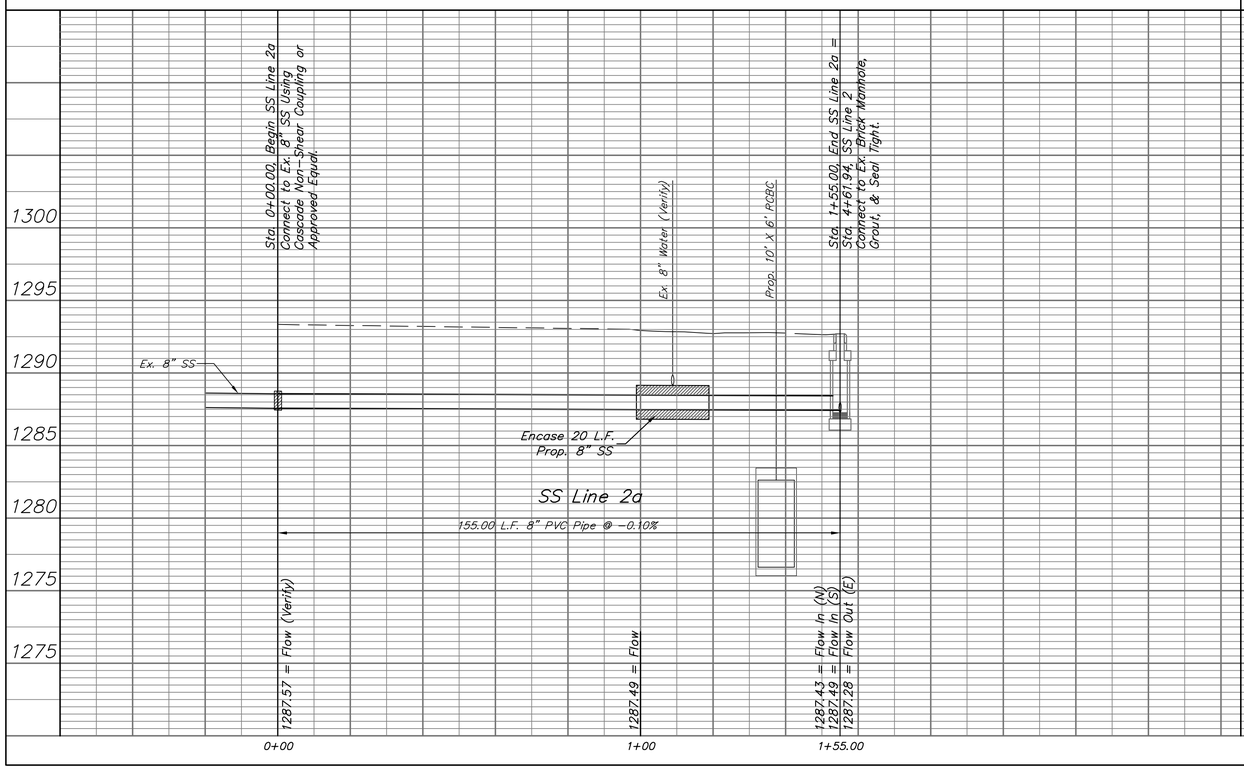
BENCHMARK:
BM #5 – Chiseled "□" on the North Curb Return of the Drive to 2011 W. Dora, 60' South and 15' West of the Centerlines of Dora and Hiram. Elev. = 1291.73 (NAVD 88)

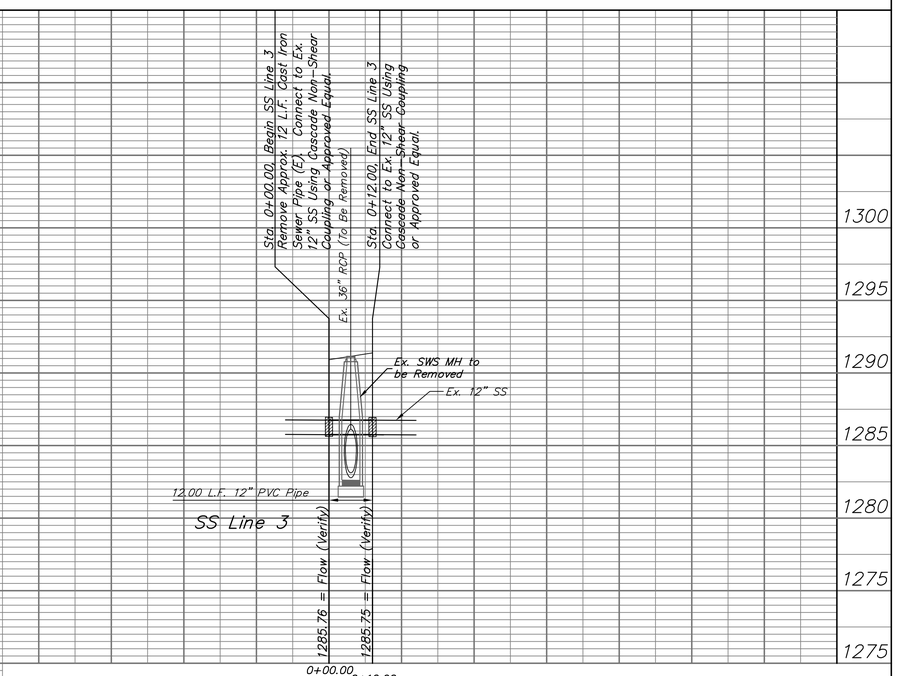
SCALE:
1" = 20' Horizontal
1" = 5' Vertical



SCALE:
1" = 20' Horizontal
1" = 5' Vertical







Drawing File: E:\Projects\Meridian Drainage\Land\dwg\Drainage Base [SS 04]

December 2012

Design: TPV Drawn: STAFF Approved: TPV Scale: NOTED	Project No. 0802-E038 CAPITAL IMPROVEMENT PROJECT SANITARY SEWER PLAN & PROFILE SS LINE 2a & SS Line 3 MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT	Baughman Company , P.A. 315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149 ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE SHEET OF

BENCHMARK:
BM #6 – Chiseled "□" located 10.5' North of the Curb Return of the Northwest Corner of Dora and Glenn, 41' North and 16' West of the Centerline of Both.
Elev. = 1292.81 (NAVD 88)

SCALE:
HORIZONTAL: 1" = 20'
VERTICAL: 1" = 5'

N

N–10015.69, E–19286.70
W.L. Sta. 0+00.00, Begin Water Line 1
Tap Ex. 8" Water Line.
Install 1–8" X 8" Tapping Sleeve (E) & 6" Tapping Valve with Valve Box to be Furnished & Installed by the City of Wichita.
Valve Box Elev. = 1292.0

N–10016.06, E–19324.20
W.L. Sta. 0+37.50, Water Line 1
Deflect Pipe 3° 00' (Rt.)

CAUTION!
Proposed 15" RCP Crossing

N–10015.53, E–19336.69
W.L. Sta. 0+50.00, Water Line 1
Install 1–Air Release Assy.
Top Elevation = 1293.5

N–10013.64, E–19381.47
W.L. Sta. 0+94.82, Water Line 1
Deflect Pipe 3° 00' (Lt.)

Encase 20 L.F. 8" Sanitary Sewer per City Specs. See Detail, Sheet ___.

N–10015.70, E–19586.64
W.L. Sta. 3+00.00, Water Line 1
Install 1–Air Release Assy.
Top Elevation = 1293.3

Install 386.57 L.F. 8" Pipe

CAUTION!
Existing 2" Gas 2" Water Crossings

N–10016.57, E–19686.63
W.L. Sta. 3+86.57, Water Line 1
Install 1–8" X 8" CIMJ Tee (N)
Install 5.00 L.F. 8" DICL Pipe (N)
Install 1–8" 90° CIMJ Bend (W)
Install 5.00 L.F. 8" DICL Pipe (W)
Install 1–8" X 6" CIMJ Reducer
Install 1–6" X 6" Tapping Sleeve (E) & 6" Tapping Valve with Valve Box to be Furnished & Installed by the City of Wichita.
Valve Box Elev. = 1293.1

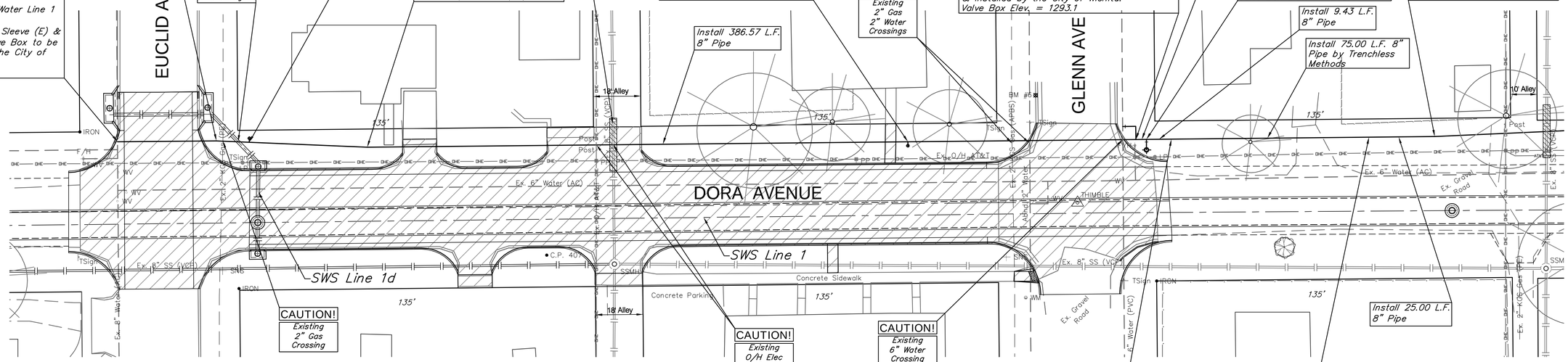
Install 4.00 L.F. 8" DICL Pipe

N–10016.61, E–19677.21
W.L. Sta. 3+90.57, Water Line 1
Install 1–Fire Hydrant Assy. (S)
L = 4.00'
Bury Line Elev. = 1293.3
Valve Box Elev. = 1293.4

Install 9.43 L.F. 8" Pipe

Install 75.00 L.F. 8" Pipe by Trenchless Methods

N–10017.70, E–19786.63
W.L. Sta. 5+00.00, Water Line 1
Deflect Pipe 2° 00' (Lt.)
Match Point



CAUTION!
Existing 2" Gas Crossing

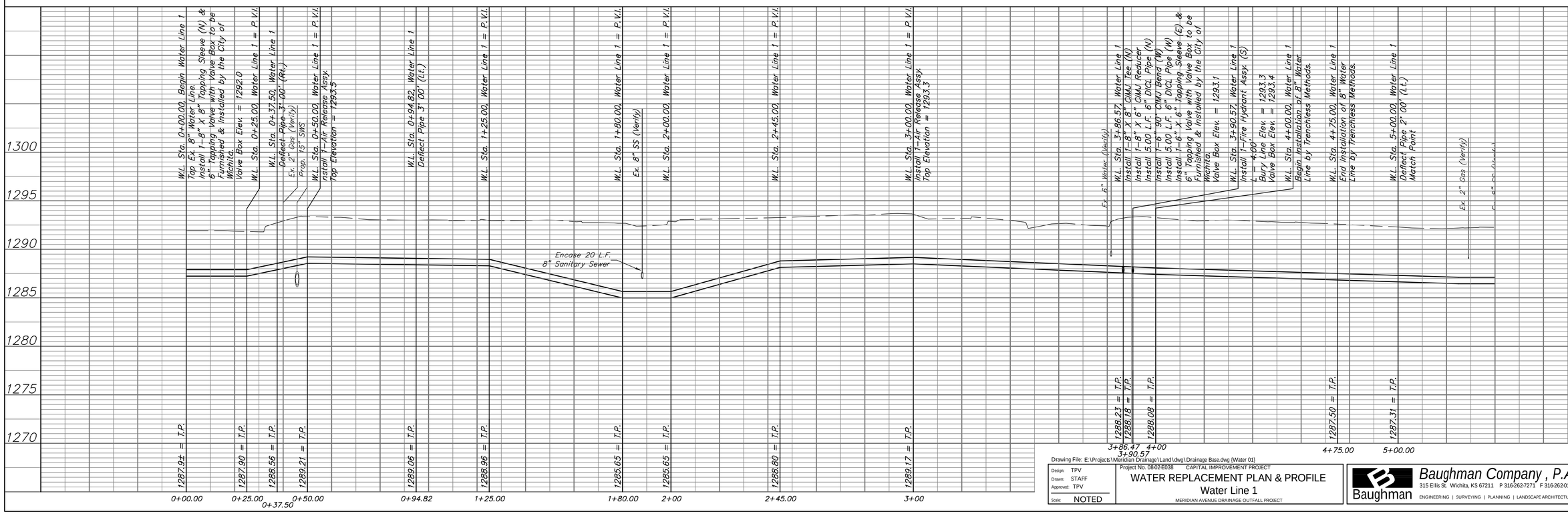
CAUTION!
Existing O/H Elec 8" SS Crossings

CAUTION!
Existing 6" Water Crossing

N–10016.70, E–19686.63
W.L. Sta. 4+00.00, Water Line 1
Begin Installation of 8" Water Line by Trenchless Methods.

N–10017.45, E–19761.63
W.L. Sta. 4+75.00, Water Line 1
End Installation of 8" Water Line by Trenchless Methods.

Install 25.00 L.F. 8" Pipe



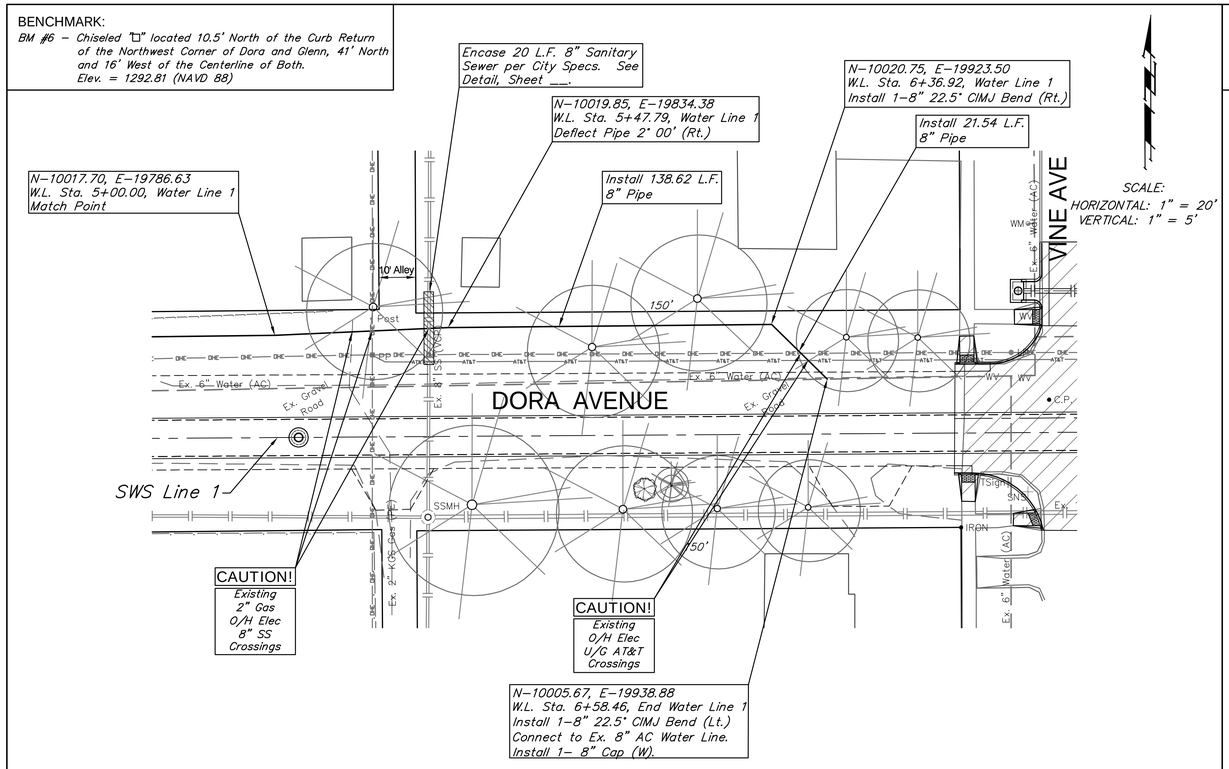
Drawing File: E:\Projects\Meridian Drainage\Land\dwg\Drainage Base.dwg [Water 01]

December 2012

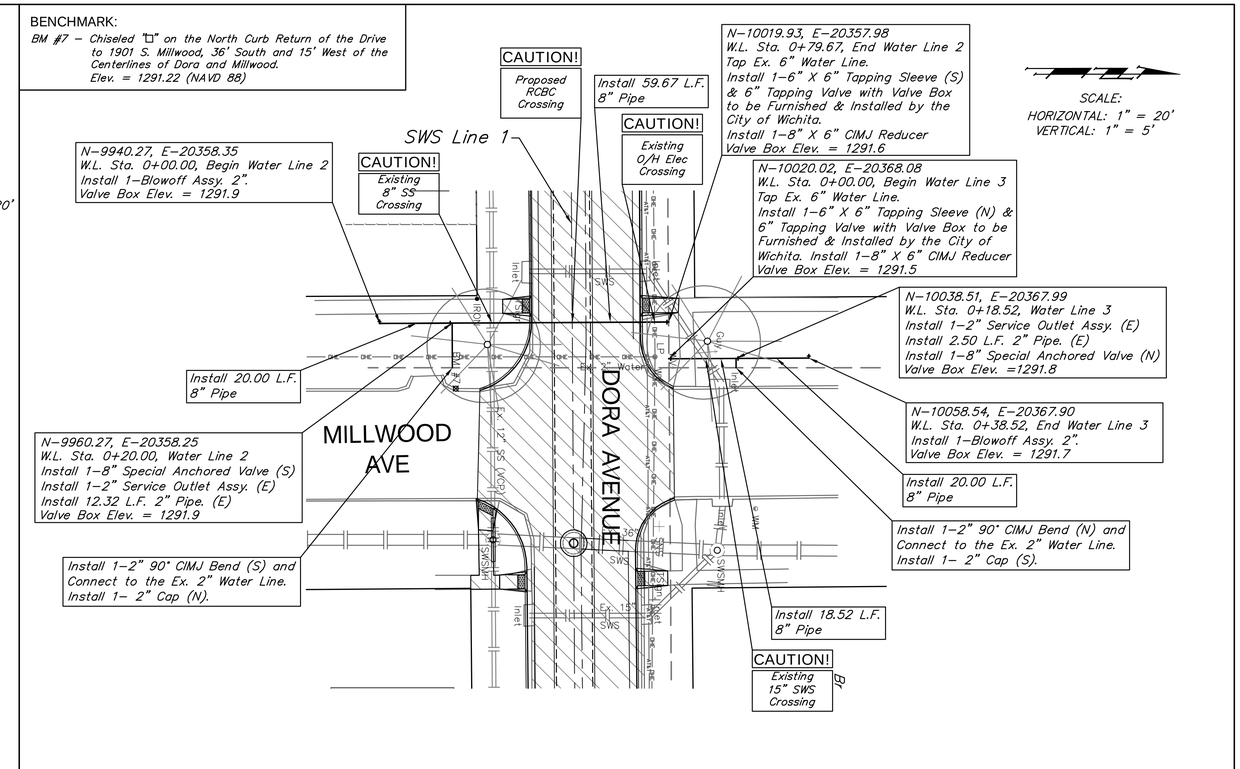
Design: TPV Drawn: STAFF Approved: TPV Scale: NOTED	Project No. 0802-E038 CAPITAL IMPROVEMENT PROJECT WATER REPLACEMENT PLAN & PROFILE Water Line 1 MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT	Baughman Company , P.A. 315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149 ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

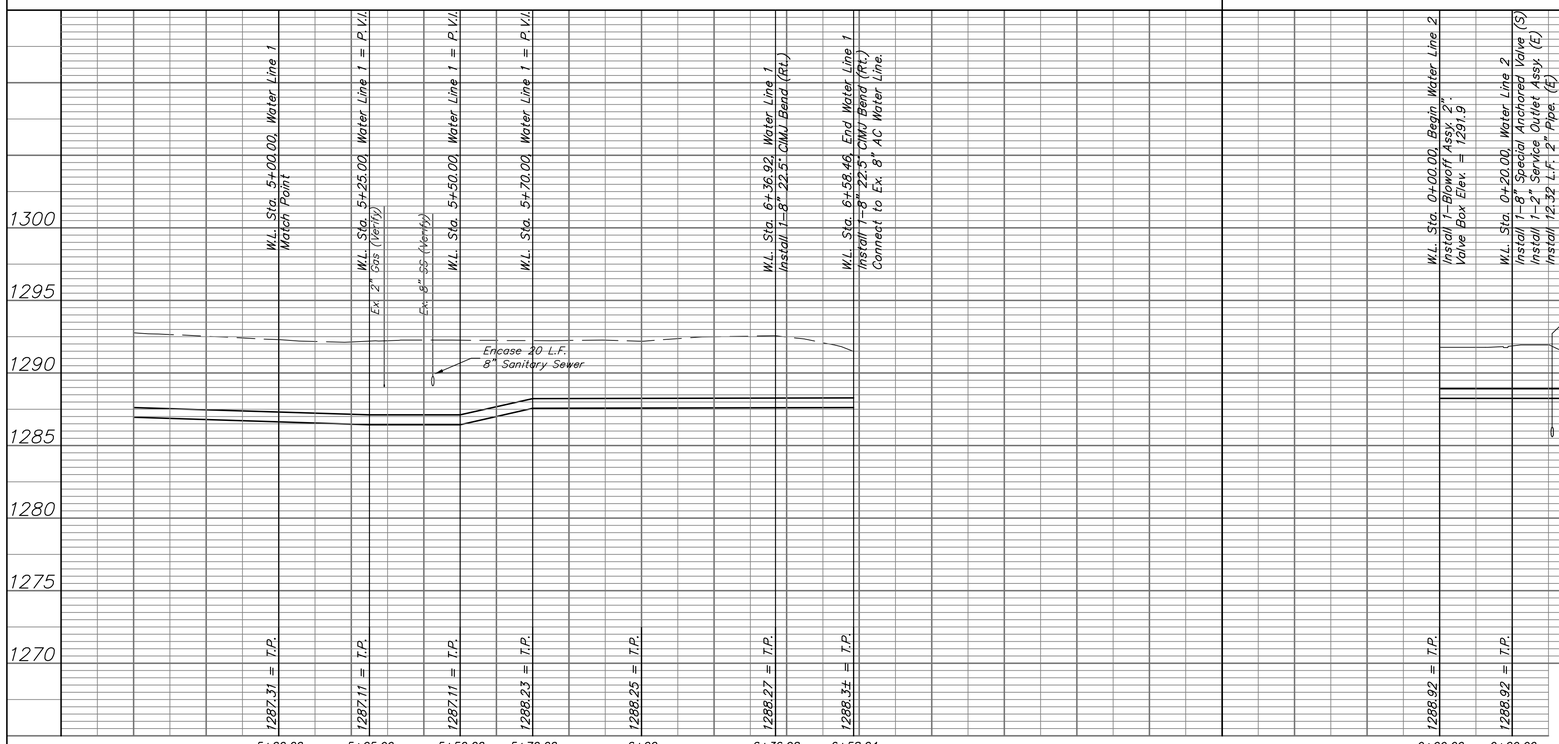
SHEET
OF

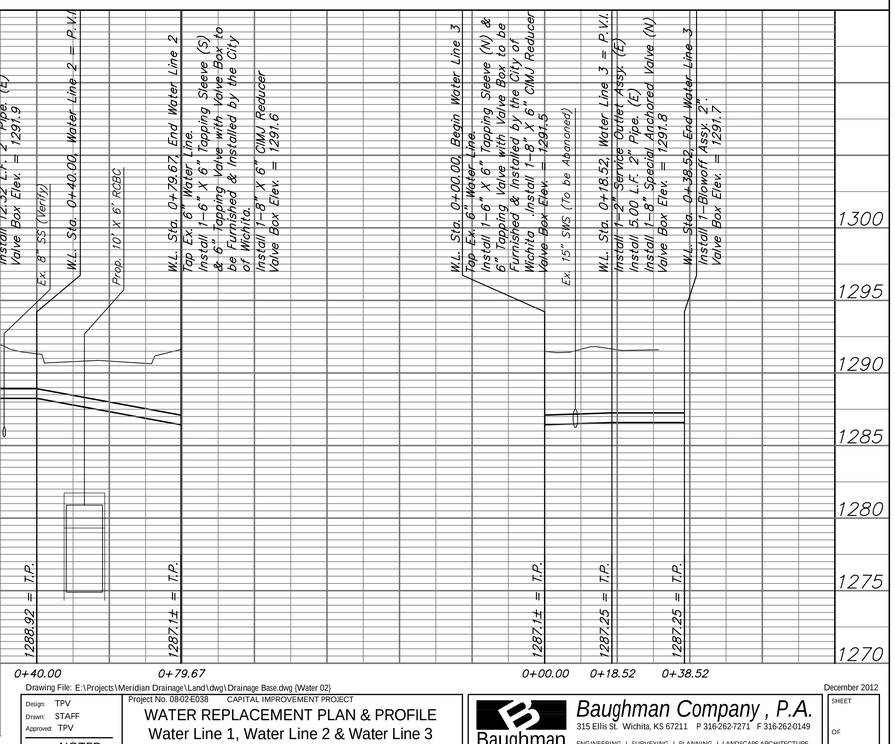
BENCHMARK:
BM #6 – Chiseled "□" located 10.5' North of the Curb Return of the Northwest Corner of Dora and Glenn, 41' North and 16' West of the Centerline of Both. Elev. = 1292.81 (NAVD 88)



BENCHMARK:
BM #7 – Chiseled "□" on the North Curb Return of the Drive to 1901 S. Millwood, 36' South and 15' West of the Centerlines of Dora and Millwood. Elev. = 1291.22 (NAVD 88)







Drawing File: E:\Projects\Meridian Drainage\Land\dwg\Drainage Base.dwg {Water 02}

December 2012

Design: TPV
Drawn: STAFF
Approved: TPV
Scale: NOTED

Project No. 0802-E038 CAPITAL IMPROVEMENT PROJECT

WATER REPLACEMENT PLAN & PROFILE
Water Line 1, Water Line 2 & Water Line 3

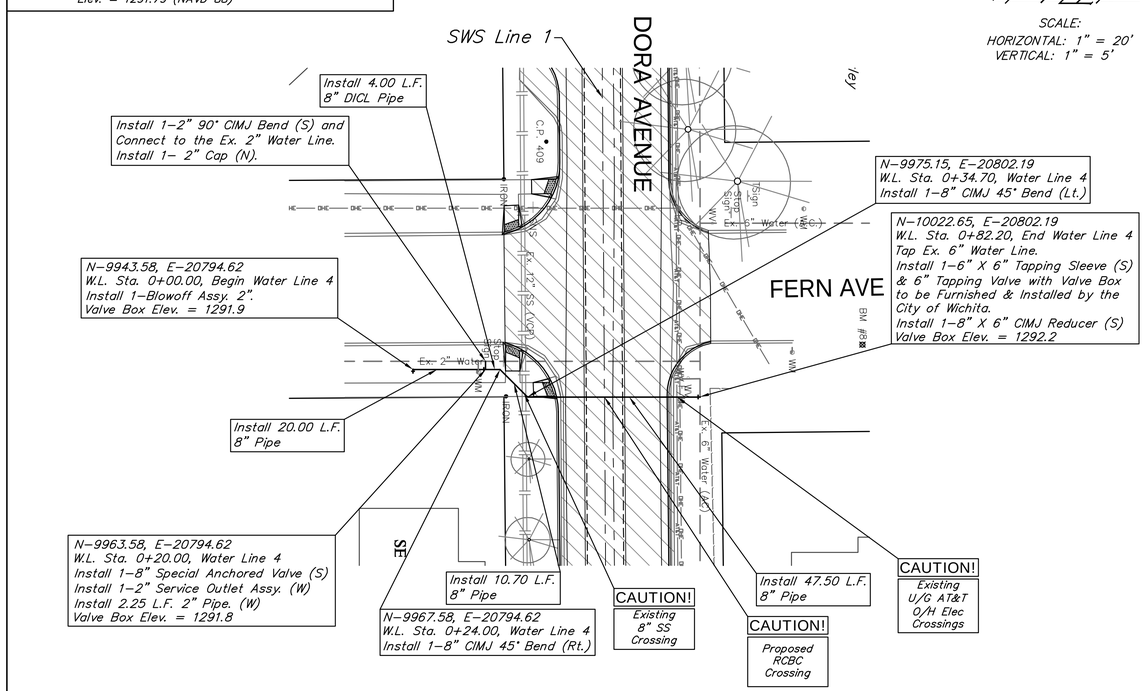
MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT

Baughman Company , P.A.
315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149
ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

SHEET
OF

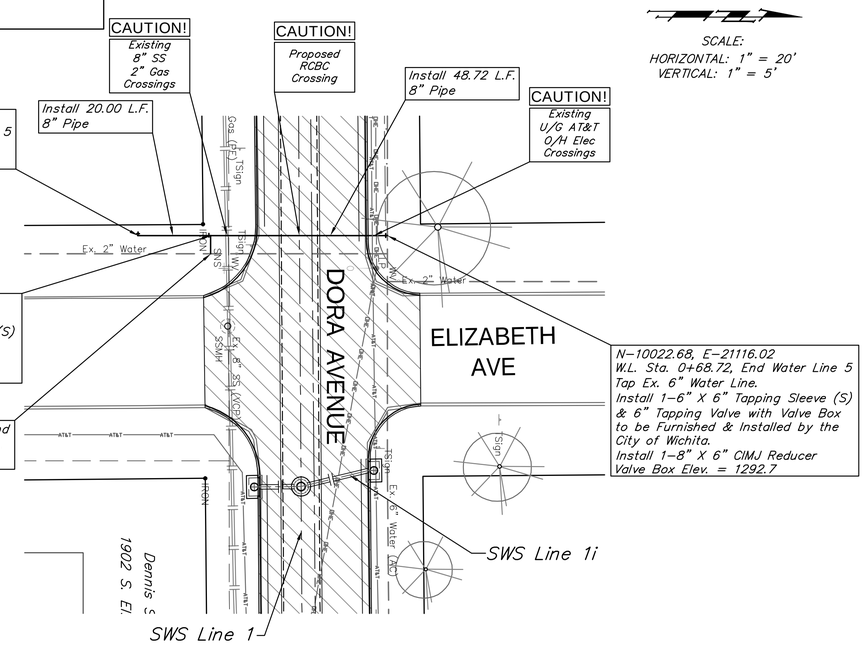
BENCHMARK:
BM #8 – Chiseled "□" on the South Curb Return of the Drive to 1836 S. Fern, 68' North and 16' East of the Centerlines of Dora and Fern. Elev. = 1291.79 (NAVD 88)

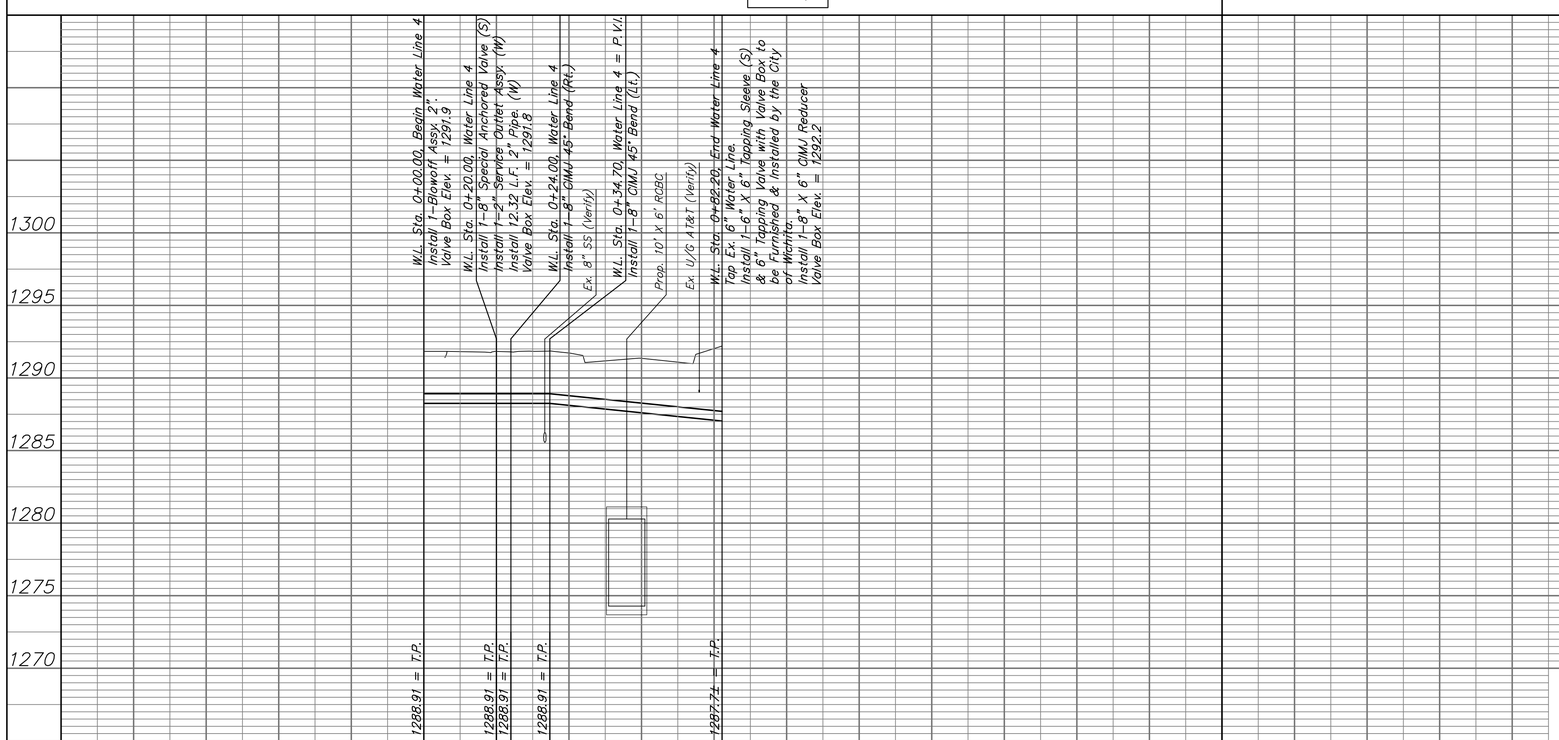
SCALE:
HORIZONTAL: 1" = 20'
VERTICAL: 1" = 5'

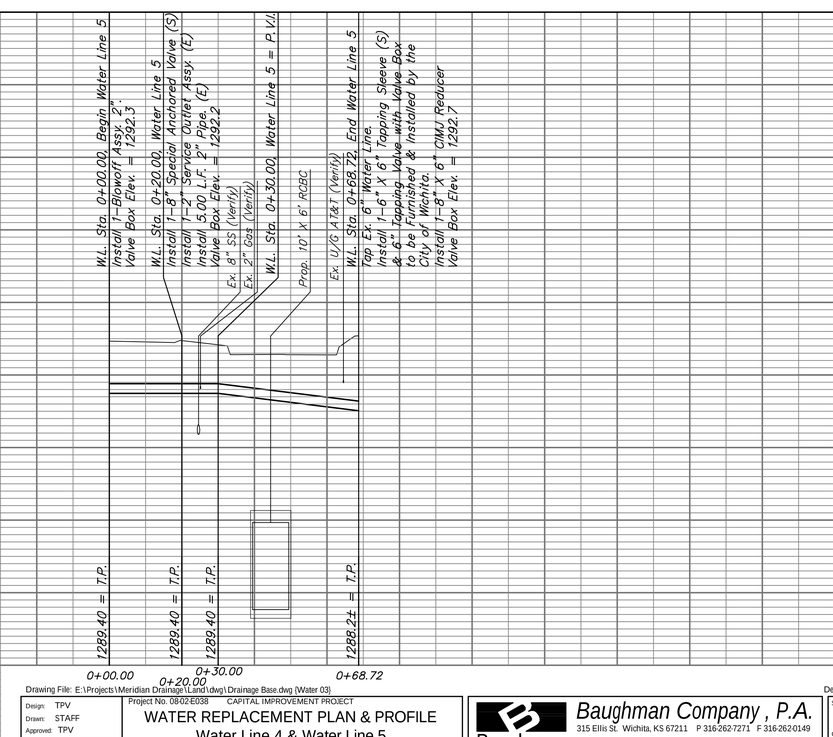


BENCHMARK:
BM #8 – Chiseled "□" on the South Curb Return of the Drive to 1836 S. Fern, 68' North and 16' East of the Centerlines of Dora and Fern. Elev. = 1291.79 (NAVD 88)

SCALE:
HORIZONTAL: 1" = 20'
VERTICAL: 1" = 5'







Drawing File: E:\Projects\Meridian Drainage\Land\dwg\Drainage Base.dwg [Water 03]

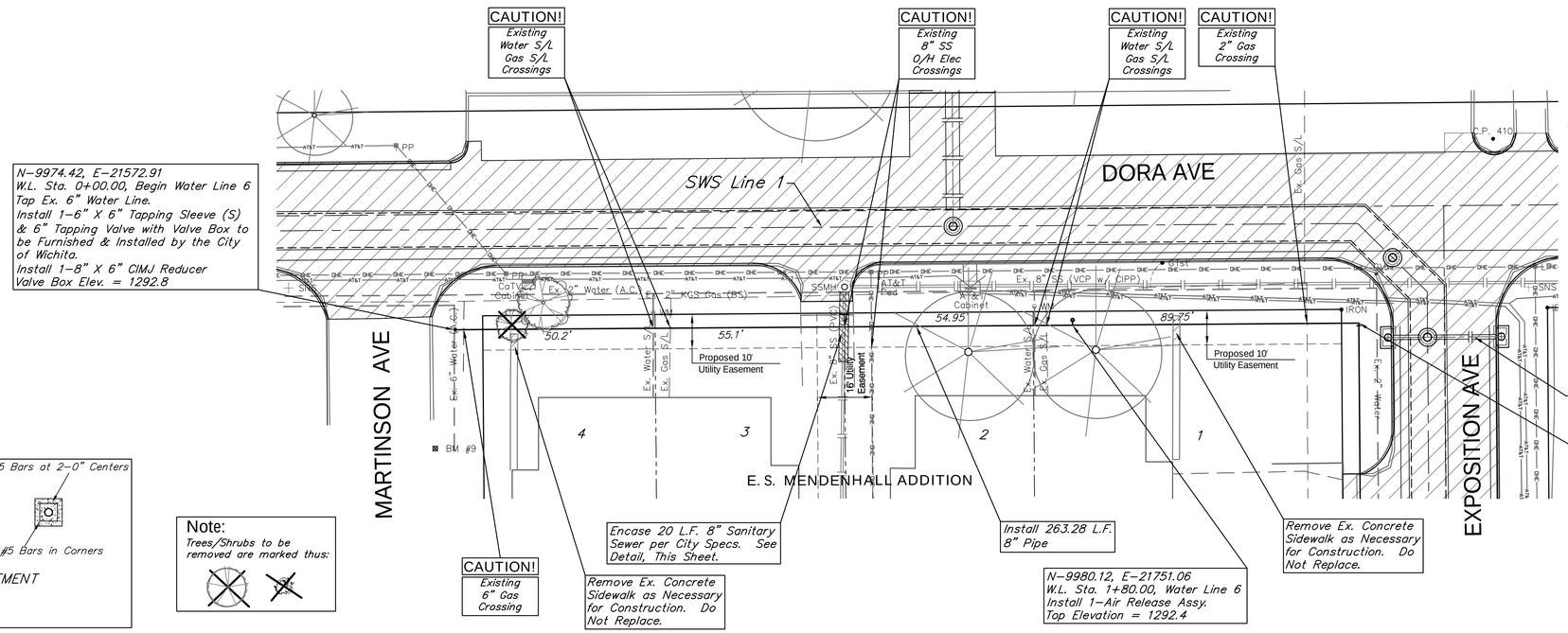
December 2012

Design: TPV	Project No. 0802E038 CAPITAL IMPROVEMENT PROJECT
Drawn: STAFF	WATER REPLACEMENT PLAN & PROFILE
Approved: TPV	Water Line 4 & Water Line 5
Scale: NOTED	MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT

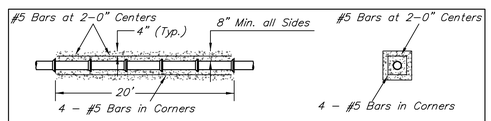
Baughman Company , P.A.
315 Ellis St Wichita, KS 67211 P 316-262-7271 F 316-262-0149
ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

SHEET
OF

BENCHMARK:
BM #9 – Chiseled "□" on the North Curb Return of the Drive to 1341 W. Dora, 68' South and 16' East of the Centerlines of Dora and Martinson. Elev. = 1292.58 (NAVD 88)

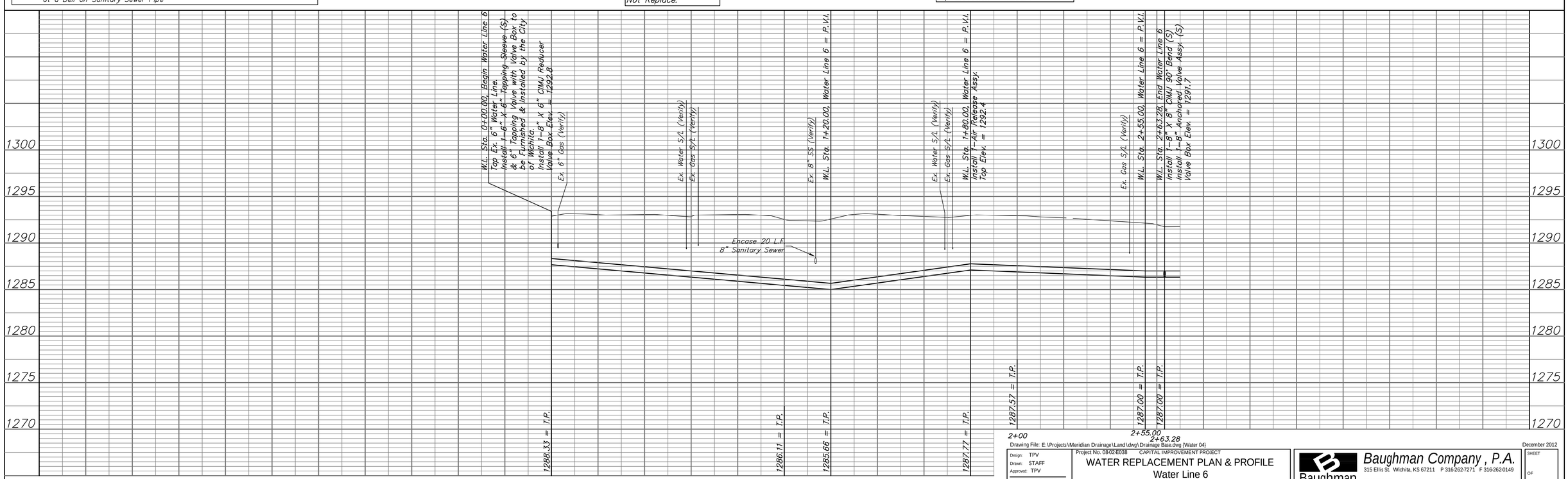


SCALE:
HORIZONTAL: 1" = 20'
VERTICAL: 1" = 5'



REINFORCED CONCRETE ENCASEMENT OF SANITARY SEWER
Note: Encasement to begin and end at a Bell on Sanitary Sewer Pipe

Note:
Trees/Shrubs to be removed are marked thus:



Drawing File: E:\Projects\Meridian Drainage\Land\dwg\Drainage Base.dwg (Water 04)

December 2012

Design: TPV
Drawn: STAFF
Approved: TPV
Scale: NOTED

Project No. 0802E038 CAPITAL IMPROVEMENT PROJECT

WATER REPLACEMENT PLAN & PROFILE
Water Line 6

MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT

Baughman Company , P.A.
315 Ellis St Wichita, KS 67211 P 316-262-7271 F 316-262-0149
ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

SHEET
OF

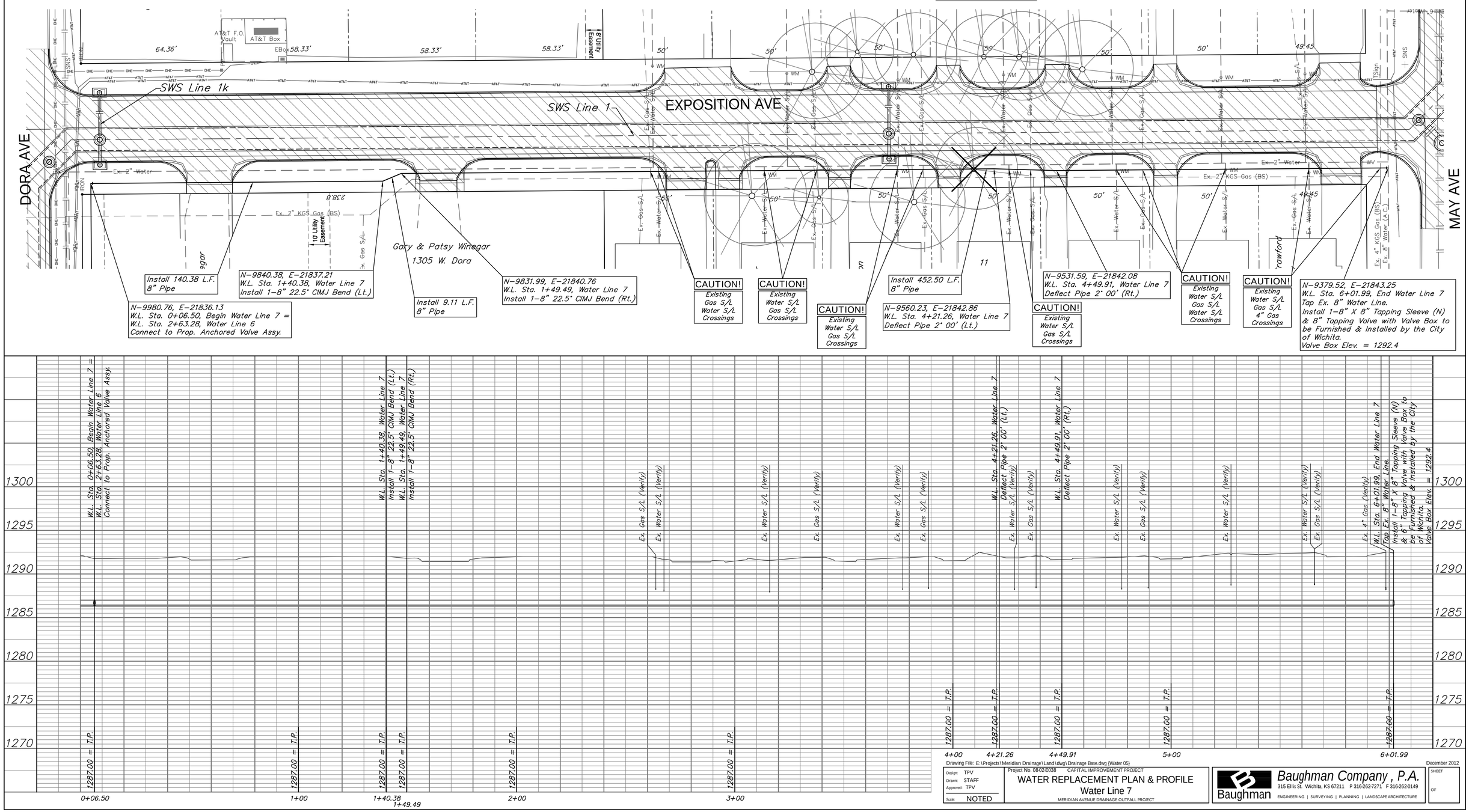
BENCHMARK:

BM #10 – Chiseled "□" on the Top of Curb East of the Sidewalk, 15' North and 35' East of the Centerlines of Dora and Exposition.
Elev. = 1290.70 (NAVD 88)

BM #11 – Chiseled "□" on the West Curb Return of the Drive to the Seneca Village Townhouses, 15' South and 52' West of the Centerlines of May and Exposition.
Elev. = 1291.76 (NAVD 88)

Note:
Trees/Shrubs to be removed are marked thus:

SCALE:
HORIZONTAL: 1" = 20'
VERTICAL: 1" = 5'



Drawing File: E:\Projects\Meridian Drainage\Land\dwg\Drainage Base.dwg {Water 05}

December 2012

Design:	TPV
Drawn:	STAFF
Approved:	TPV
Scale:	NOTED

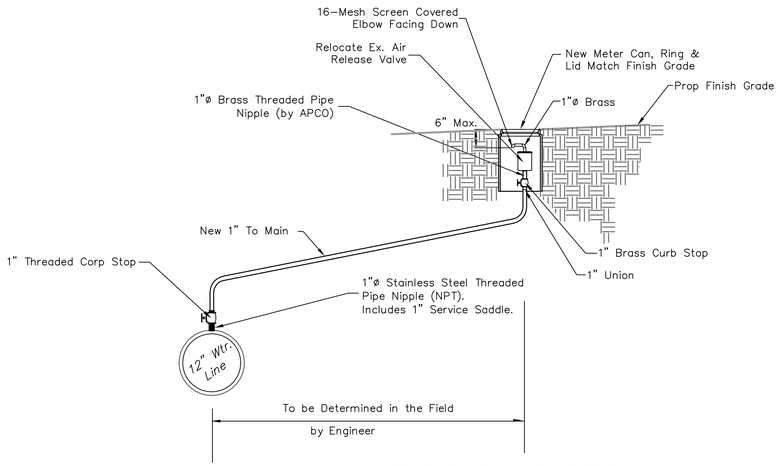
Project No. 0802-E038 CAPITAL IMPROVEMENT PROJECT

WATER REPLACEMENT PLAN & PROFILE
Water Line 7

MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT

Baughman Company , P.A.
315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149
ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

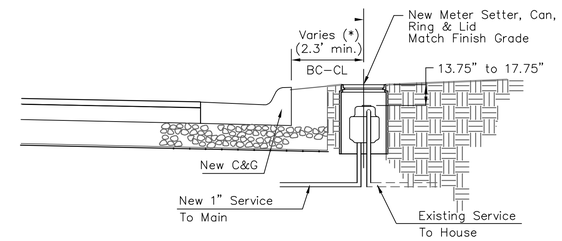
SHEET
OF



AIR RELEASE DETAIL

Replace meter setter, can, ring & lid.
Existing 3/4" Copper Setter must be
replaced with 1" Copper Setter.

All work and materials required is to
be included in the Bid Items
"Long & Short Services Replaced"



TYPICAL WATER METER INSTALATION DETAIL

VALVE BOX ADJUSTMENT TABLE				
Station	Roadway	Offset	Valve #	Notes
107+17.9	Dora	23.6' Lt	5043	2"
107+20.0	Dora	8.1' Lt	5044	6" (Not Found)
200+10.3	Dora	14.9' Lt	5041	6" (Hydrant)
200+18.6	Dora	3.9' Lt	6251	8"
200+19.0	Dora	20.0' Lt	3569	8"
200+22.0	Dora	7.1' Lt	3571	6"
203+71.7	Dora	1.4' Lt	3575	6"
204+00.0	Dora	8.0-25.0'±Lt	3576	6" (Not Found)
204+04.9	Dora	21.2' Lt	10139	6" (Hydrant)
300+18.1	Dora	22.3' Lt	3562	6"
600+22.2	Dora	28.1' Lt	3776	6"
300+51.9	Dora	22.4' Lt	3573	6"
300+59.2	Dora	20.4' Lt	2286	6"
300+63.9	Dora	19.6' Lt	5525	6" (Hydrant)
303+96.0	Dora	24.1' Lt	2283	2"
303+96.2	Dora	18.1' Lt	2287	2"
307+80.1	Dora	27.0' Lt	3778	2"
308+18.3	Dora	18.6' Lt	3579	2"
308+22.8	Dora	20.8' Lt	102	6" (Hydrant)
311+46.9	Dora	20.8' Rt.	5051	2"
311+54.8	Dora	23.8' Lt	2285	2"
315+24.1	Dora	15.9' Lt	4314	6"
315+28.5	Dora	24.6' Lt	2281	6"
315+29.3	Dora	15.9' Lt	4149	2"
406+17.1	Exposition	19.7' Rt	4315	2"
501+00.7	May	29.2' Lt	14325	6"
501+05.4	May	29.0' Lt	14326	2"
503+30.5	May	21.3' Lt	33130	8" (Hydrant)
503+34.2	May	22.8' Lt	4317	8"
FOR INFORMATION ONLY. Cost to be subsidiary to the Lump Sum Bid Item "Adjustment of Water Valves"				

WATER SERVICE REPLACEMENT TABLE*				
Address	RCB Station	Meter Offset	Service	Remarks
1419 W. Dora	42+33	Rt	Long	Remove & Replace
1901 S. Fern	35+52	Rt	Long	Remove & Replace
1329 W. Dora	45+13	Rt	Short	Remove & Replace
1317 W. Dora	46+25	Rt	Short	Remove & Replace
1922 S. Exposition	50+13	Lt	Long	Remove & Replace
1921 S. Exposition	50+16	Rt	Short	Remove & Replace
1927 S. Exposition	50+64	Rt	Short	Remove & Replace
1928 S. Exposition	50+73	Lt	Long	Remove & Replace
1935 S. Exposition	51+25	Rt	Short	Remove & Replace
1934 S. Exposition	51+27	Lt	Long	Remove & Replace
1940 S. Exposition	51+73	Lt	Long	Remove & Replace
1941 S. Exposition	51+76	Rt	Short	Remove & Replace
1946 S. Exposition	52+23	Lt	Long	Remove & Replace
1947 S. Exposition	52+26	Rt	Short	Remove & Replace
1952 S. Exposition	52+73	Lt	Long	Remove & Replace
1953 S. Exposition	52+76	Rt	Short	Remove & Replace
1310 W. May	53+12	Lt	Long	Remove & Replace
1314 W. May	53+14	Rt	Short	Remove & Replace

* New Meter Boxes to be at the Same Location as the Existing Boxes Unless Directed Otherwise

Drawing File: E:\Projects\Meridian Drainage\Details\WM Tables.dwg

December 2012

Design: TPV
Drawn: Staff
Approved: TPV
Scale: Noted

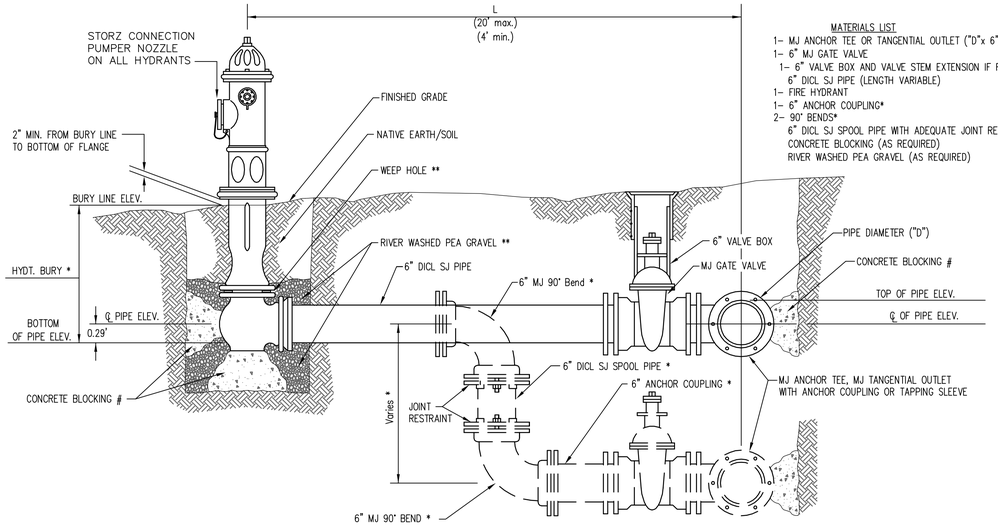
Project No. 0802-E038 CAPITAL IMPROVEMENT PROJECT

WATER VALVE & WATER METER
RELOCATION TABLES

MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT

Baughman Company , P.A.
315 Ellis St Wichita, KS 67211 P 316-262-7271 F 316-262-0149
ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

SHEET
OF



MATERIALS LIST
1– MJ ANCHOR TEE OR TANGENTIAL OUTLET ("D"x 6")
1– 6" MJ GATE VALVE
1– 6" VALVE BOX AND VALVE STEM EXTENSION IF REQUIRED *
6" DICL SJ PIPE (LENGTH VARIABLE)
1– FIRE HYDRANT
1– 6" ANCHOR COUPLING*
2– 90° BENDS*
6" DICL SJ SPOOL PIPE WITH ADEQUATE JOINT RESTRAINT *
CONCRETE BLOCKING (AS REQUIRED)
RIVER WASHED PEA GRAVEL (AS REQUIRED)

* IF THE REQUIRED HYDRANT BURY IS IN EXCESS OF 5', BUT LESS THAN 7', CONTRACTOR SHALL USE STANDARD 5' HYDRANT BURY AND HYDRANT BARREL EXTENSIONS AS NECESSARY. IF THE REQUIRED HYDRANT BURY IS GREATER THAN 7', CONTRACTOR SHALL USE 5' HYDRANT BURY, 2–MJ 90* BENDS, 6" ANCHOR COUPLING AND 6" DICL SPOOL PIPE AS NECESSARY FOR VERTICAL ADJUSTMENT. THE CONTRACTOR SHALL PROVIDE ADEQUATE THRUST BLOCKING AT HYDRANT AND MEGALUGS, ROD AND LUG OR SIMILAR RESTRAINT BETWEEN 90^ BENDS TO SECURE ALL FITTINGS DURING TESTING AND OPERATION. THE CONTRACTOR SHALL PROVIDE A VALVE STEM EXTENSION PER DETAIL THIS SHEET.

** CAUTION□□□WEEP HOLES TO BE KEPT CLEAR DURING CONSTRUCTION AND BACKFILL. CONCRETE FOR THRUST BLOCKING SHALL NOT OBSTRUCT WEEP HOLES. PLACE 1 CUBIC FOOT OF RIVER WASHED PEA GRAVEL AROUND EACH WEEP HOLE.

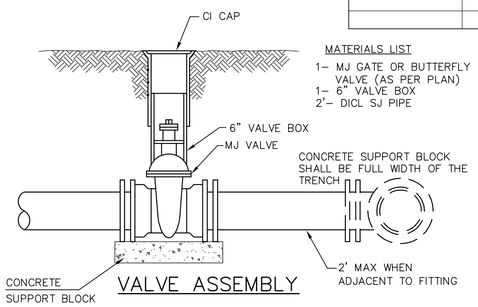
\# CONCRETE THRUST BLOCKING SHALL BE KEPT CLEAR OF BOLTS, NUTS, AND MJ ACCESSORIES.

FIRE HYDRANT ASSEMBLY

PER CITY OF WICHITA SPECIFICATIONS

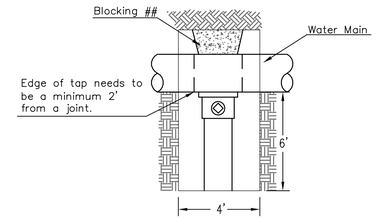
FIRE HYDRANTS REQUIRED

STATION	BURY LINE ELEVATION	TOP OF PIPE ELEVATION	FIRE HYDRANT BURY REQUIRED*	VALVE STEM EXT. REQUIRED (ft)*
3+90.57, Line 1	1293.3	1288.18	5.8	1.5'



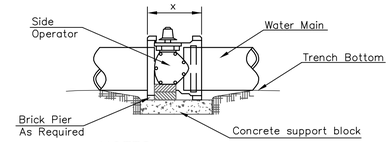
MATERIALS LIST
1– MJ GATE OR BUTTERFLY VALVE (AS PER PLAN)
1– 6" VALVE BOX
2'– DICL SJ PIPE

VALVE ASSEMBLY



CITY TAP

When the City of Wichita makes tap, blocking is to be done by Contractor

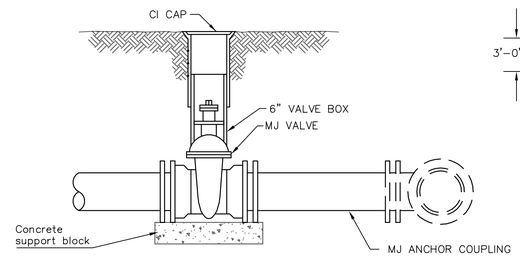


NOTES

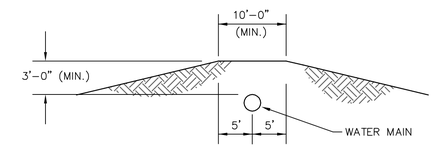
1. This detail covers Butterfly Valve installation, inclusive, regardless of type of pipe or joint used. 24" and larger lines to be detailed on plans.
2. 6" Valve Box and Cover required per City of Wichita Std. Specifications.
3. Conc. Support Block to be full width of trench.

CONCRETE SUPPORT BLOCKING FOR BUTTERFLY VALVE INSTALLATION

MATERIALS LIST
1–MJ GATE OR BUTTERFLY VALVE (AS PER PLAN)
1–MJ ANCHOR COUPLING (12" OR SMALLER)
1–6" VALVE BOX
CONCRETE SUPPORT BLOCK SHALL BE
FULL WIDTH OF THE TRENCH

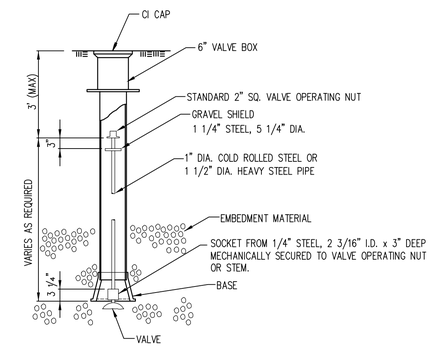


ANCHORED VALVE ASSEMBLY



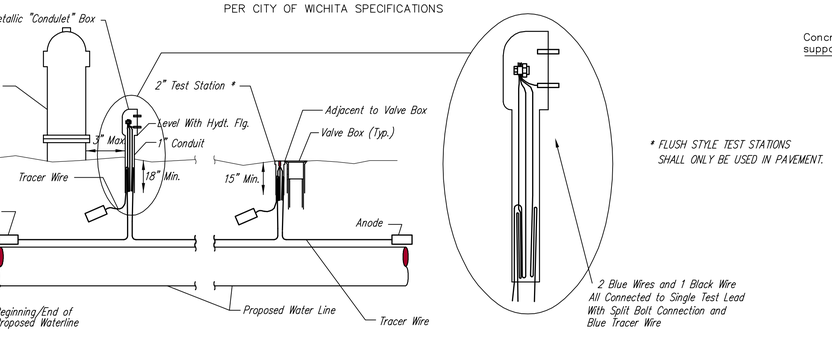
PROTECTIVE FILL DETAIL

MINIMUM PROTECTIVE FILL SHALL BE PROVIDED IN ALL INSTANCES WHERE COVER OVER THE PROP. WATER LINE IS LESS THAN 3'.
(COST SUBSIDIARY TO PIPE INSTALLATION)



VALVE STEM EXTENSION DETAIL

NOTE: ONE VALVE STEM EXTENSION FOR EACH VALVE BURIED GREATER THAN 5'.



* FLUSH STYLE TEST STATIONS SHALL ONLY BE USED IN PAVEMENT.

TRACER WIRE

Conductive type pipe locator/tracer wire shall be installed to locate all waterline pipe regardless of pipe material. The wire shall extend the entire length of the proposed pipe. The wire shall be taped to the waterline and pulled with the pipe. Split–bolt connectors shall be used at splice locations. Electrical tape shall cover all splices so no bare wire is exposed. Test stations shall be installed adjacent to all fire hydrants along the waterline and at blowoffs or valves near the ends of the waterlines. Any exceptions to the location of test stations shall be approved by the engineer. At each test station, the tracer wire shall be connected to a 3 lb. Zinc or magnesium anode. Anodes shall also be attached to the tracer wire at both the beginning and the end of the proposed waterline. A typical layout of the tracer wire and test station is provided in the above figure.

WIRE

The tracer wire shall be Blue No. 12 THHN annealed soft copper wire with thermal plastic insulation or Blue No. 12 AWG CCS with 30 mil HDPE insulation. The insulation shall be heat, oil, and gasoline resistant as manufactured by Temple Electric or approved equal. To allow for grade adjustment, a minimum of 12" of excess wire shall be coiled at the bottom of the test station for all wires. The insulation sheathing shall be removed such that 1" bare copper wire at all points of connection. Contractor shall attach wire being installed with proposed water main to any tracer wire installed with adjacent waterline projects.

TEST STATIONS

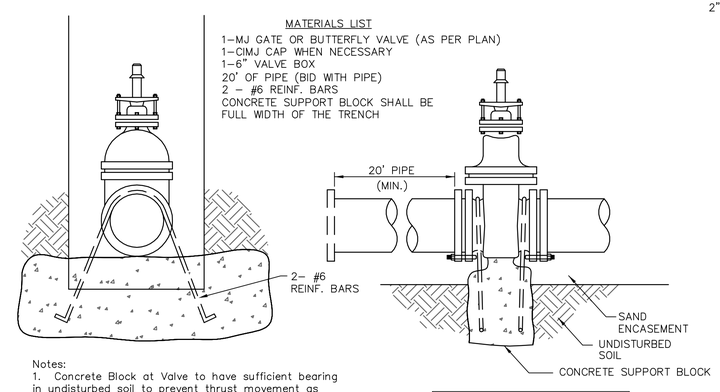
The test station for fire hydrant applications shall be a 1 inch galvanized "condulet" style test station as manufactured by AGRA Industries with a removable solid cover having two leads extending from the face or approved equal. The test station for valve applications shall be 2 inch flush style test station T2PS3B as manufactured by HANDLEY Industries or approved equal. The "condulet" style test station shall be attached to a 1 inch rigid galvanized conduit with a minimum length of 36" and plastic end bushing. The flush style shall have the word "WATER" stamped or molded into the lid. All test stations shall be manufactured using molded blue tops or sufficiently coated with blue enamel paint. The tracer wire and the anode wire shall be installed to allow 10 inches of wire within the test station. In concrete environments such as sidewalks or in the downtown area the contractor shall use the flush style test station. The location of all test stations shall be approved by the engineer, recorded, and shown in the as–built drawings.

ANODES

The anodes shall be 3 lb. bare zinc or magnesium. The anodes shall be buried at the same elevation as the waterline at each test station. The anodes shall be connected to Black No. 12 THHN annealed soft copper wire which shall be extended to the test station.

TRACER WIRE DETAIL

COST IS SUBSIDIARY TO PIPE INSTALLATION



MATERIALS LIST
1–MJ GATE OR BUTTERFLY VALVE (AS PER PLAN)
1–CIMJ CAP WHEN NECESSARY
1–6" VALVE BOX
20' OF PIPE (BID WITH PIPE)
2 – #6 REINF. BARS
CONCRETE SUPPORT BLOCK SHALL BE
FULL WIDTH OF THE TRENCH

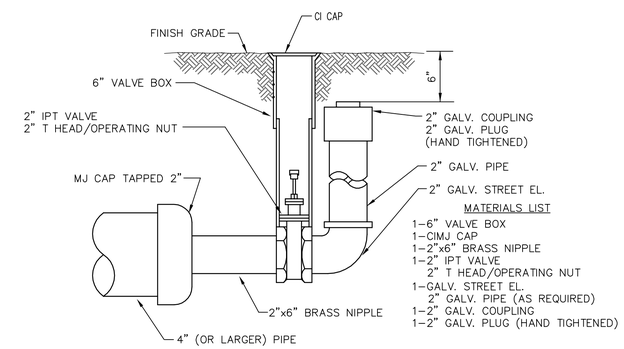
Notes:

1. Concrete Block at Valve to have sufficient bearing in undisturbed soil to prevent thrust movement as shown in table at right. Field Engineer to determine thrust loading of undisturbed soil and final size of thrust block.
2. The thrust block shall be constructed such that bolts, nuts, and other MJ accessories are kept clear of concrete.
3. All valves at dead ends and at other locations as called out on the plans shall be blocked as shown here.

THRUST AT VALVES

VALVE	THRUST AT 150 #/in²
4"	1809 lbs.
6"	4245 lbs.
8"	7540 lbs.
12"	16965 lbs.

ANCHORED VALVE ASSEMBLY, SPECIAL



MATERIALS LIST
1–6" VALVE BOX
1–CIMJ CAP
1–2"x6" BRASS NIPPLE
1–2" IPT VALVE
2" T HEAD/OPERATING NUT
1–GALV. STREET EL.
2" GALV. PIPE (AS REQUIRED)
1–2" GALV. COUPLING
1–2" GALV. PLUG (HAND TIGHTENED)

2" BLOWOFF ASSEMBLY

E:\Projects\Meridian Drainage\Details\WL–101_Std_Water_Assembly_Details.dwg

CITY OF WICHITA
PUBLIC WORKS & UTILITIES
ENGINEERING DIVISION

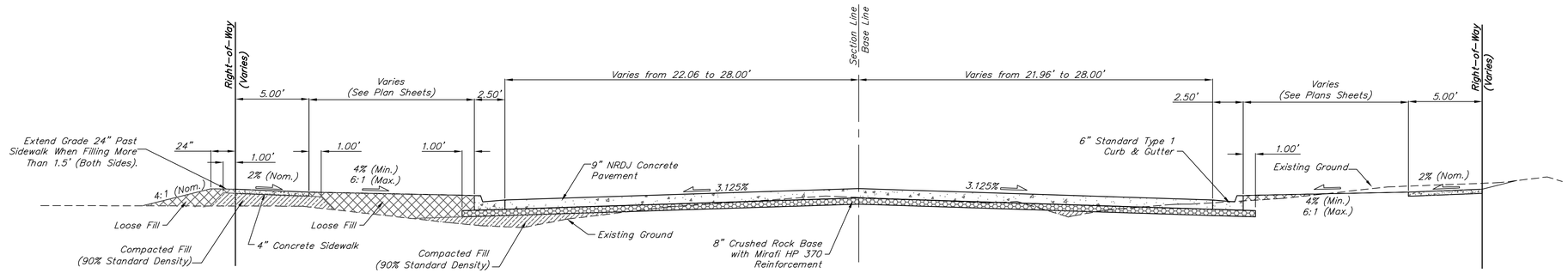
STANDARD
WATER ASSEMBLY
DETAIL

CITY ENGINEER
Gary Janzen, P.E. City Engineer

PROJECT NUMBER	OCA NUMBER	DATE
___-___	_____	01/2012

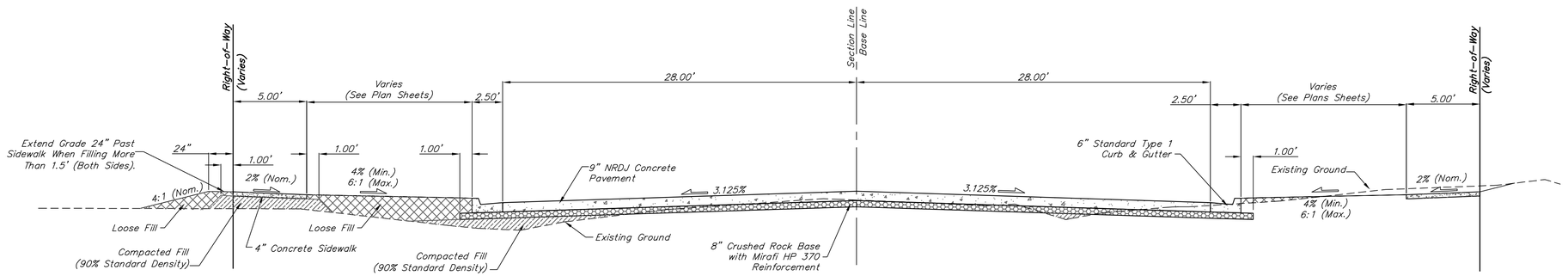
CITY ENGINEER'S OFFICE
CITY HALL - SEVENTH FLOOR
455 NORTH MAIN STREET
WICHITA, KANSAS 67202-1620
(316) 268-4501

SHEET
_ of _



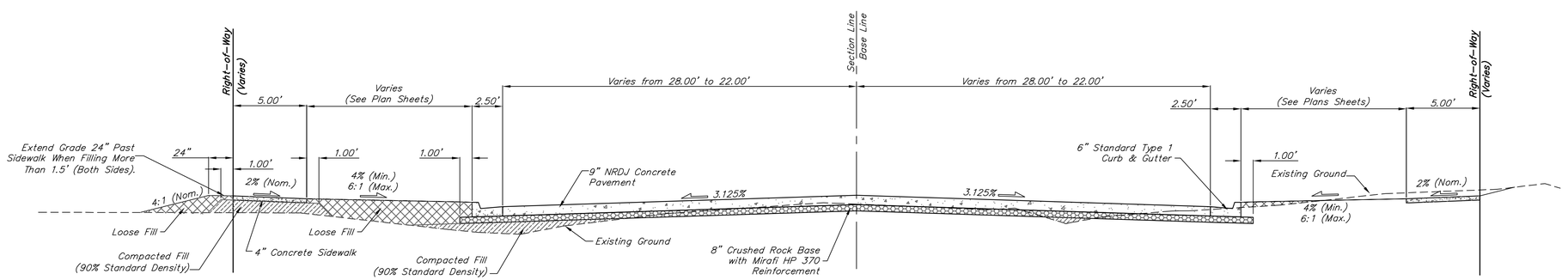
MERIDIAN AVENUE TYPICAL SECTION

Sta. 40+55.00 to Sta. 40+85.00



MERIDIAN AVENUE TYPICAL SECTION

Sta. 40+85.00 to Sta. 42+88.40



MERIDIAN AVENUE TYPICAL SECTION

Sta. 42+88.40 to Sta. 44+07.76

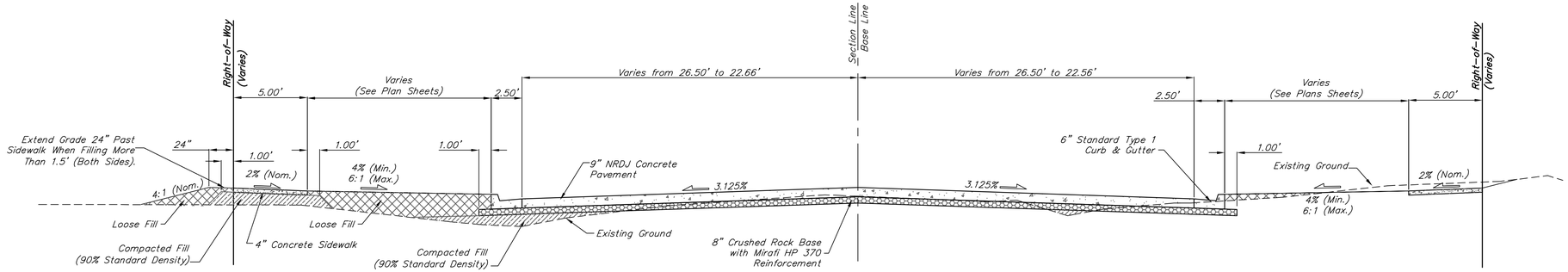
Drawing File: E:\eng\Meridian Drainage\Details\Typ Sec.dwg

December 2012

Design: TPV Drawn: TPV Approved: TPV Scale: None	Project No. 08-02-E038 CAPITAL IMPROVEMENT PROJECT TYPICAL SECTIONS MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT	Baughman Company , P.A. 315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149 ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

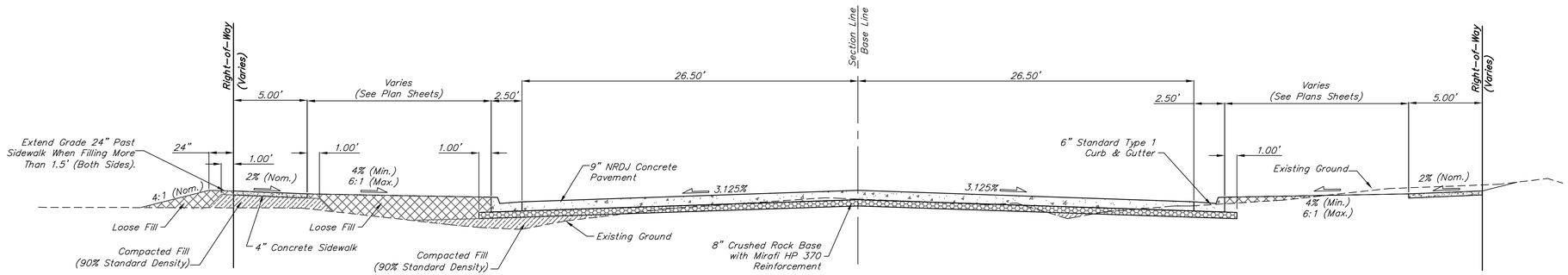
SHEET

OF



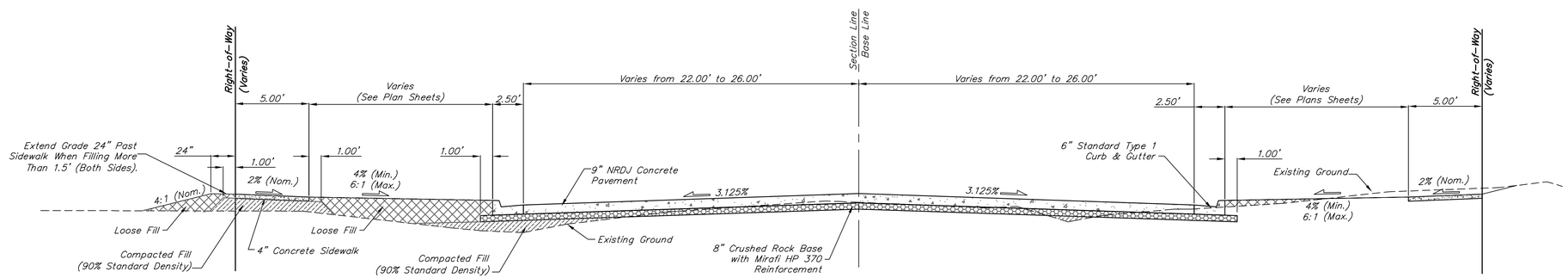
MERIDIAN AVENUE TYPICAL SECTION

Sta. 44+90.33 to Sta. 46+09.70



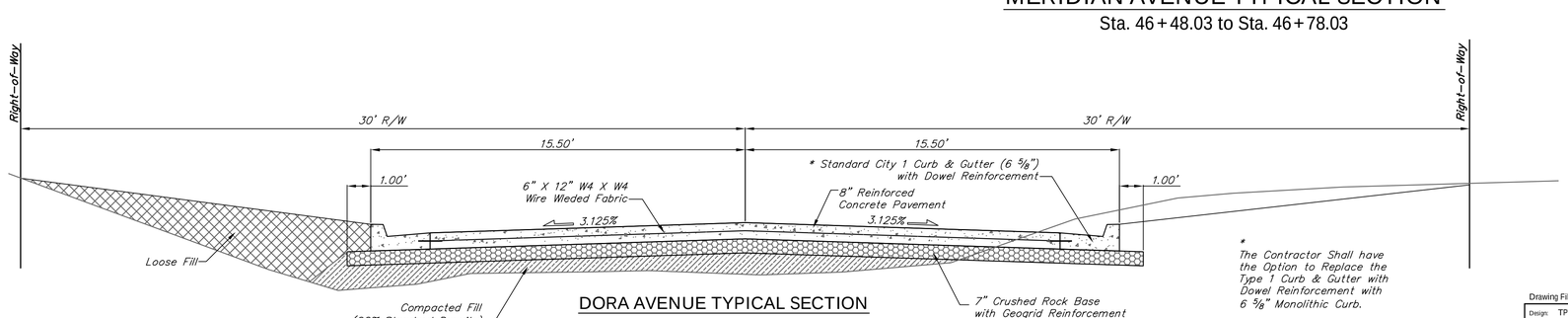
MERIDIAN AVENUE TYPICAL SECTION

Sta. 46+09.70 to Sta. 46+48.03



MERIDIAN AVENUE TYPICAL SECTION

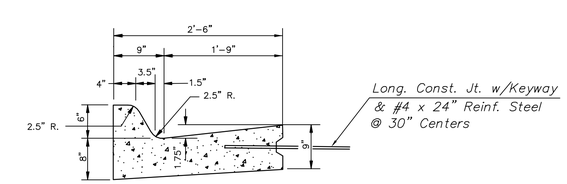
Sta. 46+48.03 to Sta. 46+78.03



DORA AVENUE TYPICAL SECTION

SEDGWICK AVENUE TYPICAL SECTION

* The Contractor Shall have the Option to Replace the Type 1 Curb & Gutter with Dowel Reinforcement with 6 5/8" Monolithic Curb.



TYPE I COMBINED CURB & GUTTER (6")

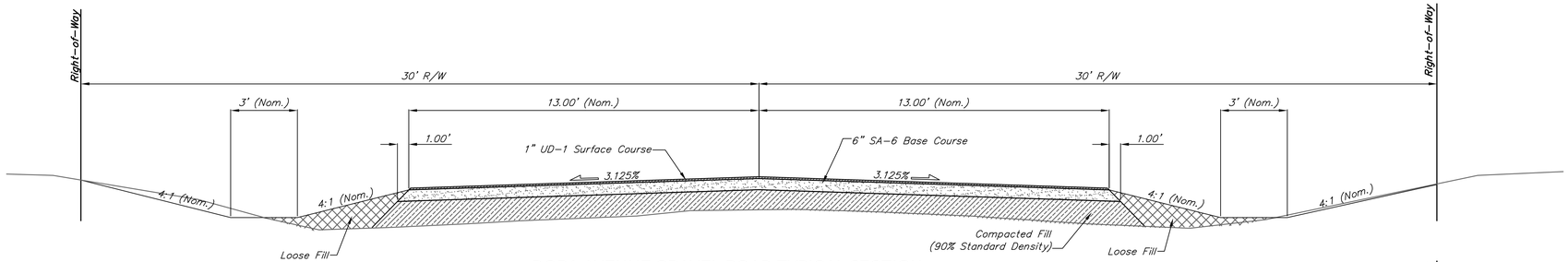
Drawing File: E:\eng\Meridian Drainage\Details\Typ Sec.dwg

December 2012

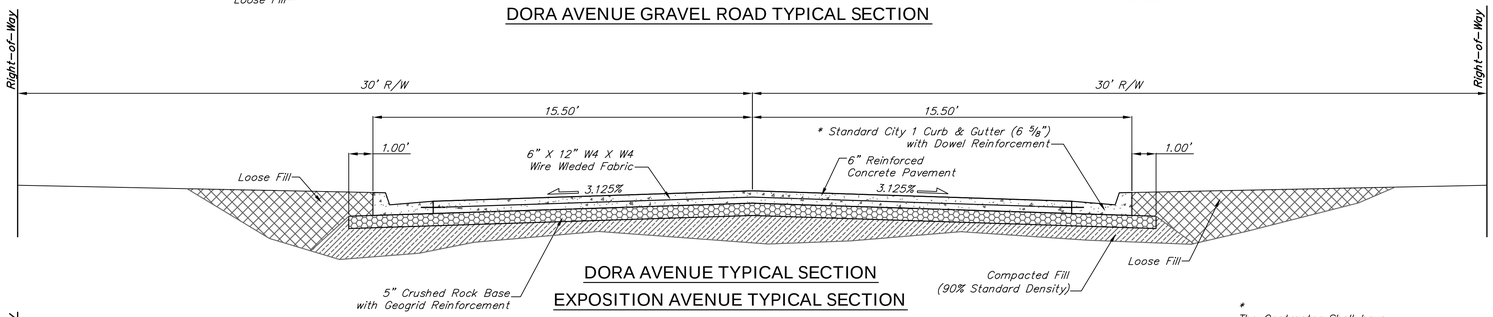
Design: TPV Drawn: TPV Approved: TPV Scale: None	Project No. 08-02-E038 CAPITAL IMPROVEMENT PROJECT TYPICAL SECTIONS MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT	Baughman Company , P.A. 315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149 ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

SHEET

OF



DORA AVENUE GRAVEL ROAD TYPICAL SECTION



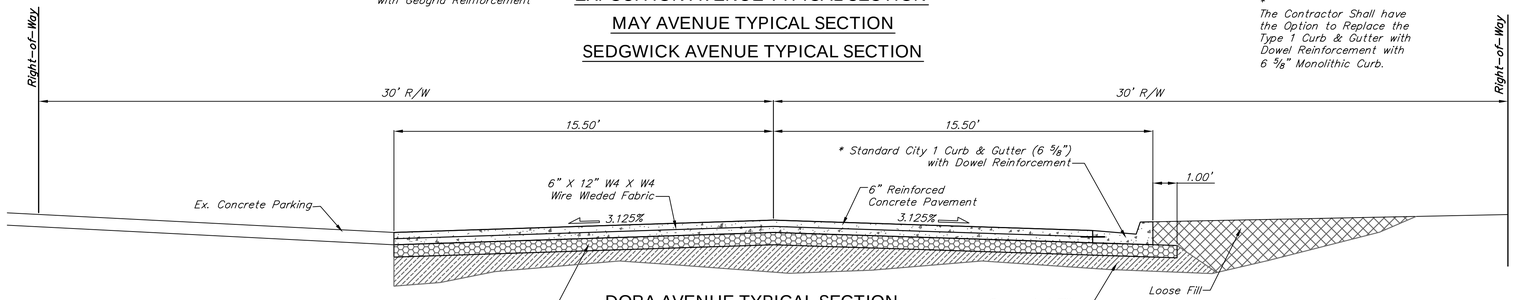
DORA AVENUE TYPICAL SECTION

EXPOSITION AVENUE TYPICAL SECTION

MAY AVENUE TYPICAL SECTION

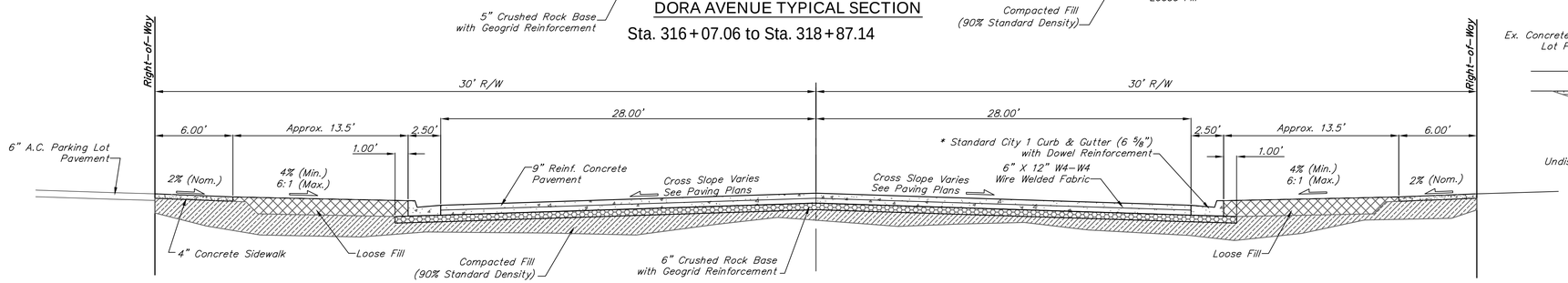
SEDGWICK AVENUE TYPICAL SECTION

* The Contractor Shall have the Option to Replace the Type 1 Curb & Gutter with Dowel Reinforcement with 6 5/8" Monolithic Curb.

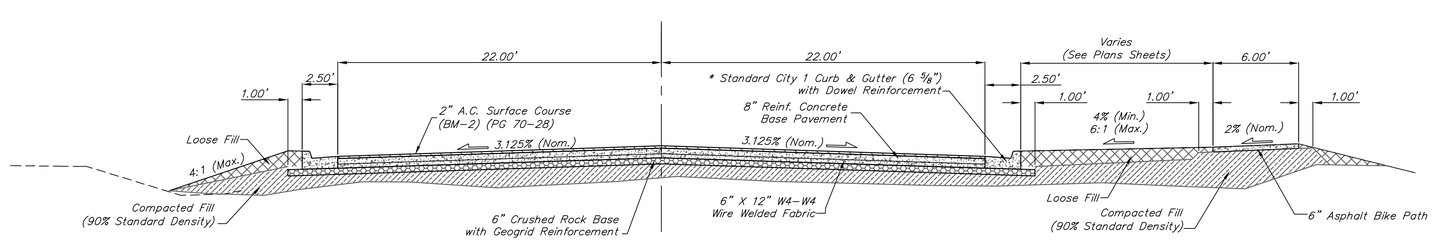


DORA AVENUE TYPICAL SECTION

Sta. 316+07.06 to Sta. 318+87.14



SENECA STREET TYPICAL SECTION



McLEAN BOULEVARD TYPICAL SECTION

General Notes

FABRIC BASE REINFORCEMENT SHALL BE B X 1100 BY TENSAR CORPORATION OR LB0201 BY TENAX CORPORATION OR APPROVED EQUAL. FABRIC BASE REINFORCEMENT SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.

ROCK BASE IS TO BE COMPACTED AND SMOOTHED WITH A STEEL FACED ROLLER PRIOR TO PLACEMENT OF ASPHALT. TACK COAT WILL NOT BE APPLIED TO ROCK

A TACK COAT OF EMULSIFIED ASPHALT (SC-1H OR CSS-1H) SHALL BE APPLIED AT AN APPROXIMATE RATE OF 0.05 GALLONS PER SQUARE YARD BETWEEN EACH LIFT OF ASPHALTIC MATERIAL.

BITUMINOUS BASE AND ASPHALTIC CONCRETE WEARING SURFACE SHALL BE PLACED WITH A LAYDOWN MACHINE HAVING AUTOMATIC CONTROLS FOR LINE AND GRADE.

CONSTRUCTION JOINTS IN EACH LIFT SHALL BE STAGGERED A MINIMUM DISTANCE OF ONE (1) FOOT FROM JOINTS IN PRECEDING LIFTS AND PLACED SO THAT A JOINT WILL BE CONSTRUCTED ON THE CENTERLINE OF THE TOP LIFT.

AGGREGATES FOR SURFACING NON-PAVED ROADWAYS SHALL MEET THE REQUIREMENTS OF SA-6 CRUSHED STONE MATERIAL AS SPECIFIED IN SECTION 1111.2, OF THE KDOT 2007 EDITION, STANDARD SPECIFICATIONS.

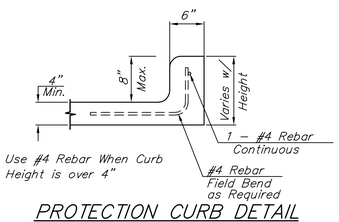
THE MAXIMUM JOINT LENGTH ALLOWED WILL BE LIMITED TO 12'.

CRUSHED ROCK GRADATION REQUIREMENTS

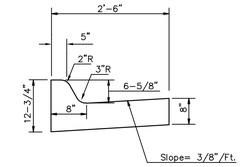
PERCENT OF AGGREGATE RETAINED

2-1/2"	0
3/4"	20 - 60
#4	50 - 80
#40	80 - 94
#200	90 - 98

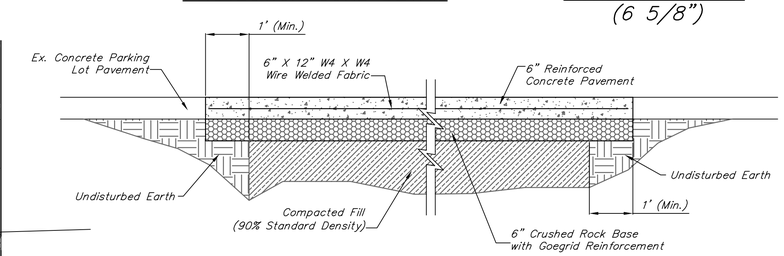
ROCK QUALITY SHALL CONFORM TO THE REQUIREMENTS SPECIFIED BE THE KDOT 1990 EDITION STANDARD SPECIFICATION SUBSECTION 1102 FOR DURABILITY CLASS I.



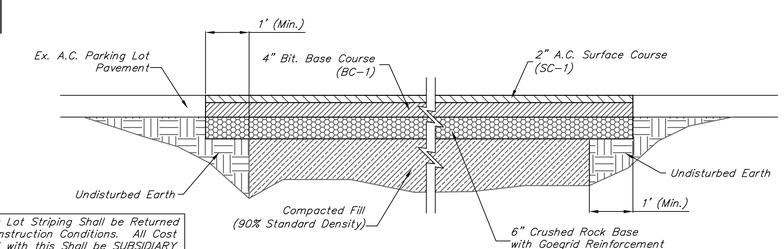
PROTECTION CURB DETAIL



STANDARD CITY CURB & GUTTER (6 5/8")



REINF. CONCRETE PARKING LOT TYPICAL SECTION



All Parking Lot Striping Shall be Returned to Pre-Construction Conditions. All Cost Associated with this Shall be SUBSIDIARY to the Repaving of the Parking Lot.

A.C. PARKING LOT TYPICAL SECTION

Drawing File: E:\eng\Meridian Drainage\Details\Typ Sec.dwg

December 2012

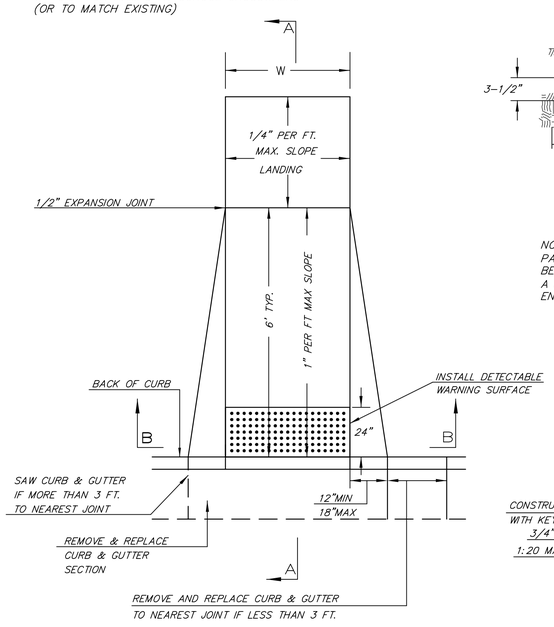
Design: TPV Drawn: TPV Approved: TPV Scale: None	Project No. 08-02-E038 CAPITAL IMPROVEMENT PROJECT TYPICAL SECTIONS MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT	Baughman Company , P.A. 315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149 ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

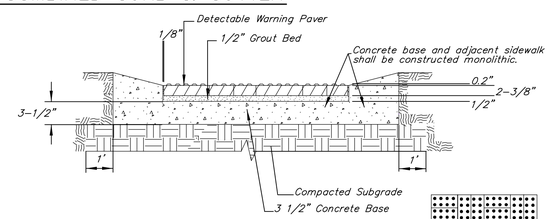
SHEET

OF

(TYPE A) STANDARD WHEELCHAIR RAMP WITH DETECTABLE WARNING CONSTRUCTION DETAIL FOR STREETS WITH COMBINED CURB & GUTTER

W= 4'0" FOR STANDARD RAMP
W= 5'0" FOR RAMPS AT SCHOOL CROSSWALKS
(OR TO MATCH EXISTING)

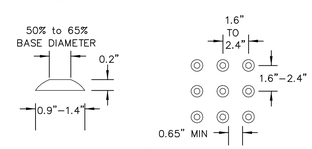




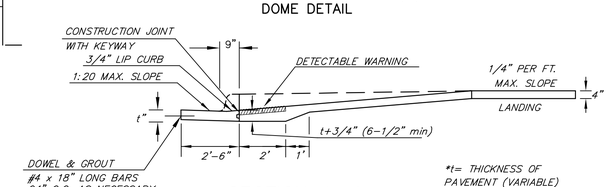
TYPICAL SECTION DETECTABLE WARNING PAVER

NOTE: RAMPS TO COMPLY WITH LATEST ADAAG GUIDELINES. PAVESTONE DETECTABLE WARNING PAVERS (OR AN APPROVED EQUAL) SHALL BE USED IN ALL WHEELCHAIR RAMPS. THE RED PAVER SHALL BE INSTALLED USING A BASKET WEAVE/PARQUET PATTERN. OTHER PATTERNS MAY BE USED WITH APPROVAL OF ENGINEER. SAND FILL JOINTS. ALIGN DOMES IN THE DIRECTION OF PEDESTRIAN TRAVEL.

SECTION B–B



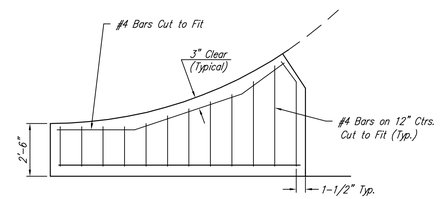
DOME DETAIL



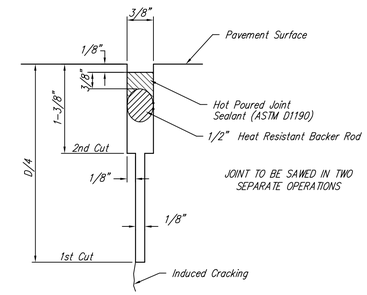
*t= THICKNESS OF PAVEMENT (VARIABLE)

SECTION A–A

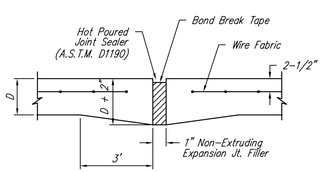
AUGUST 4, 2003



WING REINFORCING DETAIL

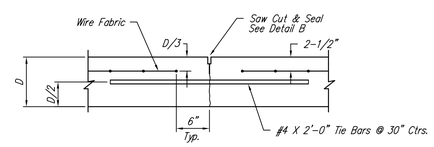


SAW JOINT DETAIL "A"

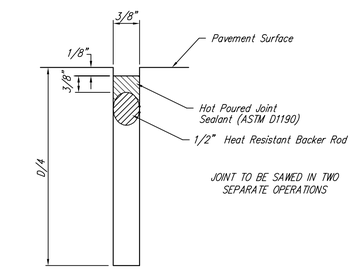


EXPANSION JOINT

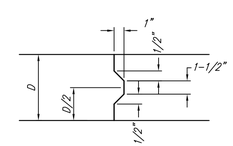
NOTE: Extra Thickness to be Subsidiary to Price of Square Yards Pavement



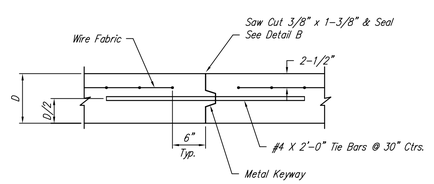
LONGITUDINAL JOINT DETAIL (L.J.)



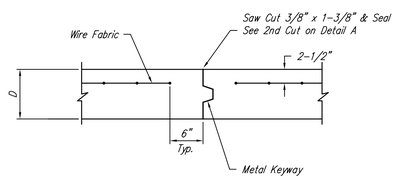
SAW JOINT DETAIL "B"



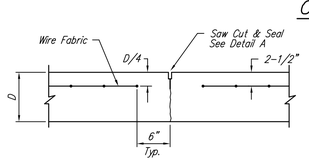
KEYWAY DETAIL



OPTIONAL LONGITUDINAL JOINT DETAIL (L.J.)
(CONSTRUCTION JOINT)



OPTIONAL CONTRACTION JOINT
(CONSTRUCTION JOINT)



CONTRACTION JOINT DETAIL (C.J.)

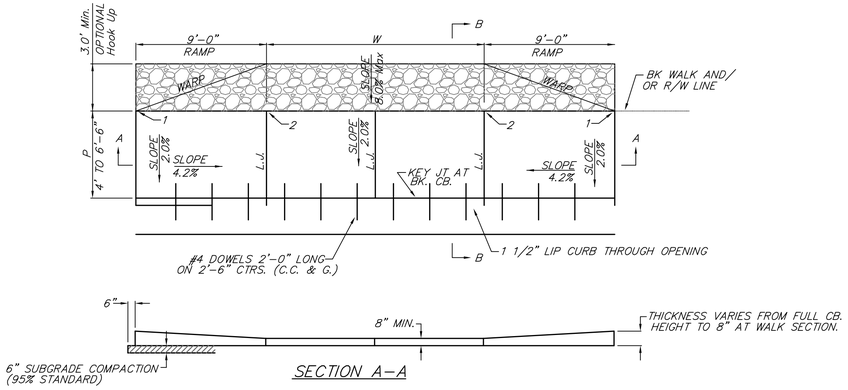
NOTE: 6" X 12" W4XW4 Wire Fabric Reinforcing Shall Be Placed So That The Wires With The 6" Spacing Will Run Parallel With The Longitudinal Joints.

Drawing File: F:\eng\Meridian Drainage\Details\Pavdet.dwg

December 2012

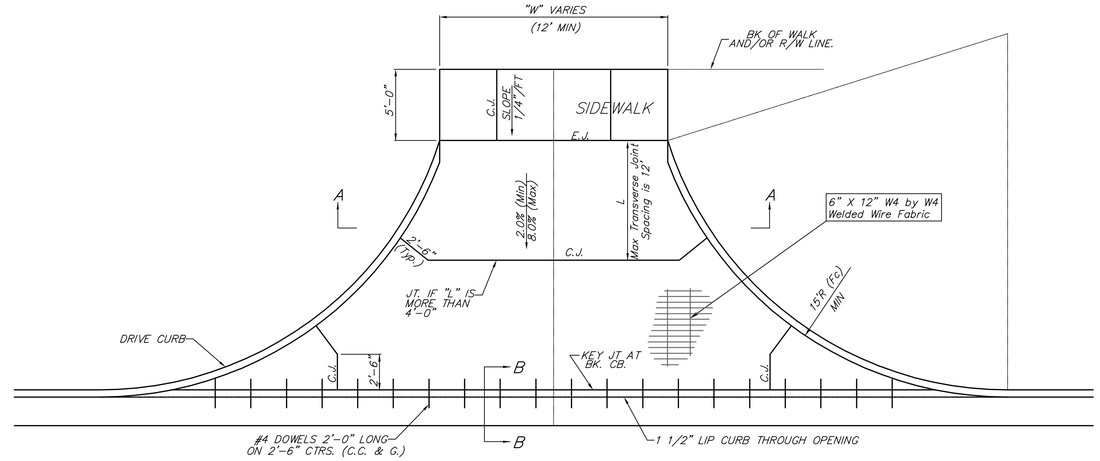
Design: STAFF Drawn: STAFF Approved: TPV Scale: NOTED	Project No. 0802-E038 CAPITAL IMPROVEMENT PROJECT PAVEMENT DETAILS MERIDIAN DRAINAGE OUTFALL PROJECT	Baughman Company , P.A. 315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149 ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

SHEET
OF



PARKING WIDTH "P"	4'	4.5'	5'	5.5'	6'	6.5'
DIST. OF PT "1" ABOVE TOP OF FULL CURB	0.08'	0.09'	0.10'	0.12'	0.13'	0.14'
DIST. OF PT "2" BELOW TOP OF FULL CURB	–.30'	–.29'	–.28'	–.26'	–.25'	–.24'

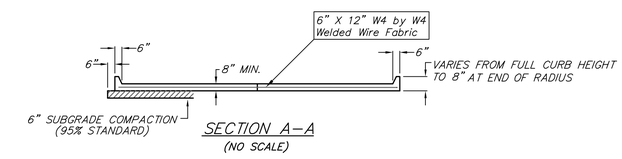
FULL RAMP DRIVE (P = 4.0' TO 6.5')

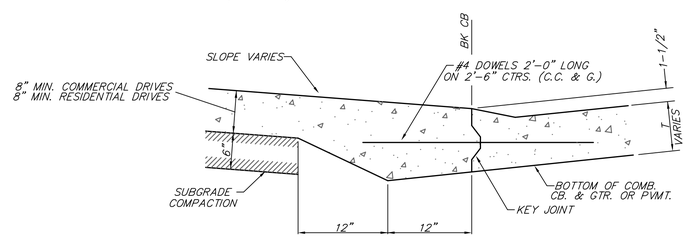


CONCRETE PARTIAL RADIUS DRIVES

NOTE

ALLEYS ON THIS PROJECT SHALL BE CONSTRUCTED AS AND PAID FOR AS SQ. YD. REINFORCED CONCRETE PAVEMENT (8") (DRIVES)





BACK OF CURB DETAIL
SECTION B–B
(NO SCALE)

GENERAL NOTES

1. CONCRETE DRIVEWAY CONSTRUCTION DETAILED ON THIS SHEET IS FOR USE WITH FULL HEIGHT STREET CURBS.
2. ONE LONGITUDINAL JOINT SHALL BE CONSTRUCTED ALONG THE CENTERLINE OF CONCRETE DRIVES HAVING A "W" DIMENSION OF 24' OR LESS. TWO LONGITUDINAL JOINTS SHALL BE CONSTRUCTED WITH EQUAL SPACINGS NOT TO EXCEED 10' FOR CONCRETE DRIVES WITH A "W" DIMENSION GREATER THAN 24'.
3. JOINT SPACING IN THE DRIVEWAY WALK SECTION SHALL BE A MINIMUM OF 3' AND A MAXIMUM OF 6' AND ARE TO BE EQUALLY SPACED WITHIN THIS RANGE. WALK SECTION SHALL BE CONSTRUCTED TO THE SAME THICKNESS AS THE DRIVEWAY.
4. DOWEL BARS SHALL BE OMITTED FROM THE KEYED CONSTRUCTION JOINT ALONG THE BACK OF THE STREET CURB LINE WHEN DRIVEWAYS ARE CONSTRUCTED IN CONJUNCTION WITH NEW CONCRETE PAVEMENT CONSTRUCTION.
5. ADDITIONAL THICKNESS OF DRIVE AS INDICATED IN THE DRAWINGS WILL NOT BE PAID FOR DIRECTLY AND THIS COST SHALL BE INCLUDED IN THE UNIT PRICE BID FOR THE DRIVEWAY CONSTRUCTION.
6. ONE HALF INCH EXPANSION JOINTS SHALL ALSO BE INSTALLED ALONG THE PROPERTY LINE AND/OR BACK OF WALK LINE WHEN DRIVE CONSTRUCTION ALONG THIS LINE ABUTS CONCRETE PARKING LOTS OR CONCRETE DRIVE EXTENSION.
7. ALL CONCRETE RESIDENTIAL DRIVEWAYS SHALL BE A MINIMUM OF 8" IN THICKNESS AND SHALL BE WITH REINFORCEMENT. DRIVEWAYS MAY BE CONSTRUCTED THICKER THAN 8" WITH 6"X12" W4–W4 WELDED WIRE FABRIC WHEN PROPERLY AUTHORIZED BY THE PROPERTY OWNER WITH THE ENGINEERS CONCURRENCE. NO EXTRA PAYMENT WILL BE MADE FOR DRIVEWAYS THICKER THAN 8".
8. ALL CONCRETE COMMERCIAL DRIVEWAYS SHALL BE A MINIMUM OF 8" IN THICKNESS AND SHALL BE WITH REINFORCEMENT. DRIVEWAYS MAY BE CONSTRUCTED THICKER THAN 8" WITH 6"X12" W4–W4 WELDED WIRE FABRIC WHEN PROPERLY AUTHORIZED BY THE PROPERTY OWNER WITH THE ENGINEERS CONCURRENCE. NO EXTRA PAYMENT WILL BE MADE FOR DRIVEWAYS THICKER THAN 8".
9. COMPACTION OF SUBGRADE BENEATH PROPOSED DRIVES SHALL NOT BE PAID FOR DIRECTLY, BUT SHALL BE INCLUDED IN THE UNIT PRICE FOR THE BID ITEM REIN. CONC. DRIVE PVMT.
10. AT LOCATIONS WHERE THE NEW DRIVEWAY ABUTS AN EXISTING SAND, GRAVEL, OR DIRT DRIVEWAY ON PRIVATE PROPERTY, THE CONTRACTOR SHALL INSTALL A GRAVEL DRIVE HOOKUP 8" DEEP, W+2' (W+18') IN WIDTH FOR THE LENGTH OF THE DRIVEWAY DISTURBANCE, WITH A MINIMUM LENGTH OF 3'. TO BE PAID FOR AS THE BID ITEM "GRAVEL DRIVEWAY HOOKUPS – S.F."

SPECIAL NOTES

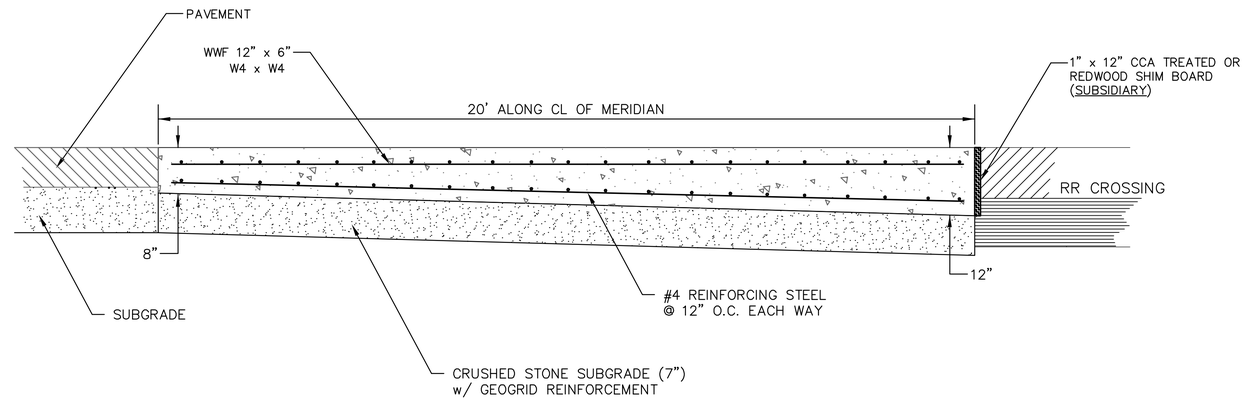
EXISTING PAVEMENT SHALL BE REMOVED BY THE PAVING CONTRACTOR. PAVEMENT IMMEDIATELY ADJACENT TO AND WITHIN THREE (3) FEET OF THE CROSSING SHALL BE REMOVED PRIOR TO THE INSTALLATION OF NEW RAILROAD CROSSING MATERIALS. PAVING CONTRACTOR SHALL COORDINATE THE PAVEMENT REMOVAL AT EACH CROSSING LOCATION WITH THE INVOLVED RAILROAD COMPANY. ALL EXPOSED JOINTS BETWEEN NEW CONSTRUCTION AND EXISTING PAVEMENT, WALK OR DRIVES SHALL BE TO NEAT LINES FORMED EITHER BY FULL DEPTH SAW CUT OR EXISTING JOINT.

LENGTHS OF CONCRETE OR RUBBER CROSSING MATERIAL SHOWN ON THE PLANS IN MOST CASES ARE TO EXTEND APPROX. THREE (3) FEET BEYOND BOTH SIDES OF THE PAVED MAIN TRAFFICWAY FOR EACH LOCATION. CONCRETE, RUBBER OR WOOD PLANKING MAY BE INSTALLED BY THE INVOLVED RAILROAD COMPANY FOR SIDEWALK, DRIVEWAY AND SHOULDER CROSSINGS WHERE REQUIRED. THE INVOLVED RAILROAD COMPANIES SHALL ADJUST THEIR RAILS TO ELEVATIONS AS SHOWN ON THE PLANS FOR EACH CROSSING LOCATION. VARIATIONS FROM THE TOP OF RAIL ELEVATIONS SHOWN WILL BE PERMITTED ONLY WHEN APPROVED BY THE FIELD ENGINEER FOR ANTICIPATED TRACK SETTLEMENT.

SURFACE OF NEW PAVEMENT AND CROSSING MATERIAL SHALL BE SET TO IDENTICAL ELEVATIONS AT THEIR POINT OF JUNCTURE ONLY WHEN THE RAILROAD COMPANY USES APPROVED MECHANICAL EQUIPMENT TO COMPACT RAILROAD FILL AND BALLAST SUCH TO PRECLUDE TRACK SETTLEMENT. RAILROAD TRACK AND CROSSING MATERIAL ELEVATIONS OR PAVEMENT ELEVATIONS SHALL BE ADJUSTED IN A RANGE OF ONE–FOURTH (1/4) INCH TO ONE (1) INCH TO ALLOW FOR TRACK SETTLEMENT WHEN THE RAILROAD COMPANY USES HAND METHODS FOR COMPACTION OF RAILROAD FILL AND BALLAST OR USE OF OTHER COMPACTION METHODS WHICH MAY NOT PRECLUDE TRACK SETTLEMENT. THE EXACT ELEVATION DIFFERENTIAL BETWEEN CROSSING MATERIAL AND PAVEMENT SHALL BE DETERMINED BY THE RAILROAD BASED ON THEIR EXPERIENCE FOR TRACK SETTLEMENT WITH CONCURRENCE BY THE ENGINEER.

INDIVIDUAL SECTIONS OF THE CROSSING MATERIAL SHALL BE OFFSET AT LEAST ONE TIE SPACE FROM EACH OTHER SUCH THAT THE ENDS OF THE CROSSING WILL MORE CLOSELY CONFORM TO SIDEWALK OR PAVEMENT CURB ALIGNMENTS WHERE RAILROAD CROSSINGS ARE SKEWED THIRTY (30) DEGREES OR MORE TO THE STREET.

TO BE PAID FOR AS SQ. YD. OF REINFORCED CONCRETE RAILROAD APPROACH SLAB (10")

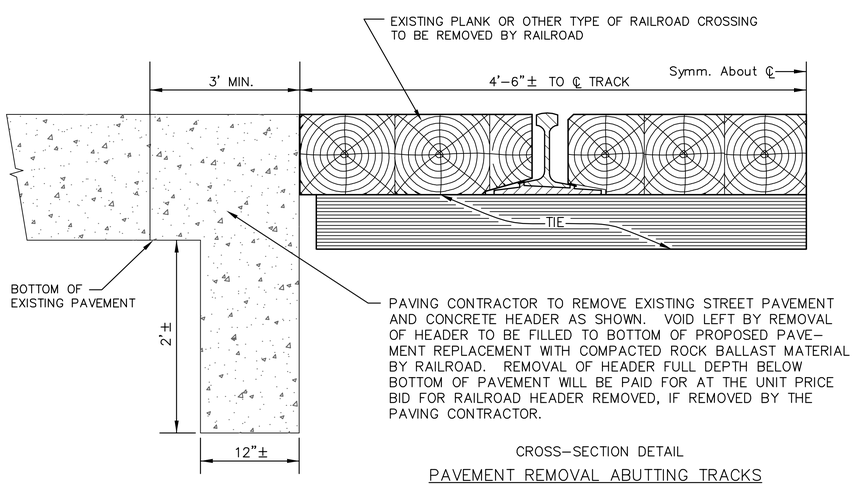


NOTE: ONE THICKNESS OF TAR PAPER SHALL BE INSTALLED BY PAVING CONTRACTOR ON ALL MATING SURFACES BETWEEN PAVEMENT AND SHIM CAP BOARD TO BREAK ANY BOND BETWEEN THE SIDEWALK OR DRIVEWAY AND RAILROAD CROSSING MATERIAL.

CROSS–SECTION DETAIL

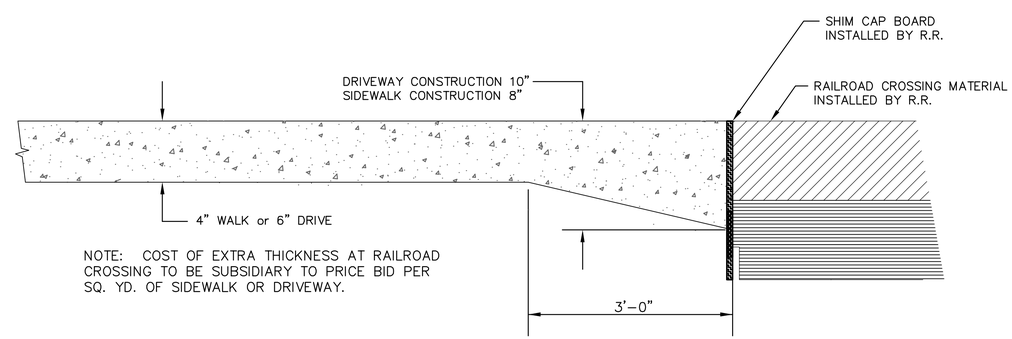
NEW PAVEMENT CONSTRUCTION

ABUTTING RAILROAD CROSSING



CROSS–SECTION DETAIL

PAVEMENT REMOVAL ABUTTING TRACKS TO FACILITATE INSTALLATION OF CROSSING



NOTE: COST OF EXTRA THICKNESS AT RAILROAD CROSSING TO BE SUBSIDIARY TO PRICE BID PER SQ. YD. OF SIDEWALK OR DRIVEWAY.

NOTE: ONE THICKNESS OF TAR PAPER SHALL BE INSTALLED BY PAVING CONTRACTOR ON ALL MATING SURFACES BETWEEN PAVEMENT AND SHIM CAP BOARD TO BREAK ANY BOND BETWEEN THE SIDEWALK OR DRIVEWAY AND RAILROAD CROSSING MATERIAL.

CROSS–SECTION DETAIL

NEW SIDEWALK AND DRIVEWAY CONSTRUCTION

ABUTTING RAILROAD CROSSING

RR Xing.DWG

REV. 03–11–02

CITY OF WICHITA PUBLIC WORKS ENGINEERING

RAILROAD CROSSING WHERE PAVEMENT IS REMOVED & REPLACED

CITY ENGINEER

GARY JANZEN, P.E.

PROJECT NUMBER	OCA NUMBER	DATE
562–862003	_____	Jan 2004

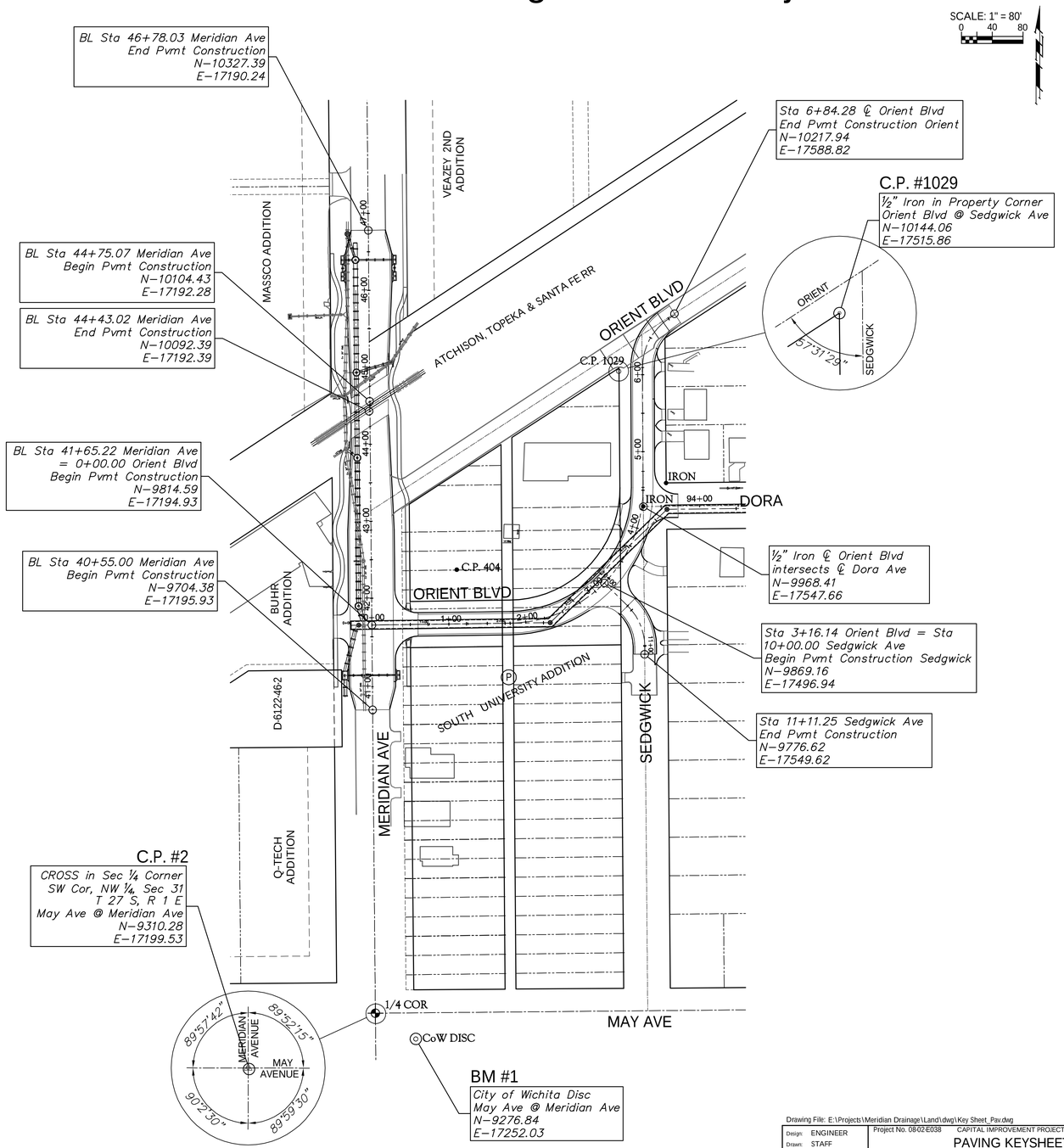
CITY ENGINEER'S OFFICE
CITY HALL – SEVENTH FLOOR
455 NORTH MAIN STREET
WICHITA, KANSAS 67202–1620
(316) 268–4501
(316) 268–4114 FAX

DESIGN	DRAWN
CoW	CoW

SHEET __ of __

Meridian Ave. and Orient Blvd. Paving

Meridian Ave. Drainage Outfall Project



Drawing File: E:\Projects\Meridian Drainage\Land\dwg\Key Sheet_Pav.dwg

December 2012

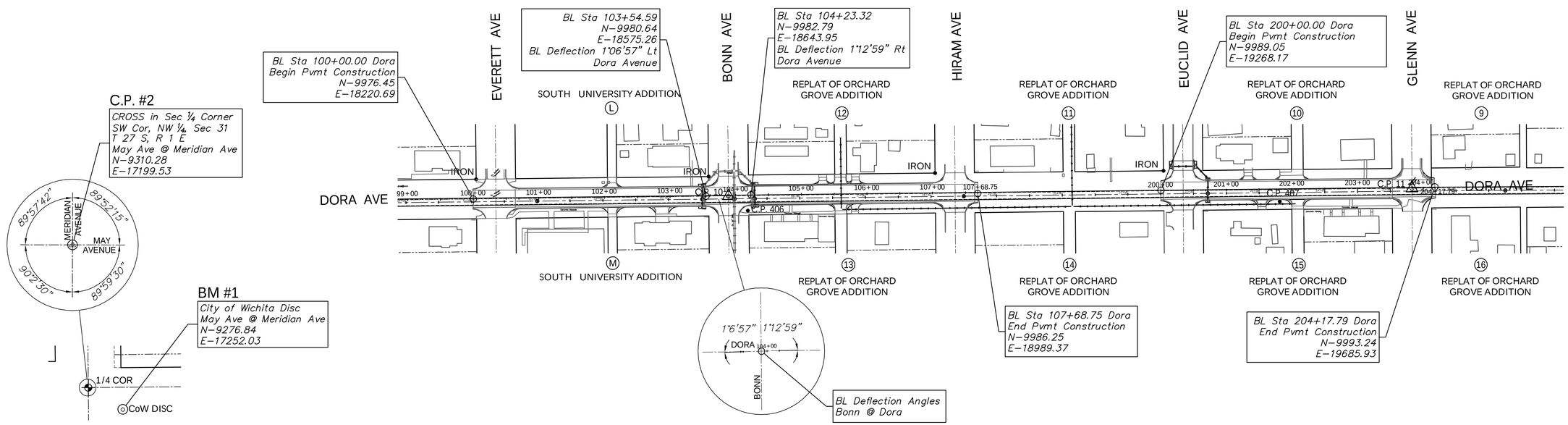
Design: ENGINEER Drawn: STAFF Approved: ENGINEER Scale: NOTED	Project No. 0802-E038 CAPITAL IMPROVEMENT PROJECT PAVING KEYSHEET MERIDIAN AVENUE & ORIENT AVENUE MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT	Baughman Company , P.A. 315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149 ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

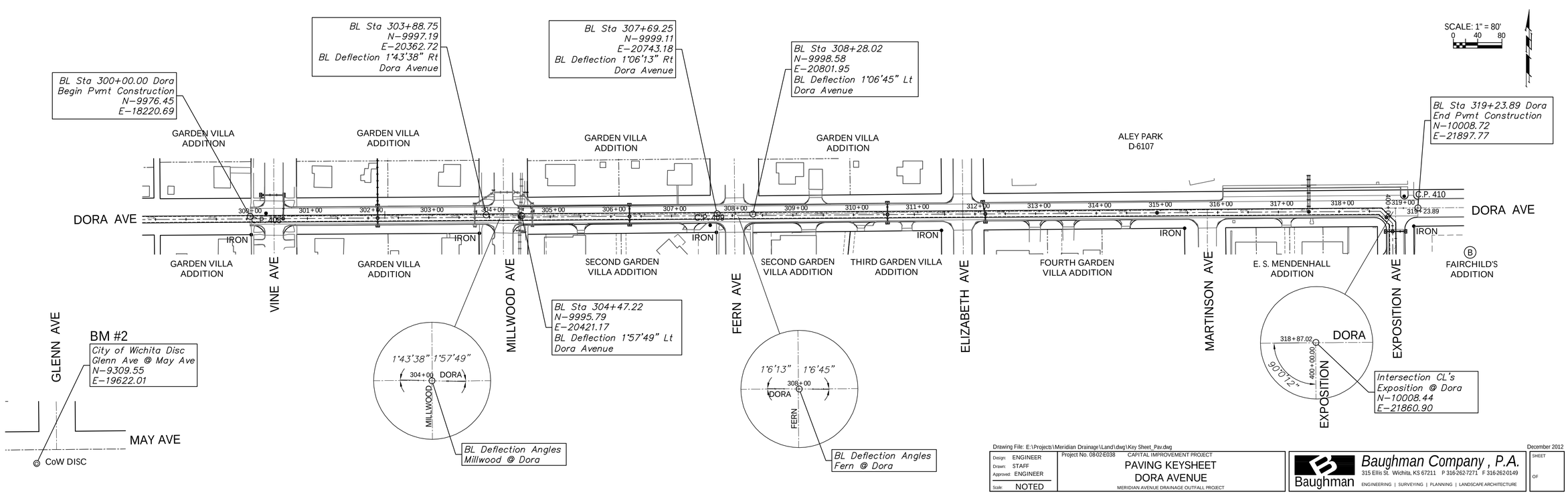
SHEET

OF

Dora Ave. Paving

Meridian Ave. Drainage Outfall Project





Drawing File: E:\Projects\Meridian Drainage\Land\dwg\Key Sheet_Pav.dwg

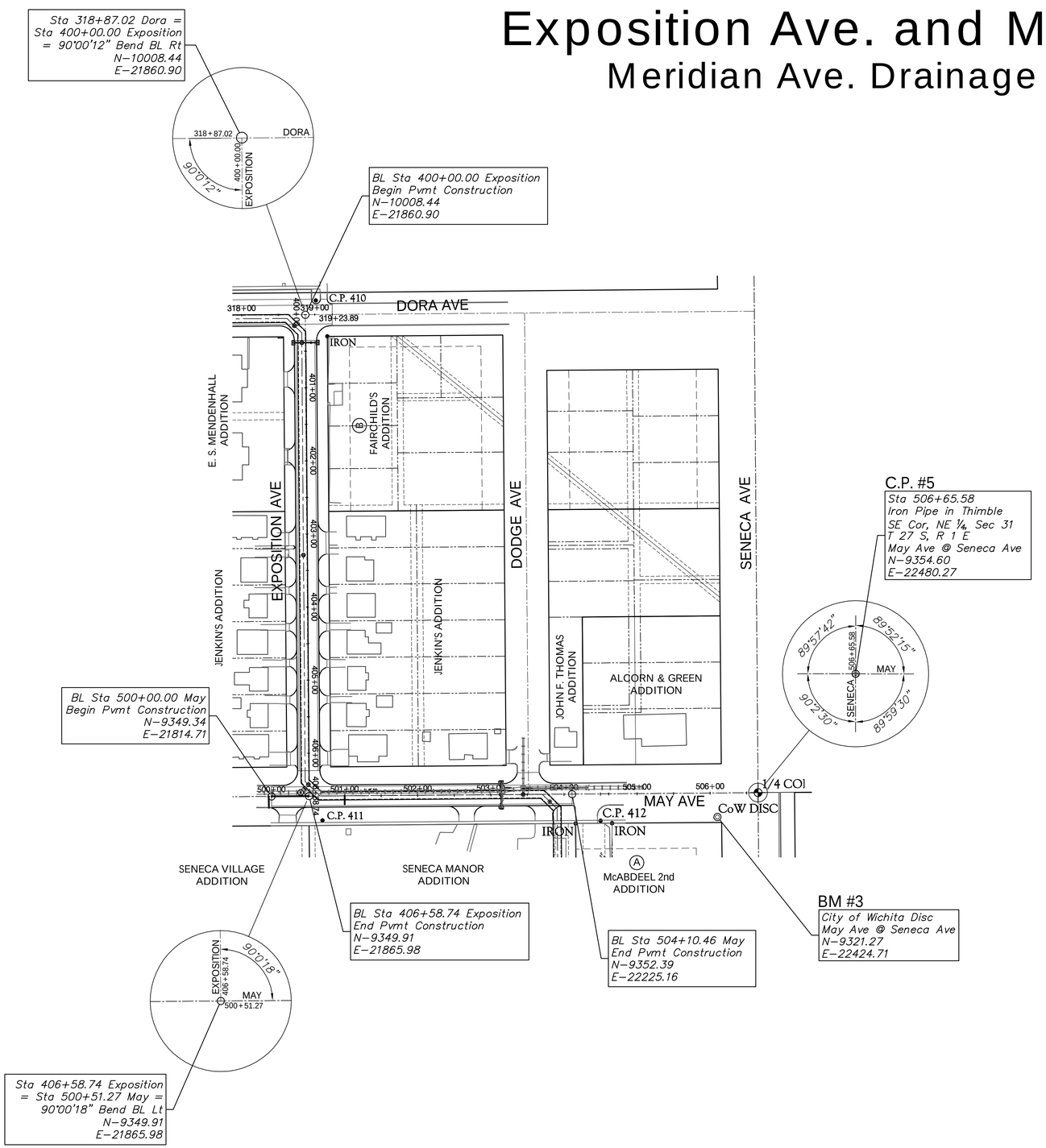
December 2012

Design: ENGINEER Drawn: STAFF Approved: ENGINEER Scale: NOTED	Project No. 0802-E038 CAPITAL IMPROVEMENT PROJECT PAVING KEYSHEET DORA AVENUE MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT	Baughman Company , P.A. 315 Ellis St Wichita, KS 67211 P 316-262-7271 F 316-262-0149 ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE SHEET OF

Exposition Ave. and May Ave. Paving

Meridian Ave. Drainage Outfall Project

SCALE: 1" = 80'
0 40 80



ADDITIONAL CONTROL POINTS

C.P. #	Northing	Easting	Description
2	9,310.28	17,199.53	Cross, SW Cor NW ¼ Sec 31 T27S, R1E
5	9,354.60	22,480.27	Iron Pipe in Thimble, SE Cor NE ¼ Sec 31; T27S, R1E
10	9,981.01	18,609.64	Thimble, Intersection Bonn @ Dora
11	9,992.58	19,651.03	Thimble, Intersection Glenn @ Dora
406	9,958.83	18,639.20	# 4 Rebar with Large Orange Baughman Cap
407	9,972.66	19,449.60	# 4 Rebar with Large Orange Baughman Cap
408	10,000.00	20,000.00	60d Nail in Concrete Pavement
409	9,980.31	20,731.83	# 4 Rebar with Large Orange Baughman Cap
410	10,027.91	21,875.28	# 4 Rebar with Large Orange Baughman Cap
411	9,316.72	21,884.44	# 4 Rebar with Large Orange Baughman Cap
412	9,316.14	22,264.92	Mag Nail in Concrete Sidewalk Joint
1005	9,312.36	22,230.63	#5 Property Iron in NW Corner of McAbdeel 2nd Addition
1006	9,971.86	21,112.90	#5 Property Iron in SW Corner of Elizabeth & Dora
1008	9,975.40	21,513.54	3/4" Property Iron in SW Corner of Martinson & Dora
1010	9,978.75	21,891.12	#4 Property Iron in SE Corner of Exposition & Dora
1012	9,967.12	20,351.59	#4 Property Iron in SW Corner of Millwood & Dora
1013	9,968.61	20,742.16	1/2" Property Iron in SW Corner of Fern & Dora
1015	9,964.80	19,975.73	#4 Property Iron in SW Corner of Vine & Dora
1017	10,019.44	19,272.43	3/4" Property Iron in NW Corner of Euclid & Dora
1019	10,015.95	18,924.40	3/4" Property Iron in NW Corner of Hiram & Dora
1023	10,006.47	18,225.16	#5 Property Iron in NW Corner of Everett & Dora
1027	10,010.65	18,579.41	3/4" Property Iron in NW Corner of Bonn & Dora

Drawing File: E:\Projects\Meridian Drainage\Land\dwg\Key Sheet_Pav.dwg

December 2012

Design: ENGINEER
Drawn: STAFF
Approved: ENGINEER
Scale: NOTED

Project No. 08-02-E038 CAPITAL IMPROVEMENT PROJECT

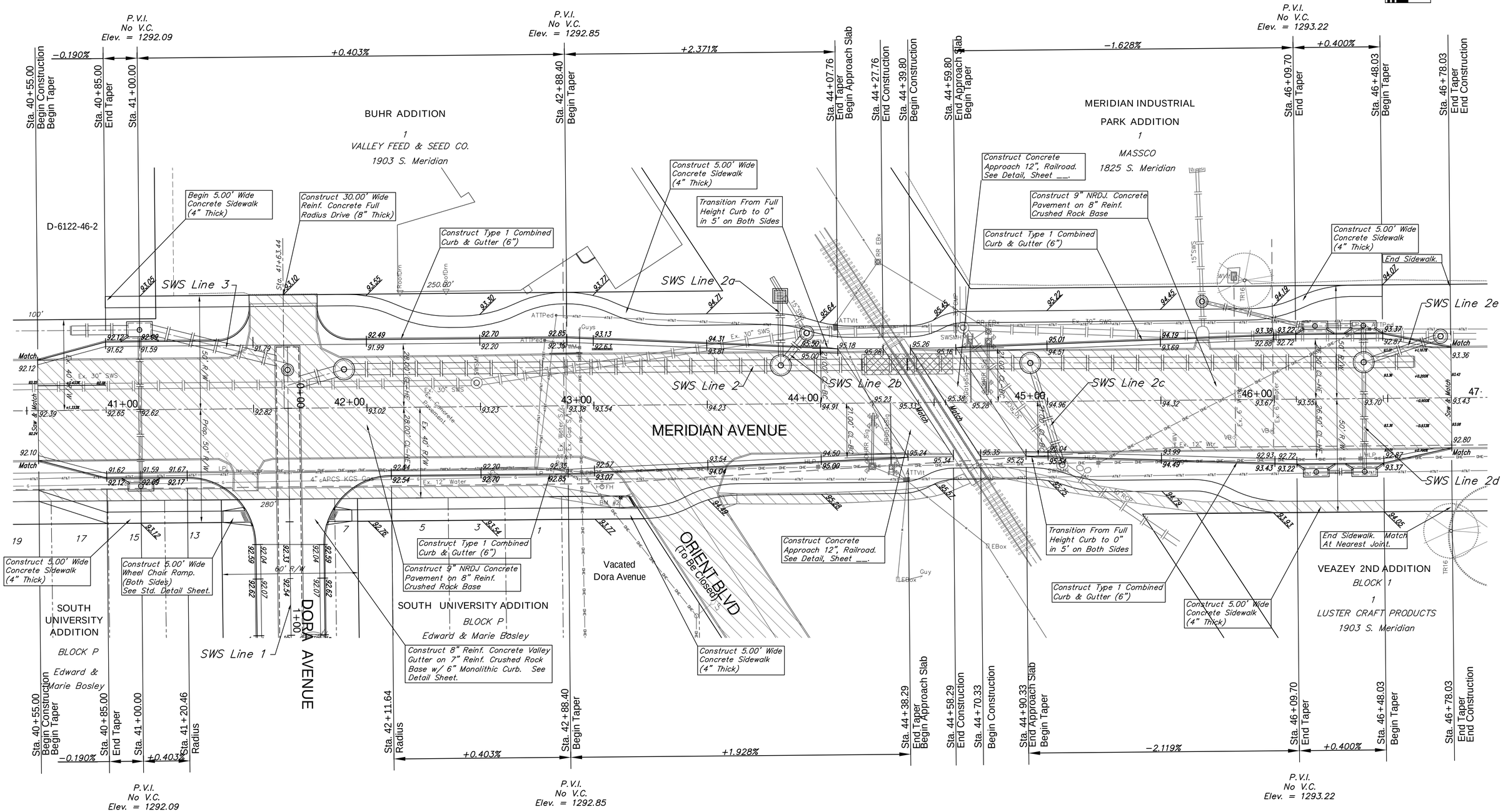
PAVING KEYSHEET
EXPOSITION AVENUE & MAY AVENUE
MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT

Baughman Company , P.A.
315 Ellis St Wichita, KS 67211 P 316-262-7271 F 316-262-0149
ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

SHEET
OF

BENCHMARK:
BM #2 – Chiseled "□" on the West Side of the Wheel Chair Ramp at the southeast corner of Meridian & Orient
Elev. = 1293.19 (NAVD 88)

SCALE: 1" = 20'
0 10 20



Areas of Full Pavement Removal & Replacement are Indicated By:

Drawing File: E:\Projects\Meridian Drainage\Land\dwg\Drainage Base.dwg [Pav-01]

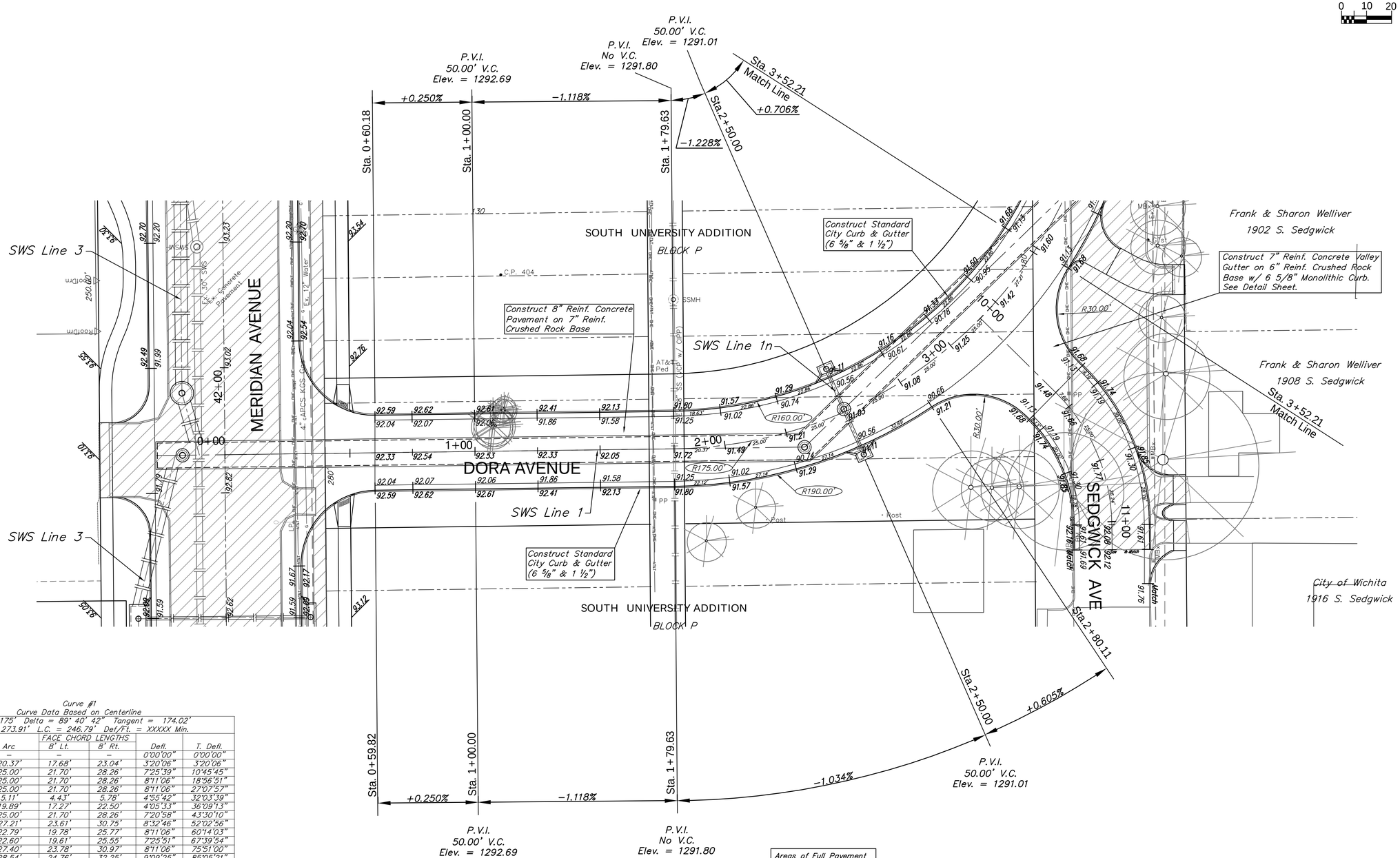
December 2012

Design: TPV Drawn: STAFF Approved: TPV Scale: Noted	Project No. 08-02-E038 CAPITAL IMPROVEMENT PROJECT MERIDIAN AVENUE PAVING STA. 40+55.00 to STA. 46+78.03 MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT	Baughman Company , P.A. 315 Ellis St Wichita, KS 67211 P 316-262-7271 F 316-262-0149 ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

SHEET
OF

BENCHMARK:
BM #2 – Chiseled "□" on the West Side of the Wheel Chair Ramp at the southeast corner of Meridian & Orient
Elev. = 1293.19 (NAVD 88)

SCALE: 1" = 20'
0 10 20



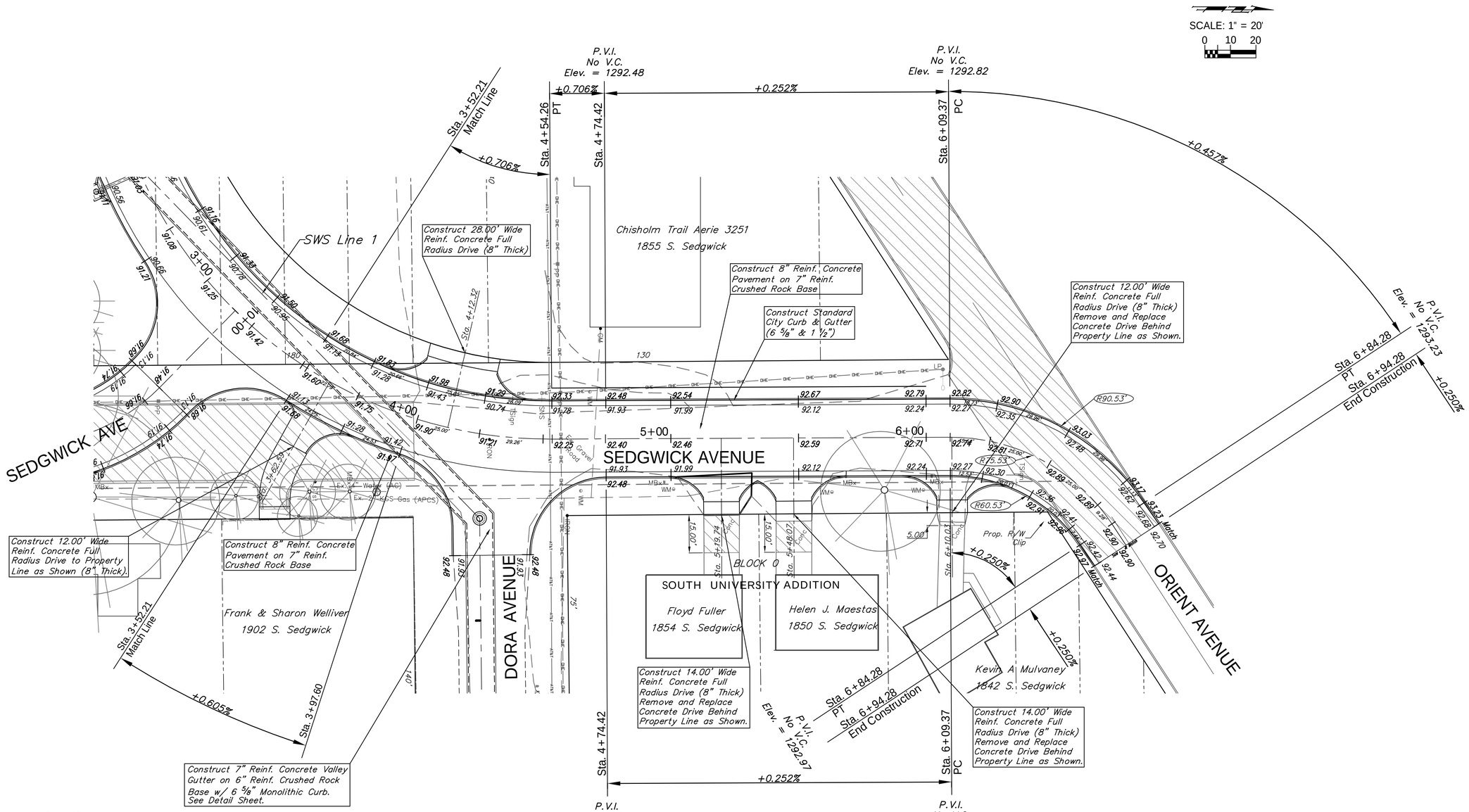
Curve #1
Curve Data Based on Centerline
Rad. = 175' Delta = 89° 40' 42" Tangent = 174.02'
Arc = 273.91' L.C. = 246.79' Def/Ft. = XXXXX Min.

Station	Arc	FACE CHORD LENGTHS 8' Lt.	8' Rt.	Defl.	T. Defl.
1+79.63	–	–	–	0°00'00"	0°00'00"
2+00.00	20.37'	17.68'	23.04'	3°20'06"	3°20'06"
2+25.00	25.00'	21.70'	28.26'	7°25'39"	10°45'45"
2+50.00	25.00'	21.70'	28.26'	8°11'06"	18°56'51"
2+75.00	25.00'	21.70'	28.26'	8°11'06"	27°07'57"
2+80.11	5.11'	4.43'	5.78'	4°55'42"	32°03'39"
3+00.00	19.89'	17.27'	22.50'	4°05'33"	36°09'13"
3+25.00	25.00'	21.70'	28.26'	7°20'58"	43°30'10"
3+52.21	27.21'	23.61'	30.75'	8°32'46"	52°02'56"
3+75.00	22.79'	19.78'	25.77'	8°11'06"	60°14'03"
3+97.60	22.60'	19.61'	25.55'	7°25'51"	67°39'54"
4+25.00	27.40'	23.78'	30.97'	8°11'06"	75°51'00"
4+53.54	28.54'	24.76'	32.25'	9°09'25"	85°05'21"

Areas of Full Pavement Removal & Replacement are Indicated By:

Drawing File: E:\Projects\Meridian Drainage\Land\dwg\Drainage Base.dwg [Pav 02]
Design: TPV
Drawn: Sonny
Approved: TPV
Scale: Noted
Project No. 0808-E186 CAPITAL IMPROVEMENT PROJECT
DORA AVENUE PAVING
STA. 0+59.82 to STA. 3+52.21
MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT
Baughman Company , P.A.
315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149
ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE
NOV 2009
SHEET
OF

BENCHMARK:
BM #2 – Chiseled "□" on the West Side of the Wheel Chair Ramp at the southeast corner of Meridian & Orient Elev. = 1293.19 (NAVD 88)



Curve #2
Curve Data Based on Centerline
Rad. = 75.53' Delta = 56° 49' 43" Tangent = 40.86'
Arc = 74.91' L.C. = 71.88' Def/Ft. = XXXXX Min.

Station	Arc	FACE CHORD LENGTHS 8' Lt.	8' Rt.	Defl.	T. Defl.
6+09.37	–	–	–	0°00'00"	0°00'00"
6+25.00	15.63	20.35'	10.85'	5°55'42"	5°55'42"
6+50.00	25.00'	32.46	17.31'	15°24'38"	21°20'20"
6+75.00	25.00'	32.46	17.31'	18°57'52"	40°18'12"
6+84.28	9.28'	12.10'	6.45'	13°00'14"	53°18'26"

Areas of Full Pavement Removal & Replacement are Indicated By:

Drawing File: E:\Projects\Meridian Drainage\Land\dwg\Drainage Base.dwg [Pav 03]

Design: TPV
Drawn: Sonny
Approved: TPV
Scale: Noted

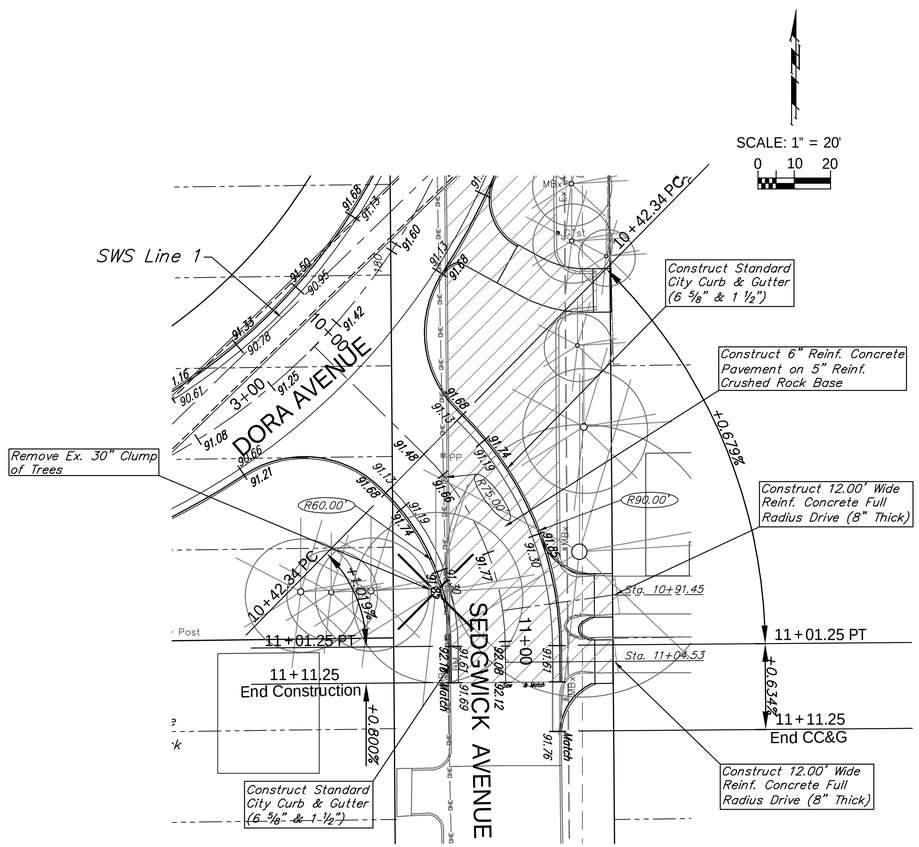
Project No. 0808-E186 CAPITAL IMPROVEMENT PROJECT

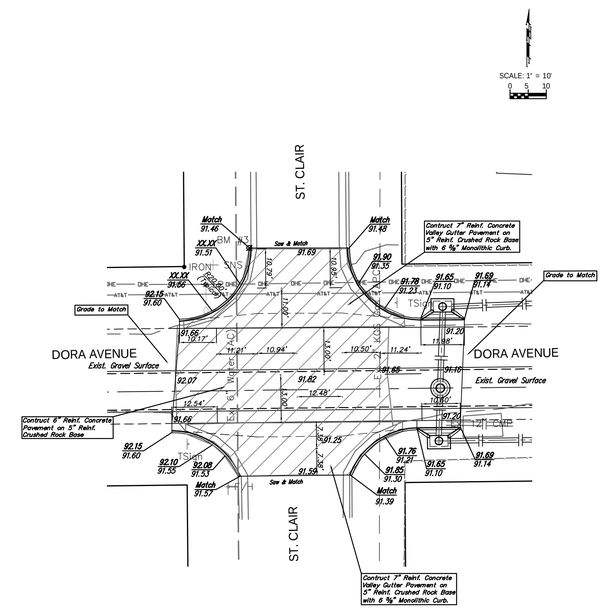
SEDGWICK AVENUE PAVING
STA. 3+52.21 to STA. 6+94.28
MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT

Baughman Company , P.A.
315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149
Baughman ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

NOV 2009
SHEET
OF

BENCHMARK:
BM #2 – Chiseled "□" on the West Side of the Wheel Chair Ramp at the southeast corner of Meridian & Orient Elev. = 1293.19 (NAVD 88)





Curve #3
Curve Data Based on Centerline
Rad. = 75.00' Delta = 49° 59' 57" Tangent = 31.07'
Arc = 58.90' L.C. = 57.40' Def/Ft. = XXXXX Min.

Station	Arc	FACE CHORD LENGTHS 8' Lt.	8' Rt.	Defl.	T. Defl.
10+42.34	–	–	–	0°00'00"	0°00'00"
10+50.00	7.66'	10.00'	5.31'	2°55'31"	2°55'31"
10+75.00	25.00'	32.25'	17.25'	12°28'26"	15°23'57"
11+01.24	26.24'	34.12	18.11'	19°34'29"	34°58'26"

Areas of Full Pavement Removal & Replacement are Indicated By:

Drawing File: E:\Projects\Meridian Drainage\Land\dwg\Drainage Base.dwg (Pav 04)

NOV 2009

Design: TPV
Drawn: Sonny
Approved: TPV
Scale: Noted

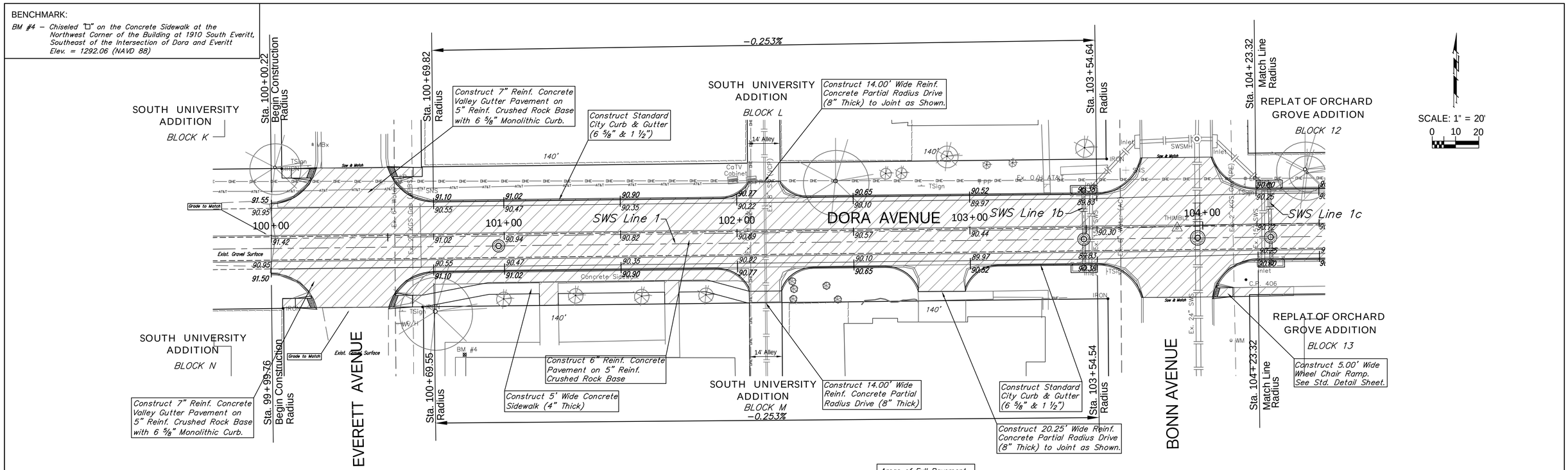
Project No. 0808E185 CAPITAL IMPROVEMENT PROJECT

SEDGWICK AVENUE & ST CLAIR PAVING
STA. 10+42.34 to STA. 11+11.25
MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT

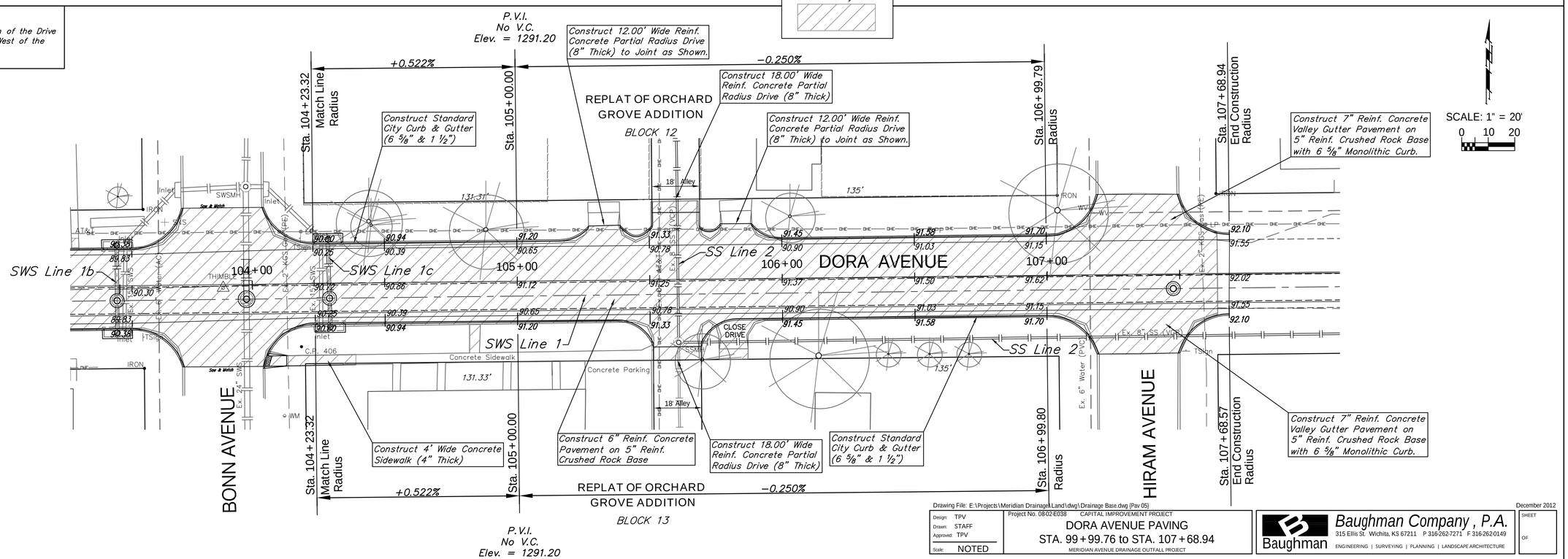
Baughman Company , P.A.
315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149
Baughman ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

SHEET
OF

BENCHMARK:
BM #4 – Chiseled "□" on the Concrete Sidewalk at the Northwest Corner of the Building at 1910 South Everitt, Southeast of the Intersection of Dora and Everitt
Elev. = 1292.06 (NAVD 88)



BENCHMARK:
BM #5 – Chiseled "□" on the North Curb Return of the Drive to 2011 W. Dora, 60' South and 15' West of the Centerlines of Dora and Hiram.
Elev. = 1291.73 (NAVD 88)



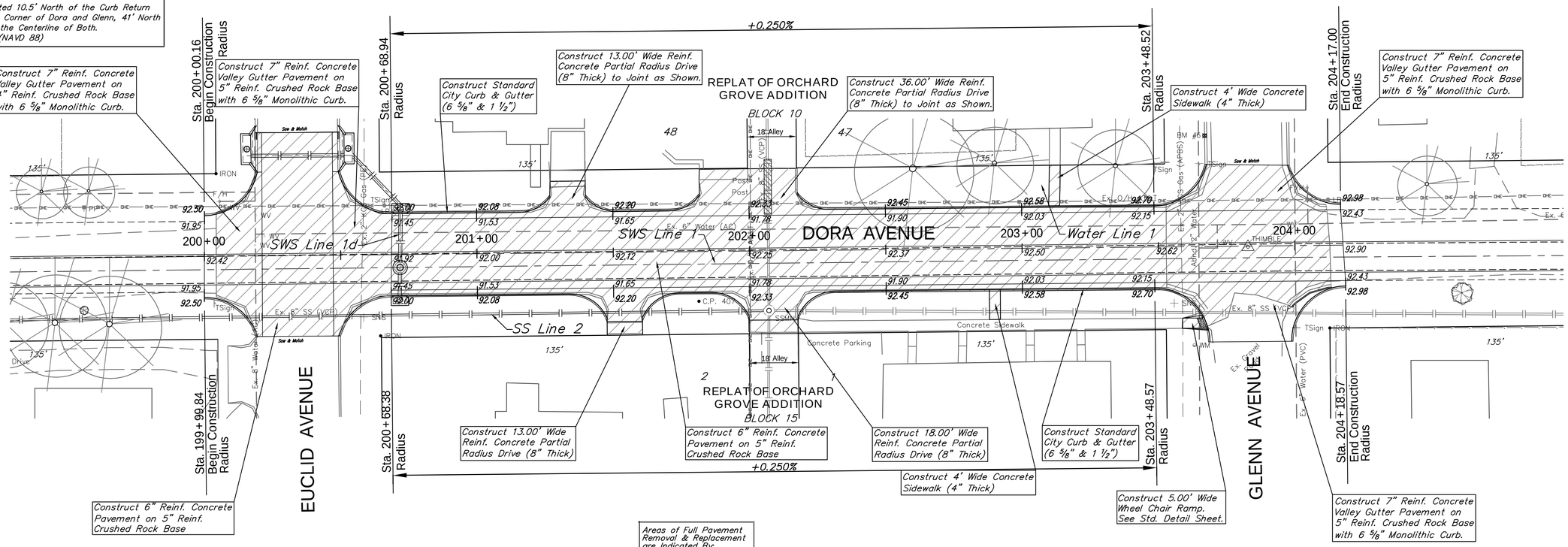
Drawing File: E:\Projects\Meridian Drainage\Land\dwg\Drainage Base.dwg (Pav 05)
December 2012

Design: TPV	Project No. 0802E038 CAPITAL IMPROVEMENT PROJECT
Drawn: STAFF	DORA AVENUE PAVING
Approved: TPV	STA. 99+99.76 to STA. 107+68.94
Scale: NOTED	MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT

Baughman Company , P.A.
315 Ellis St Wichita, KS 67211 P 316-262-7271 F 316-262-0149
ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

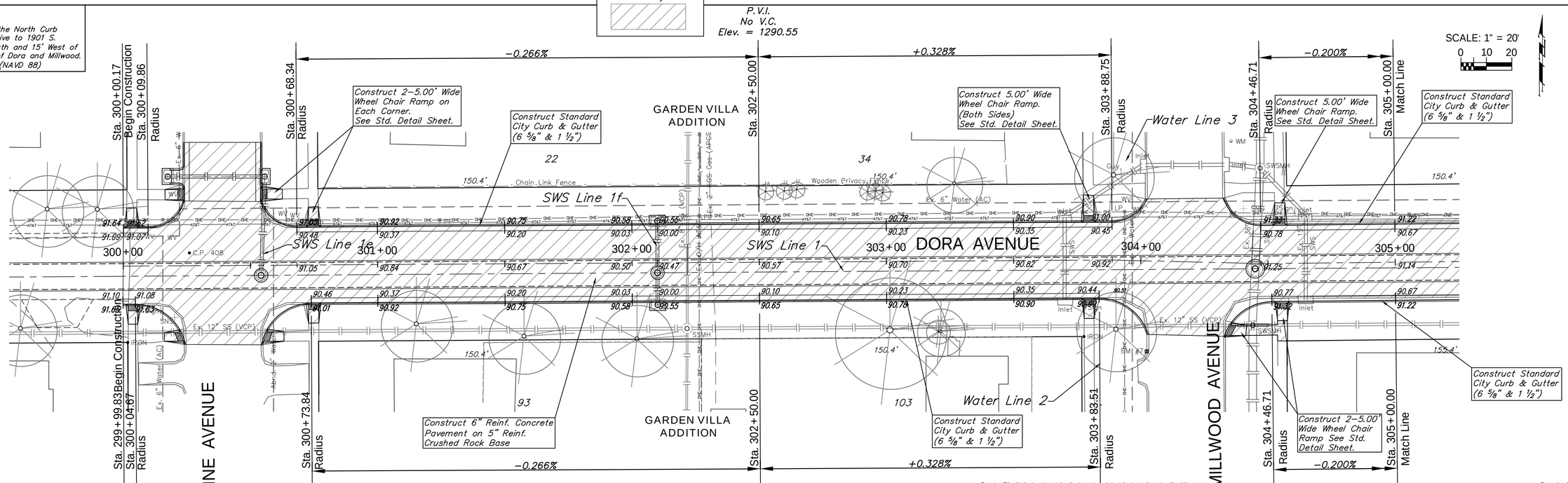
SHEET
OF

BENCHMARK:
BM #6 – Chiseled "□" located 10.5' North of the Curb Return of the Northwest Corner of Dora and Glenn, 41' North and 16' West of the Centerline of Both. Elev. = 1292.81 (NAVD 88)



Areas of Full Pavement Removal & Replacement are Indicated By:

BENCHMARK:
BM #7 – Chiseled "□" on the North Curb Return of the Drive to 1901 S. Millwood, 36' South and 15' West of the Centerlines of Dora and Millwood. Elev. = 1291.22 (NAVD 88)



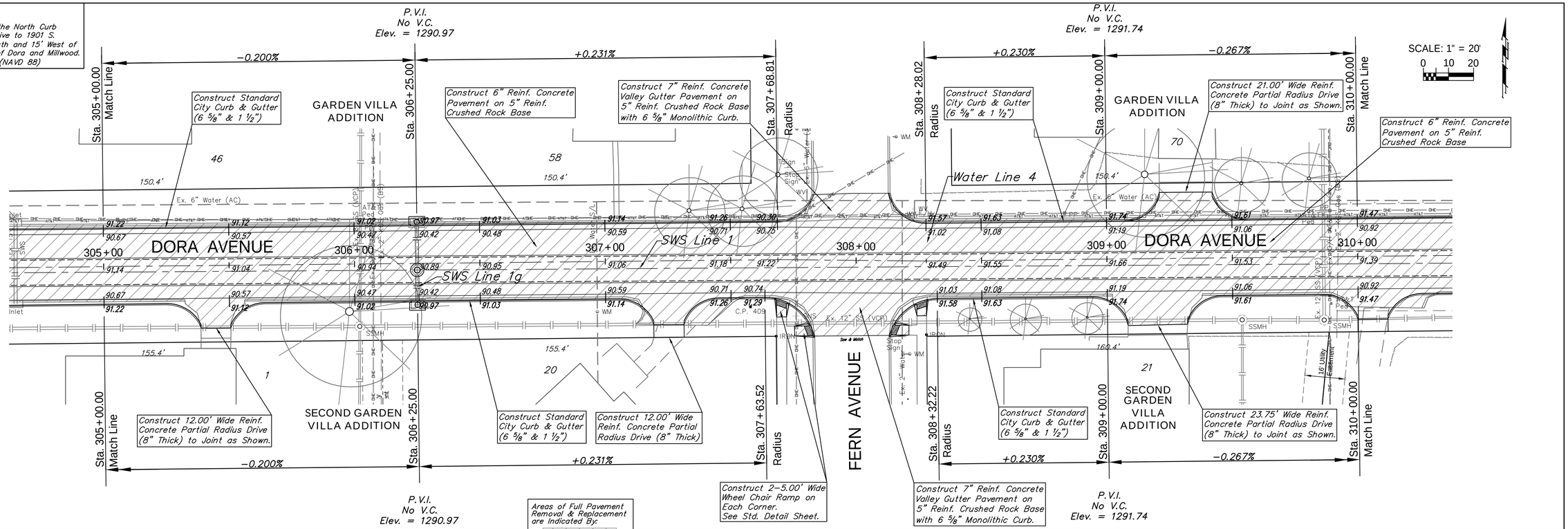
Drawing File: E:\Projects\Meridian Drainage\Land\dwg\Drainage Base.dwg [Pav 06]

December 2012

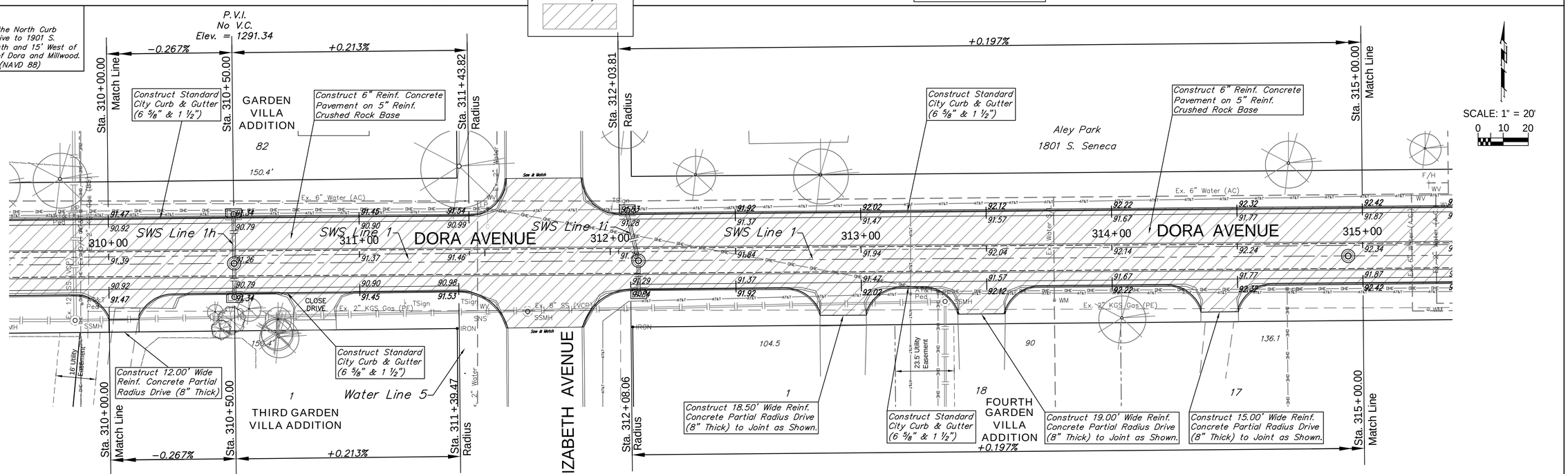
Design: TPV Drawn: STAFF Approved: TPV Scale: NOTED	Project No. 0802-E038 CAPITAL IMPROVEMENT PROJECT DORA AVENUE PAVING STA. 199+99.84 to STA. 305+00.00 MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT	Baughman Company, P.A. 315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149 ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

SHEET
OF

BENCHMARK:
BM #7 – Chiseled "□" on the North Curb Return of the Drive to 1901 S. Millwood, 36' South and 15' West of the Centerlines of Dora and Millwood. Elev. = 1291.22 (NAVD 88)



BENCHMARK:
BM #7 – Chiseled "□" on the North Curb Return of the Drive to 1901 S. Millwood, 36' South and 15' West of the Centerlines of Dora and Millwood. Elev. = 1291.22 (NAVD 88)



Drawing File: E:\Projects\Meridian Drainage\Land\dwg\Drainage Base.dwg [Pav 07]

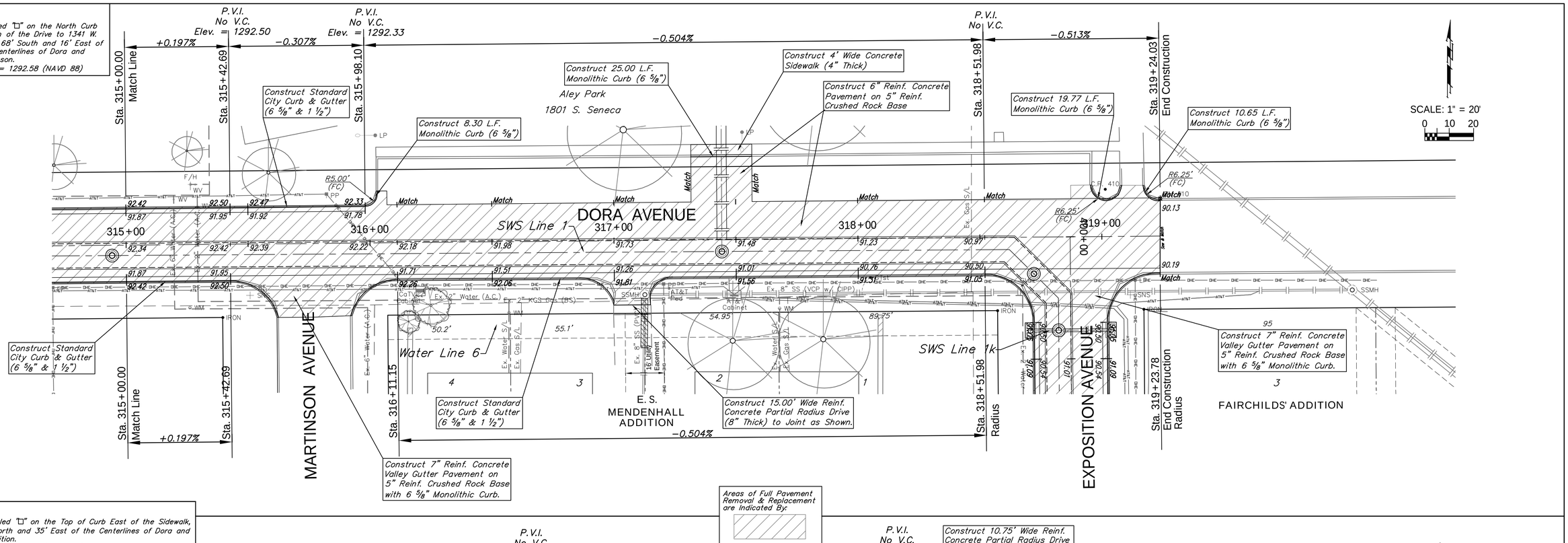
December 2012

Design: TPV	Project No. 08-02-E038 CAPITAL IMPROVEMENT PROJECT
Drawn: STAFF	DORA AVENUE PAVING
Approved: TPV	STA. 305+00.00 to STA. 315+00.00
Scale: NOTED	MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT

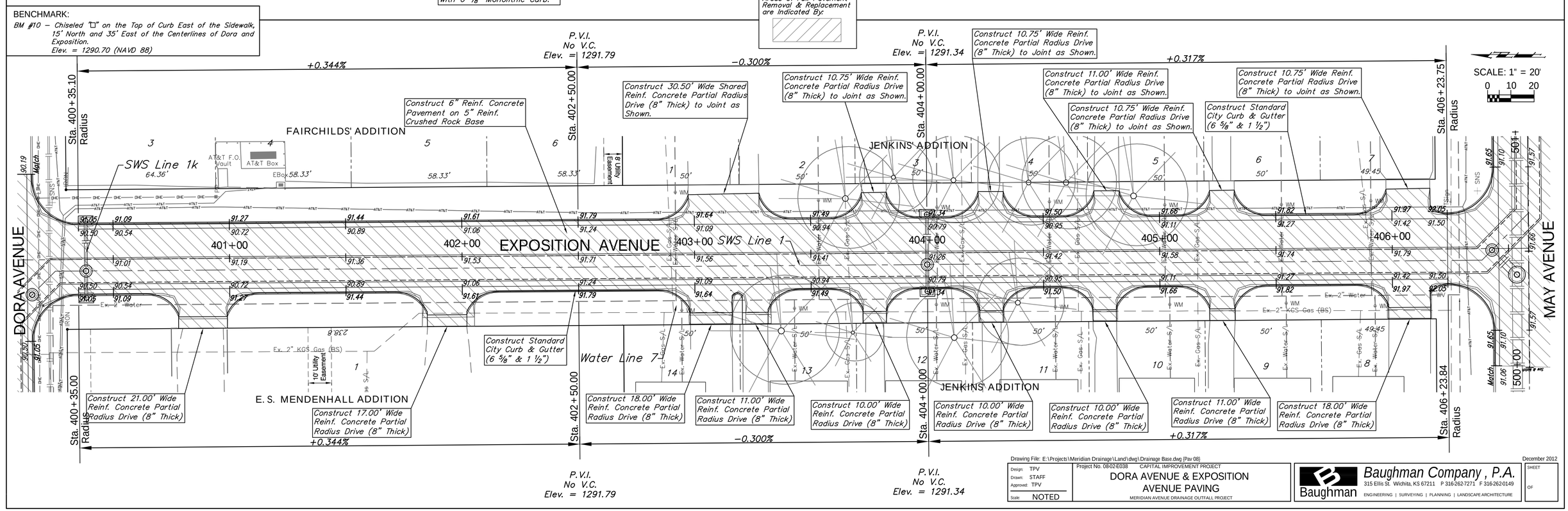
Baughman Company, P.A.
315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149
ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

SHEET
OF

BENCHMARK:
BM #9 – Chiseled "□" on the North Curb Return of the Drive to 1341 W. Dora, 68' South and 16' East of the Centerlines of Dora and Martinson.
Elev. = 1292.58 (NAVD 88)



BENCHMARK:
BM #10 – Chiseled "□" on the Top of Curb East of the Sidewalk, 15' North and 35' East of the Centerlines of Dora and Exposition.
Elev. = 1290.70 (NAVD 88)



Drawing File: E:\Projects\Meridian Drainage\Land\dwg\Drainage Base.dwg [Pav 08]

December 2012

Design:	TPV
Drawn:	STAFF
Approved:	TPV
Scale:	NOTED

Project No. 08-02-E038 CAPITAL IMPROVEMENT PROJECT

DORA AVENUE & EXPOSITION AVENUE PAVING

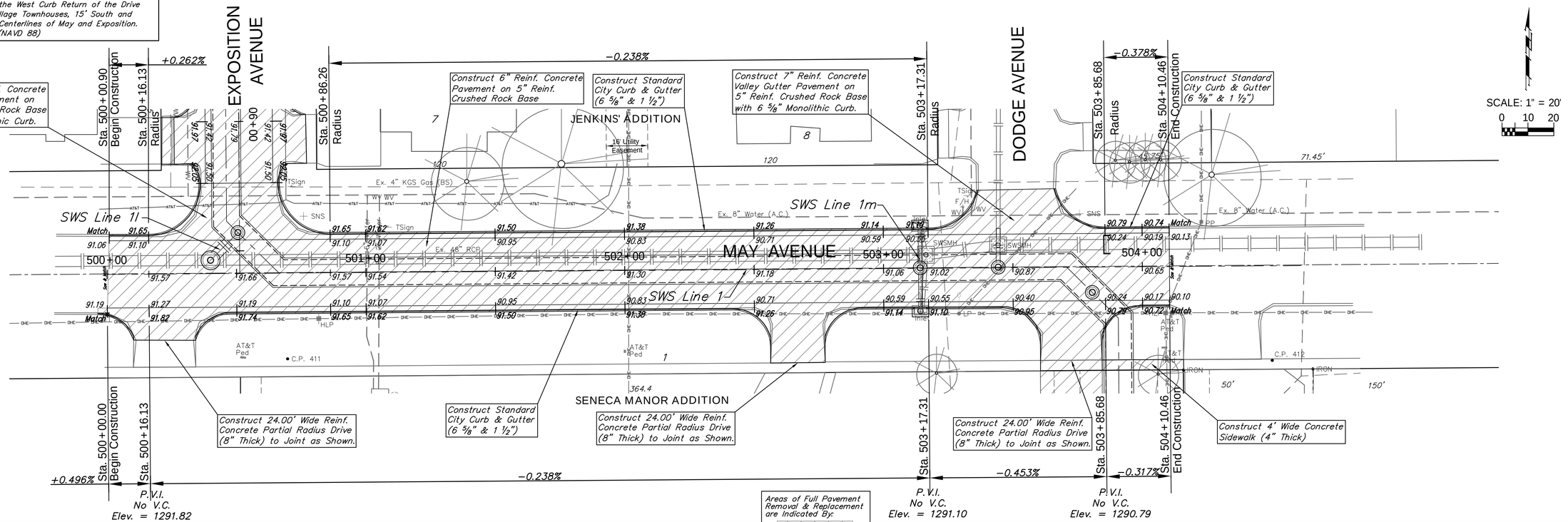
MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT

Baughman Company , P.A.
315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149
ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

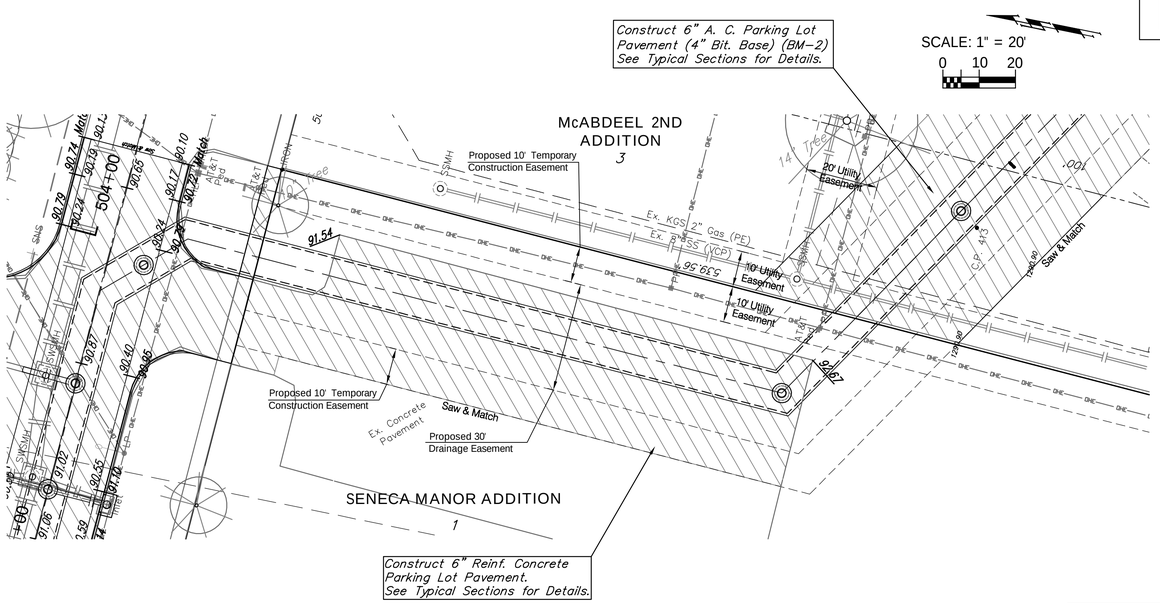
SHEET

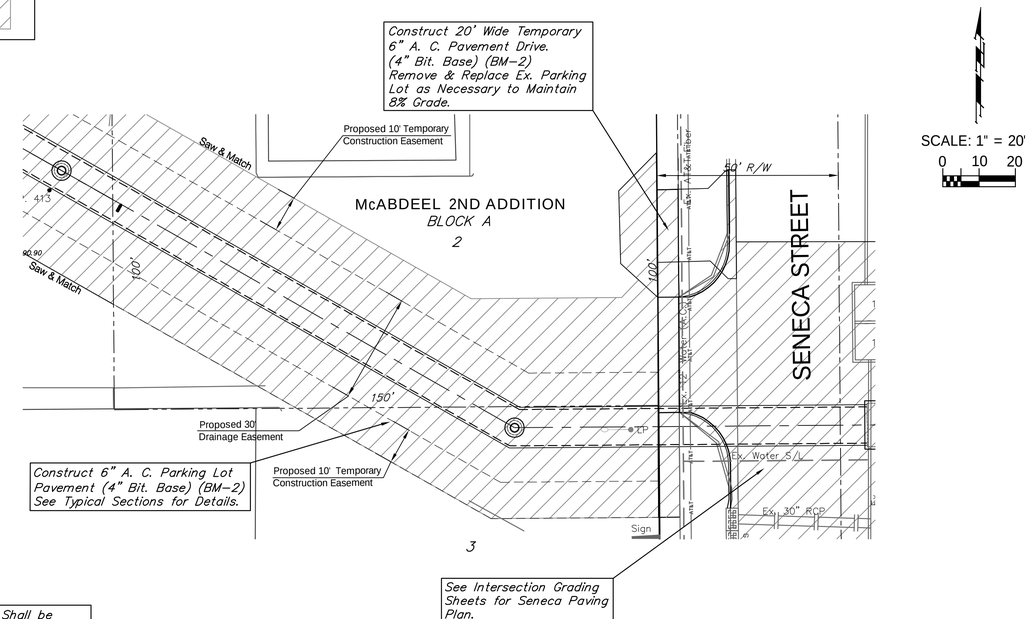
OF

BENCHMARK:
BM #11 – Chiseled "□" on the West Curb Return of the Drive to the Seneca Village Townhouses, 15' South and 52' West of the Centerlines of May and Exposition. Elev. = 1291.76 (NAVD 88)



Areas of Full Pavement Removal & Replacement are Indicated By:





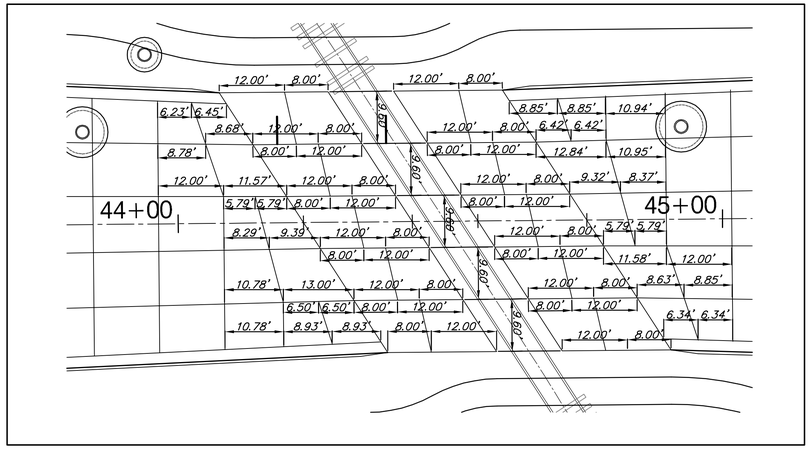
The Ex. Parking Lot Striping Shall be Returned to Pre–Construction Conditions after the Parking Lot Pavement has been Replaced. All Cost Associated with Striping the Parking Lot Shall be Considered SUBSIDIARY to the Installation of the Parking Lot Pavement.

Drawing File: E:\Projects\Meridian Drainage\Land\dwg\Drainage Base.dwg [Pav 09]

December 2012

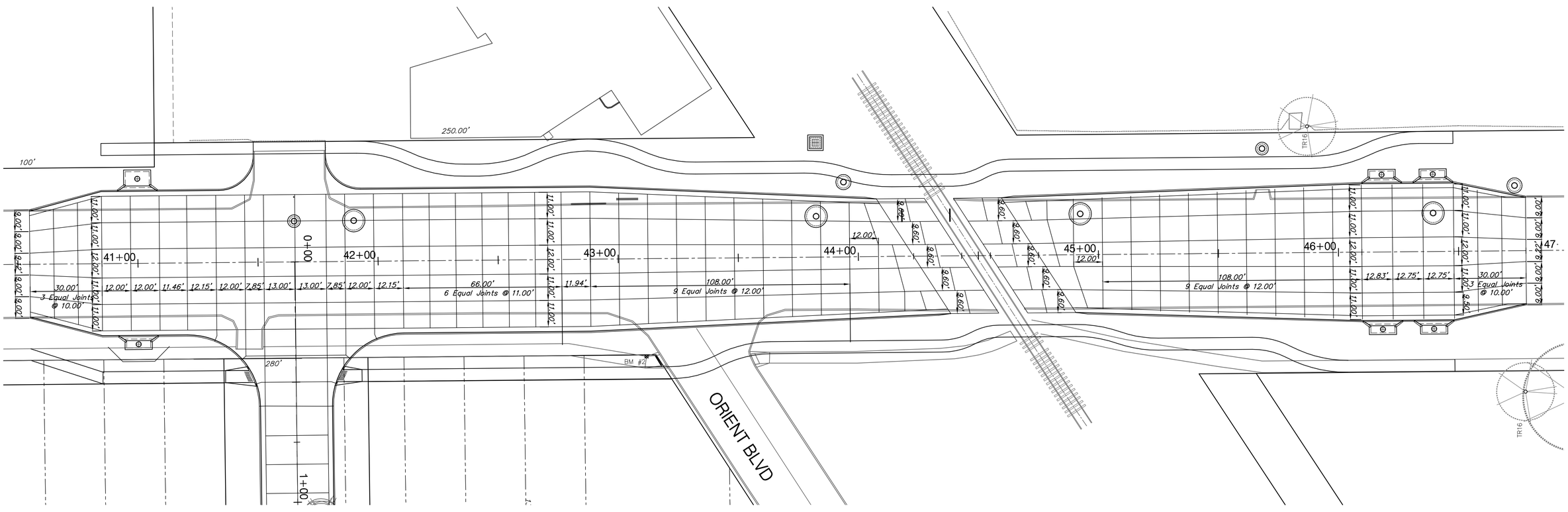
Design: TPV Drawn: STAFF Approved: TPV Scale: NOTED	Project No. 08-02-E038 CAPITAL IMPROVEMENT PROJECT MAY AVENUE & PARKING LOT PAVING PLAN MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT	Baughman Company , P.A. 315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149 ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

SHEET
OF



SCALE: 1" = 20'

0 10 20



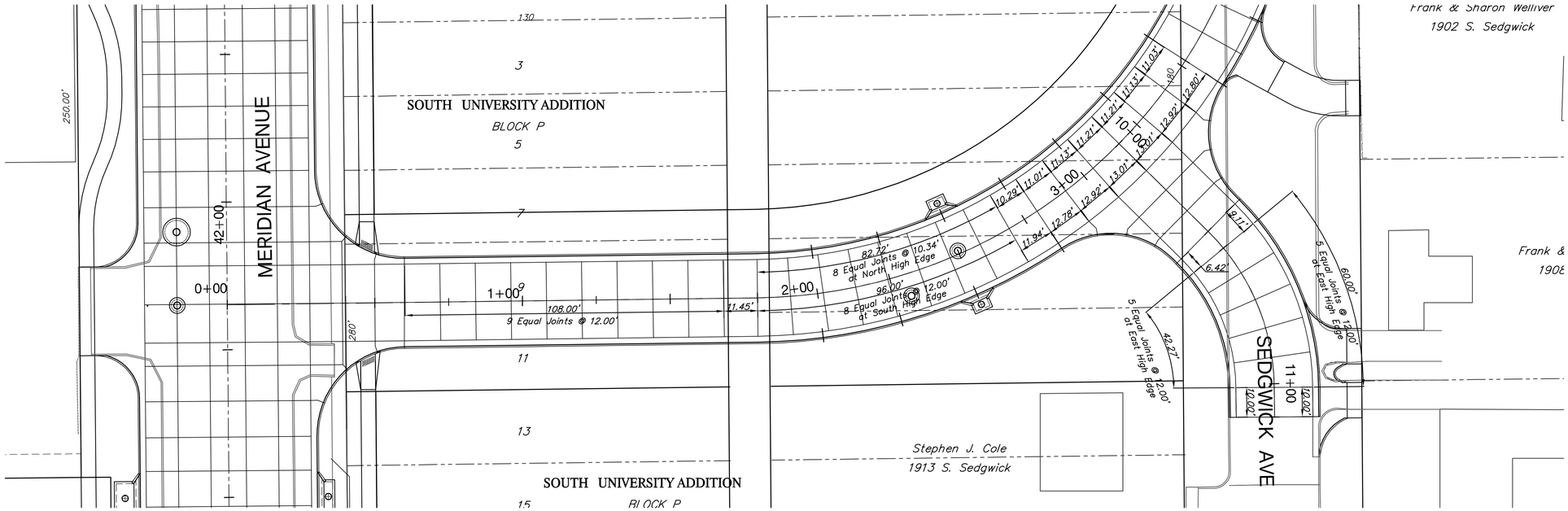
Drawing File: E:\Projects\Meridian Drainage\Land\dwg\Drainage Base.dwg {Joint 01}

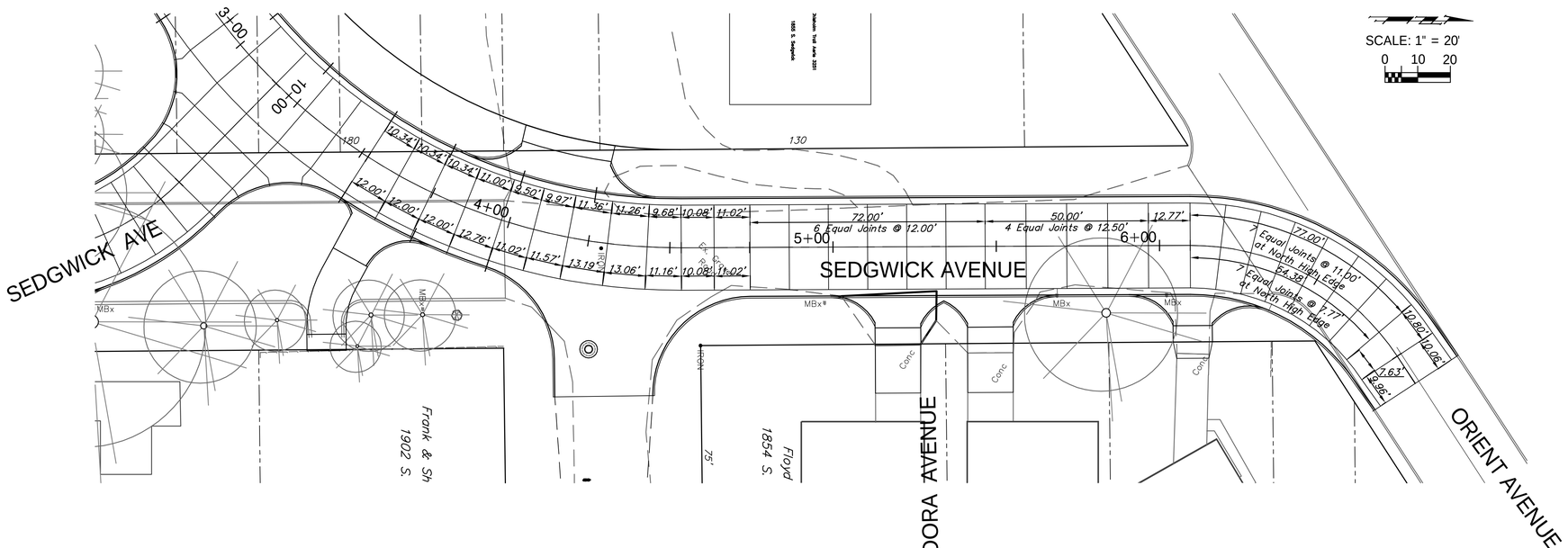
December 2012

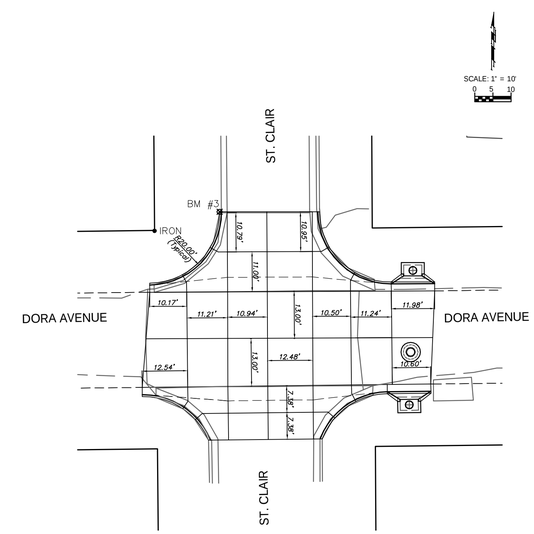
Design: TPV Drawn: STAFF Approved: TPV Scale: NOTED	Project No. 08-02-E038 CAPITAL IMPROVEMENT PROJECT MERIDIAN AVENUE PAVING JOINT PLAN MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT	Baughman Company , P.A. 315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149 ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

SHEET

OF







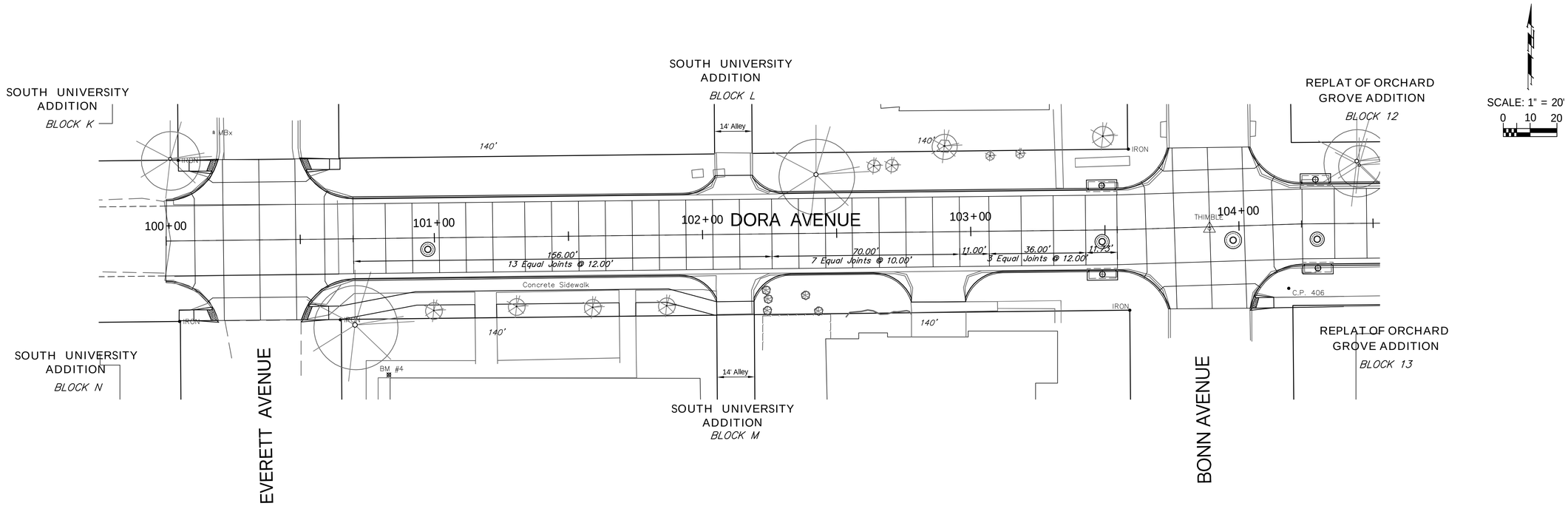
Drawing File: E:\Projects\Meridian Drainage\Land\dwg\Drainage Base.dwg [Joint 02]

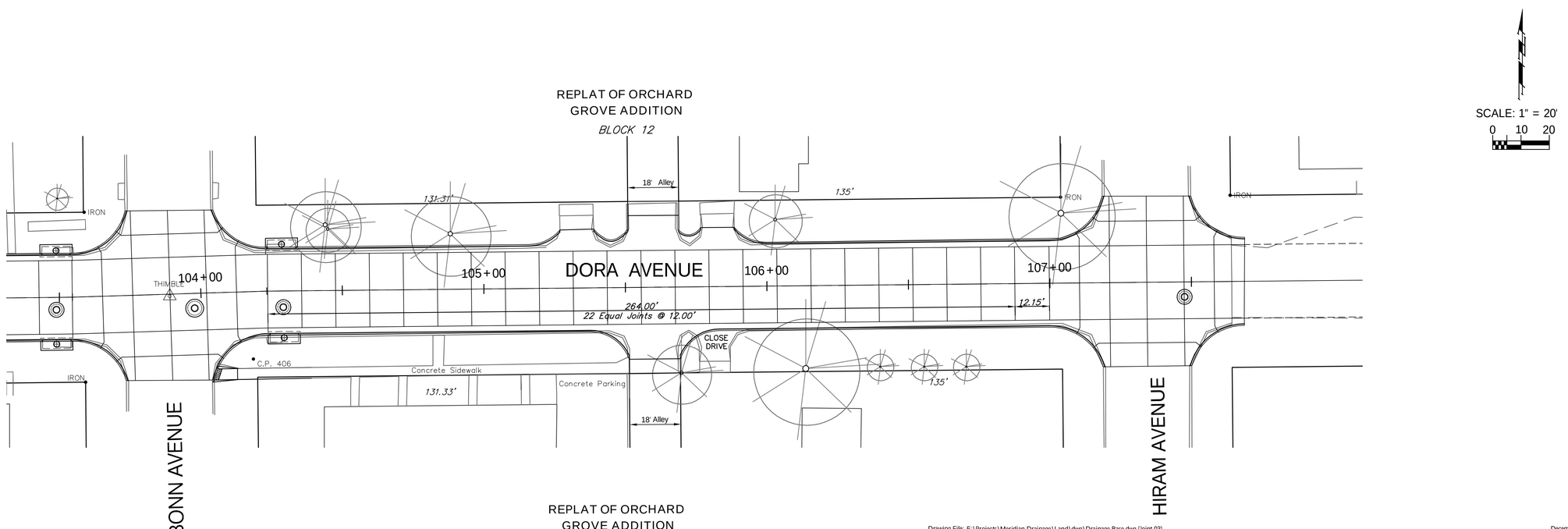
December 2012

Design: TPV Drawn: STAFF Approved: TPV Scale: NOTED	Project No. 0802E038 CAPITAL IMPROVEMENT PROJECT DORA AVE, SEDGWICK AVE & ST CLAIR JOINT PLAN MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT	Baughman Company , P.A. 315 Ellis St Wichita, KS 67211 P 316-262-7271 F 316-262-0149 Baughman ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

SHEET

OF





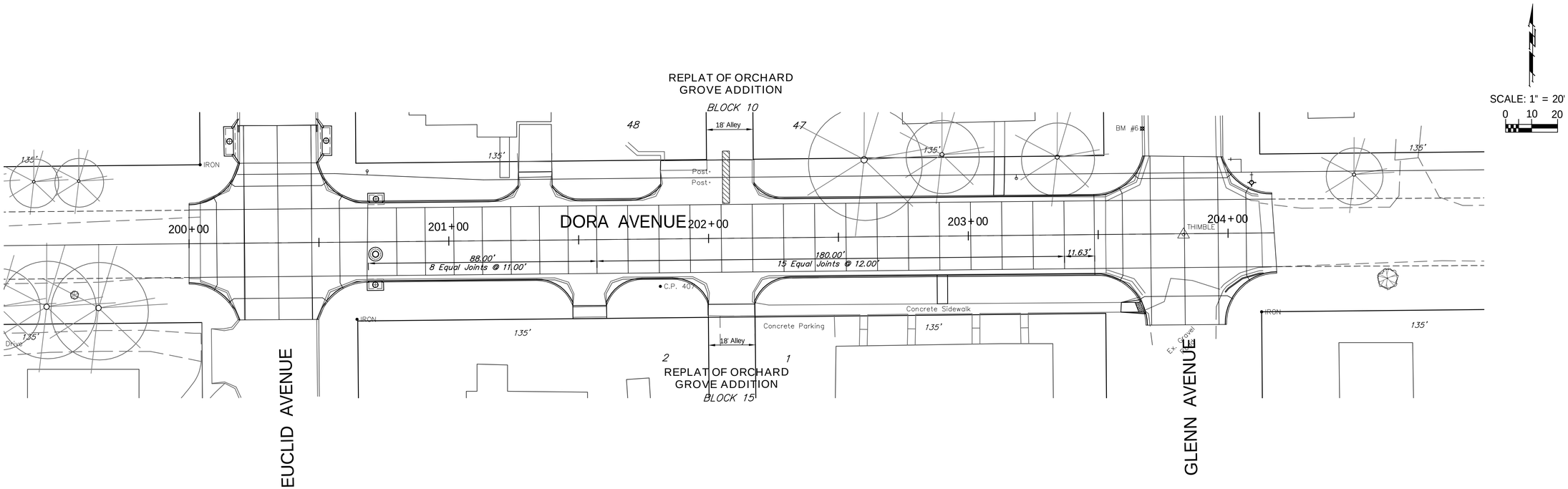
Drawing File: E:\Projects\Meridian Drainage\Land\dwg\Drainage Base.dwg [Joint 03]

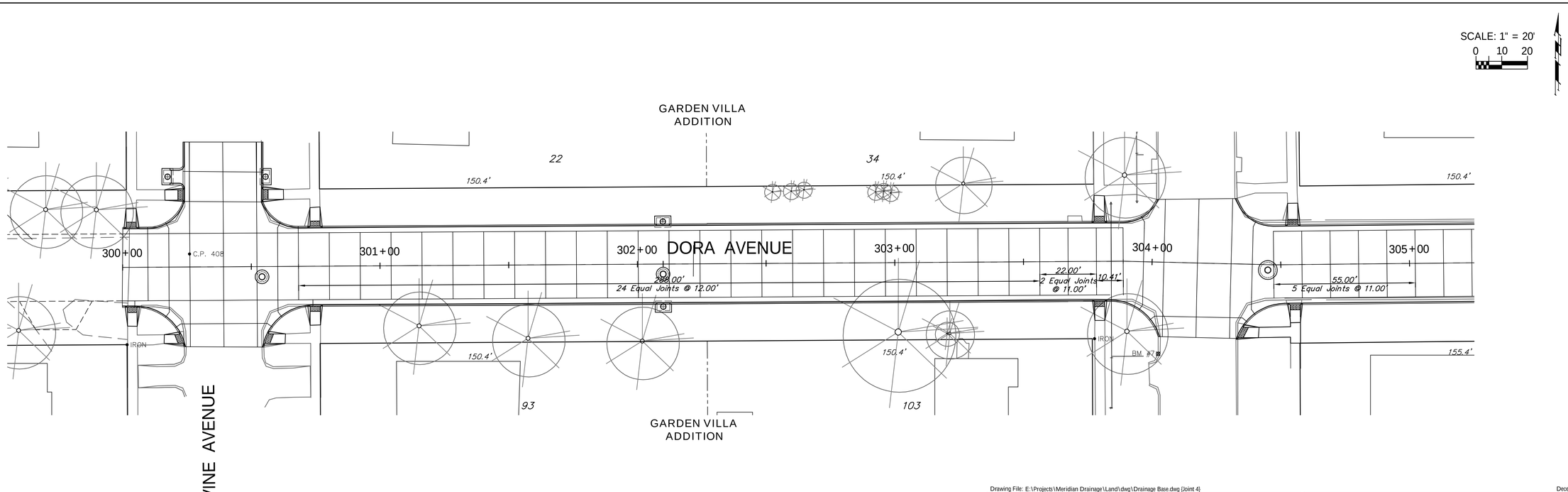
December 2012

Design: TPV Drawn: STAFF Approved: TPV Scale: NOTED	Project No. 0802E038 CAPITAL IMPROVEMENT PROJECT DORA AVENUE JOINT PLAN STA. 99+99.76 to STA. 107+68.94 MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT	Baughman Company , P.A. 315 Ellis St Wichita, KS 67211 P 316-262-7271 F 316-262-0149 ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

SHEET

OF





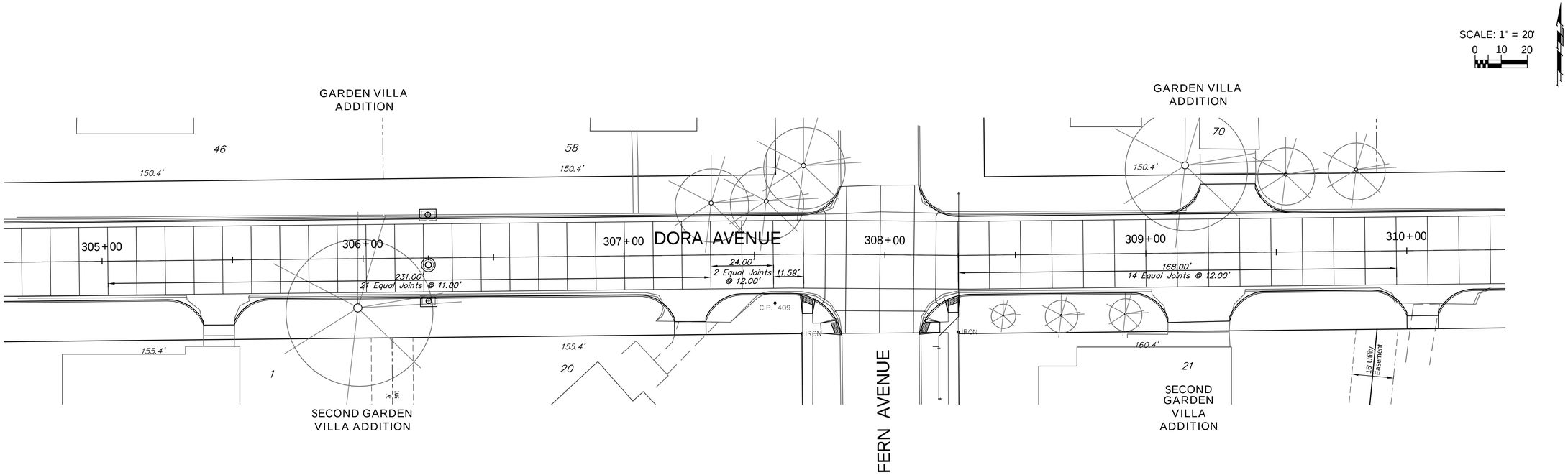
Drawing File: E:\Projects\Meridian Drainage\Land\dwg\Drainage Base.dwg [Joint 4]

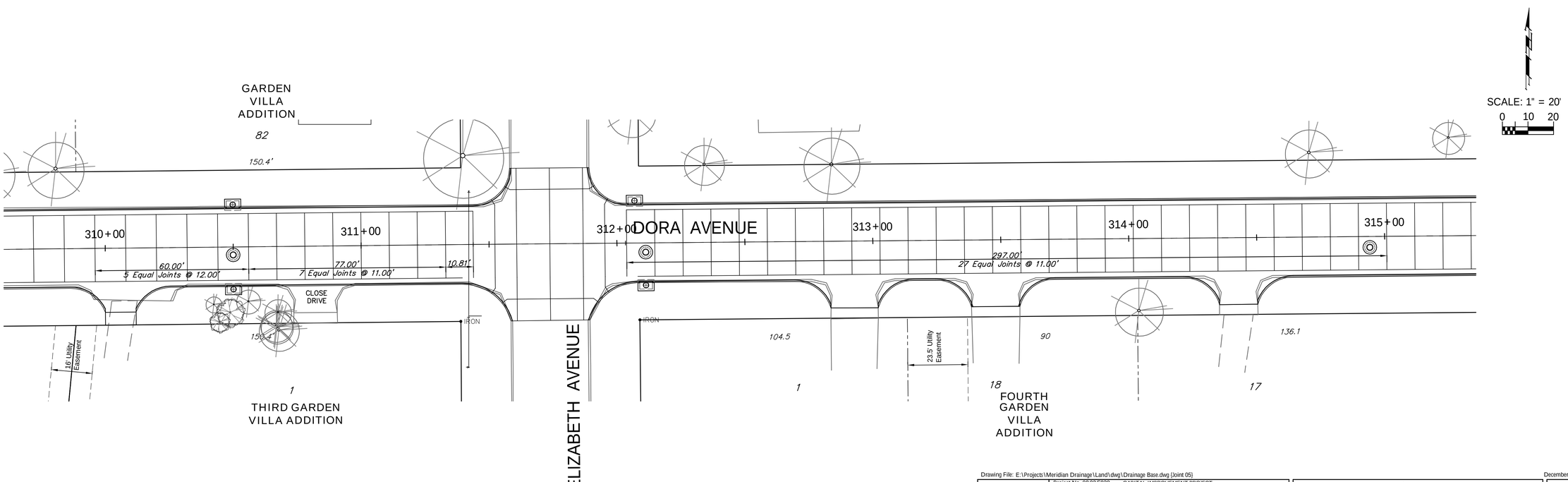
December 2012

Design: TPV Drawn: STAFF Approved: TPV Scale: NOTED	Project No. 0802E038 CAPITAL IMPROVEMENT PROJECT DORA AVENUE JOINT PLAN STA. 199+99.84 to STA. 305+00.00 MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT	Baughman Company , P.A. 315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149 ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

SHEET

OF





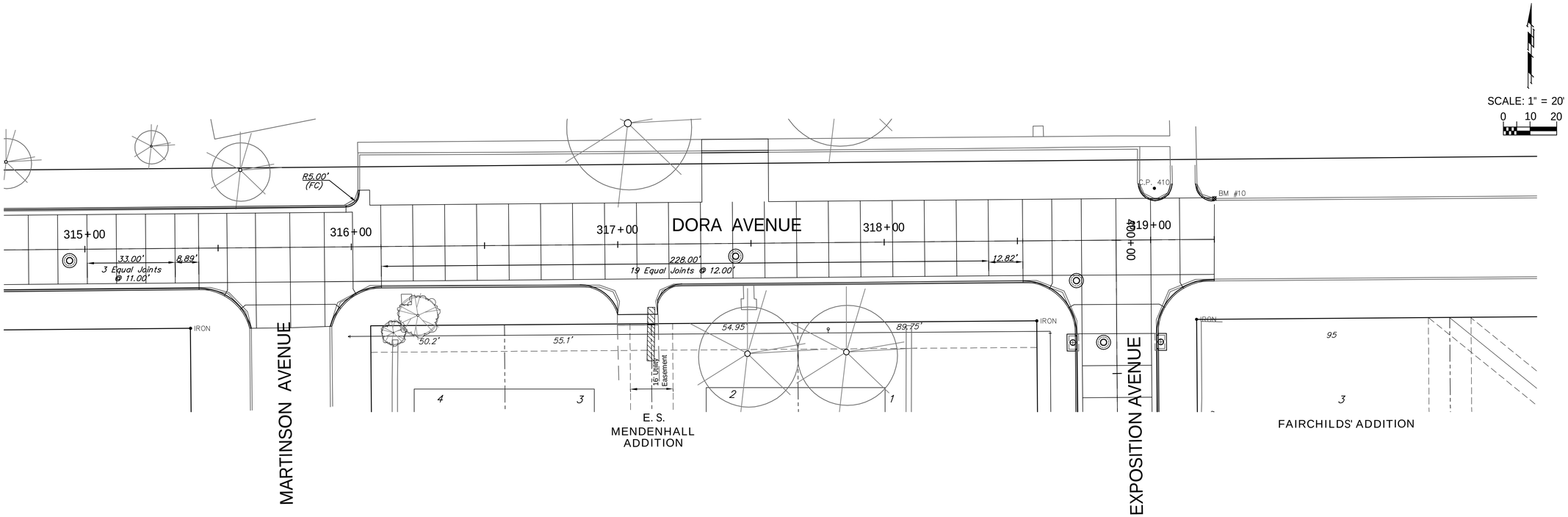
Drawing File: E:\Projects\Meridian Drainage\Land\dwg\Drainage Base.dwg (Joint 05)

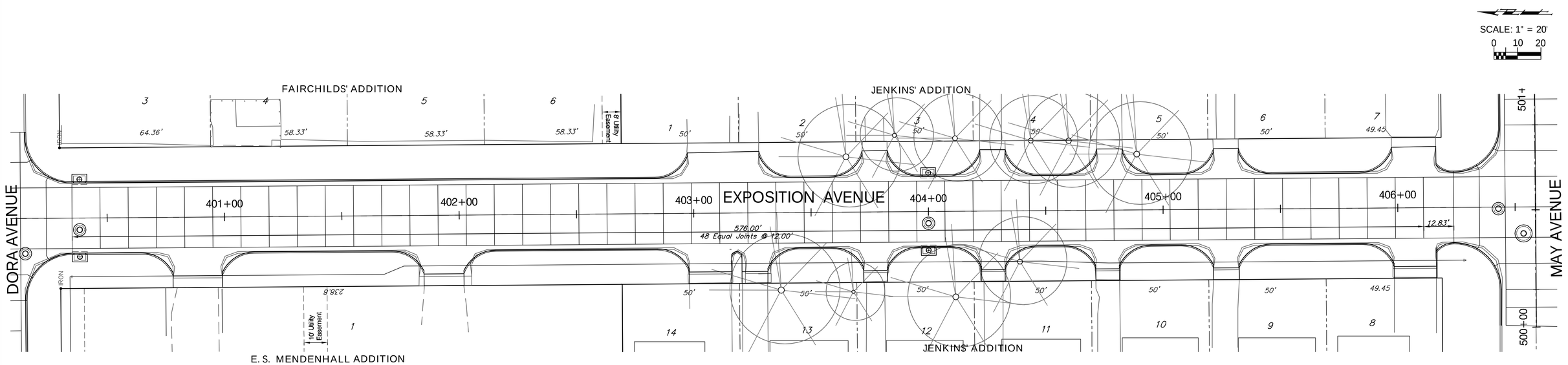
December 2012

Design: TPV Drawn: STAFF Approved: TPV Scale: NOTED	Project No. 0802E038 CAPITAL IMPROVEMENT PROJECT DORA AVENUE JOINT PLAN STA. 305+00.00 to STA. 315+00.00 MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT	Baughman Company , P.A. 315 Ellis St Wichita, KS 67211 P 316-262-7271 F 316-262-0149 ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

SHEET

OF





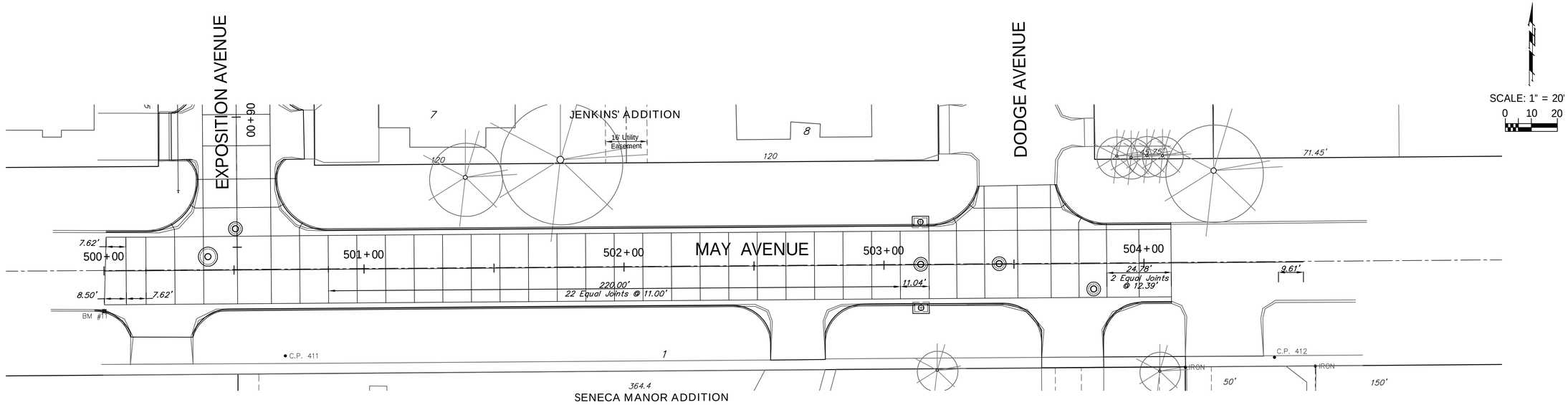
Drawing File: E:\Projects\Meridian Drainage\Land\dwg\Drainage Base.dwg [Joint 06]

December 2012

Design: TPV Drawn: STAFF Approved: TPV Scale: NOTED	Project No. 0802E038 CAPITAL IMPROVEMENT PROJECT DORA AVENUE & EXPOSITION AVENUE JOINT PLAN MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT	Baughman Company , P.A. 315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149 ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

SHEET

OF



Drawing File: E:\Projects\Meridian Drainage\Land\dwg\Drainage Base.dwg [Joint 07]

December 2012

Design: TPV
Drawn: STAFF
Approved: TPV
Scale: NOTED

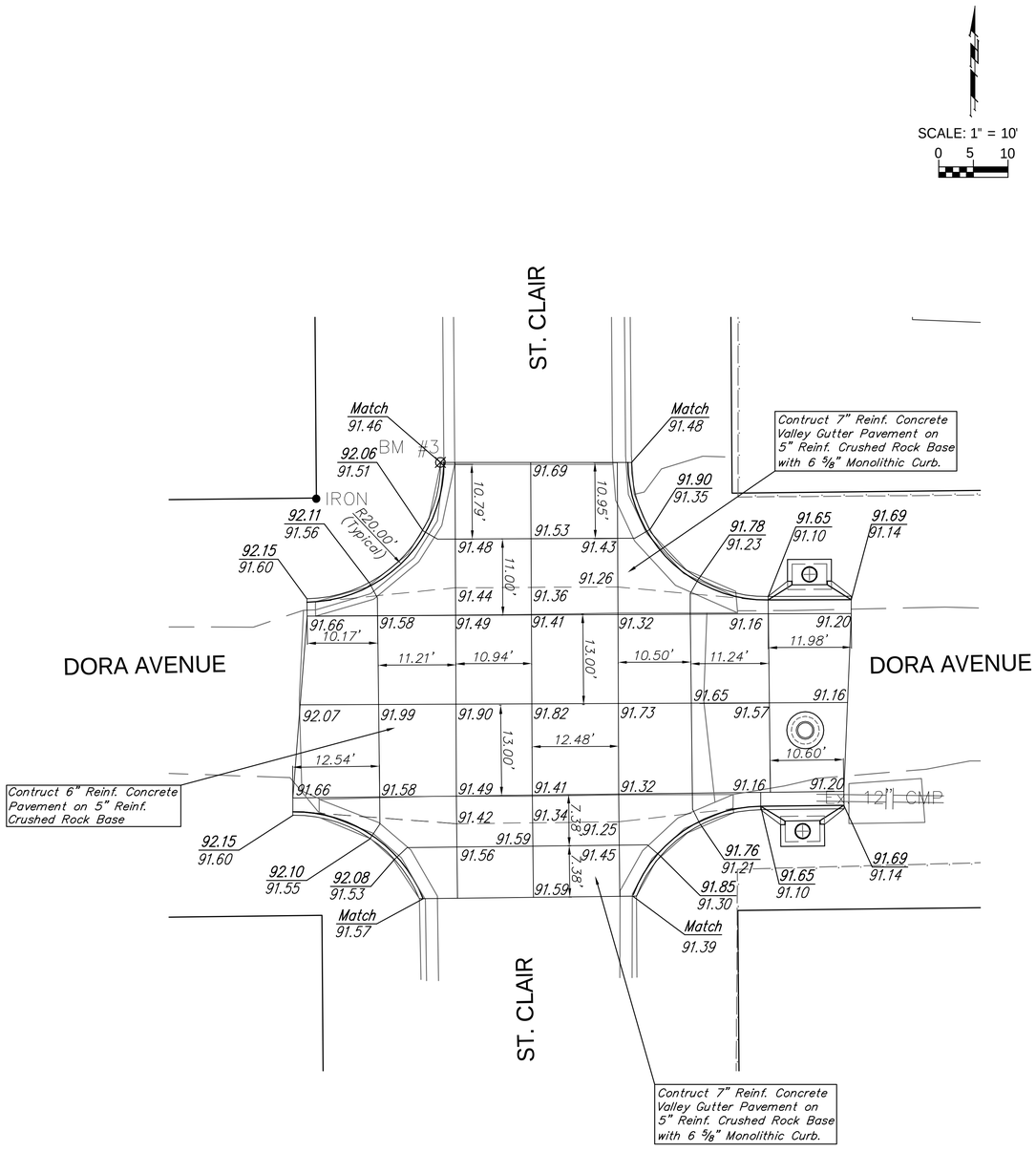
Project No. 08-02-E038 CAPITAL IMPROVEMENT PROJECT

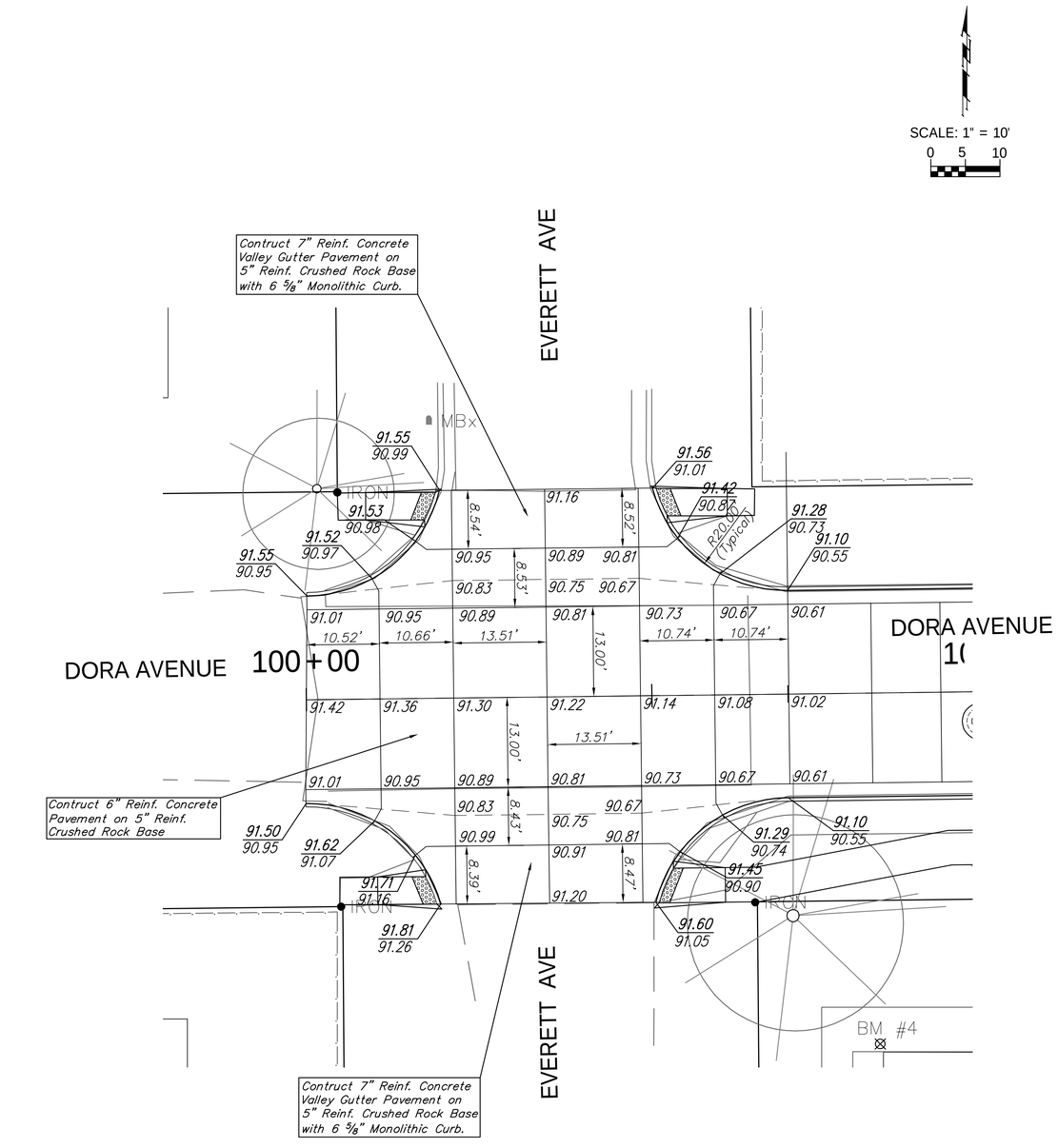
MAY AVENUE JOINT PLAN

MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT

Baughman
Baughman Company , P.A.
315 Ellis St Wichita, KS 67211 P 316-262-7271 F 316-262-0149
ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

SHEET
OF





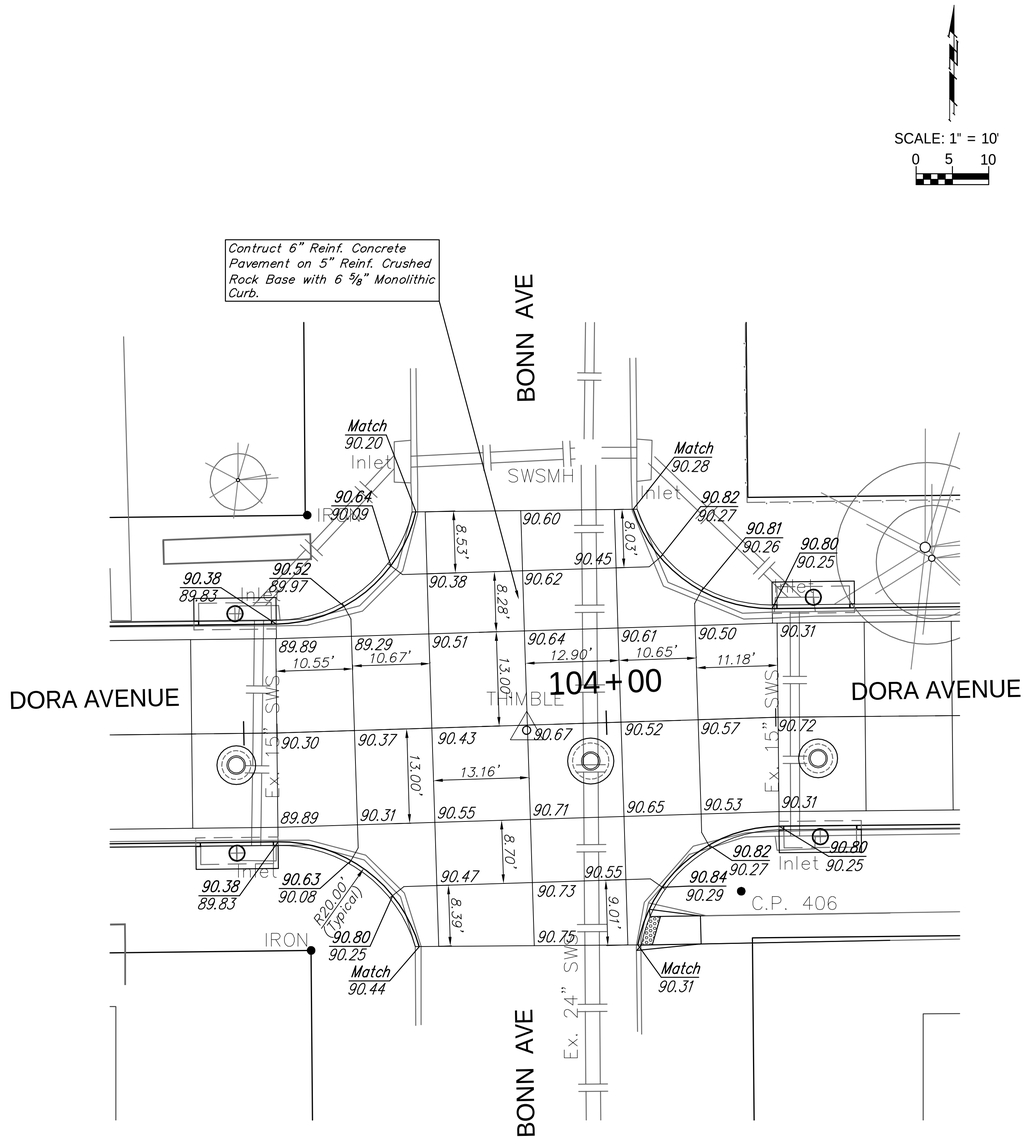
Drawing File: E:\Projects\Meridian Drainage\Land\dwg\Drainage Base.dwg [Int 01]

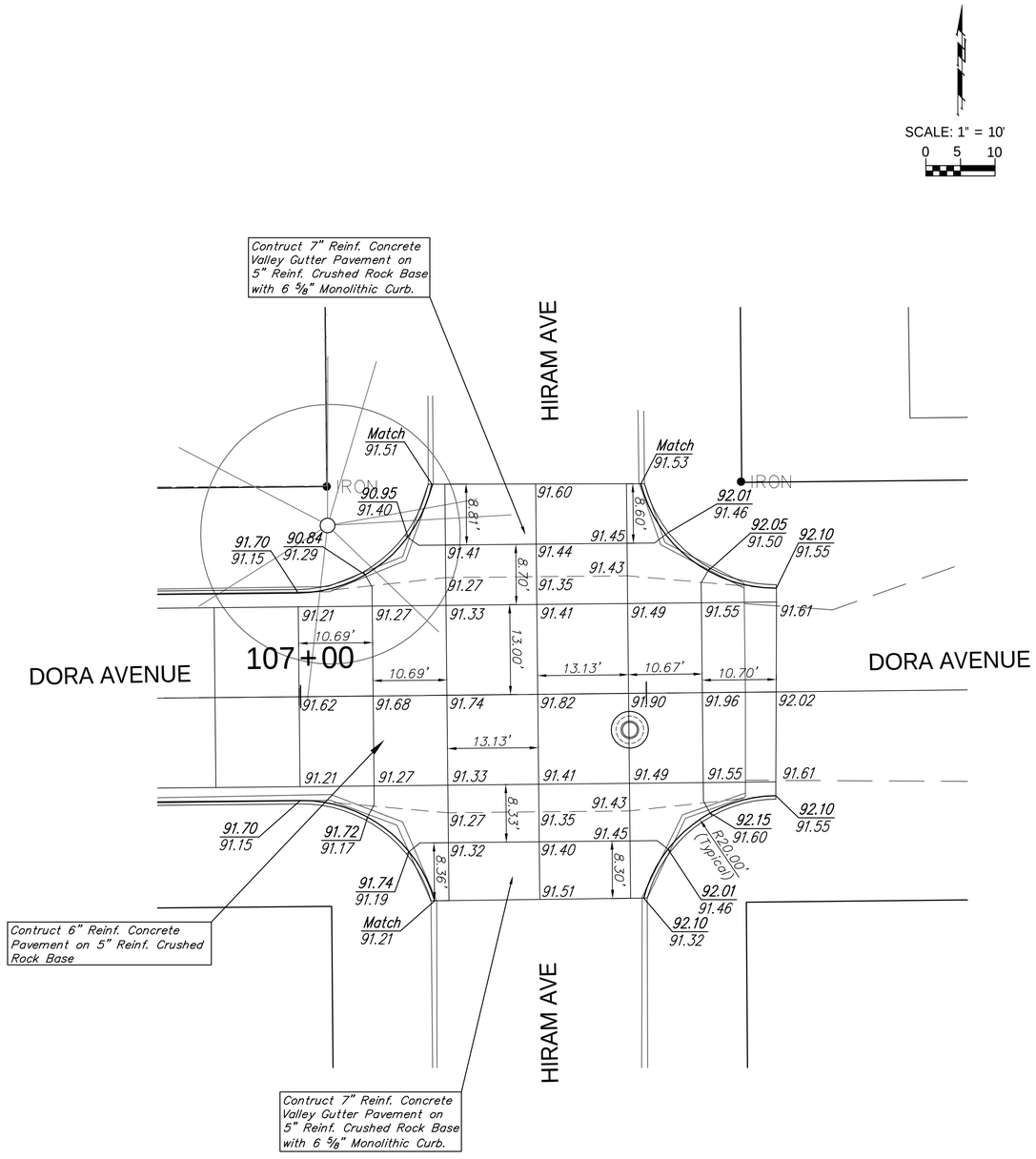
December 2012

Design: TPV Drawn: STAFF Approved: TPV Scale: NOTED	Project No. 08-02-E038 CAPITAL IMPROVEMENT PROJECT ST. CLAIR & EVERETT INTERSECTION JOINT & GRADING PLANS MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT	Baughman Company , P.A. 315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149 Baughman ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

SHEET

OF





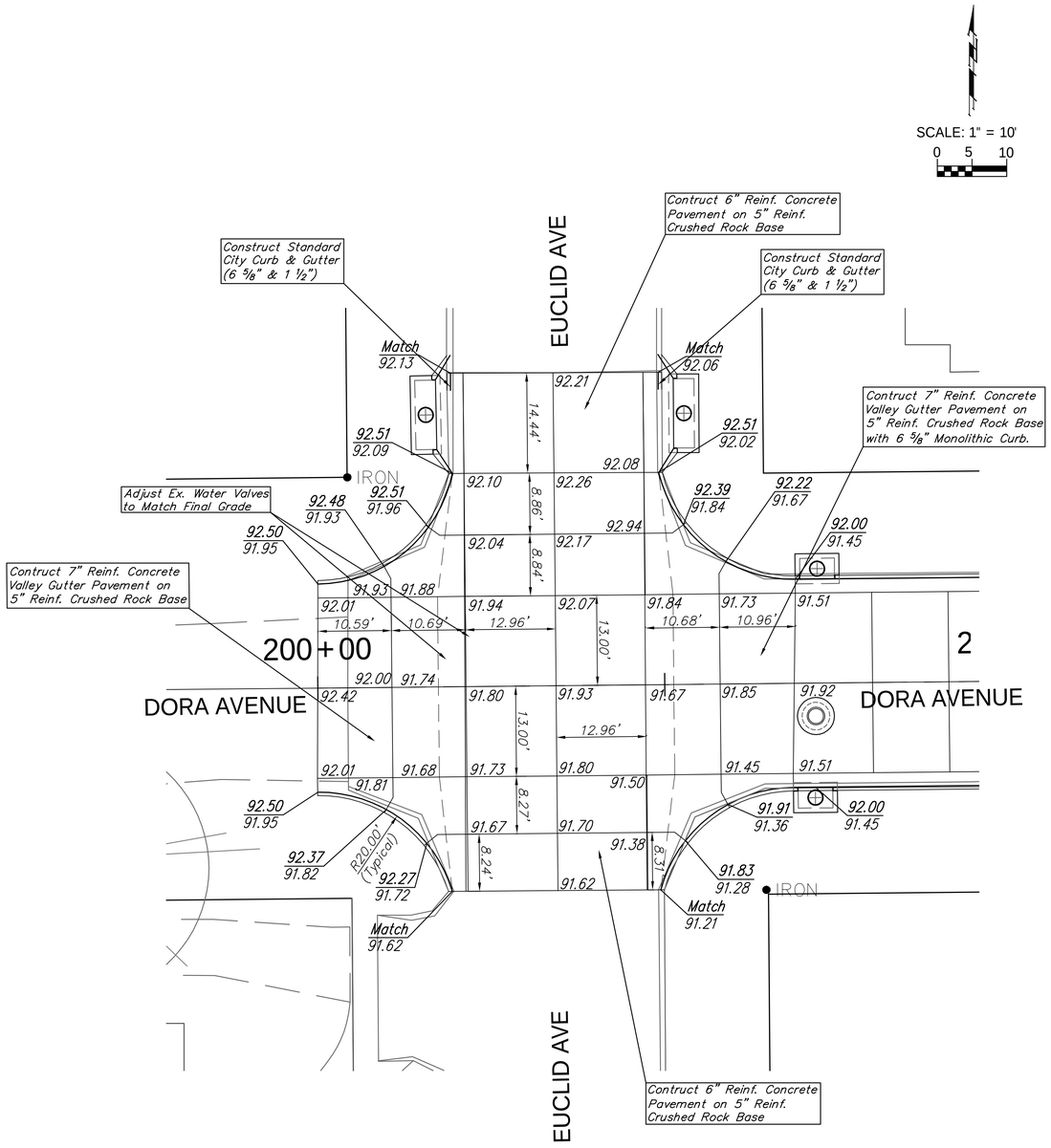
Drawing File: E:\Projects\Meridian Drainage\Land\dwg\Drainage Base.dwg {Int 02}

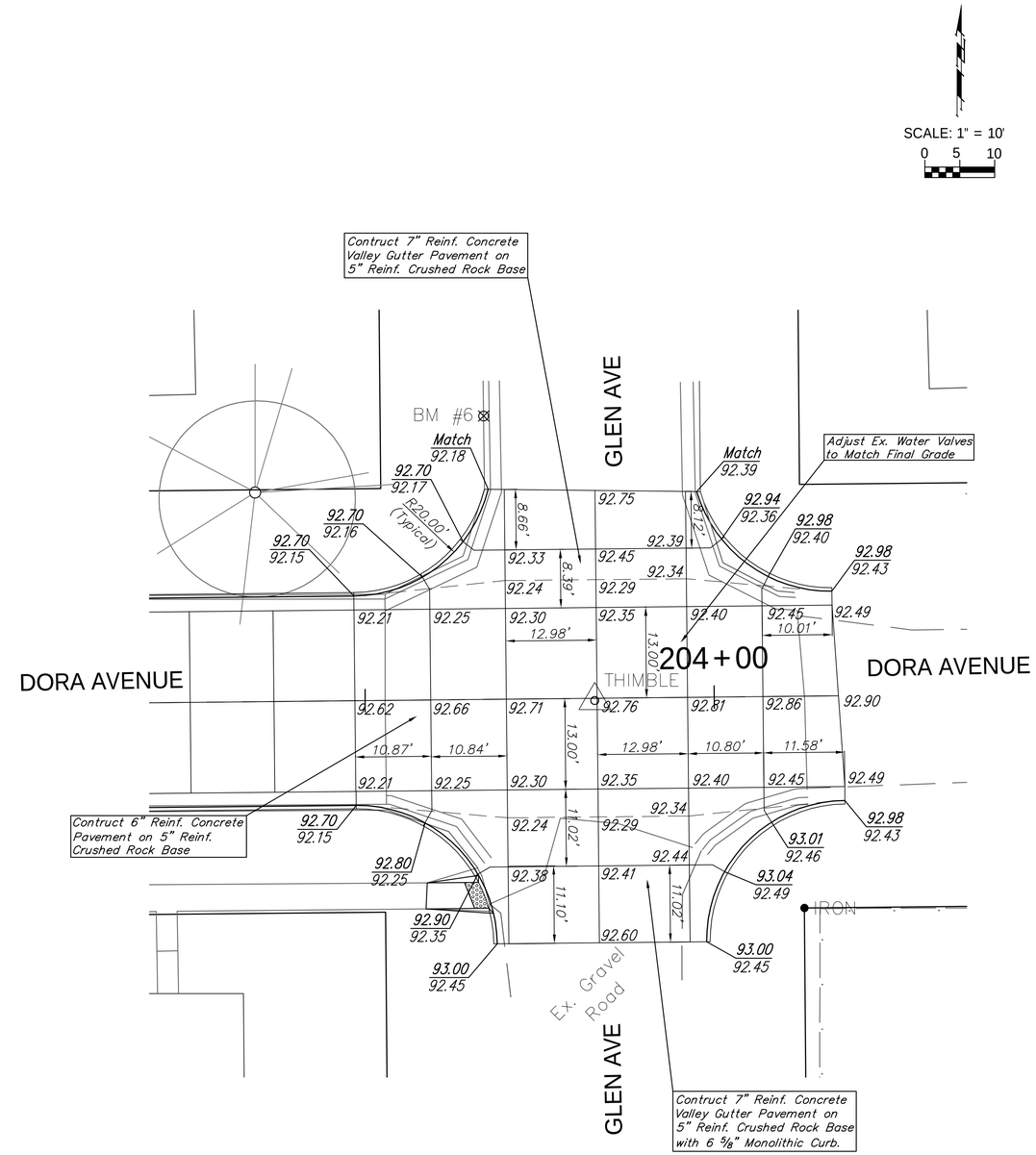
December 2012

Design: TPV Drawn: STAFF Approved: TPV Scale: NOTED	Project No. 08-02-E038 CAPITAL IMPROVEMENT PROJECT BONN & HIRAM INTERSECTION JOINT & GRADING PLANS MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT	Baughman Company , P.A. 315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149 Baughman ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

SHEET

OF





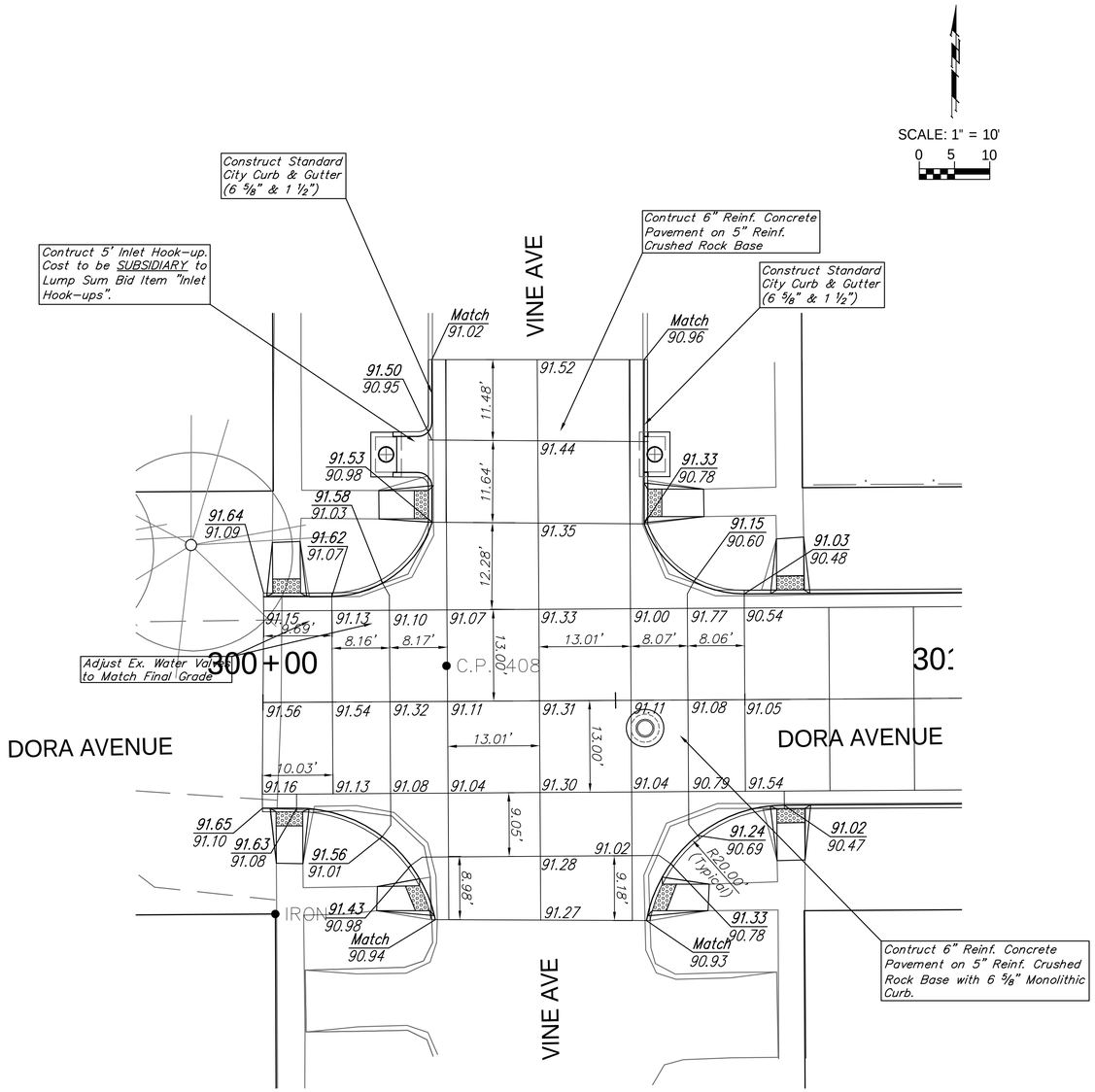
Drawing File: E:\Projects\Meridian Drainage\Land\dwg\Drainage Base.dwg {Int 03}

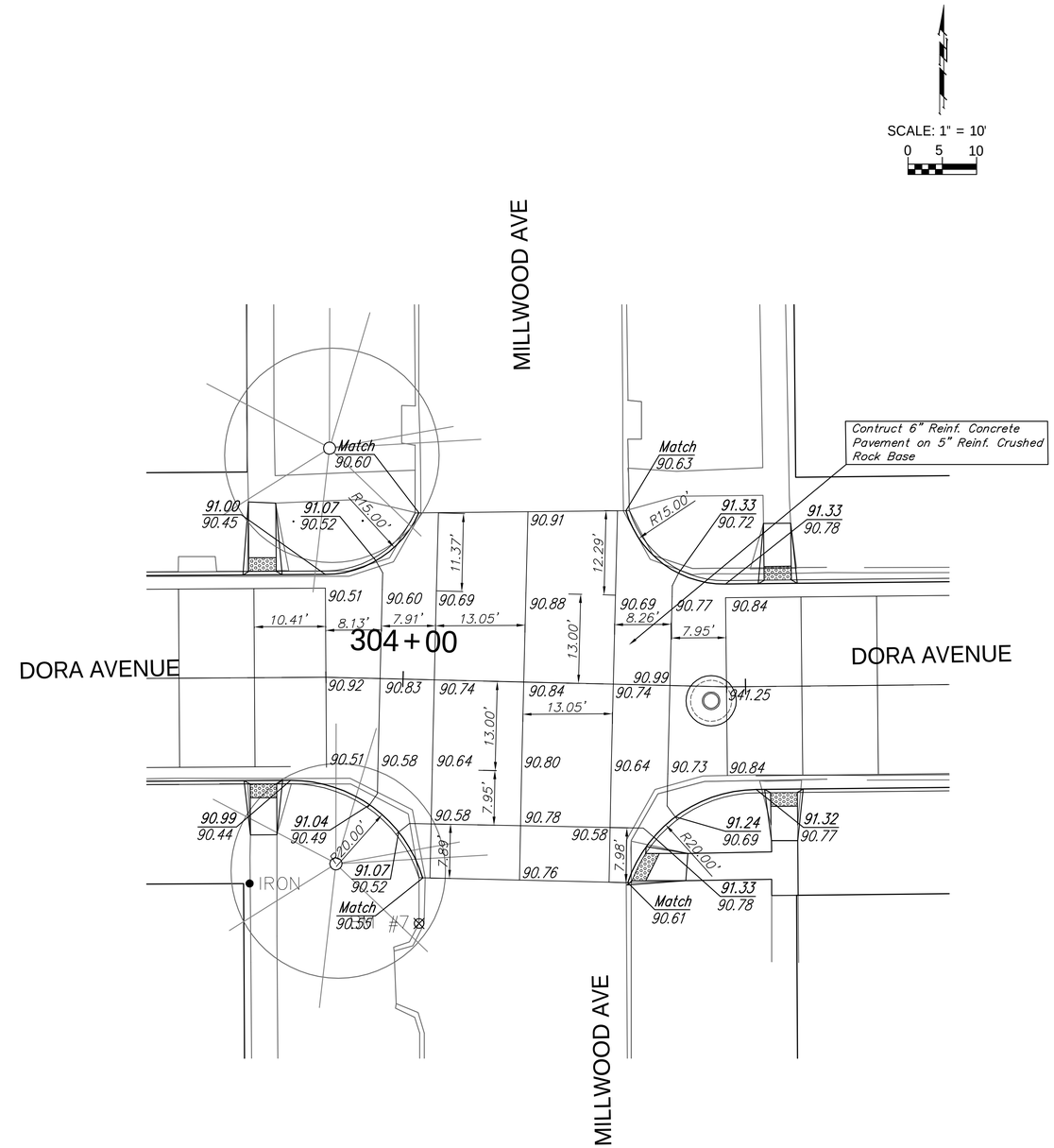
December 2012

Design: TPV Drawn: STAFF Approved: TPV Scale: NOTED	Project No. 0802E038 CAPITAL IMPROVEMENT PROJECT EUCLID & GLENN INTERSECTION JOINT & GRADING PLANS MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT	Baughman Company , P.A. 315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149 ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE Baughman

SHEET

OF





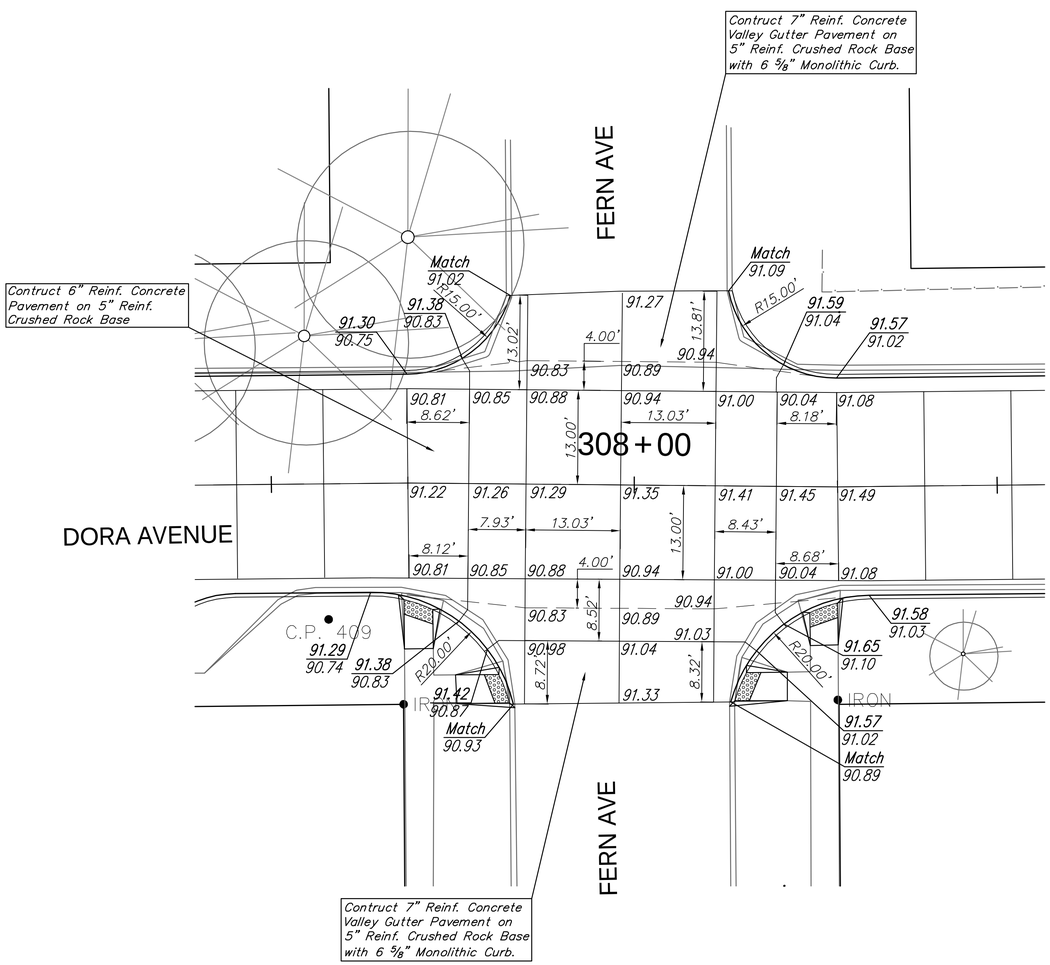
Drawing File: E:\Projects\Meridian Drainage\Land\dwg\Drainage Base.dwg [Int 04]

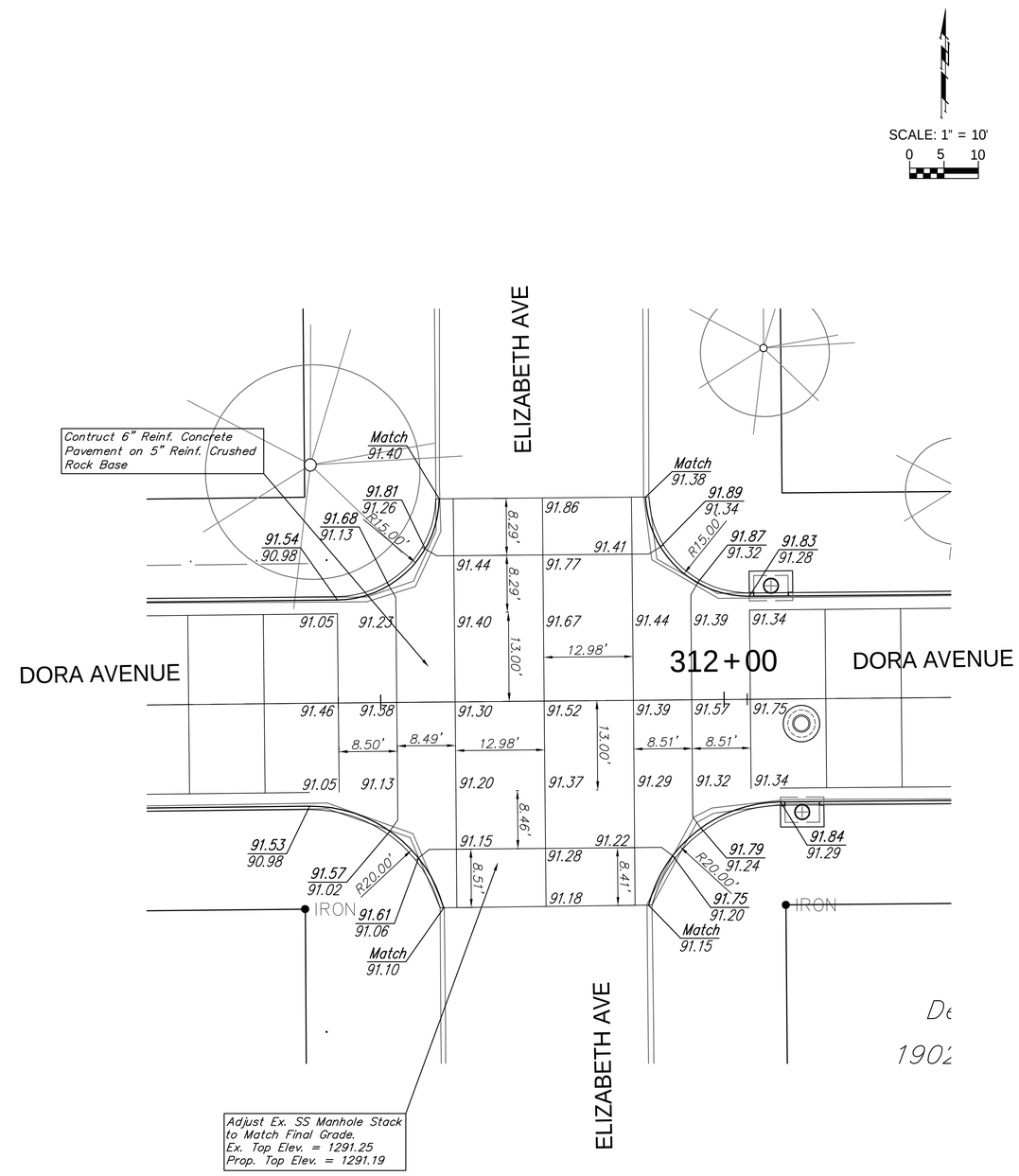
December 2012

Design: TPV Drawn: STAFF Approved: TPV Scale: NOTED	Project No. 08-02-E038 CAPITAL IMPROVEMENT PROJECT VINE & MILLWOOD INTERSECTION JOINT & GRADING PLANS MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT	Baughman Company , P.A. 315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149 Baughman ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

SHEET

OF



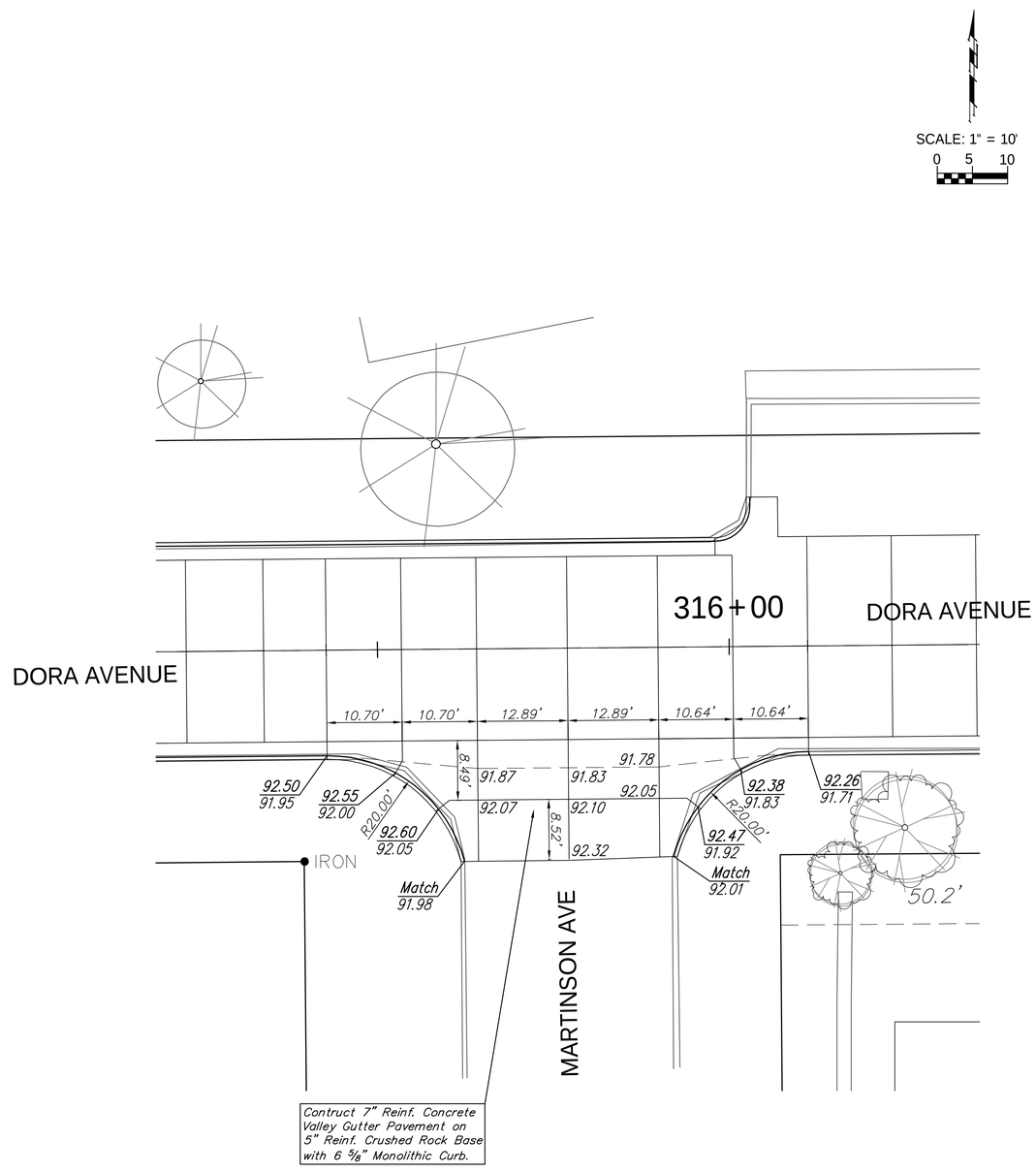


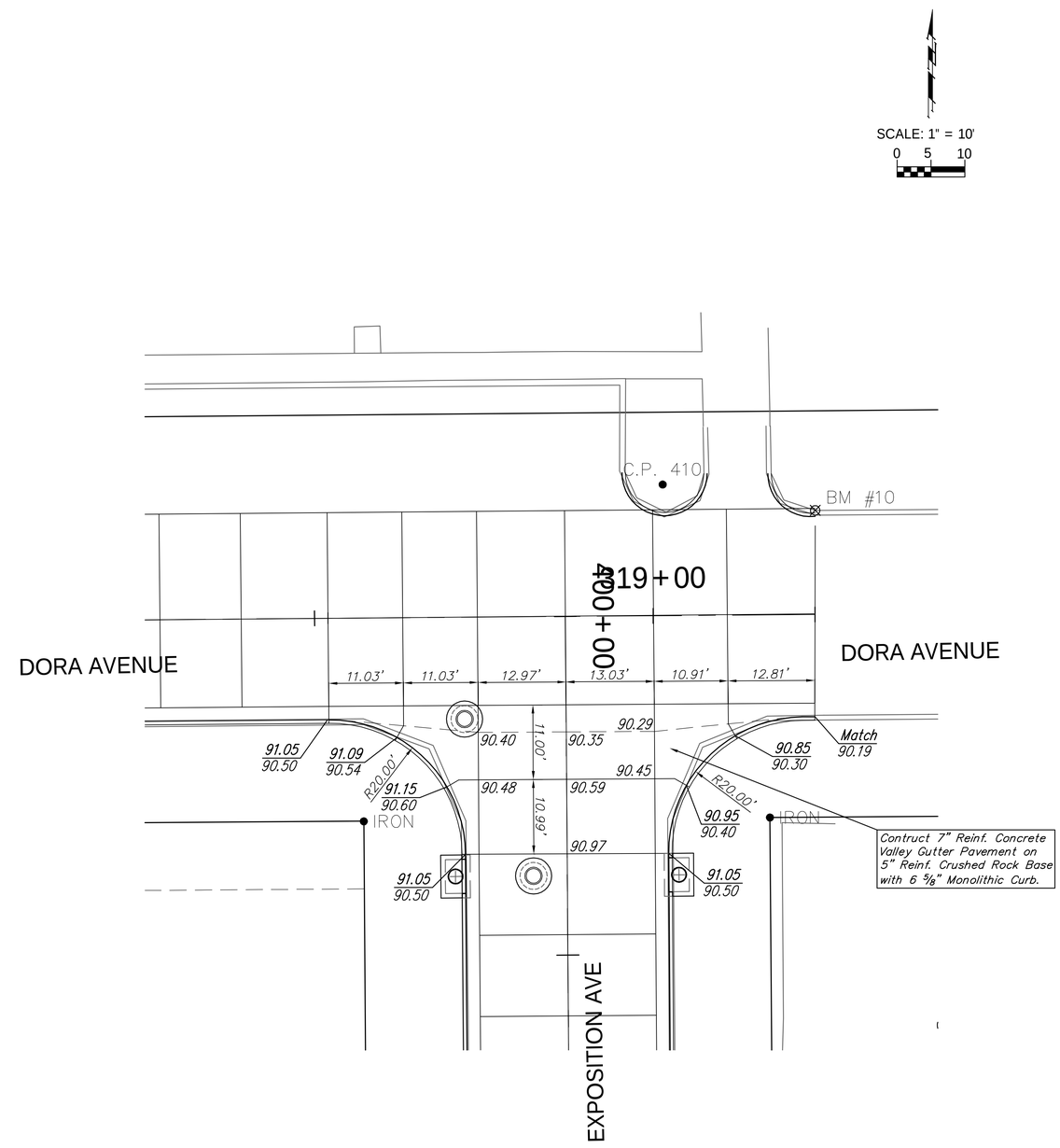
Drawing File: E:\Projects\Meridian Drainage\Land\dwg\Drainage Base.dwg (Int 05)

December 2012

Design: TPV Drawn: STAFF Approved: TPV Scale: NOTED	Project No. 0802-E038 CAPITAL IMPROVEMENT PROJECT FERN & ELIZABETH INTERSECTION JONIT & GRADING PLANS MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT	Baughman Company , P.A. 315 Ellis St Wichita, KS 67211 P 316-262-7271 F 316-262-0149 ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE Baughman

SHEET
OF





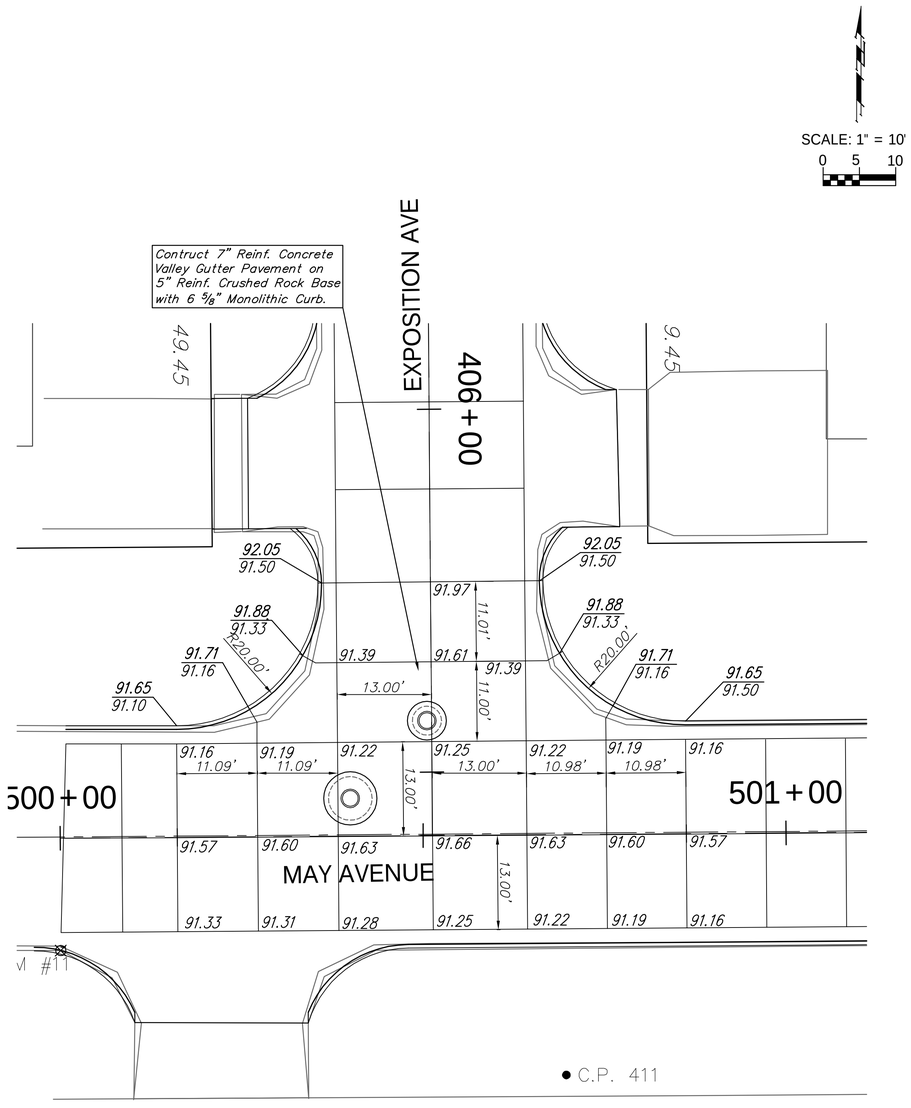
Drawing File: E:\Projects\Meridian Drainage\Land\dwg\Drainage Base.dwg [Int 06]

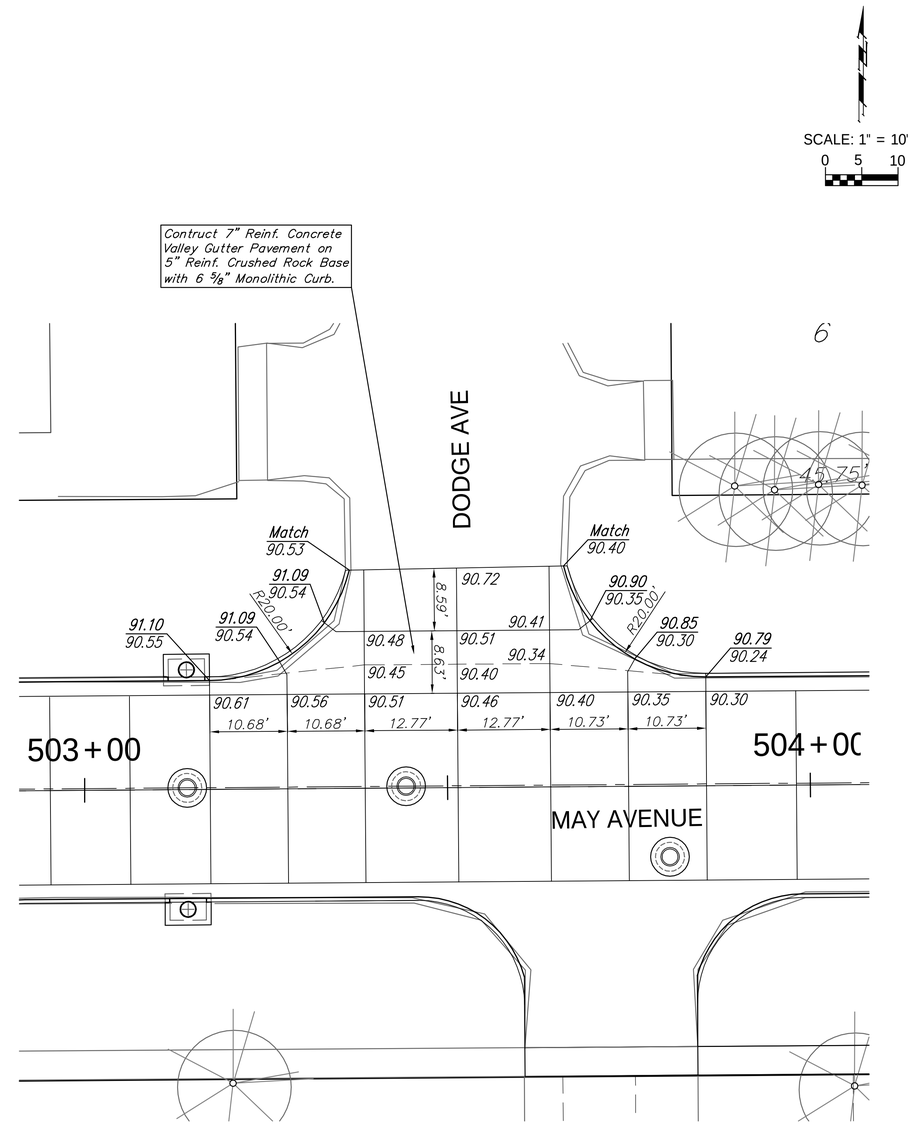
December 2012

Design: TPV Drawn: STAFF Approved: TPV Scale: NOTED	Project No. 0802-E038 CAPITAL IMPROVEMENT PROJECT MARTINSON & EXPOSITION INTERSECTION JOINT & GRADING PLANS MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT	Baughman Company , P.A. 315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149 ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

SHEET

OF





Drawing File: E:\Projects\Meridian Drainage\Land\dwg\Drainage Base.dwg {Int 07}

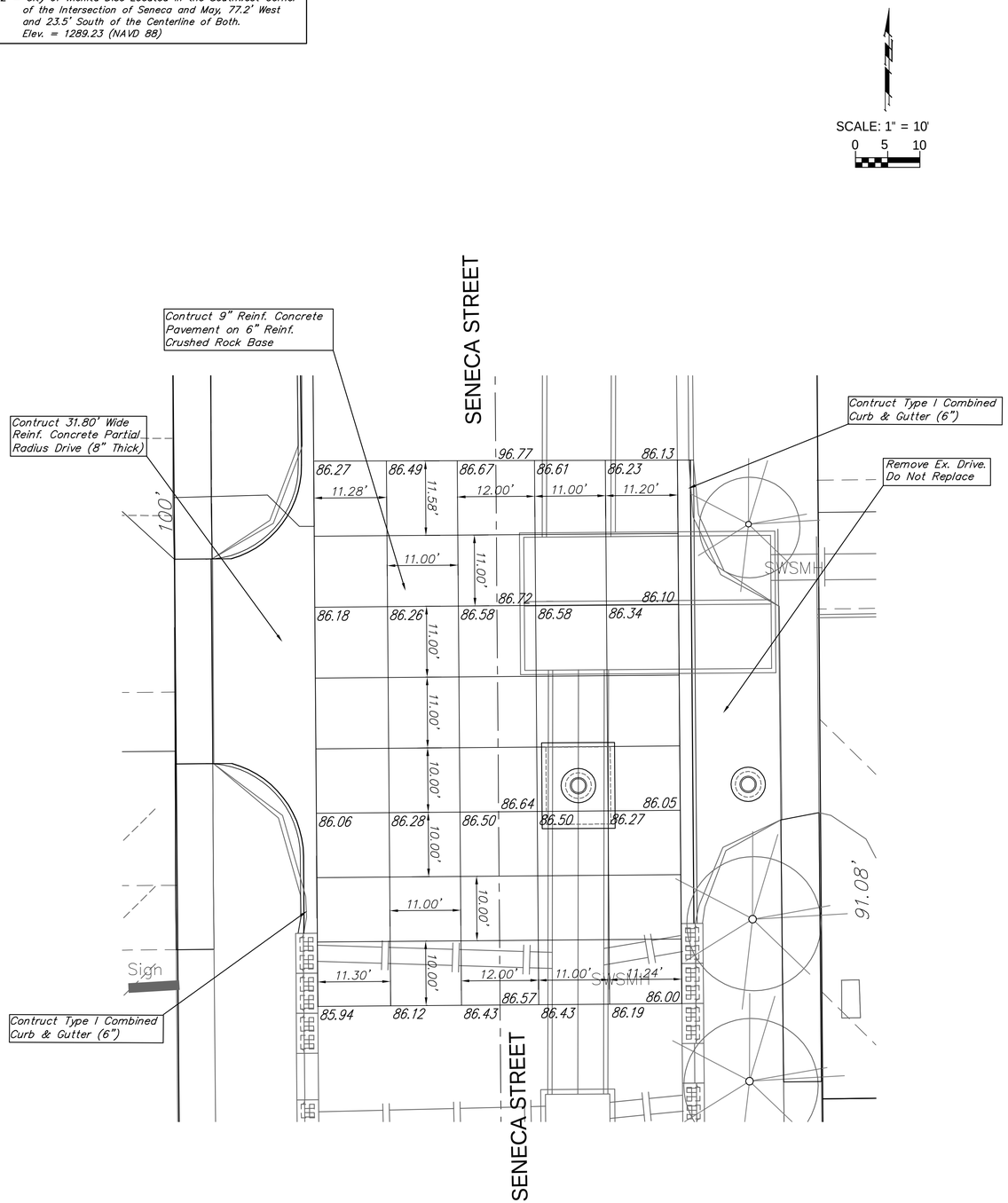
December 2012

Design: TPV Drawn: STAFF Approved: TPV Scale: NOTED	Project No. 0802-E038 CAPITAL IMPROVEMENT PROJECT EXPOSTION & DODGE INTERSECTIONS JOINT & GRADING PLANS MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT	Baughman Company , P.A. 315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149 ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

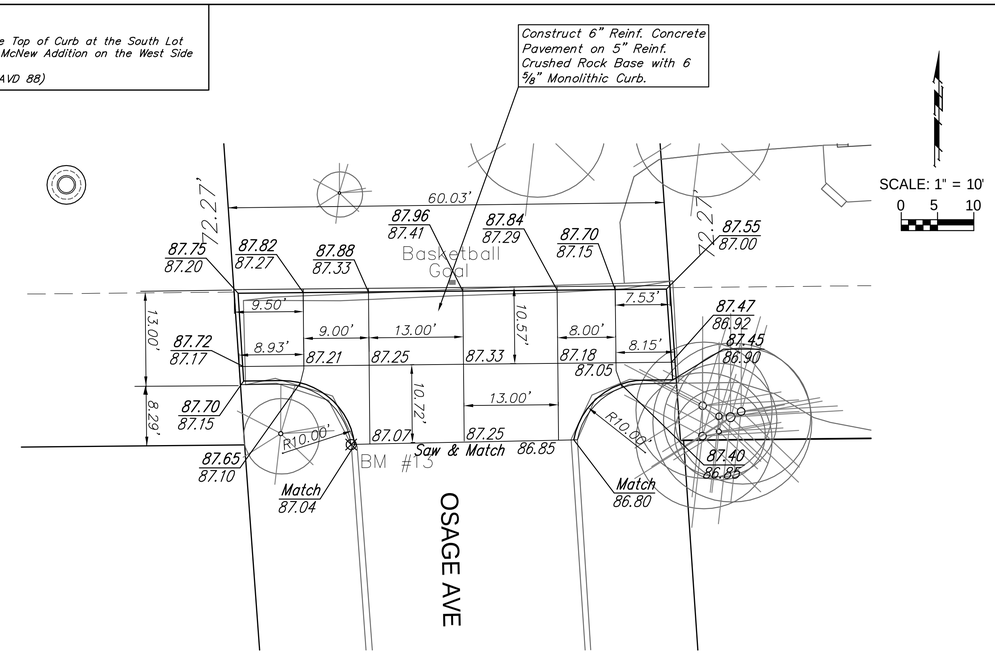
SHEET

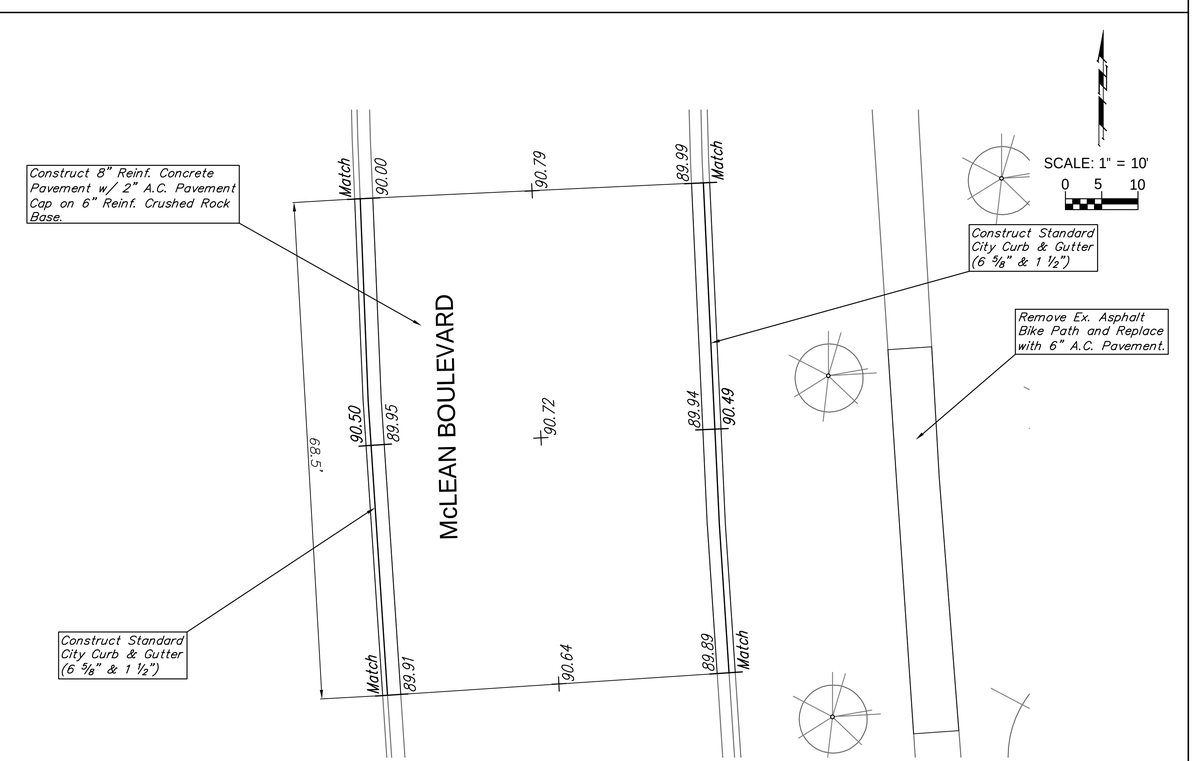
OF

BENCHMARK:
BM #12 – City of Wichita Disc Located in the Southwest Corner of the Intersection of Seneca and May, 77.2' West and 23.5' South of the Centerline of Both. Elev. = 1289.23 (NAVD 88)



BENCHMARK:
BM #13 – Chiseled "□" on the Top of Curb at the South Lot Line of Lot 2, Van McNew Addition on the West Side of Osage. Elev. = 1287.70 (NAVD 88)





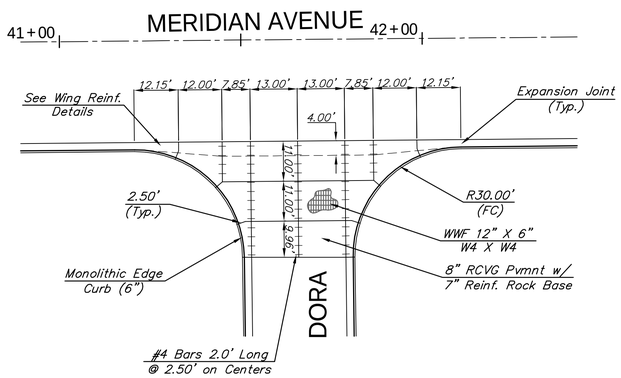
Drawing File: E:\Projects\Meridian Drainage\Land\dwg\Drainage Base.dwg (Int 08)

December 2012

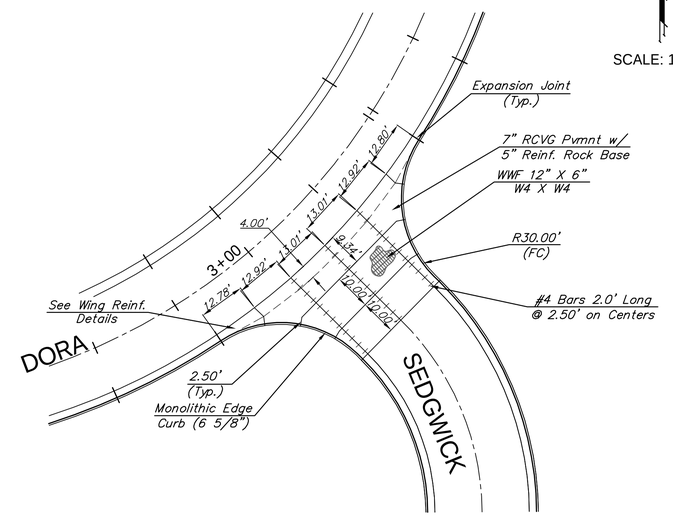
Design: TPV Drawn: STAFF Approved: TPV Scale: NOTED	Project No. 08-02-E038 CAPITAL IMPROVEMENT PROJECT SENECA, OSAGE & McLEAN JOINT & GRADING PLANS MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT	Baughman Company , P.A. 315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149 ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

SHEET
OF

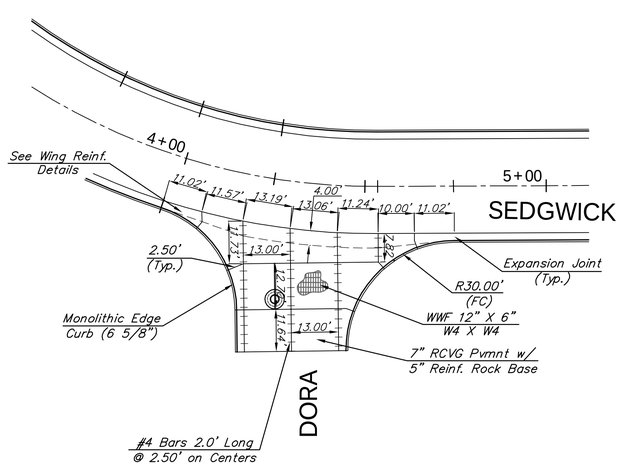
SCALE: 1" = 20'



SCALE: 1" = 20'



SCALE: 1" = 20'



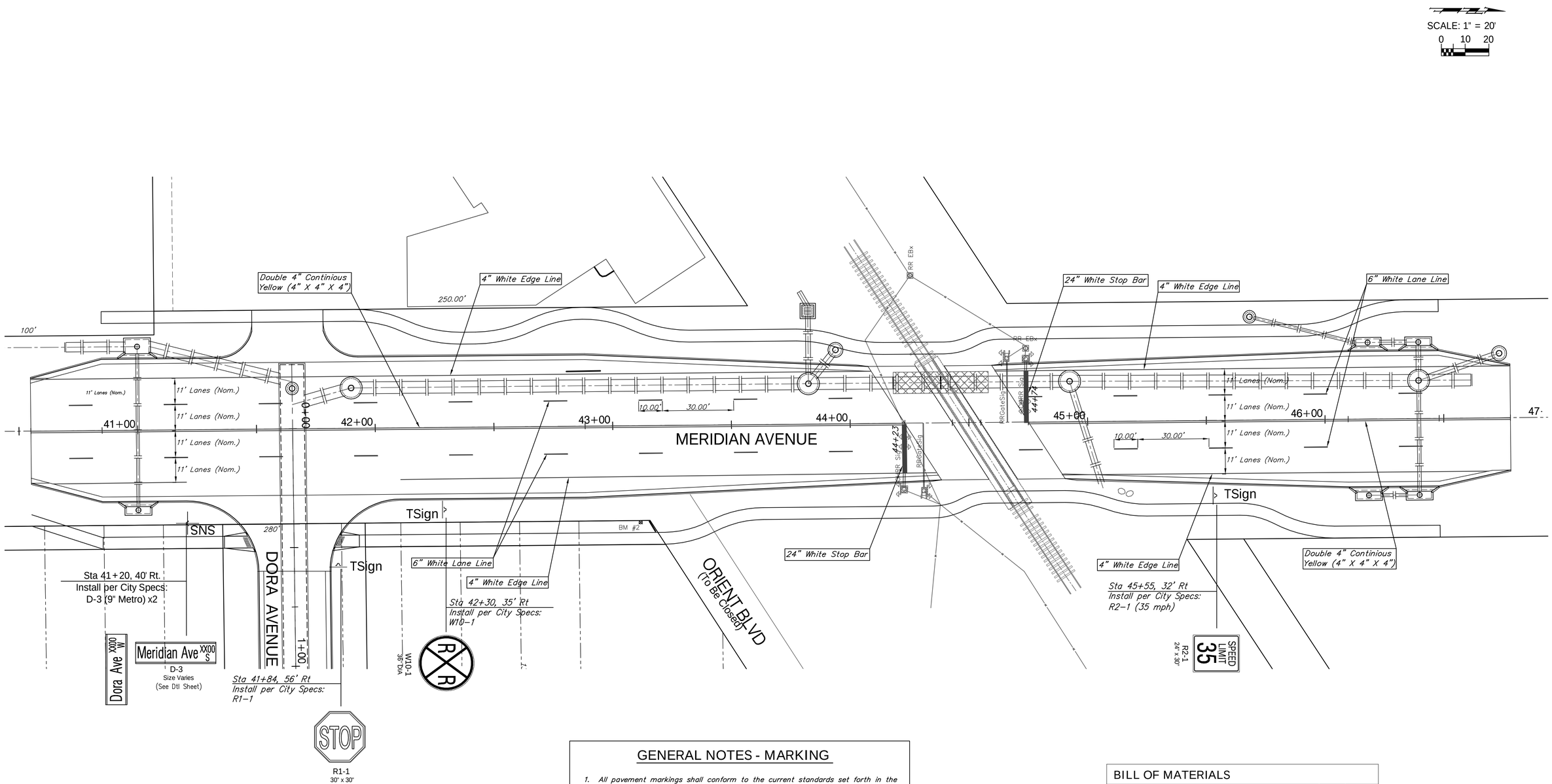
Drawing File: E:\Projects\Meridian Drainage\Land\dwg\Drainage Base.dwg {Valley Gutter}

December 2012

Design: TPV Drawn: STAFF Approved: TPV Scale: NOTED	Project No. 08-02-E038 CAPITAL IMPROVEMENT PROJECT DORA & SEDGWICK VALLEY GUTTER DETAILS MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT	Baughman Company , P.A. 315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149 ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

SHEET

OF



GENERAL NOTES - MARKING

1. All pavement markings shall conform to the current standards set forth in the latest publication of the "Manual on Uniform Traffic Control Devices".

2. All pavement markings shall be thermoplastic, unless otherwise approved by the Engineer. Pavement markings shall be installed per manufacturer's recommendations and shall meet KDOT's 2007 Standard Specification. Full traffic may not be restored (and substantial project completion achieved) until all pavement markings are in place. Should construction timing be such that restoration of traffic becomes necessary during temperatures prohibiting the installation of thermoplastic markings, the contractor shall install and maintain temporary markings until such time that thermoplastic markings may be properly installed. Except for the material requirement, temporary pavement markings shall be placed equivalent, in every manner (i.e. dimension, frequency, spacing, etc.), to the permanent marking layout. The cost for temporary pavement markings will not be paid for directly, but shall be considered SUBSIDIARY to the bid item "Pavement Markings".

BILL OF MATERIALS

ITEMS	UNITS	TOTAL
PLASTIC MARKING TAPE (4" WHITE)	LF	934
PLASTIC MARKING TAPE (6" WHITE)	LF	280
PLASTIC MARKING TAPE (24" WHITE)	LF	44
PLASTIC MARKING TAPE (4" YELLOW)	LF	1142
FOR INFORMATION ONLY		

Drawing File: E:\Projects\Meridian Drainage\Land\dwg\Drainage Base.dwg [Pav 01]

December 2012

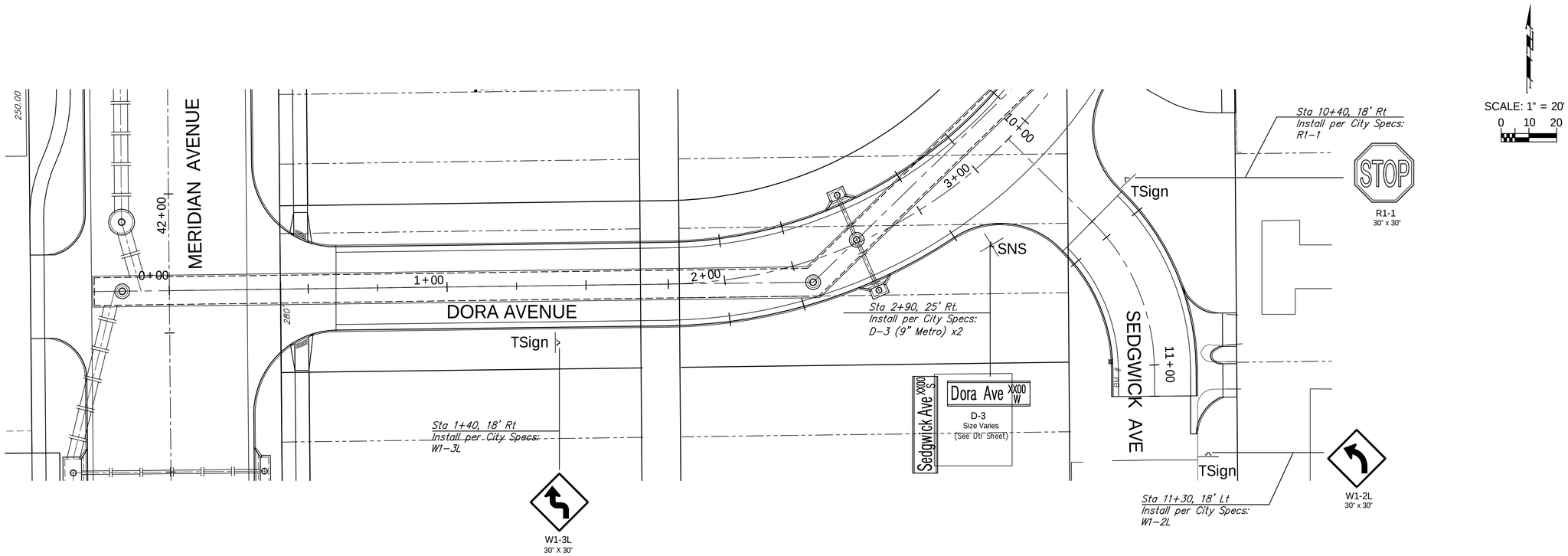
Design: TPV
Drawn: STAFF
Approved: TPV
Scale: NOTED

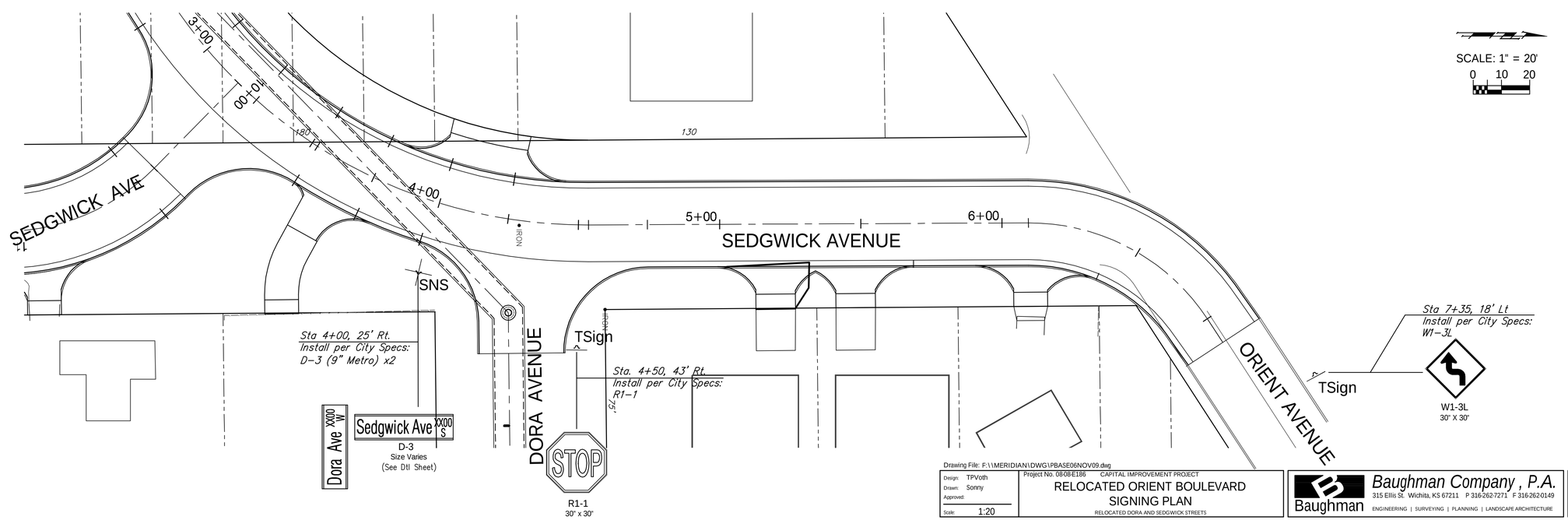
Project No. 0802-E038 CAPITAL IMPROVEMENT PROJECT

MERIDIAN AVENUE
MARKING & SIGNING PLAN
MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT

Baughman Company , P.A.
315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149
ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

SHEET
OF





Drawing File: F:\\MERIDIAN\DWG\PBASE06NOV09.dwg

Design: TPVoth
Drawn: Sonny
Approved:
Scale: 1:20

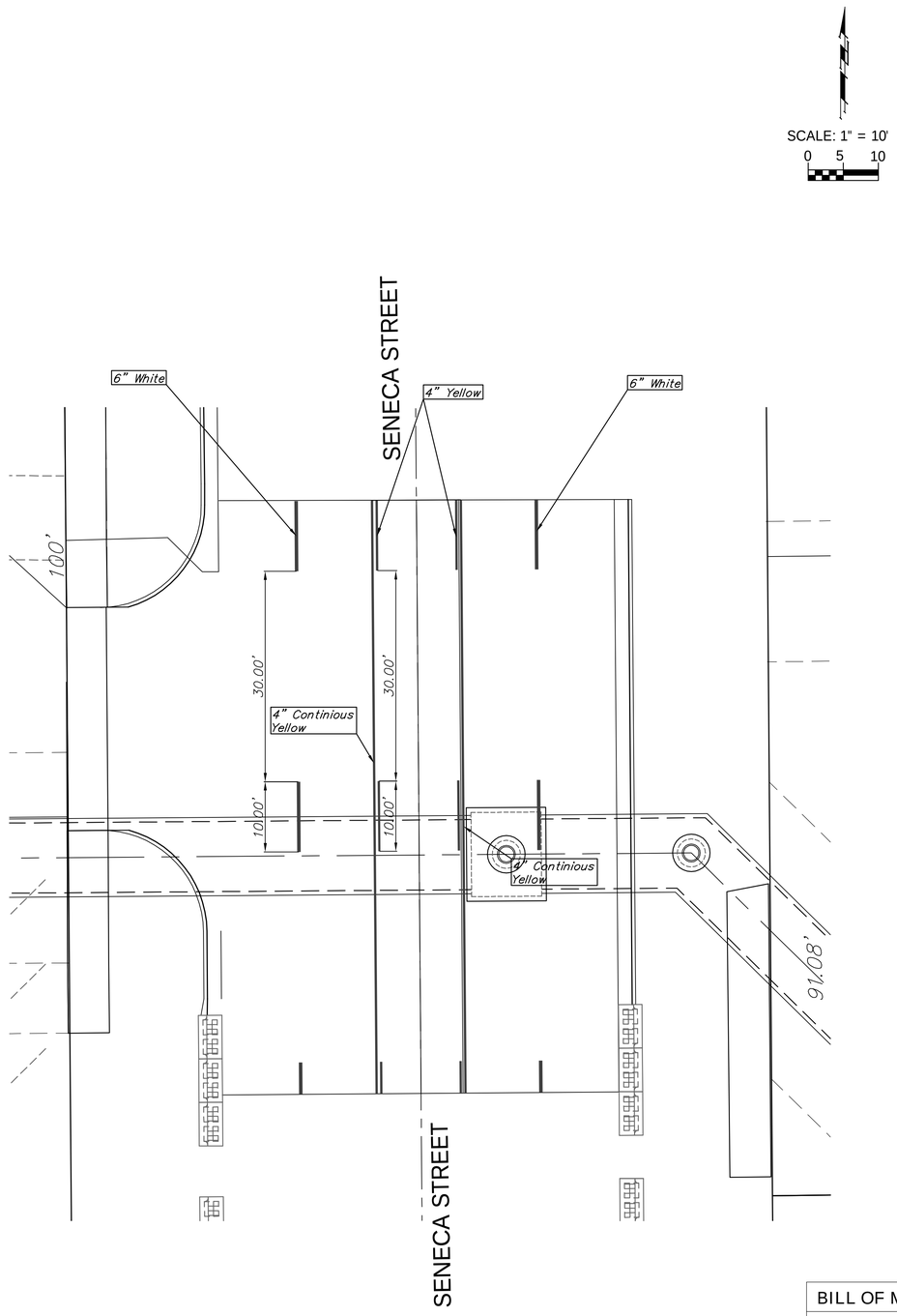
Project No. 0808E186 CAPITAL IMPROVEMENT PROJECT

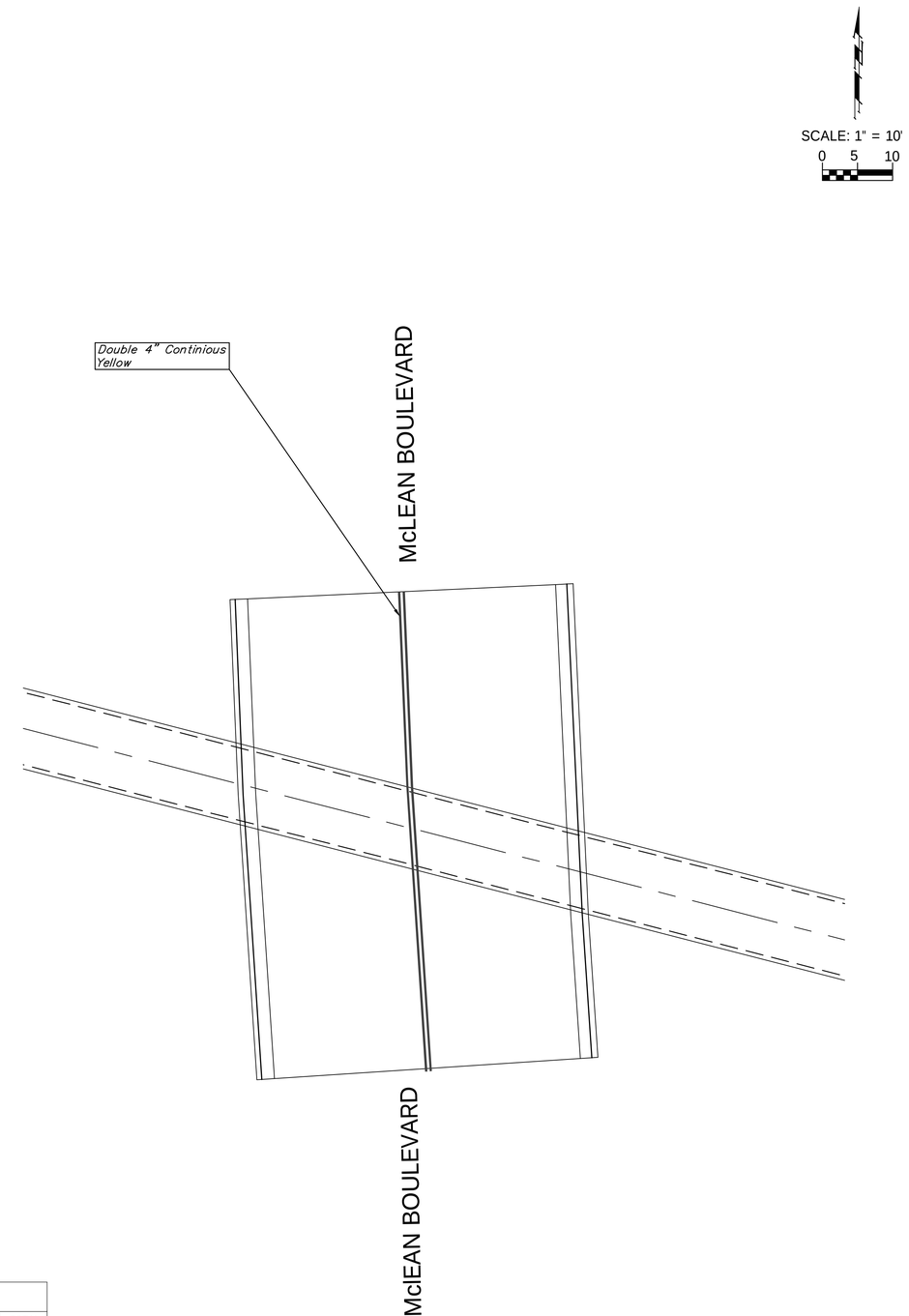
RELOCATED ORIENT BOULEVARD
SIGNING PLAN
RELOCATED DORA AND SEDGWICK STREETS

Baughman Company , P.A.
315 Ellis St Wichita, KS 67211 P 316-262-7271 F 316-262-0149
ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

NOV 2009

SHEET
OF





BILL OF MATERIALS

ITEMS	UNITS	TOTAL
PLASTIC MARKING TAPE (6" WHITE)	LF	50
PLASTIC MARKING TAPE (4" YELLOW)	LF	70
FOR INFORMATION ONLY		

Drawing File: E:\Projects\Meridian Drainage\Land\dwg\Drainage Base.dwg {Mark 01}

December 2012

Design: TPV
Drawn: STAFF
Approved: TPV
Scale: NOTED

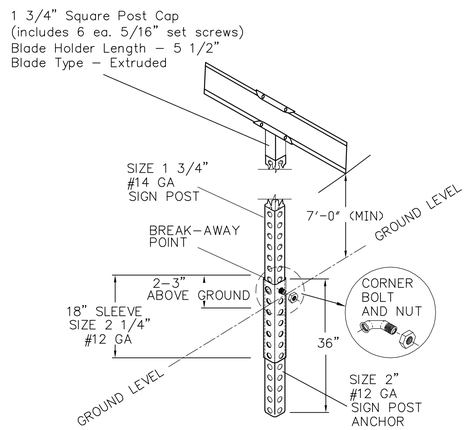
Project No. 0802-E038 CAPITAL IMPROVEMENT PROJECT

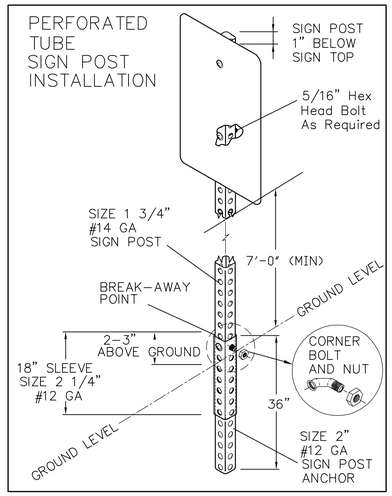
SENECA STREET & McLEAN BLVD
MARKING PLANS

MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT

Baughman Company , P.A.
315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149
ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

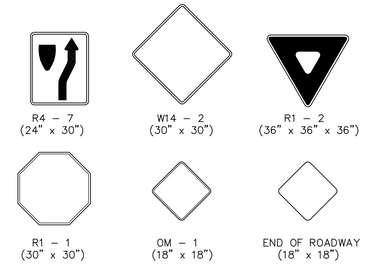
SHEET
OF

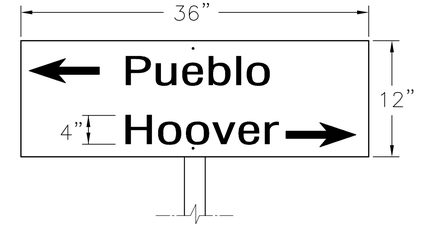




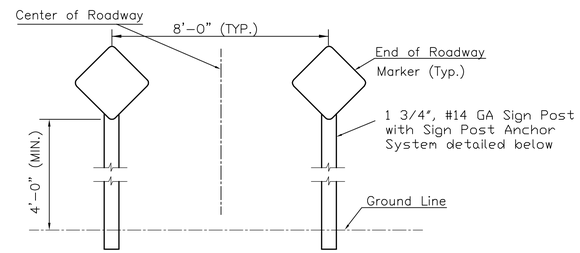
TYPICAL TRAFFIC CONTROL AND STREET NAME SIGN MOUNTING INSTALLATION

CURB AND GUTTER SECTION

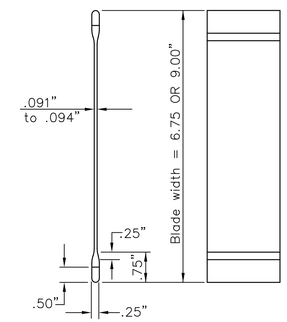




FLAT PLATE STREET NAME SIGN

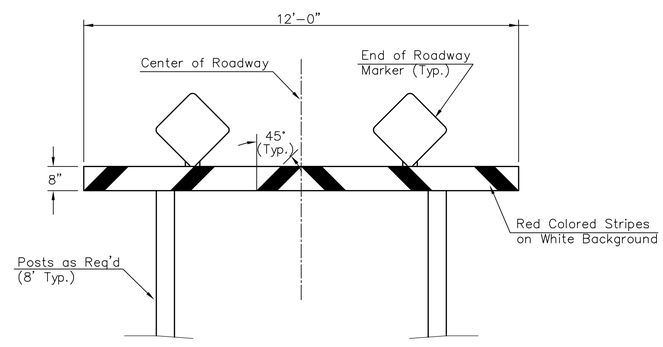


TYPICAL END OF ROADWAY SIGN MOUNTING INSTALLATION

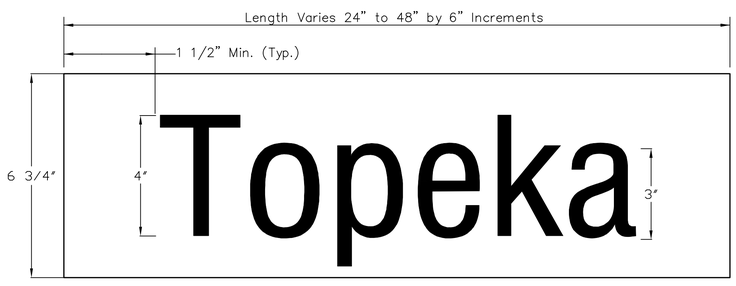


STREET NAME SIGN

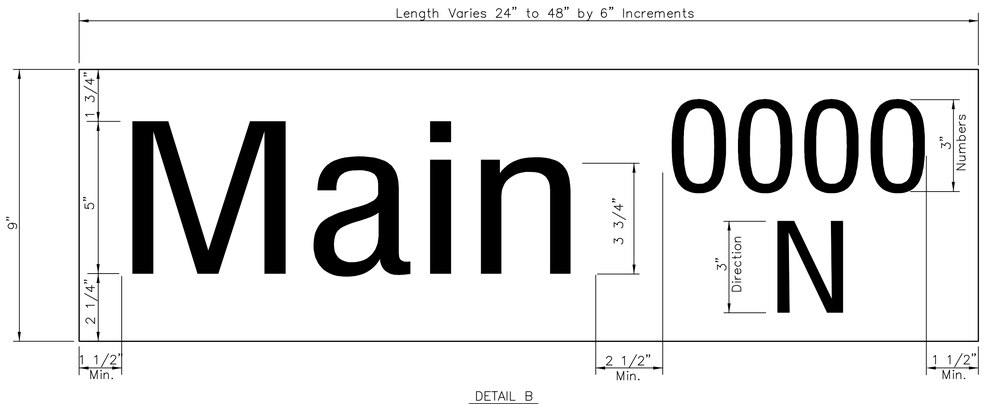
BLADE DETAILS



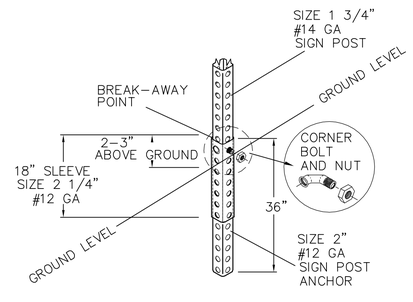
TYPE I BARRICADE DETAIL W/ E.O.R. MARKERS



DETAIL A
6 3/4" STANDARD



DETAIL B
9" METRO



SIGN POST ANCHOR SYSTEM

SIGN ASSEMBLY TABLE

SIGN	QUANTITY*
R2–1 (40 mph)	8
R3–9b	8
R1–1	10
R3–7R	2
OM–1	14
R9–1	1
W4–R2	1

STREET NAME	NO. BLADES REQ'D	
	6 3/4" STD.	9" METRO
Meridian 4600 S		2

NOTE: REFERENCES BELOW TO "STANDARD SPECIFICATIONS" DENOTE "STANDARD SPECIFICATION FOR STATE ROAD AND BRIDGE CONSTRUCTION EDITION 1990" BY THE KANSAS DEPARTMENT OF TRANSPORTATION.

1. POST ANCHORS: POSTS SHALL BE ANCHORED WITH A YIELDING BASE POST SUPPORT AS DETAILED.
2. POSTS FOR TRAFFIC CONTROL SIGNS: POSTS SHALL BE GALVANIZED AND CONFORM TO THE REQUIREMENTS OF SUBSECTION 1620 OF THE STANDARD SPECIFICATIONS, EXCEPT THAT ALL POSTS SHALL WEIGH 3 LBS./FT. MINIMUM.
3. POSTS FOR STREET NAME SIGNS (SNS): POSTS SHALL BE 9 FEET LONG, CONSTRUCTED FROM #14 GALVANIZED STEEL PIPE AND SHALL BE 1 3/4" SQUARE WEIGHING A MINIMUM OF 3 LBS/FT. POSTS SHALL BE POSITIONED SO THAT THE BOTTOM BLADE IS 7 FEET ABOVE GRADE.
4. POSTS FOR END OF ROADWAY SIGN TO BE 8' LONG AND INSTALLED A MINIMUM OF 4' FROM ROADWAY TO BOTTOM OF SIGN.
5. SIGN BLANKS FOR TRAFFIC CONTROL SIGNS: SIGN BLANKS SHALL BE FABRICATED FROM 0.080" ALUMINUM ALLOY 6063–T6 CONFORMING TO THE REQUIREMENTS OF SUBSECTION 1626 OF THE STANDARD SPECIFICATIONS.
6. SIGN BLADES FOR STREET NAME SIGNS: EXTRUDED ALUMINUM BLADES SHALL BE ALUMINUM ALLOY CONFORMING TO 6063–T6 OR 5052–H38 (ASTM SPECIFICATION B221, LATEST ISSUE). BLADES SHALL HAVE AN ALODINE OR PHOSPHATE ETCHED FINISH. BLADES SHALL HAVE SQUARE CORNERS AND NO HOLES.

   MINIMUM BLADE LENGTH SHALL BE 24". MAXIMUM BLADE LENGTH SHALL BE 48". LENGTH VARIES BY INCREMENTS OF 6".

   BLADES BEARING THE STREET NAMES SHALL BE FIRMLY ATTACHED TO THE MOUNTING BRACKETS USING ALLEN–TYPE CONICAL SET SCREWS. THE BLADES SHALL BE ORIENTED PARALLEL TO THE STREET.
7. MOUNTING BRACKETS FOR SIGNS: DIE–CAST ALUMINUM BRACKETS SHALL BE ALUMINUM ALLOY 360 HAVING A TENSILE STRENGTH OF 44,000 PSI. THE BRACKETS SHALL BE SMOOTHLY FINISHED FREE OF PITS, BURRS, AND FLAWS. EACH BRACKET SHALL BE TAPPED AND DRILLED FOR 5/16" ZINC–PLATED ALLEN–TYPE SET SCREWS HAVING SELF–LOCKING SAW–TOOTH ENDS.
8. FASTENERS: ALL STEEL FASTENERS FOR TRAFFIC CONTROL SIGNS SHALL BE GALVANIZED AND SHALL CONFORM TO THE REQUIREMENTS OF SUBSECTION 1614 OF THE STANDARD SPECIFICATIONS.
9. REFLECTIVE SHEETING: REFLECTIVE SHEETING SHALL BE A MINIMUM TYPE IV PRISMATIC.
10. PROCESS INK: ALL PROCESS INK SHALL CONFORM TO THE REQUIREMENTS OF SUBSECTION 2202 OF THE STANDARD SPECIFICATIONS.
11. FABRICATION AND INSTALLATION OF ALL SIGNS SHALL CONFORM TO THE LATEST ADDITION OF THE MUTCD.
12. DETAILS – SNS: THE REFLECTIVE SHEETING FOR THE 6 3/4" STANDARD SIZE SNS IS TO BE THE HIGHWAY GREEN BACKGOUND WITH SILVER–WHITE #2 COPY WITH 4" UPPER CASE AND LOWER CASE PRIMARY COPY AND SUFFIX COPY. BOTH SERIES "C". FACES TO TRIM TO A 6 1/4". (SEE DETAIL A.)

    THE REFLECTIVE SHEETING FOR THE 9" METRO SIZE SNS IS TO BE THE HIGHWAY GREEN BACKGROUND WITH SILVERWHITE #2 COPY WITH 5" UPPER CASE AND LOWER CASE PRIMARY COPY AND SUFFIX COPY, BOTH SERIES "C". THE CARDINAL DIRECTION CENTERED DIRECTLY BELOW THE BLOCK NUMBER SHALL BE AN UPPER CASE, 4" SERIES "C" LETTER. FACES TO TRIM TO A 8 1/2" WIDTH. (SEE DETAIL B.)

    FOR CUL–DE–SAC STREETS, A 9" METRO SIZE BLADE SHALL BE USED WITH THE BLOCK NUMBERS DISPLAYED BENEATH THE STREET NAME. LETTERING TO BE THE SAME AS FOR THE 6 3/4" SIZE BLADE, EXCEPT THAT THE BLOCK NUMBER INFORMATION SHALL BE 4" SERIES "C".

    IF BLOCK NUMBERS ARE NOT SHOWN ON THE PLANS THE CONTRACTOR SHALL CONTACT THE TRAFFIC ENGINEER AT 268–4501 PRIOR TO MANUFACTURING THE SIGN.

    SHOP DRAWINGS OF LAYOUT FOR SNS SHALL BE SUBMITTED TO THE TRAFFIC ENGINEERING DIVISION OF THE CITY OF WICHITA FOR APPROVAL PRIOR TO FABRICATION. THE FINISHED SIGNS AS SUPPLILED SHALL BE OF GOOD APPEARANCE, FREE FROM RAGGED EDGES, CRACKS SCALES OR BLISTERS AND SHALL BE CLEAN–CUT. SIGNS SHALL BE PACKED IN SUCH MANNER AS TO PREVENT DAMAGE OR DEFACEMENT DURING SHIPMENT OR STORAGE.
13. PERMANENT TRAFFIC CONTROL AND SNS: PERMANENT TRAFFIC CONTROL AND SNS SHALL BE MEASURED AND PAID FOR AT THE LUMP SUM PRICE FOR SIGNING. THE PAYMENT AS SET FORTH ABOVE SHALL BE CONSIDERED FULL COMPENSATION FOR ALL EXCAVATION, BACKFILLING. POSTS, ANCHORS, FASTENERS, MATERIALS, LABOR, TOOLS AND SUBSIDIARYS NECESSARY TO COMPLETE THIS WORK.

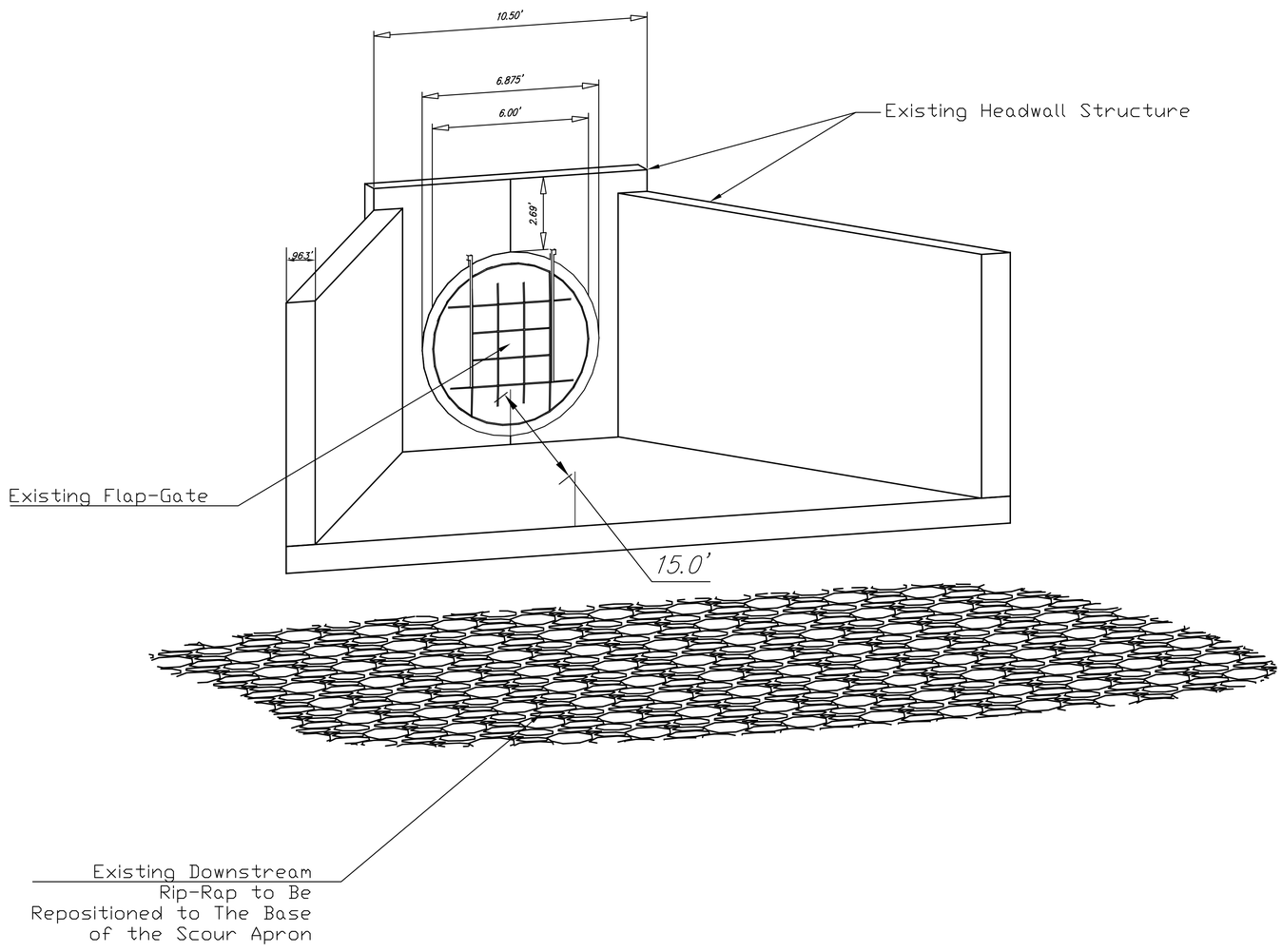
SIGNING DETAILS

SCALE: NONE
DRAWN BY: TM
REVISED BY: AR

APPROVED BY

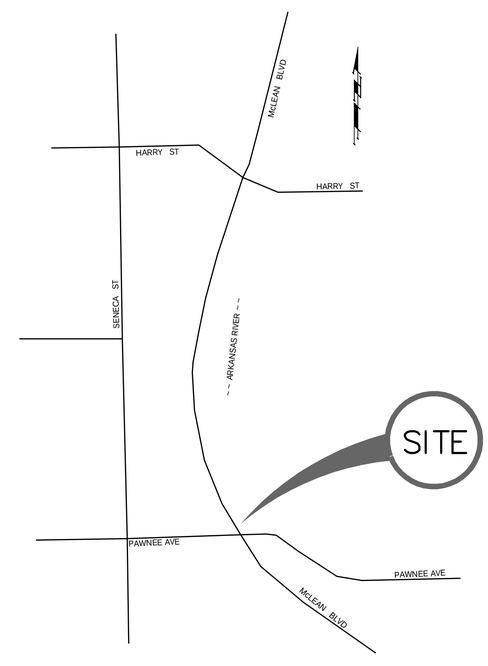
DATE: JUNE 1993
REVISED: APRIL 2008

CITY OF WICHITA
DEPARTMENT OF PUBLIC WORKS
PAUL GUNZELMAN, TRAFFIC ENGINEER, ENGINEERING DIVISION



GENERAL NOTES

1. The Contractor Shall Remove and Dispose of the Existing Iron Flap Gate.
2. The Surface to Which the Flap Gate is to be Attached Must be Cleaned, Free of Debris and all Obtrusions, and Ground Smooth. Surface Preparations Shall be SUBSIDIARY to the Flap Gate Bid Item.
3. The Contractor Shall Install and Seal the New Frame to the Headwall per the Manufacturer's Specifications.
4. The Contractor Shall Install the New Flap Gate per the Manufacturer's Specifications.
5. The Contractor Shall Retrieve and Reposition the Existing Rip-Rap that has Moved Below the Existing Scour Apron.
6. The Contractor Shall Note that Water Drains Continuously out of the Iron Flap Gate and that Wet Working Conditions will Need to be Taken into Account.
7. New Flap Gate Shall be Supplied by PLASTI-FAB Composite Flap Gate or Approved Equal.



VICINITY MAP

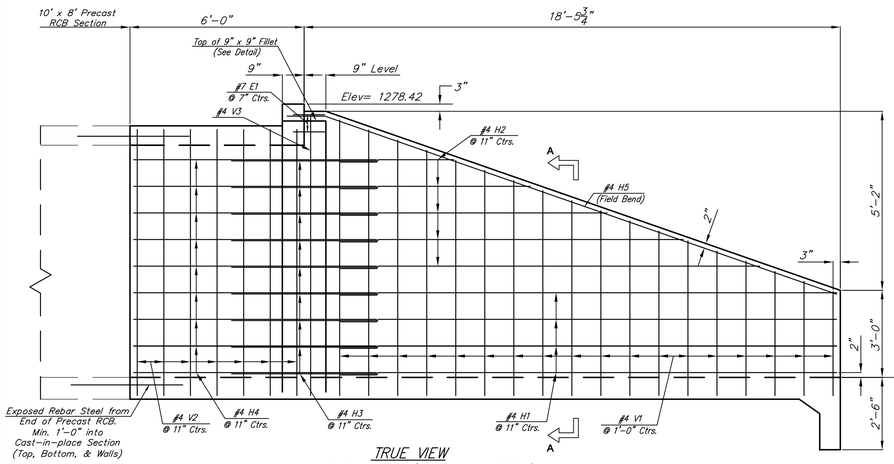
Drawing File: E:\Projects\Meridian Drainage\Details\SWS Flap Gate Replacement.dwg

December 2012

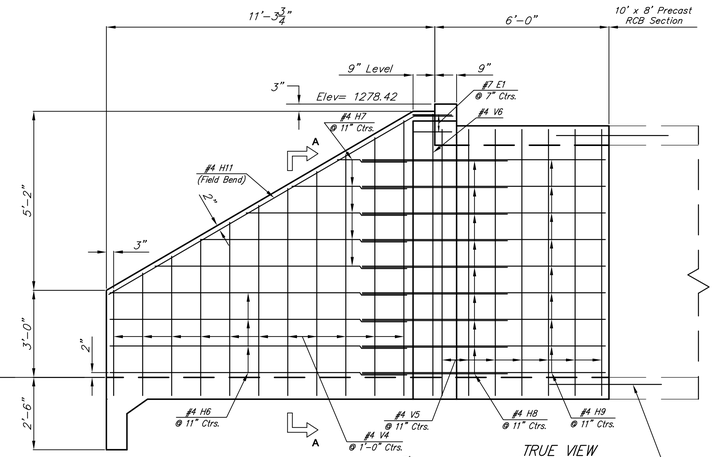
Design: JFB Drawn: JDM Approved: TPV Scale: NOTED	Project No. 0802-E032 CAPITAL IMPROVEMENT PROJECT DETAILS for SWS FLAP GATE REPLACEMENT at the PAWNEE BRIDGE DETAILS MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT	Baughman Company , P.A. 315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149 ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

SHEET

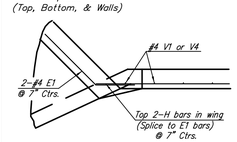
OF



TRUE VIEW
SOUTH WALL (LOOKING NORTH)

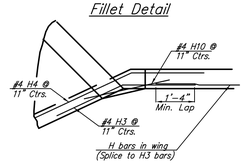


TRUE VIEW
NORTH WALL (LOOKING SOUTH)

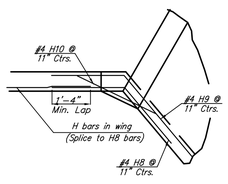


DETAIL OF WINGWALL
TO RCB HEADWALL
(Plan View)

Fillet Detail

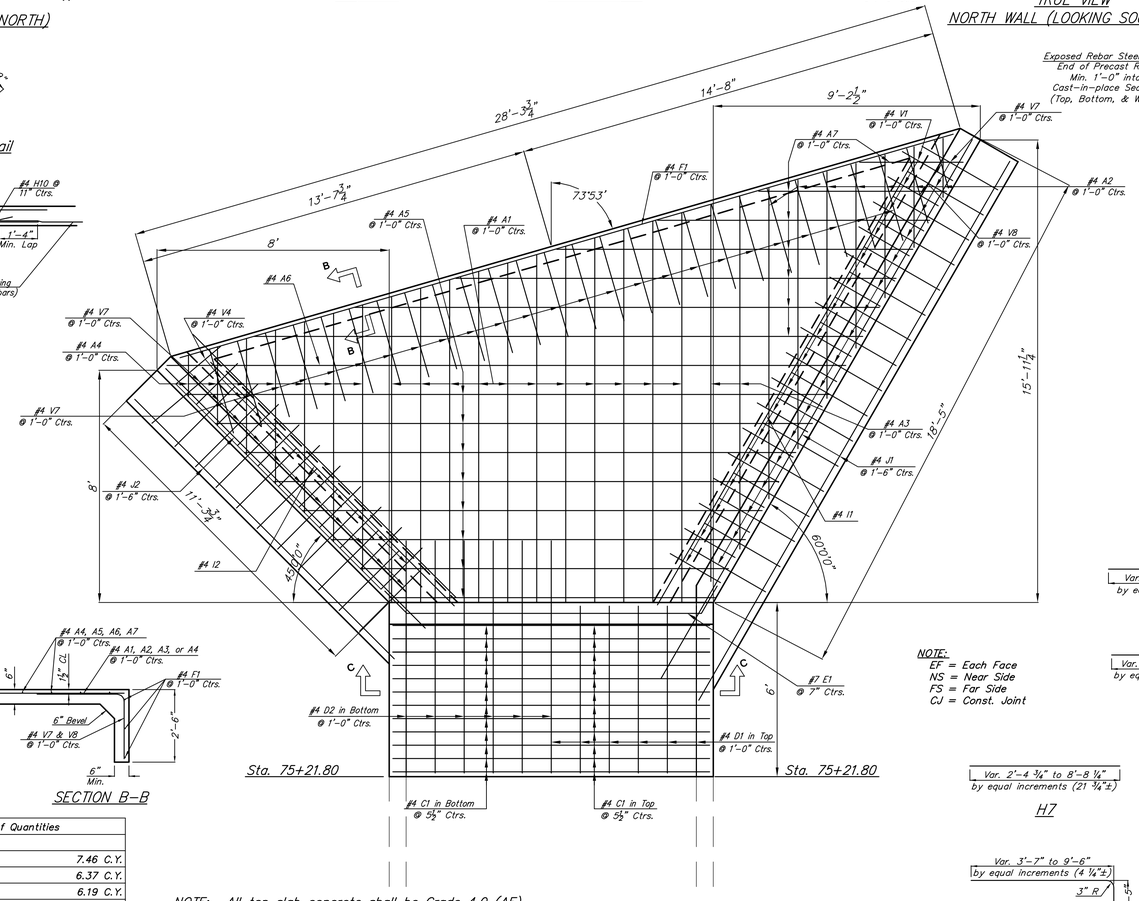


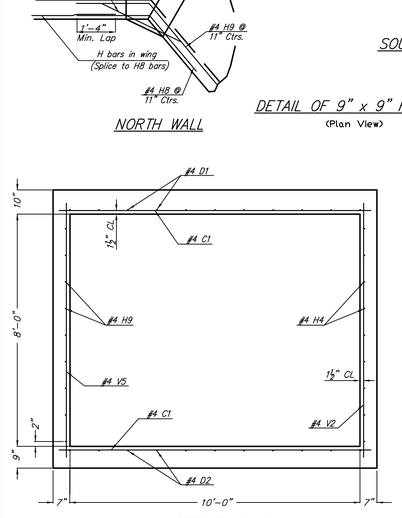
SOUTH WALL



NORTH WALL

DETAIL OF 9" x 9" FILLET
(Plan View)





SECTION C-C

SECTION B-B

Summary of Quantities	
Concrete (Grade 4.0)	
Wingwalls	7.46 C.Y.
Apron	6.37 C.Y.
Box	6.19 C.Y.
Soil Saver	0.0 C.Y.
Reinforcing Steel	1,738.7 Lbs
Welded Wire Fabric	0.0 Lbs

NOTE: All top slab concrete shall be Grade 4.0 (AE).
All Top Slab and Hubguard reinforcement steel shall be epoxy coated.

NOTE:
EF = Each Face
NS = Near Side
FS = Far Side
CJ = Const. Joint

GENERAL NOTES

LOADING: HS20-44 AASHTO Specifications, 1983 Edition.

UNIT STRESSES: Grade 4.0 Concrete; f'c = 4,000 p.s.i.
Reinforcing Steel; fy = 60,000 p.s.i.

CONCRETE: Grade 4.0 Concrete shall be used throughout. Bevel all exposed edges with a 3/4 inch triangular moulding. Where Grade 4.0 Concrete (AE) is specified, it shall be placed in the top slab above the Construction Joint.

REINFORCING: All reinforcing shall conform to ASTM A615, Grade 60. Welded wire fabric shall conform to ASTM A185. Wire fabric shall be electrically welded and shall be composed of 6x6-W1.4xW1.4 welded wire fabric and shall be classified as pounds of reinforcing. All dimensions relative to reinforcing steel shall be to centerline of bar unless otherwise noted.

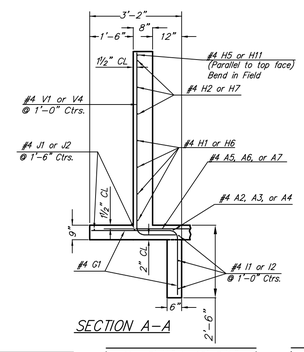
SEAL COURSE: A Seal Course may be required. The Seal Course shall be unreinforced Concrete (Commercial Grade) to a minimum depth of 3 inches or as determined by the Engineer.

FOUNDATION AND BACKFILL MATERIAL: Soils judged as high plasticity clays, fat clays, expansive clays, or organic clays are unsuitable for foundation and/or backfill material for wingwalls and will not be used. Where these conditions exist, Foundation Stabilization and/or Granular Backfill (Wingwalls) shall be used as determined by the Engineer. See "RCB Auxiliary Details" sheet for additional details.

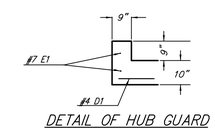
QUANTITIES: The quantities shown in the Culvert Summary include apron and/or soil saver quantities when their construction is required by the plans.

GRANULAR BACKFILL (WINGWALLS): Special backfill procedures may be required at the direction of the Engineer. See Auxiliary Details Sheet.

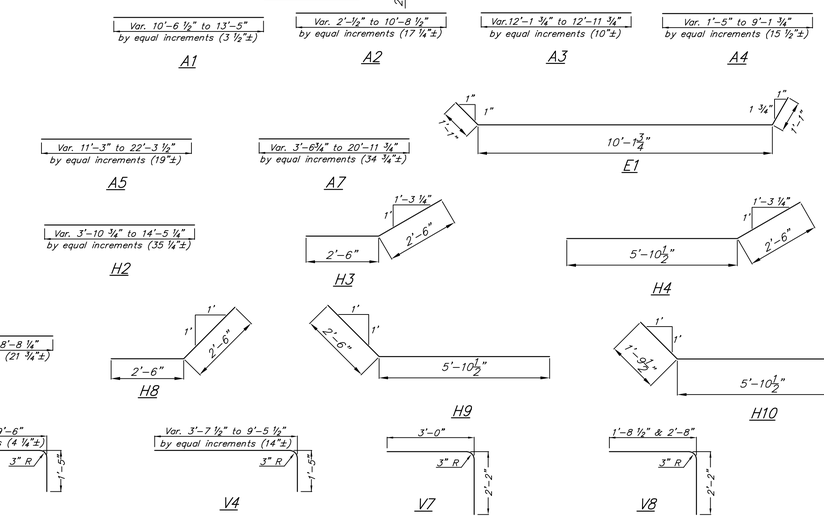
STRIKE LINE: Wingwalls and that portion of the RCB outside the Strike Line shall be constructed level. See wingwall detail sheet.



SECTION A-A



DETAIL OF HUB GUARD



Bar Schedule	#4 A1	#4 A2	#4 A3	#4 A4	#4 A5	#4 A6	#4 A7	#4 C1	#4 D1	#4 D2	#7 E1	#4 F1	#4 H1	#4 H2	#4 H3	#4 H4	#4 H5	#4 H6	#4 H7	#4 H8	#4 H9	#4 H10	#4 I1	#4 I2	#4 J1	#4 J2	#4 V1	#4 V2	#4 V3	#4 V4	#4 V5	#4 V6	#4 V7	#4 V8
											△																						△	
Number	11	7	2	7	8	1	7	26	11	11	2	3	4	5	9*	9	1	4	5	9*	9*	18	3	3	2	2	18	7	1	11*	7	1	53*	2*
Length	*	*	*	*	*	23'-6 1/2"	*	10'-11"	5'-9"	8'-0"	12'-3 1/4"	27'-8 3/4"	17'-1"	*	5'-0"	8'-4 1/2"	19'-11 1/4"	10'-2 3/4"	*	5'-0"	8'-4 1/2"	3'-0"	17'-8"	11'-11"	21'-5"	12'-8"	*	9'-2"	9'-8"	*	9'-2"	9'-2"	9'-2"	*

△ = Epoxy Coated

* See Bending Diagram

Drawing File: F:\eng\Meridian Drainage\Detail\Wingwall

December 2012

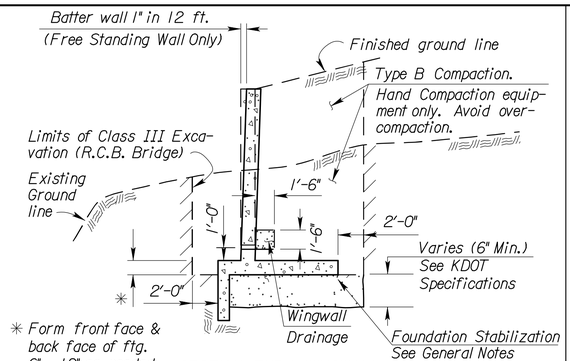
Design: TPV
Drawn: TPV
Approved: TPV
Scale: 1"=30'

Project No. 0802-6938
CAPITAL IMPROVEMENT PROJECT
FLARED WINGWALLS Sta. 75+21.80
3 ft. Rise (0° Skew)(1-10 ' X 8')
MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT

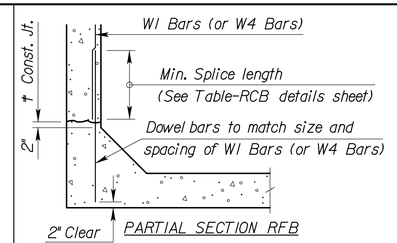
Baughman Company , P.A.
315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149
ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

SHEET
OF

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS		2012	XX	XXX



SECTION THRU WINGWALL

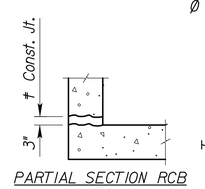


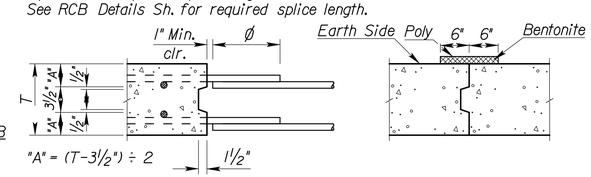
OPTIONAL BAR DETAIL

The Contractor shall have the option of using Dowel Bars to match vertical wall bars as shown, however no allowance will be made for additional steel required for bar laps.

† OPTIONAL COLD JOINT

The Contractor has the option of placing the Lower Horizontal Construction Joint at the top of the slab for RCB's or at the top of the fillet for RFB's



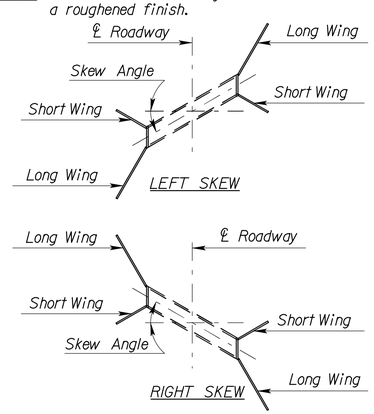


VERTICAL CONSTRUCTION JOINTS

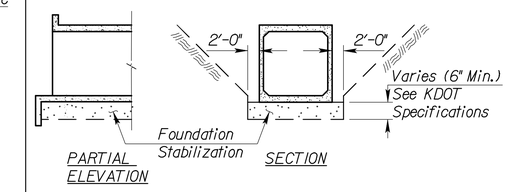
NOTE: Vertical construction joints shall be perpendicular to the longitudinal axis of the RCB and shall be placed at any location as needed for construction and as approved by the Engineer.

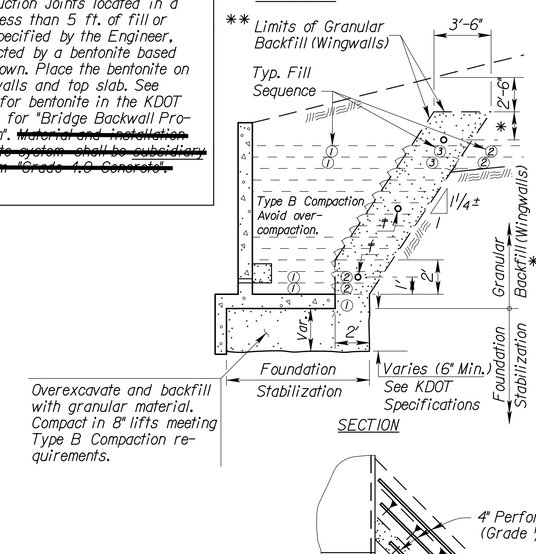
NOTE: Horizontal construction joints shall be a roughened finish.

NOTE: Barrel Construction Joints located in a median with less than 5 ft. of fill or at locations specified by the Engineer, shall be protected by a bentonite based system as shown. Place the bentonite on the exterior walls and top slab. See requirements for bentonite in the KDOT Specifications for "Bridge Backwall Protection System". ~~Material and installation of the bentonite system shall be subsidiary to the bid item "Grade 4.0 Concrete".~~



PLAN VIEW SKEWED R.C.B.

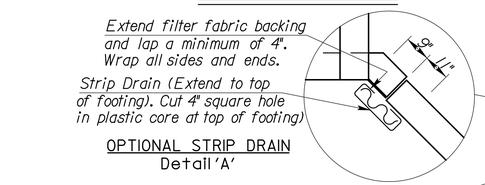




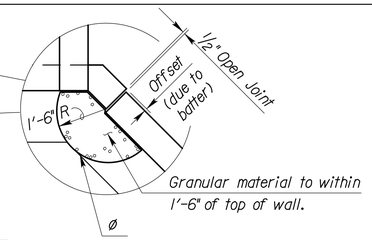
✳ Omit Drain Pipe when distance is less than 2'-0".

† 4" Perforated Pipe (Install ea. 4' in Elev.)

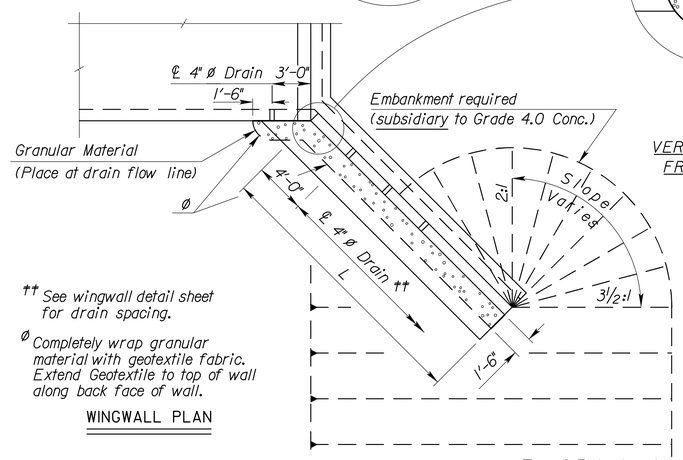
✳✳ NOTE: As an alternative, all backfill for the wall (within 2'-6" of finish grade) may be granular backfill material. Measurement for quantity shall be to the same limits as listed in the General Notes.



OPTIONAL STRIP DRAIN
Detail 'A'



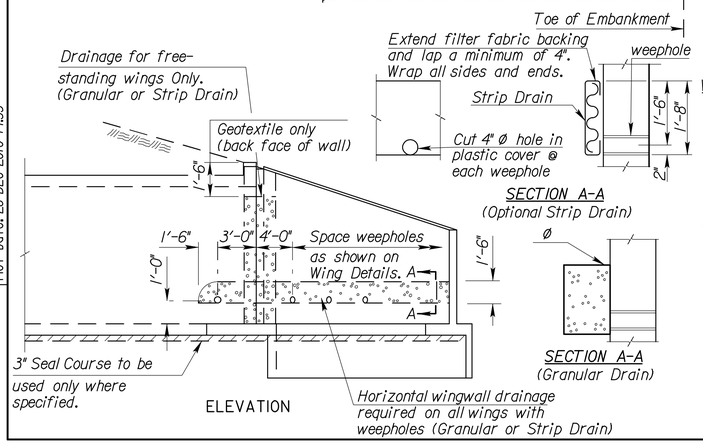
VERTICAL WINGWALL DRAINAGE FOR FREE-STANDING WINGWALLS ONLY

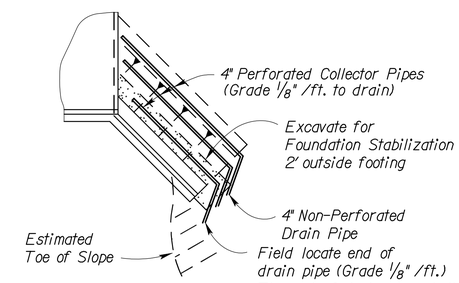


†† See wingwall detail sheet for drain spacing.

Ø Completely wrap granular material with geotextile fabric. Extend Geotextile to top of wall along back face of wall.

WINGWALL PLAN





PLAN

GRANULAR BACKFILL AND FOUNDATION STABILIZATION

GENERAL NOTES

Wingwall Drainage:

1. All wingwalls with weepholes shall have horizontal wingwall drainage as shown. Free-standing wingwalls shall also have the vertical wingwall drainage. Strip drains may be used in lieu of aggregate. See KDOT Specifications for "Abutment Strip Drains" for strip drain requirements.
2. ~~Construction and materials for wingwall drainage, including weepholes, geotextile fabric, granular material, and strip drain shall be subsidiary to the bid item "Grade 4.0 Concrete".~~ Granular material for wingwall drainage shall conform to the requirements of UD-1. Weepholes may be a formed opening or corrugated polyethylene tubing.

Wingwall Foundation Stabilization:

The Foundation Stabilization quantity has been calculated to the limits shown in the Section Thru Wingwall. The depth may be increased by the Engineer. Use Foundation Stabilization on all wingwalls unless founded on rock or granular material.

Seal Course:

1. Seal Course consisting of 3" min. of Commercial Grade Concrete shall be constructed to the limits directed by the Engineer. No reinforcing in the floor of the slab or wall footing shall be placed until the Seal Course has gained sufficient strength to permit working upon it without injury.

GENERAL NOTES

Foundation Stabilization:

The depth of Foundation Stabilization may be increased by the Engineer. The Contractor may underrun Foundation Stabilization under the barrel if founded on firm material and with the Engineer's approval. Use Foundation Stabilization on all wingwalls unless founded on rock or granular material.

Granular Backfill (Wingwalls):

1. In locations where the material behind the wingwall consist of soils judged as high plasticity clays, fat clays, expansive clays or organic clays, Granular Backfill (Wingwalls) shall be used. Granular Backfill construction may be used separately or combined with Foundation Stabilization as directed by the Engineer.
2. ~~Measurement for the bid item "Granular Backfill (Wingwalls)", shall be measured in Cubic Yards to the theoretical limits as shown. Drainage pipe, rodent screens, and excavation shall be subsidiary to the bid item "Granular Backfill (Wingwalls)".~~
3. Material for Granular Backfill (Wingwalls) shall conform to the requirements of UD-1 or BD-1. Drainage Pipe shall be corrugated polyethylene tubing conforming to KDOT Specifications.

NO.	DATE	REVISIONS	BY	APP'D
3	7/14/08	Change Type 'C' Compaction to 'B'	JPJ	KFH
2	10/16/06	Add Found. Stab. Details and Notes	JPJ	KFH
1	3/2/06	Optional Construction Joint	JPJ	KFH

KANSAS DEPARTMENT OF TRANSPORTATION

RCB
AUXILIARY DETAILS
(LFD)

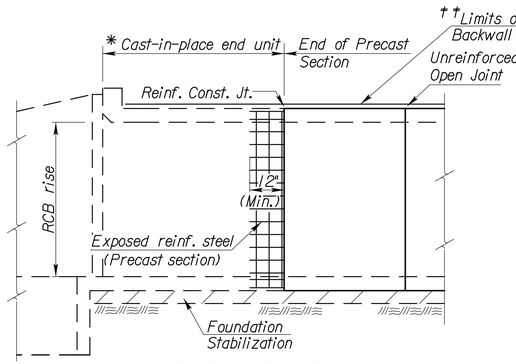
~~BR020A~~

FHWA APPROVAL		11/01/06	APP'D		KENNETH F. HURST
DESIGNED	RAM	DETAILED	RDR	QUANTITIES	CADD
DESIGN CK.	RRR	DETAIL CK.	RRR	QUAN.CK.	CADD CK.

Std. Base File: br020.dgn
Plotted By: rlong | Plot Location: Bridge Design
File: br020a.dgn (br020a)
Plot Date: 28-DEC-2010 14:55

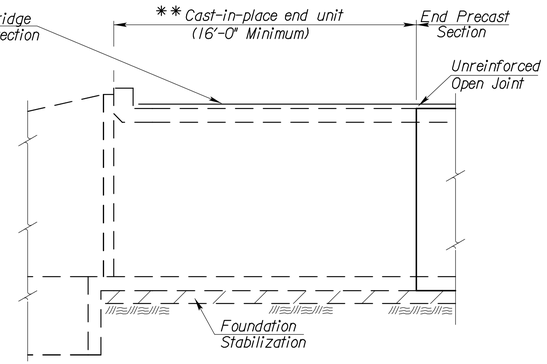
CADconform Certify This File

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS		2012	XX	XXX



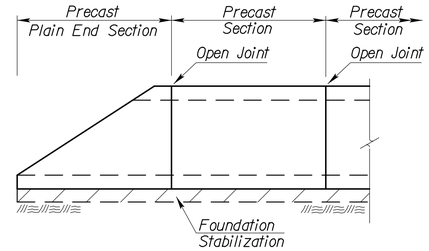
ELEVATION AT HEADWALL

* Minimum barrel length of cast-in-place end unit shall equal the RCB rise or 8'-0", whichever is less. This length can be used when the joint between the cast-in-place end unit and the precast section is reinforced as shown.



ELEVATION AT HEADWALL

** Minimum barrel length of cast-in-place end unit shall be 16'-0" when using an unreinforced open joint at the end of the precast section.



ELEVATION AT PRECAST END SECTION

(Precast End Sections are permitted where straight wings are shown in the plans or at the downstream end for single cell RCB with a rise of six feet or less.)

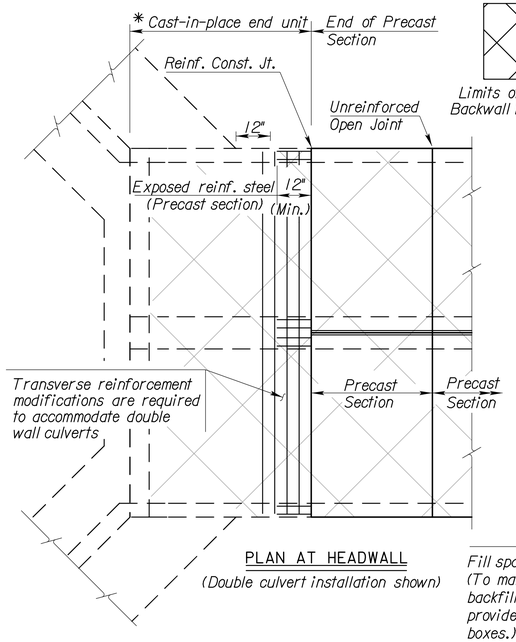
NOTE: See "Bridge Excavation" sheet, (Std. No. BR100), for excavation details and basis of payment.

NOTE: Minimum length of precast section shall be 4'-0".

NOTE: A single cell box of equivalent area may be substituted for a double cell box with cell spans less than or equal to 6'-0". Any revision in the cell height from that shown on the plans will not be permitted, unless approved by the Engineer. Two single cell boxes may be substituted for a double cell box, when approved by the Engineer.

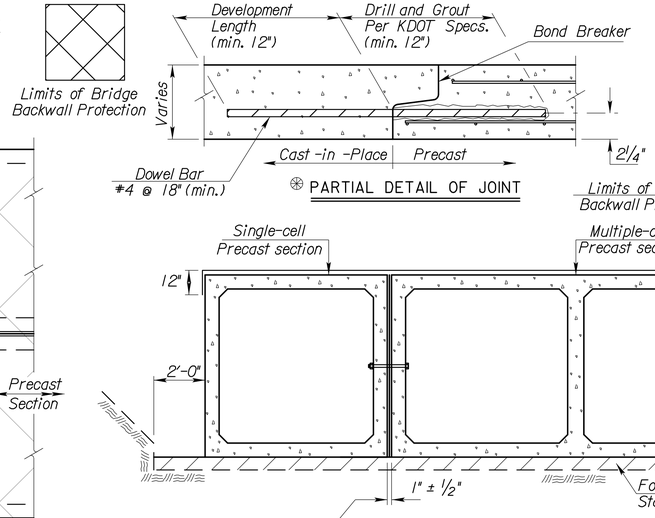
NOTE: See respective RCB Standard Sheets for cast-in-place details.

NOTE: When the fill height is 2'-0" or less "Bridge Backwall Protection" is required.



PLAN AT HEADWALL

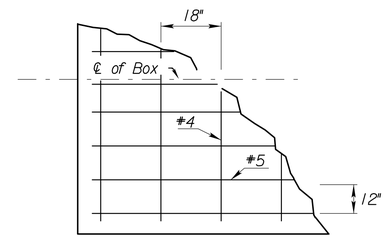
(Double culvert installation shown)



⊛ PARTIAL DETAIL OF JOINT

⊛ Bridge Backwall Protection not shown for clarity

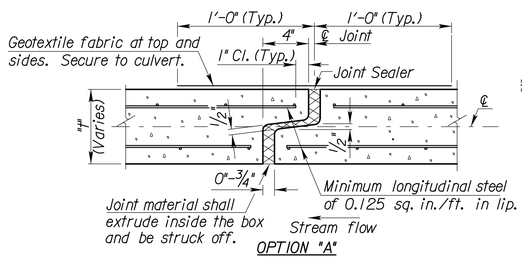
TYPICAL INSTALLATION DETAILS



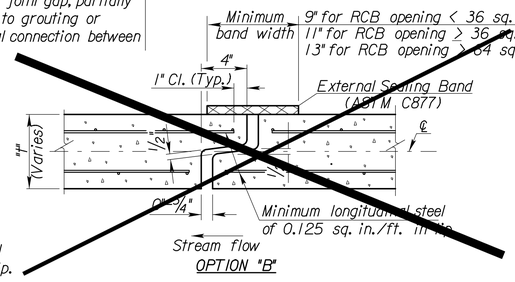
CAST IN PLACE DISTRIBUTION SLAB

(Partial plan of reinforcement)

Fill space between boxes with grout. (To maintain proper joint gap, partially backfill boxes prior to grouting or provide a mechanical connection between boxes.)

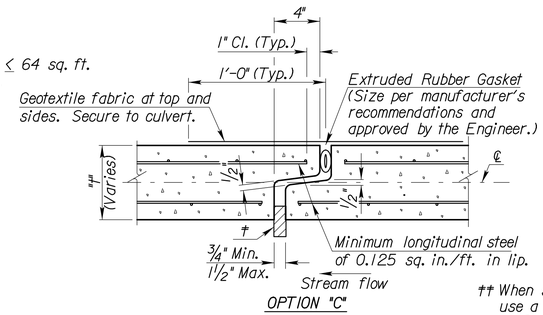


OPTION "A"



OPTION "B"

⊛ OPEN JOINT DETAIL



OPTION "C"

† Insert temporary, ¾"-1" wide, hardwood wedges to prevent over-compressing gasket.

†† When shown on the shop details use a Bridge Backwall Protection conforming to Section 1700 of the KDOT Specifications.

GENERAL NOTES

(All Items on this sheet are subsidiary)

PRECAST BOX CULVERTS: If precast boxes are specified, construct them at the locations shown in the plans and according to the requirement shown on this sheet. When approved by the Engineer, precast box culverts may be used in lieu of cast-in-place box culverts. If the Contractor chooses the precast option, use the cast-in-place quantities as the cost basis. This cost includes all labor equipment, material and incidentals necessary to complete the installation.

Unless otherwise approved by the Engineer, use cast-in-place collars at horizontal and vertical changes in RCB alignment. Use cast-in-place end sections and wingwalls except as noted on this sheet. The Engineer may require cast-in-place sections at junctions of drainage structures.

Cast-in-place concrete work shall conform to the requirements of the KDOT Specifications and KDOT's 'Guidelines for Structural Design and Detail of Reinforced Concrete Box Culverts'. Use Grade 4.0 concrete and Grade 60 reinforcing steel conforming to ASTM A615 for cast-in-place construction.

Cast-in-place box sections shall have member thicknesses and reinforcement not less than the RCB Standard from the original design. Connections between the cast-in-place and precast members shall be drilled and grouted according to details shown on this sheet. When the wall thicknesses differ between the cast-in-place and precast, transition at a 4:1 without reducing the box opening size. See KDOT Specifications for further requirements.

SPECIFICATIONS: Single-cell Precast Concrete Box Culverts shall conform to the requirements of the following specifications except as noted in the KDOT Specifications. Design multiple-cell precast boxes in accordance with the criteria used to develop the single-cell precast boxes. (See Appendix of ASTM Specification C 1577-08, Table 2 and the latest AASHTO LRFD Specifications.)

DISTRIBUTION SLAB: Fill heights less than 2 feet require a distribution slab. Construct the distribution slab over the width of the exterior walls of the barrel to the outside edges of the roadway shoulders. Terminate the slab a minimum of 2 feet from the edge of a barrel segment.

If the fill height is less than or equal to one foot then:

A distribution slab shall be a minimum of 6 inches thick, reinforced with #4 bars spaced at 18 inches, placed perpendicular to centerline of the box and with #5 bars spaced at 12 inches, placed parallel to centerline of the box. Substitution of an equivalent welded wire fabric is acceptable. Place a min. of 3" of granular material between the box and slab.

If the fill height is greater than one foot then:

(Use one of the following options)

1) Use the cast-in-place criteria above.
2) Use precast distribution slabs with same criteria as the cast-in-place above. Center the joints in slabs over the box segments. Provide a minimum of 3 inches of granular material between the box and the slabs.
3) Reinforced concrete pavement (min. 6 inches thick) will meet the requirements of a distribution slab. Reinforce as noted above. Provide a minimum of 3 inches of granular material between the concrete pavement and the precast boxes.
4) Asphalt pavement (min. 6 inches thick) will meet the requirements of a distribution slab. Provide a minimum of 6 inches of granular material between the asphalt and the precast boxes. Also provide a geogrid on top of the granular material.

A special design will be required when the above options are not geometrically possible.

NO.	DATE	REVISIONS	BY	APP'D
5	07-28-11	Added Bridge Backwall Protection	JPJ	TLF
4	03-10-10	Clarification of Extension	JPJ	KFH
3	12-03-09	Revised ASTM / Added Note	JPJ	KFH
2	4-07-09	Clarified Distribution Slab	JPJ	LRR
1	07-31-01	Revised Notes	RAM	KFH

KANSAS DEPARTMENT OF TRANSPORTATION

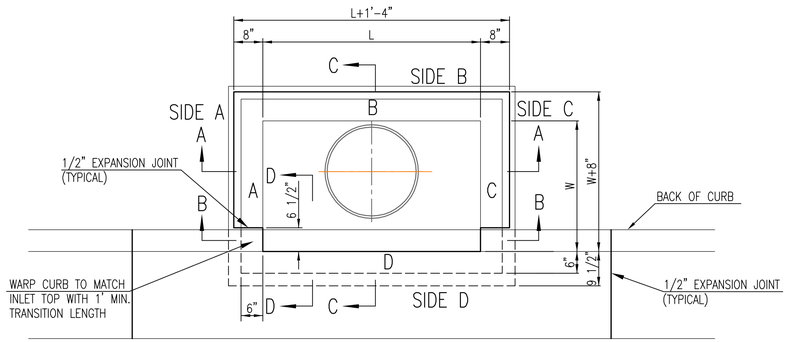
PRECAST CONCRETE BOX CULVERT DETAILS

~~BR031~~

FHWA APPROVAL		9-20-11	APP'D		KENNETH F. HURST
DESIGNED	DETAILED	PF	QUANTITIES		CADD
DESIGN CK.	DETAIL CK.	RAM	QUAN. CK.		CADD CK.

Std. Base File: br031.dgn
Plotted By: rlong
Plot Location: Bridge Design
File: br031.dgn (br031)
Plot Date: 05-OCT-2011 09:34

CADconform Certify This File



TOP VIEW

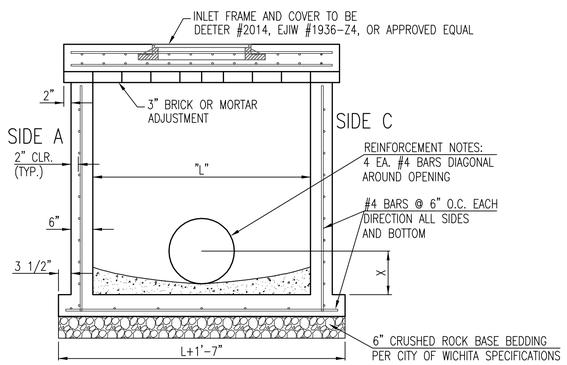
BAR SCHEDULE		
INLET OPENING	B1 BARS	SPACING
5'-0"	#4	4"
10'-0"	#6	3.5"

PRECAST CURB INLET WIDTHS				
W	PRE-CAST TOP SIZE			PIPE DIA.**
	WIDTH	LENGTH	TOP	
3'-0"	W+8"	L+1'-4"	7 1/2"	21" & SMALLER
4'-0"	W+8"	L+1'-4"	7 1/2"	24" & 30"
5'-0"	W+8"	L+1'-4"	7 1/2"	36" & 42"
6'-0"	W+8"	L+1'-4"	7 1/2"	48" & 54"
7'-0"	W+8"	L+1'-4"	7 1/2"	60" & 66"

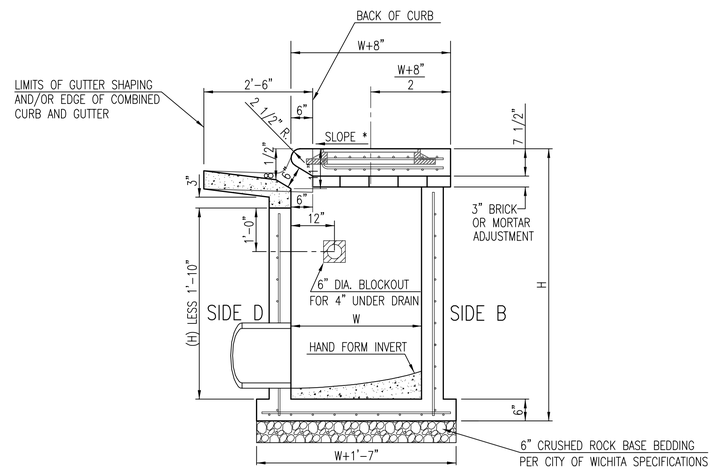
** FOR PIPES PERPENDICULAR TO INLET WALL

GENERAL NOTES

1. CONCRETE TOPS TO BE INSTALLED ON THIN MORTAR CUSHION TO INSURE FULL SUPPORT ALONG BRICK. CONCRETE TOPS MAY BE CAST IN PLACE OR PRECAST. CONCRETE USED FOR INLET CONSTRUCTION SHALL CONFORM TO CITY OF WICHITA SPECIFICATIONS FOR CONCRETE PAVEMENT MIX.
2. CONTRACTOR SHALL HAVE THE OPTION OF CONSTRUCTING 8" BRICK MASONRY WALLS BETWEEN THE CONCRETE INLET BASE AND TOP OF THIS INLET WHEN W=5'-0" AND H=7'-0" OR LESS.
3. INLET INVERT SHALL BE SHAPED WITH 8 SACK SAND MIX CONCRETE TO CREATE FLOW CHANNELS AND TO INCREASE HYDRAULIC EFFICIENCY SUCH THAT THE INLET WILL BE SELF CLEANING BETWEEN ALL INLET AND/OR OUTLET PIPES.
4. THE ENDS OF ALL PIPES INSTALLED IN INLETS SHALL BE CUT OFF FLUSH WITH THE INSIDE FACE OF THE INLET WALL.
5. INLET FRAME AND COVER TO BE DEETER #2014, EJIW #1936 Z4, OR APPROVED EQUAL, SEE SW-303.
6. CONTRACTOR SHALL REMOVE LIFTING HOOKS AFTER INSTALLATION. RECESSES IN INLET WALL SHALL BE GROUTED FLUSH TO THE INLET WALL WITH HYDRAULIC CEMENT AFTER THE INLET IS IN PLACE. LIFTING HOLES THRU THE INLET WALL WILL NOT BE ACCEPTED.

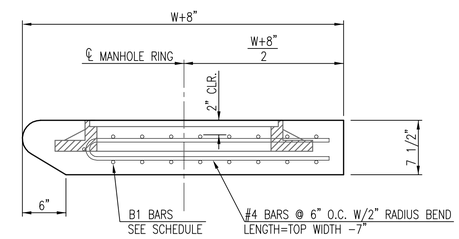


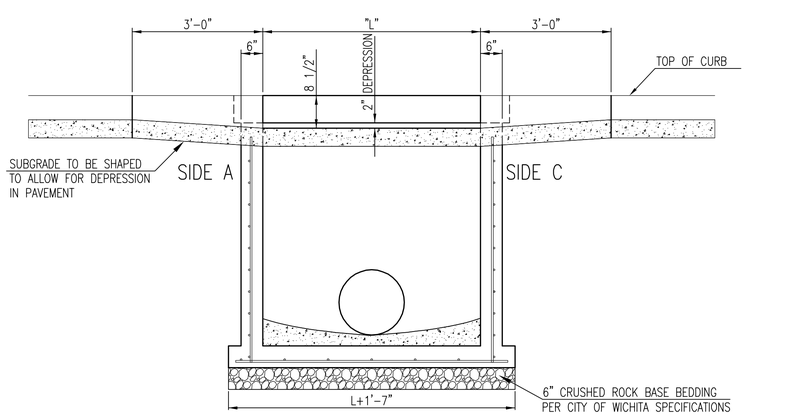
SECTION "A-A"



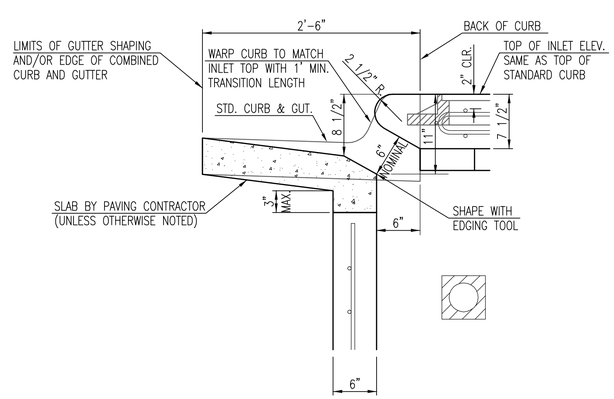
SECTION "C-C"

NOTES:
* SLOPE OF INLET TOP TO MATCH SIDEWALK OR PARKING SLOPES WITHIN LIMITS INDICATED.





SECTION "B-B"



SECTION "D-D"

CITY OF WICHITA
PUBLIC WORKS & UTILITIES ENGINEERING DIVISION

STANDARD TYPE 1
CURB INLET
5'-0" OR 10'-0" OPENING

CITY ENGINEER
Gary Janzen, P.E. Interim City Engineer

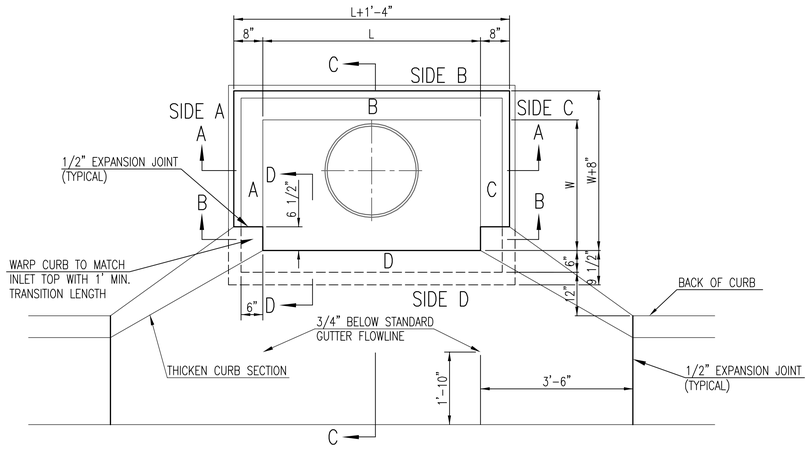
PROJECT NUMBER	OCA NUMBER	DATE
		4/2012

CITY ENGINEER'S OFFICE
CITY HALL - SEVENTH FLOOR
455 NORTH MAIN STREET
WICHITA, KANSAS 67202-1620
(316) 268-4501

DESIGN	DRAWN
Staff	Staff

SHEET
X of XX

E:\Projects\Meridian Drainage\Details\SW-101-Type 1 Inlet L=5' and 10'.dwg_SW-101



TOP VIEW

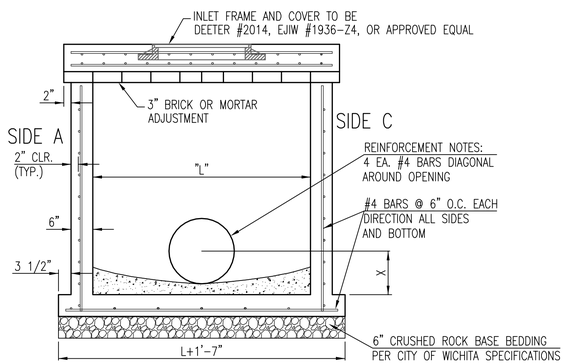
BAR SCHEDULE		
INLET OPENING	B1 BARS	SPACING
5'-0"	#4	4"
10'-0"	#6	3.5"

PRECAST CURB INLET WIDTHS				
W	PRE-CAST TOP SIZE			PIPE DIA.**
	WIDTH	LENGTH	TOP	
3'-0"	W+8"	L+1'-4"	7 1/2"	21" & SMALLER
4'-0"	W+8"	L+1'-4"	7 1/2"	24" & 30"
5'-0"	W+8"	L+1'-4"	7 1/2"	36" & 42"
6'-0"	W+8"	L+1'-4"	7 1/2"	48" & 54"
7'-0"	W+8"	L+1'-4"	7 1/2"	60" & 66"

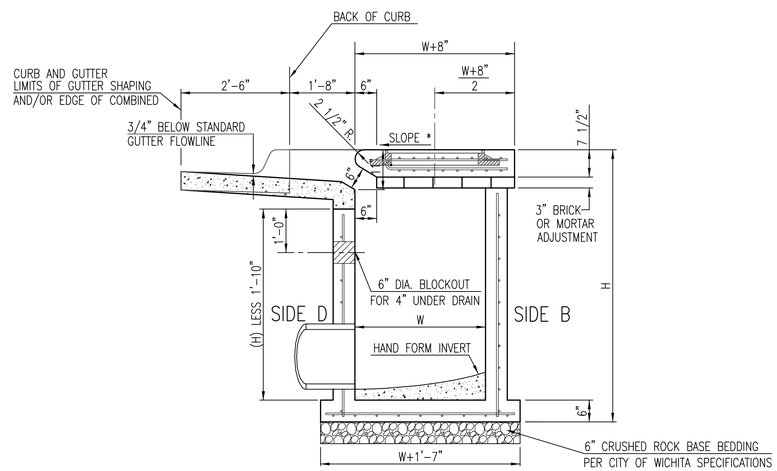
** FOR PIPES PERPENDICULAR TO INLET WALL

GENERAL NOTES

1. CONCRETE TOPS TO BE INSTALLED ON THIN MORTAR CUSHION TO INSURE FULL SUPPORT ALONG BRICK. CONCRETE TOPS MAY BE CAST IN PLACE OR PRECAST. CONCRETE USED FOR INLET CONSTRUCTION SHALL CONFORM TO CITY OF WICHITA SPECIFICATIONS FOR CONCRETE PAVEMENT MIX.
2. CONTRACTOR SHALL HAVE THE OPTION OF CONSTRUCTING 8" BRICK MASONRY WALLS BETWEEN THE CONCRETE INLET BASE AND TOP OF THIS INLET WHEN W=5'-0" AND H=7'-0" OR LESS.
3. INLET INVERT SHALL BE SHAPED WITH 8 SACK SAND MIX CONCRETE TO CREATE FLOW CHANNELS AND TO INCREASE HYDRAULIC EFFICIENCY SUCH THAT THE INLET WILL BE SELF CLEANING BETWEEN ALL INLET AND/OR OUTLET PIPES.
4. THE ENDS OF ALL PIPES INSTALLED IN INLETS SHALL BE CUT OFF FLUSH WITH THE INSIDE FACE OF THE INLET WALL.
5. INLET FRAME AND COVER TO BE DEETER #2014, EJIW #1936-Z4, OR APPROVED EQUAL, SEE SW-303.
6. CONTRACTOR SHALL REMOVE LIFTING HOOKS AFTER INSTALLATION. RECESSES IN INLET WALL SHALL BE GROUTED FLUSH TO THE INLET WALL WITH HYDRAULIC CEMENT AFTER THE INLET IS IN PLACE. LIFTING HOLES THRU THE INLET WALL WILL NOT BE ACCEPTED.

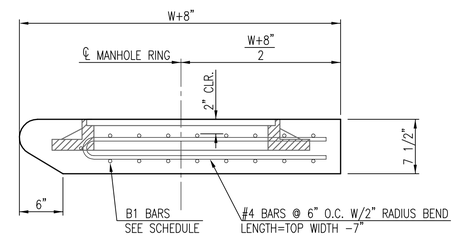


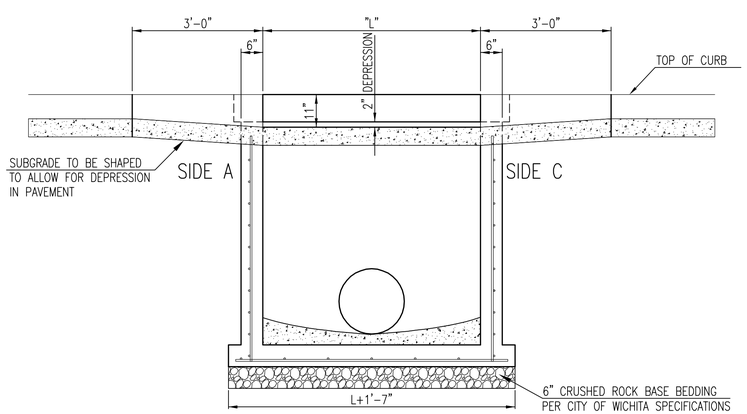
SECTION "A-A"



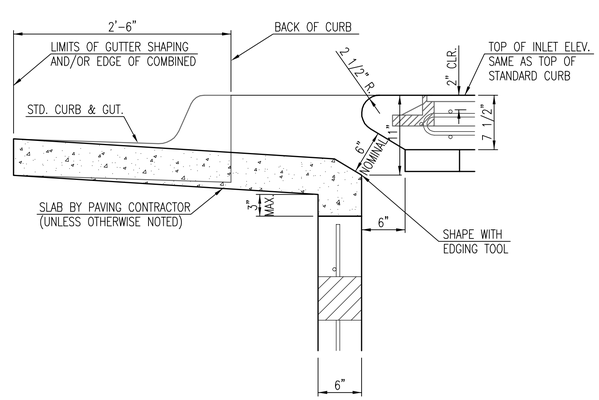
SECTION "C-C"

NOTES:
* SLOPE OF INLET TOP TO MATCH SIDEWALK OR PARKING SLOPES WITHIN LIMITS INDICATED.





SECTION "B-B"



SECTION "D-D"

CITY OF WICHITA
PUBLIC WORKS & UTILITIES ENGINEERING DIVISION

STANDARD TYPE 1A
CURB INLET
5'-0" OR 10'-0" OPENING

CITY ENGINEER
Gary Janzen, P.E. Interim City Engineer

PROJECT NUMBER	OCA NUMBER	DATE
		4/2012

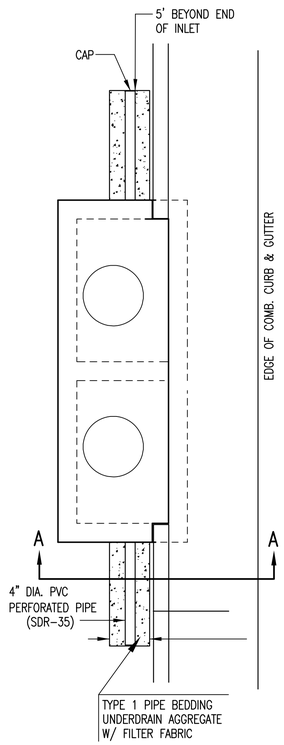
CITY ENGINEER'S OFFICE
CITY HALL - SEVENTH FLOOR
455 NORTH MAIN STREET
WICHITA, KANSAS 67202-1620
(316) 268-4501

DESIGN	DRAWN
Staff	Staff

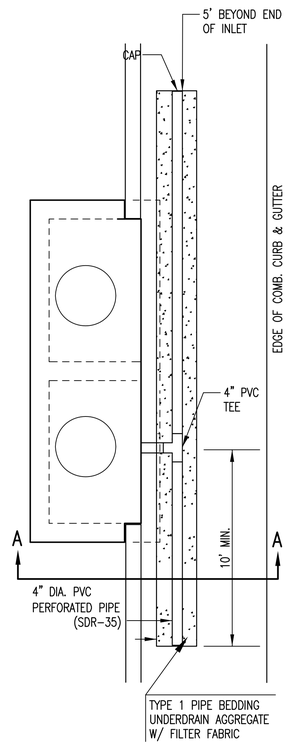
SHEET
X of XX

E:\Projects\Meridian Drainage\Details\SW-103-Type 1A Inlet L=5' and 10'.dwg_SW-103

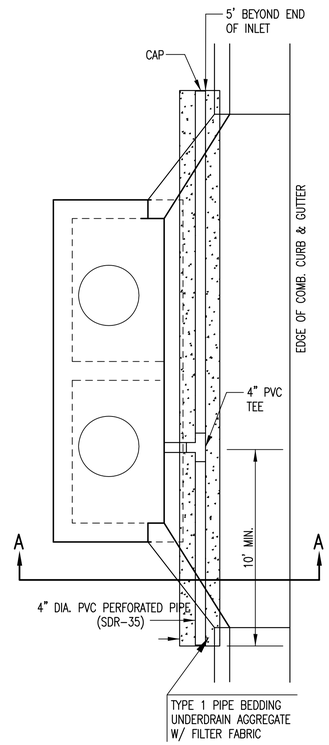
PAVEMENT UNDERDRAIN SHALL BE INSTALLED ON ALL CURB INLETS.



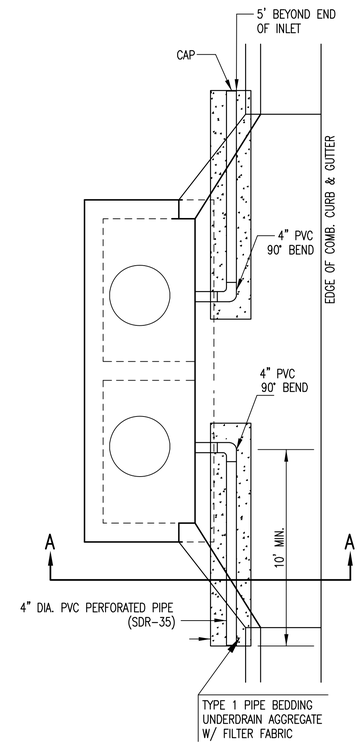
TYPE 1
OPTION 1



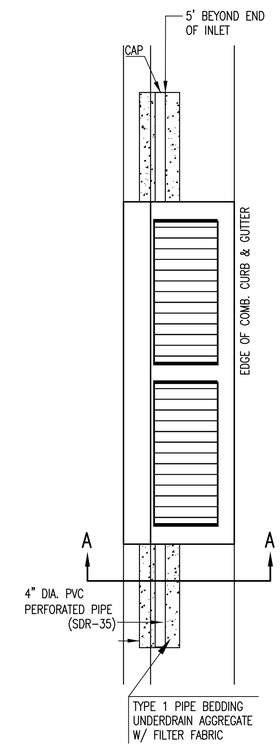
TYPE 1
OPTION 2



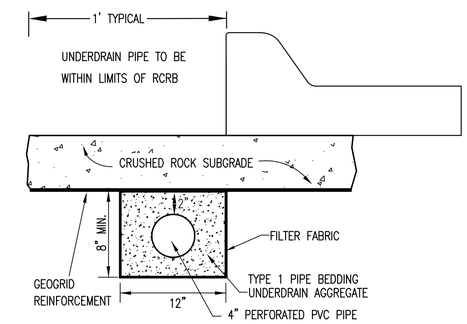
TYPE 1-A INLET
OPTION 1



TYPE 1-A INLET
OPTION 2



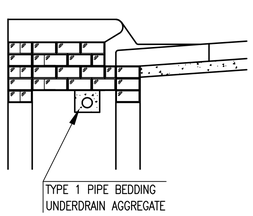
TYPE 2

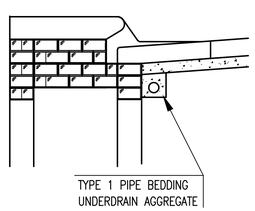


SECTION A-A (TYPICAL)

GENERAL NOTES

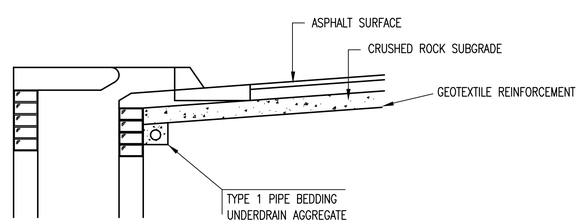
1. PAVEMENT CONTRACTOR WILL BE REQUIRED TO INSTALL SDR 35, 4" PERFORATED DRAIN PIPE AND TEE AS INDICATED IN THE DETAILS.
2. WHEN SWS CONSTRUCTED BY SEPARATE PROJECT, SWS CONTRACTOR SHALL INSTALL SDR 35, 4" DRAIN PIPE STUB ONLY THROUGH WALLS OF CURB INLETS AND CAP TO ALLOW FUTURE CONNECTION OF TEE AND ADDITIONAL DRAIN PIPE BY OTHERS.
2. UNDERDRAIN PIPE SHALL BE PAID AS A MEASURED QUANTITY BY THE LINEAL FOOT.





(MIN. 16 PERFORATIONS PER LIN. FT. @ 1/4" DIA.)
PERFORATIONS TO BE ON BOTTOM HALF

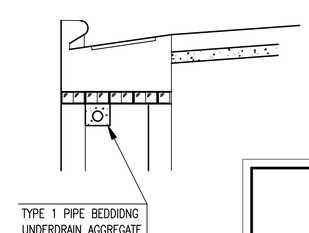
SECTION A-A



SECTION A-A

PAVEMENT UNDERDRAIN DETAIL

BID ITEM TO BE PROVIDED PER 4" PERFORATED UNDERDRAIN PIPE.



SECTION A-A

CITY OF WICHITA
PUBLIC WORKS & UTILITIES ENGINEERING DIVISION

CURB INLET PAVEMENT UNDERDRAIN DETAIL

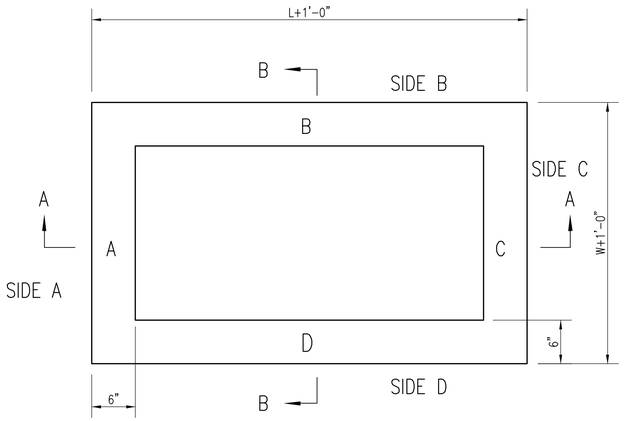
INTERIM CITY ENGINEER
GARY JANZEN, P.E.

PROJECT NUMBER	OCA NUMBER	DATE
XXXXXX	XXXXXX	10/2012

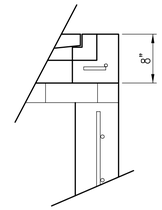
CITY ENGINEER'S OFFICE
CITY HALL - SEVENTH FLOOR
455 NORTH MAIN STREET
WICHITA, KANSAS 67202-1620
(316) 268-4501

SHEET
XX of XXX

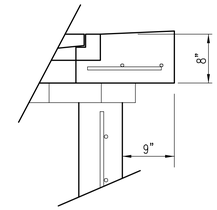
SW-111



TOP VIEW

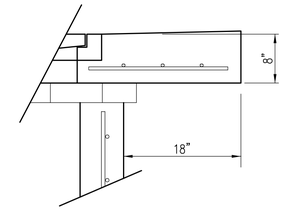


FLUSH STYLE TOP
NO APRON



9" APRON

* APRON TO EXTEND ON ALL 4 SIDES OF INLET.
DESIGNER TO DESIGNATE APRON SIZE.



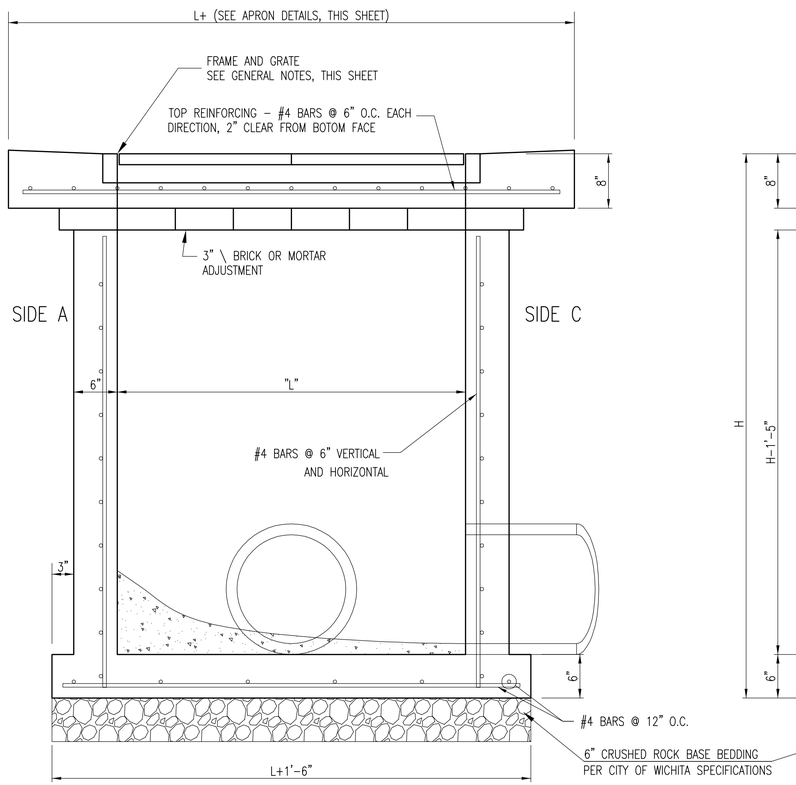
18" APRON

W=2' and L=2' for SINGLE DROP INLET
W=2' and L=4' for DOUBLE DROP INLET

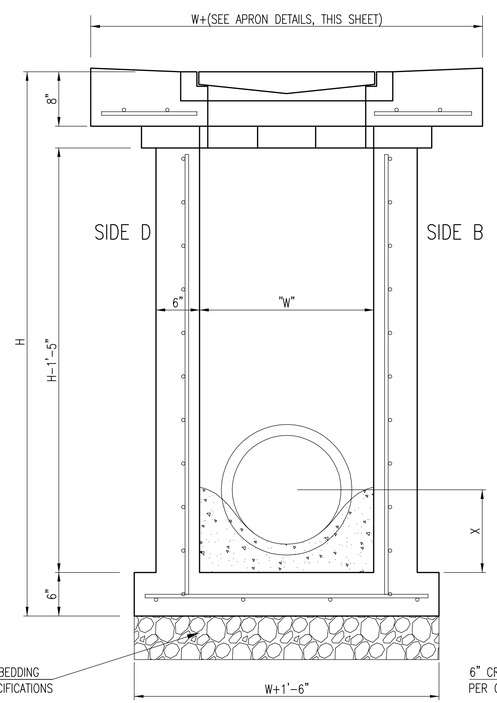
The structure(s) on this detail sheet are designed for HS-20 loading at these specific dimensions only. If larger dimensions are required, the ENGINEER shall provide a project specific structure design for approval by the City Engineer's office.

GENERAL NOTES

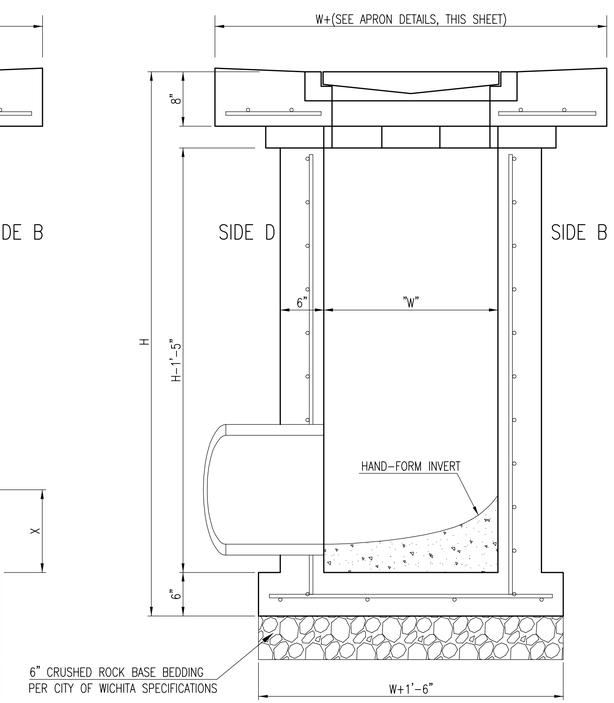
1. GRATE FRAME TO BE INSTALLED ON THIN MORTAR CUSHION TO INSURE FULL SUPPORT ALONG BRICK. CONCRETE USED FOR INLET CONSTRUCTION SHALL CONFORM TO CITY OF WICHITA SPECIFICATIONS FOR CONCRETE PAVEMENT MIX.
2. INLET INVERT SHALL BE SHAPED WITH 8 SACK SAND MIX CONCRETE TO CREATE FLOW CHANNELS AND TO INCREASE HYDRAULIC EFFICIENCY SUCH THAT THE INLET WILL BE SELF CLEANING BETWEEN ALL INLET AND/OR OUTLET PIPES.
3. THE ENDS OF ALL PIPES INSTALLED IN INLETS SHALL BE CUT OFF FLUSH WITH THE INSIDE FACE OF THE INLET WALL.
4. INLET FRAME AND GRATE TO BE DEETER #2433, EJIW #5391-Z1 OR APPROVED EQUAL FOR 2'x2' SINGLE DROP INLET AND DEETER #2434, EJIW #5391 Z3 OR APPROVED EQUAL FOR 2'x4' DOUBLE DROP INLET.
5. CONTRACTOR SHALL REMOVE LIFTING HOOKS AFTER INSTALLATION. RECESSES IN INLET WALL SHALL BE GROUTED FLUSH TO THE INLET WALL WITH HYDRAULIC CEMENT AFTER THE INLET IS IN PLACE. LIFTING HOLES THRU THE INLET WALL WILL NOT BE ACCEPTED.



SECTION "A-A"



SECTION "B-B"
END OUTLET



SECTION "B-B"
SIDE OUTLET

REVISED 05/10/2011 – GJ

CITY OF WICHITA
PUBLIC WORKS & UTILITIES
ENGINEERING DIVISION

SINGLE/DOUBLE
DROP INLET

CITY ENGINEER
Gary Janzen, P.E. Interim City Engineer

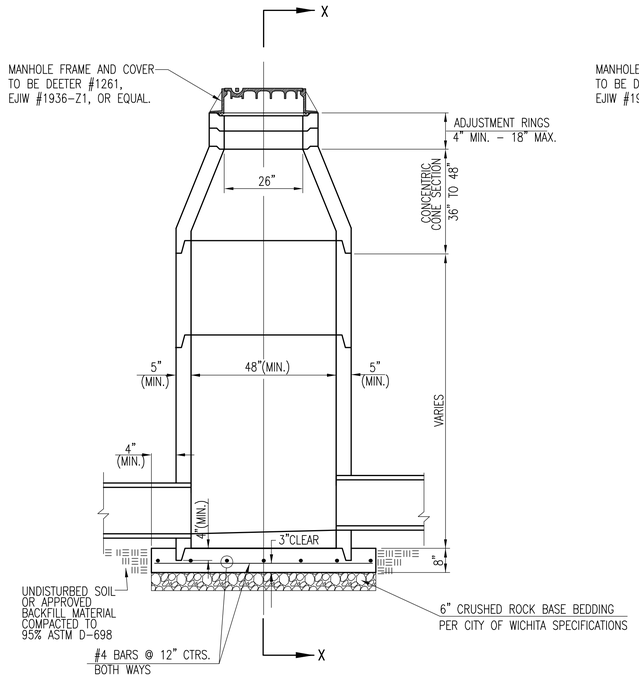
PROJECT NUMBER	OCA NUMBER	DATE
		4/2012

CITY ENGINEER'S OFFICE
CITY HALL - SEVENTH FLOOR
455 NORTH MAIN STREET
WICHITA, KANSAS 67202-1620
(316) 268-4501

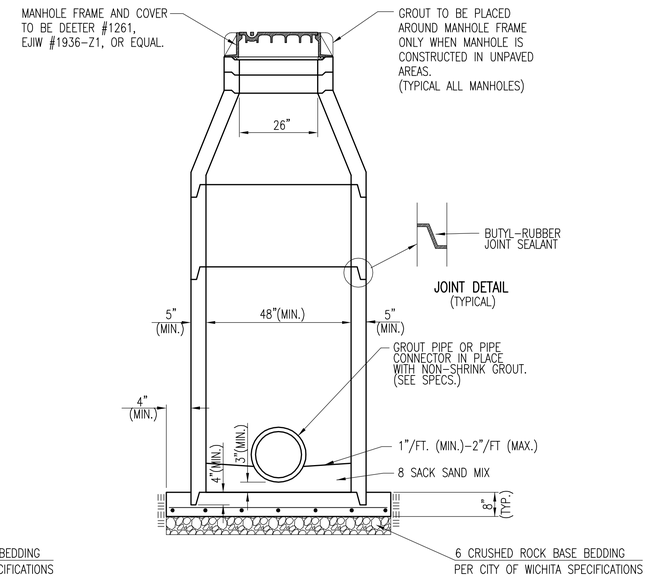
DESIGN	DRAWN
Staff	Staff

SHEET
X of XX

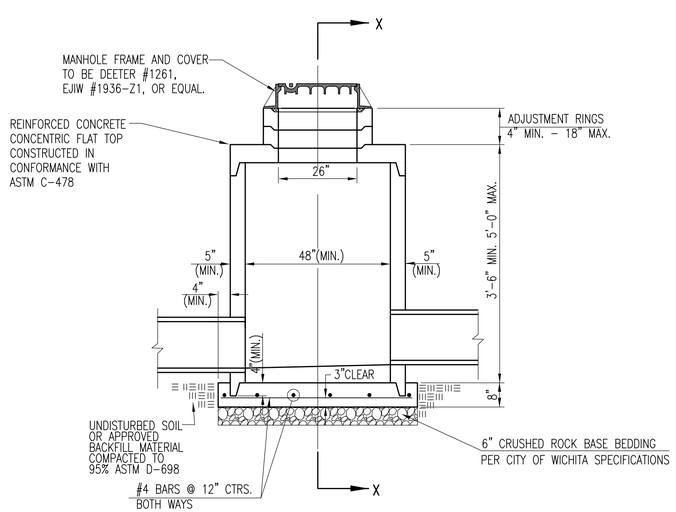
E:\Projects\Meridian Drainage\Details\SW-201-Single-Double Drop Inlet.dwg_SW-201



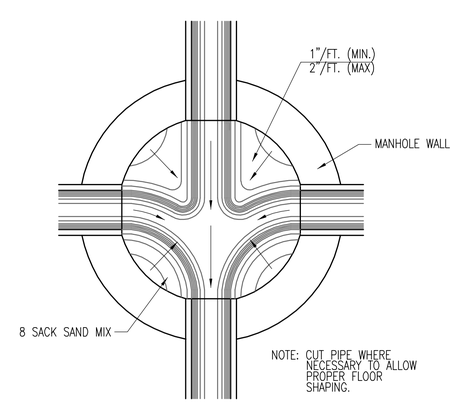
PRECAST
STANDARD MANHOLE
TYPE "A"



SECTION X-X
(TYPICAL)



PRECAST
SHALLOW MANHOLE
TYPE "B"



TYPICAL MANHOLE
FLOOR SHAPING

GENERAL NOTES

1. IF, IN THE OPINION OF THE ENGINEER, THE MANHOLE SUBGRADE APPEARS UNSTABLE, THE CONTRACTOR WILL HAVE THE OPTION TO COMPACT SUBGRADE AS SHOWN OR INCREASE THE THICKNESS OF THE MANHOLE BASE AS DIRECTED BY THE ENGINEER.
2. STEEL REINFORCING WILL BE REQUIRED IN ALL MANHOLE BASES.
3. ALL MANHOLE CONSTRUCTION SHALL BE WATER TIGHT.
4. TOP OF MANHOLE FLOOR SLAB SHALL BE AT LEAST 3 INCHES BELOW THE FLOW LINE OF THE OUTLET PIPE TO INSURE SUFFICIENT MINIMUM THICKNESS OF SHAPED INVERT.
5. ALL PRECAST CONCRETE MANHOLE SECTIONS SHALL CONFORM TO THE LATEST REVISION OF ASTM C-478 AS MODIFIED BY THE SPECIFICATIONS.
6. CONCRETE USED FOR MANHOLE CONSTRUCTION SHALL CONFORM TO CITY OF WICHITA SPECIFICATIONS FOR CONCRETE PAVEMENT MIX.
7. PRECAST MANHOLES SHALL BE SET AT LEAST 4 INCHES INTO MANHOLE BASE.
8. MANHOLES WITH PIPE SIZES 24" AND LARGER SHALL HAVE 5 FOOT INSIDE DIAMETER (MIN.)
9. MANHOLES WITH PRECAST BASES MAY BE USED AT THE CONTRACTORS OPTION. THESE MANHOLES SHALL HAVE AN 8" MINIMUM BASE THICKNESS AND SHALL BE PLACED ON AN 8" MIN. CRUSHED ROCK BASE. PIPES SHALL BE ENCASED WITH CRUSHED ROCK TO AT LEAST 3 FEET FROM THE MANHOLE WALL.
10. CONTRACTOR SHALL REMOVE LIFTING HOOKS AFTER INSTALLATION. RECESSES IN MANHOLE WALL SHALL BE GROUTED FLUSH TO THE MANHOLE WALL WITH HYDRAULIC CEMENT AFTER THE MANHOLE IS IN PLACE. LIFTING HOLES THRU THE MANHOLE WALL WILL NOT BE ACCEPTED.
11. THE ENDS OF ALL PIPES IN MANHOLES SHALL BE CUT OFF FLUSH WITH THE INSIDE FACE OF THE MANHOLE WALL.
12. MANHOLE INVERT SHALL BE SHAPED WITH 8 SACK SAND MIX CONCRETE TO CREATE FLOW CHANNELS AND TO INCREASE HYDRAULIC EFFICIENCY SUCH THAT THE MANHOLE WILL BE SELF CLEANING BETWEEN ALL INLET AND/OR OUTLET PIPES.
13. MANHOLE FRAME AND COVER TO BE DEETER #1261, EJIW #1936-Z1, OR APPROVED EQUAL, SEE SW-303.
14. FOR FLAT GRATED INLET APPLICATION, GRATE TO BE DEETER #1933, EJIW #1205 MDI, OR APPROVED EQUAL.
15. FOR BEEHIVE GRATE APPLICATION, GRATE TO BE DEETER #4495, EJIW #120545, OR APPROVED EQUAL.

CITY OF WICHITA
PUBLIC WORKS & UTILITIES
ENGINEERING DIVISION

PRECAST CONCRETE MANHOLE (STORM SEWER)

CITY ENGINEER
Gary Janzen, P.E. Interim City Engineer

PROJECT NUMBER	OCA NUMBER	DATE
		4/2012

CITY ENGINEER'S OFFICE
CITY HALL - SEVENTH FLOOR
455 NORTH MAIN STREET
WICHITA, KANSAS 67202-1620
(316) 268-4501

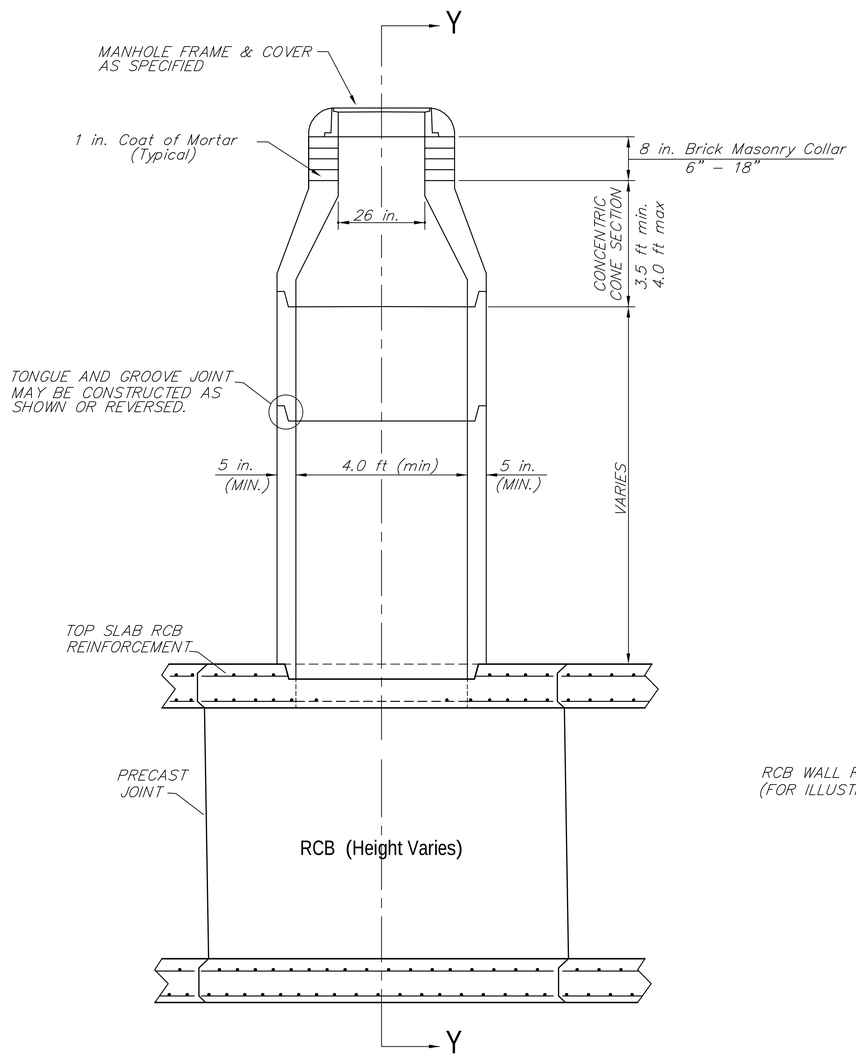
DESIGN	DRAWN
Staff	Staff

SHEET
X of XX

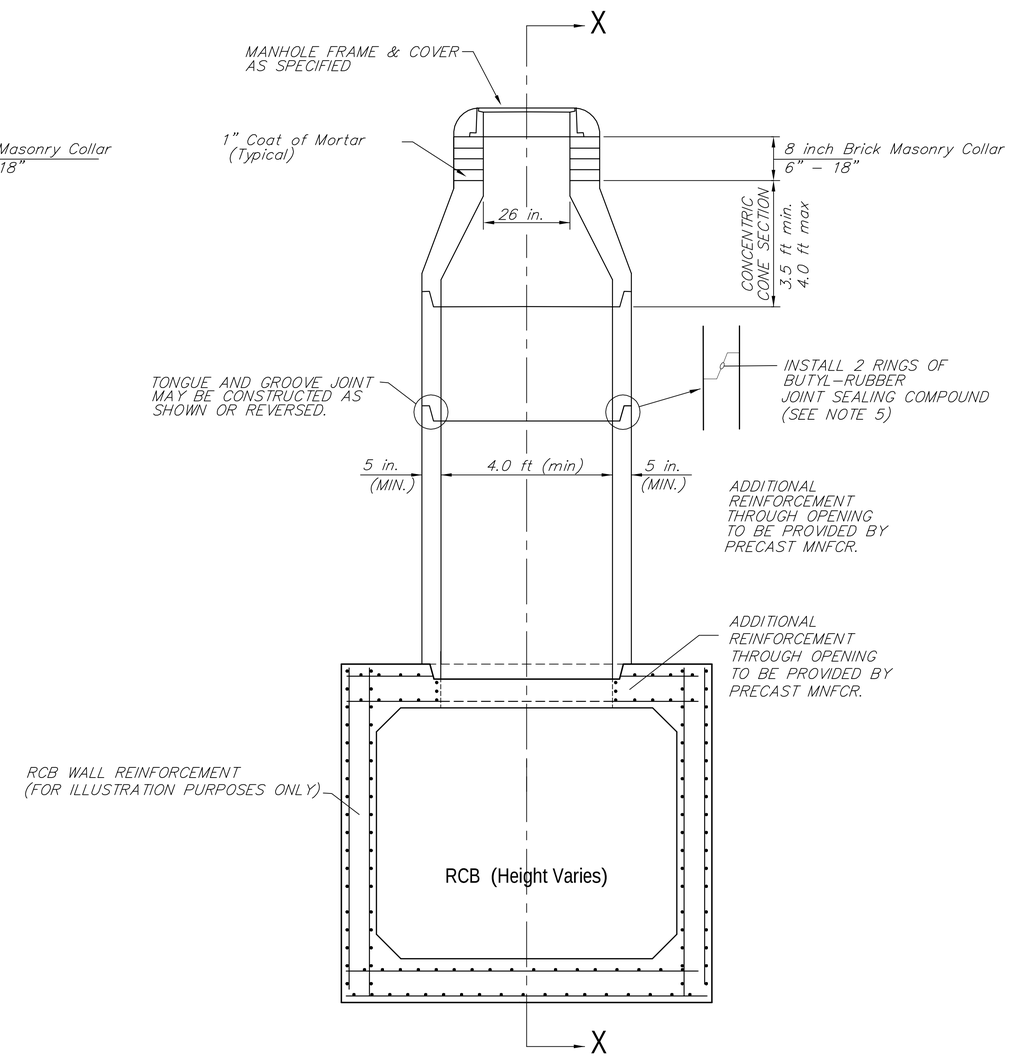
E:\Projects\Meridian Drainage\Details\SW-301-Precast Conc MH.dwg_SW-301

PRECAST MANHOLE LOCATED ALONG THE REINF. CONCRETE BOX SHALL HAVE A TONGUE & GROOVE JOINT AT THE MATING SURFACE OF THE BASE OF THE STACK & THE ADJOINING REINFORCED CONCRETE BOX.

PRECAST MANHOLE DETAIL



SECTION X-X



SECTION Y-Y

GENERAL NOTES

1. ALL PRECAST CONCRETE MANHOLE SECTIONS SHALL CONFORM TO THE LATEST REVISIONS OF A.S.T.M. C-478M AS MODIFIED BY THE SPECIFICATIONS.
2. NON-SHRINK GROUT SHALL BE NON-METALLIC TYPE.
3. ALL INSIDE SURFACES OF THE CONCRETE MANHOLE WHICH WOULD BE EXPOSED TO SEWER GAS SHALL BE COATED WITH 2 COATS TNEMEC SERIES 66 HI-BUILD EPOXOLINE, DRY THICKNESS OF 8 MILS (MIN.) OR APPROVED EQUAL.
4. EXTERIOR MANHOLE WALLS SHALL BE COATED WITH 1 COAT MOBILARMA 633 BITUMINOUS COATING OR APPROVED EQUAL.
5. JOINT SEALING COMPOUND SHALL BE KENT SEAL NO. 2 OR APPROVED EQUAL.
6. LIFTING HOLES SHALL BE FILLED WITH NON-SHRINK GROUT AND THE INTERIOR SURFACE COATED AS SPECIFIED.
7. MORTAR USED IN MASONRY CONSTRUCTION SHALL CONTAIN 8.0 SACKS OF CEMENT PER ONE CUBIC YARD.
8. MANHOLES CONSTRUCTED WHERE INFLOWING PIPE SIZES ARE SMALLER THAN 24 In. SHALL HAVE AN INSIDE DIAMETER OF 4.0 Ft. MANHOLES CONSTRUCTED WHERE PIPE SIZES ARE 24 In. OR LARGER SHALL HAVE AN INSIDE DIAMETER OF 5.0 Ft. COMPLETED MANHOLE SHALL BE WITHOUT LEAKS AND WATER TIGHT.
9. MANHOLE COVER CASTINGS AND MANHOLE FRAME CASTINGS SHALL CONFORM TO THE REQUIREMENTS AS INDICATED IN THE STANDARD SPECIFICATIONS AND AS SHOWN IN THE STANDARD DETAIL DRAWING.
10. THE BID ITEM "PRECAST ACCESS MANHOLE" SHALL INCLUDE ALL MATERIAL, PAINTING, CAST IRON, EXCAVATION, BACKFILLING, EQUIPMENT, TOOLS, AND ALL OTHER INCIDENTALS NECESSARY TO COMPLETE THE WORK.
11. A BRICK MASONRY COLLAR SHALL BE INSTALLED BETWEEN THE CAST IRON FRAME AND THE CONCENTRIC CONE. THE COLLAR WILL HAVE 8 INCH WALLS AND A VERTICAL HEIGHT OF 6 In. MINIMUM AND 18 In. MAXIMUM. A 1 In. COAT OF MORTAR WILL BE PLASTERED ON THE OUTSIDE OF THE COLLAR. THE USE OF PRE-CAST CONCRETE SPACERS FOR MANHOLE TOP ADJUSTMENT SHALL BE ALLOWED.
12. PIPES INSTALLED WITHIN THE EXCAVATION MADE FOR THE MANHOLE MAY REQUIRE (WHEN DIRECTED BY THE ENGINEER) A SUPPORTING CONCRETE CRADLE TO THE LIMITS OF THE EXCAVATION. COST OF CRADLE WITHIN MANHOLE EXCAVATION SHALL BE INCLUDED IN THE UNIT PRICE BID FOR THE MANHOLE.

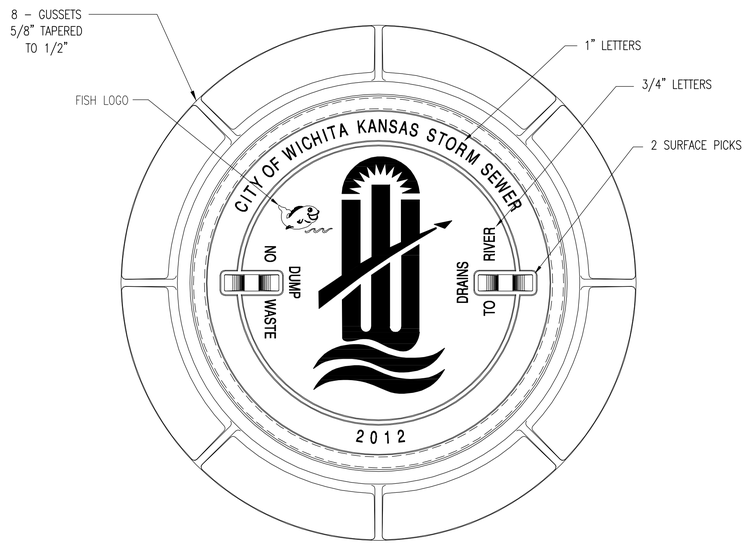
Drawing File: E:\Project\Meridian Drainage\Details\Access MH.dwg

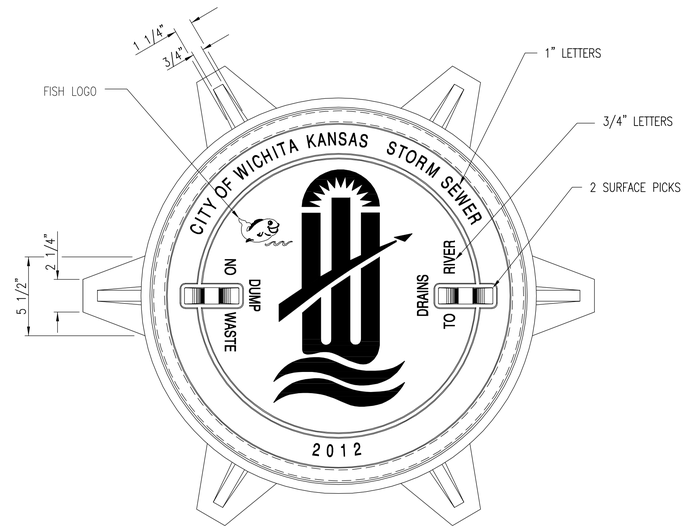
December 2012

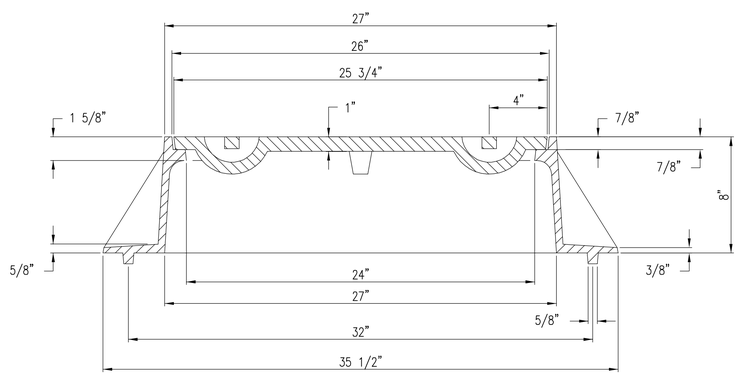
Design: City of Wichita Drawn: STAFF Approved: TPV Scale: None	Project No. 0802E038 CAPITAL IMPROVEMENT PROJECT STANDARD DETAILS for PRECAST ACCESS MANHOLES MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT	Baughman Company , P.A. 315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149 Baughman ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

SHEET

OF



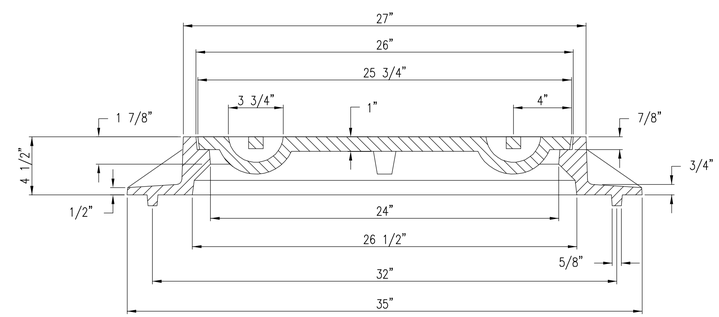




MANHOLE FRAME

DEETER #1261 OR EJIW #1936-Z1

NOTE:
1. FURNISHED WITH MACHINED HORIZONTAL BEARING SURFACE.
2. COVER TO BE DEETER #1261 OR EJIW #1936A.



INLET FRAME

DEETER #2014 OR EJIW #1936-Z4

NOTE:
1. FURNISHED WITH MACHINED HORIZONTAL BEARING SURFACES.
2. NOT TO BE USED UNDER PAVEMENT.
3. COVER TO BE DEETER #1261 OR EJIW #1936A.

CITY OF WICHITA

PUBLIC WORKS & UTILITIES
ENGINEERING DIVISION

MANHOLE/INLET FRAME AND COVER (STORM SEWER)

CITY ENGINEER
Gary Janzen, P.E. Interim City Engineer

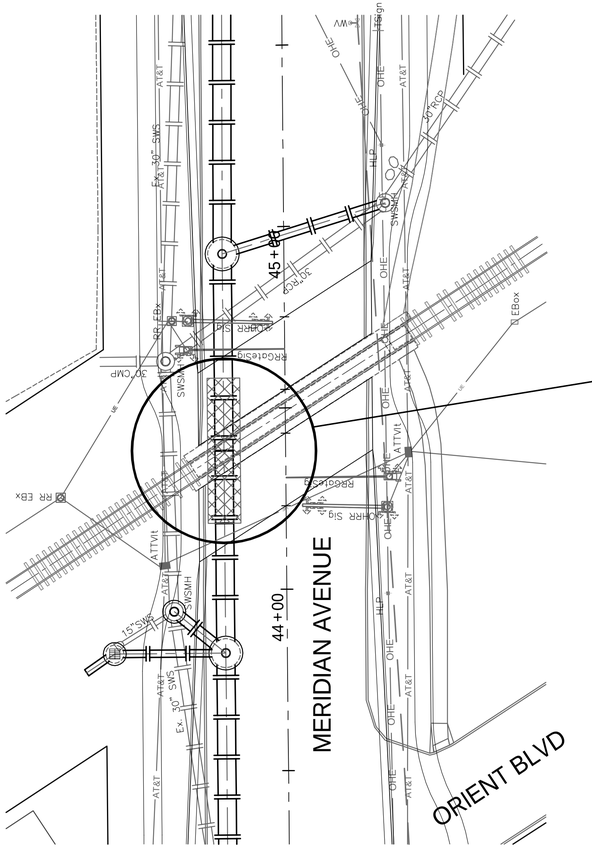
PROJECT NUMBER	OCA NUMBER	DATE
		4/2012

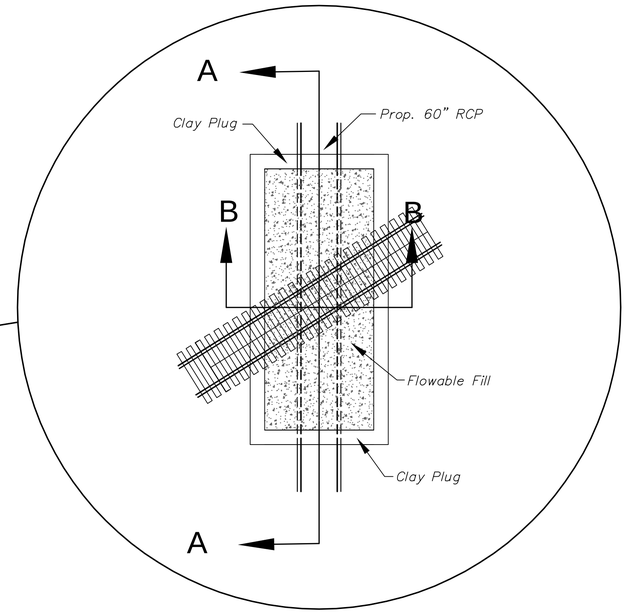
CITY ENGINEER'S OFFICE
CITY HALL - SEVENTH FLOOR
455 NORTH MAIN STREET
WICHITA, KANSAS 67202-1620
(316) 268-4501

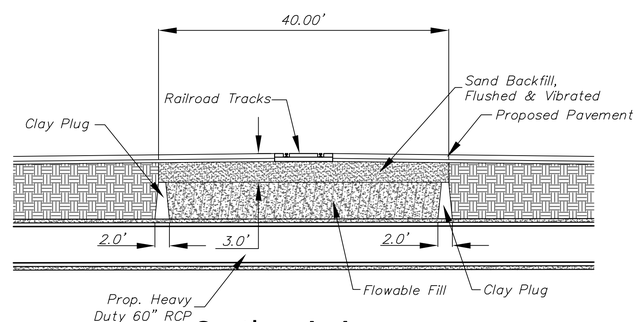
DESIGN	DRAWN
Staff	Staff

SHEET
X of XX

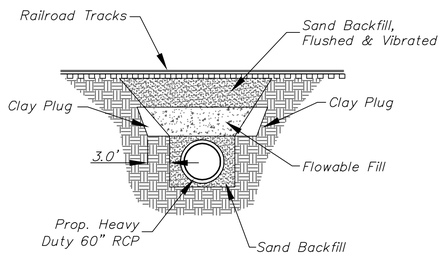
E:\Projects\Meridian Drainage\Details\SW-303-MH-Inlet Frame & Cover.dwg_SW-303







Section A-A



Section B-B

GENERAL NOTES

1. The Clay Plug shall be constructed of Clay Soils having a minimum Plasticity Index of 22.
2. See Project Special Specifications for Additional Railroad Requirements.
3. The Heavy Duty Reinforced Concrete Pipe Shall Conform to Cooper E-80 Loading Specs.
4. All Cost Associated with the Railroad Crossing, Including the Clay Plug, Flowable Fill and Sand Backfill, Shall be Considered SUBSIDIARY to the Lump Sum Bid Item "Pipe, RCP 60" (Heavy Duty).

Drawing File: E:\Projects\Meridian Drainage\Details\Railroad Crossing.dwg

December 2012

Design: TPV
Drawn: TPV
Approved: TPV
Scale: Noted

Project No. 08-02-E038 CAPITAL IMPROVEMENT PROJECT

RAILROAD CROSSING DETAIL

MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT

Baughman Company , P.A.
315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149
ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

SHEET
OF

MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT

Project # 468-_____

RECAPITULATION OF QUANTITIES

ITEM	QUANTITY TOTAL	UNIT
LUMP SUM BID ITEMS - DRAINAGE		
MOBILIZATION	1	Lump Sum
FIELD OFFICE & LAB	1	Each
SITE CLEARING	1	Lump Sum
SITE RESTORATION	1	Lump Sum
SEEDING	1	Lump Sum
SODDING	1	Lump Sum
COMMUNITY RELATIONS SUPPORT	1	Lump Sum
REMOVAL OF EXISTING STRUCTURES (Includes Pipes, Manholes, etc.)	1	Lump Sum
PIPE, RCBC (10' X 6') (Precast)	4,786	Ft.
PIPE, RCBC (10' X 7') (Precast)	1,204	Ft.
PIPE, RCBC (10' X 8') (Precast)	1,481	Ft.
PIPE, RCP 15"	778	Ft.
PIPE, RCP 18"	106	Ft.
PIPE, RCP 24"	71	Ft.
PIPE, RCP 30"	101	Ft.
PIPE, RCP 36"	15	Ft.
PIPE, RCP 48"	105	Ft.
PIPE, RCP 54	68	Ft.
PIPE, RCP 60"	458	Ft.
PIPE, RCP 60" (Heavy Duty)	40	Ft.
FILL, SAND (Flushed & Vibrated)	9,173	Ft.
RIP RAP, LIGHT STONE	10	Sq. Yds.
RIP RAP, HEAVY STONE	90	Sq. Yds.
SWS OUTFALL AT RIVER	1	Each
DEBRIS REMOVAL STRUCTURE	1	Each
INLET, CURB (Type 1) (L=5' W=3')	18	Each
INLET, CURB (Type 1) (L=10' W=3')	4	Each
INLET, CURB (Type 1a) (L=10' W=3')	7	Each
INLET, CURB (Type 1a) (L=10' W=6')	1	Each
INLET, CURB (Type 1a) (L=5' W=3')	4	Each
INLET, DROP (Single)	1	Each
INLET HOOK-UP	34	Each
MH, TYPE P, SHALLOW (4')	1	Each
MH, TYPE P, SHALLOW (5')	1	Each
MH, TYPE P, STANDARD (5')	1	Each
MH, TYPE P, STANDARD (6')	1	Each
MH, TYPE P, STANDARD (8')	4	Each
MH, REINFORCED CONCRETE (13' 4" X 11' 4")	1	Each
MH, STACK (4') (Includes Ring & Cover)	33	Each
MH, STACK (5') (Includes Ring & Cover)	1	Each
MH, STACK (6') (Includes Ring & Cover)	1	Each
MEASURED QUANTITY BID ITEMS - DRAINAGE		
PIPE, SWS, PVC 4", PERFORATED	460	Ft.
MEASURED QUANTITY BID ITEMS - WATER		
PIPE, WL 2"	22	Ft.
PIPE, WL 8"	1712	Ft.
PIPE, WL 8", DIRECTIONAL DRILLED	75	Ft.
PIPE, DICL 8"	18	Ft.
VALVE ASSEMBLY, ANCHORED 8", SPECIAL	4	Each
VALVE ASSEMBLY, ANCHORED 8"	1	Each
SERVICE OUTLET ASSY. 2"	4	Each
VALVE ASSEMBLY, BLOWOFF 2"	4	Each
VALVE ASSEMBLY, AIR RELEASE 2"	3	Each
FIRE HYDRANT ASSYMBLY	1	Each
CONCRETE ENCASEMENT 8", REINFORCED	60	Ft.
VALVE BOX ADJUSTED	29	Each
SERVICE LINE, LONG 1"	9	Each
SERVICE LINE, SHORT 1"	9	Each
LUMP SUM BID ITEMS - SANITARY SEWER		
PIPE, PVC 8"	1,002	Ft.
PIPE, PVC 12"	12	Ft.
MH, TYPE P, SHALLOW (4')	1	Each
CONCRETE ENCASEMENT 8", REINFORCED	60	Ft.
MH FRAME & COVER	2	Each
AIR TESTING, SS PIPE	1,014	Ft.
MEASURED QUANTITY BID ITEMS - SANITARY SEWER		
CONCRETE ENCASEMENT REMOVAL	100	Ft.
CONCRETE ENCASEMENT 8", REINFORCED	100	Ft.
LUMP SUM BID ITEMS - TRAFFIC		
TRAFFIC CONTROL	1	Each
PAVEMENT MARKINGS	1	Each
SIGNING	1	Each

RECAPITULATION OF QUANTITIES, cont.

ITEM	QUANTITY TOTAL	UNIT
LUMP SUM BID ITEMS - PAVING		
CONCRETE PAVEMENT REMOVED (Includes Drives and Curb & Gutter)	24,470	Sq. Yds.
AC PAVEMENT REMOVED	3,066	Sq. Yds.
CONCRETE SIDEWALK REMOVED	814	Sq. Yds.
GRAVEL STREETS/DRIVES REMOVED & REPLACED	3,379	Sq. Yds.
A.C. PAVEMENT 2" SURFACE	332	Sq. Yds.
CONCRETE PAVEMENT 6" (Reinforced)	13,279	Sq. Yds.
CONCRETE PAVEMENT (VG) 7" (Reinf)	1,727	Sq. Yds.
CONCRETE PAVEMENT 8" (Reinforced) (Base Course)	332	Sq. Yds.
CONCRETE PAVEMENT (VG) 8" (Reinf)	169	Sq. Yds.
CONCRETE PAVEMENT 8" (Reinforced)	1,831	Sq. Yds.
CONCRETE PAVEMENT 9" (Reinforced)	531	Sq. Yds.
CONCRETE PAVEMENT 9" (NRDJ)	3,285	Sq. Yds.
CONCRETE APPROACH 12" RAILROAD	214	Sq. Yds.
CRUSHED ROCK BASE 5", Reinforced	17,701	Sq. Yds.
CRUSHED ROCK BASE 6", Reinforced	2,690	Sq. Yds.
CRUSHED ROCK BASE 7", Reinforced	2,953	Sq. Yds.
CRUSHED ROCK BASE 8", Reinforced	3,727	Sq. Yds.
CONCRETE C & G, COMB. TYPE I (6" & 1-1/2")	1,056	Ft.
CONCRETE C & G, COMB. TYPE I (6-5/8" & 1-1/2")	8,158	Ft.
CONCRETE CURB, MONO EDGE (6" & 1-1/2")	95	Ft.
CONCRETE CURB, MONO EDGE (6-5/8" & 1-1/2")	1,620	Ft.
MEASURED QUANTITY BID ITEMS - PAVING		
AC SURFACE COURSE (SC-1) 2" (Parking Lot)	1,331	Sq. Yds.
AC BASE COURSE (BC-1) 4" (Parking Lot)	1,331	Sq. Yds.
CONCRETE PAVEMENT 6" (Reinforced) (Parking Lot)	594	Sq. Yds.
CONCRETE DRIVEWAY 8" (Reinforced)	14,859	Sq. Ft.
CONCRETE SIDEWALK 4"	7,525	Sq. Ft.
AC PAVEMENT (6") (4" Bit Base) (Bike Path)	320	Sq. Yds.
WHEELCHAIR RAMP W/ DETECTABLE WARNINGS	25	Each
CONCRETE SIDEWALK PROTECTION CURB (6")	10	Ft.
TREES REMOVED (Small)	23	Each
TREES REMOVED (Large)	7	Each
A.C. PAVEMENT 5" (3" Bit. Base), TEMPORARY	1,800	Sq. Yds.
SIGNING, ELEC. PORTABLE MESSAGE BOARD (ea/day)	180	Sq. Yds.
MEASURED QUANTITY BID ITEMS - EROSION CONTROL		
BMP, SILT FENCE	225	Ft.
BMP, CURB INLET PROTECTION	34	Each
BMP, DROP INLET PROTECTION	2	Each
BMP, BACK OF CURB PROTECTION	10,929	Ft.
BMP, CONSTRUCTION ENTRANCE	4	Each

REMOVAL OF EXISTING STRUCTURES

SWS STATION	ROADWAY	SIDE	ITEM	REMARKS
Sta. 6+06, Line 1	Dora Avenue	1' Lt.	SS Manhole	
Sta. 6+08, Line 1	Dora Avenue	11' Rt.	20 L.F. 12" CMP	
Sta. 6+16, Line 1	Dora Avenue	7' Rt.	Guard Post	
Sta. 8+35, Line 1	Dora Avenue	10' Rt.	10 L.F. 12" CMP	
Sta. 9+46, Line 1	Dora Avenue	8' Rt.	Guard Post	
Sta. 9+57, Line 1	Dora Avenue	11' Rt.	16 L.F. 8" CMP	
Sta. 9+65, Line 1	Dora Avenue	9' Rt.	Guard Post	
Sta. 14+54, Line 1	Dora Avenue	12' Rt.	SWS Inlet	
Sta. 14+55, Line 1	Dora Avenue	21' Lt.	SWS Inlet	
Sta. 14+55, Line 1	Dora Avenue	--	32 L.F. 15" Pipe	
Sta. 15+28, Line 1	Dora Avenue	21' Lt.	SWS Inlet	
Sta. 15+29, Line 1	Dora Avenue	12' Rt.	SWS Inlet	
Sta. 15+29, Line 1	Dora Avenue	--	32 L.F. 15" Pipe	
Sta. 32+26, Line 1	Dora Avenue	13' Rt.	SWS Inlet	
Sta. 32+26, Line 1	Dora Avenue	20' Lt.	SWS Inlet	
Sta. 32+26, Line 1	Dora Avenue	--	32 L.F. 15" Pipe	
Sta. 33+00, Line 1	Dora Avenue	22' Rt.	SWS Manhole	
Sta. 33+21, Line 1	Dora Avenue	13' Rt.	SWS Inlet	
Sta. 33+21, Line 1	Dora Avenue	20' Lt.	SWS Inlet	
Sta. 33+21, Line 1	Dora Avenue	--	32 L.F. 15" Pipe	
Sta. 55+00, Line 1	May Avenue	5' Lt.	276 L.F. 48" RCP	
Sta. 56+36, Line 1	May Avenue	17' Rt.	SWS Inlet	
Sta. 56+36, Line 1	May Avenue	16' Lt.	SWS Inlet	
Sta. 56+38, Line 1	May Avenue	--	20 L.F. 15" Pipe	
Sta. 56+38, Line 1	May Avenue	10' Lt.	10 L.F. 15" Pipe	
Sta. 56+38, Line 1	May Avenue	5' Lt	SWS Manhole	
Sta. 56+52, Line 1	May Avenue	7' Lt.	28 L.F. 48" RCP	
Sta. 56+66, Line 1	May Avenue	8' Lt.	SWS Manhole	
Sta. 57+10, Line 1	May Avenue	8' Rt.	89 L.F. 48" RCP	
Sta. 62+26, Line 1	Seneca Street	--	27 L.F. 8' X 4' RCB	
Sta. 62+88, Line 1	Seneca Street	13' Rt.	Concrete Sign Base	
Sta. 67+03, Line 1	Osage Avenue	14' Rt.	Basketball Goal	
Sta. 70+25, Line 1	--	--	200 L.F. RR Tracks	
Sta. 0+35, Line 2	Meridian Avenue	7' Rt.	98 L.F. 30" RCP	
Sta. 0+84, Line 2	Meridian Avenue	7' Rt.	SWS Manhole	
Sta. 1+55, Line 2	Meridian Avenue	4' Lt.	144 L.F. 30" RCP	
Sta. 0+37, Line 2b	Meridian Avenue	4' Rt.	22 L.F. 30" RCP	
Sta. 0+00, Line 2c	Meridian Avenue	--	32 L.F. 30" RCP	

FOR INFORMATION ONLY. Cost to be SUBSIDIARY to the bid item "Removal of Existing Strucures"

SMALL TREES REMOVED

RCBC STATION	STREET	SIDE	TREE SIZE
1+34	--	Lt.	4-10" Trees
1+38	--	Lt.	3-6" Trees
21+06	Dora Avenue	Rt.	Bush
26+11	Dora Avenue	Rt.	Bush
27+70	Dora Avenue	Rt.	Bush
27+78	Dora Avenue	Rt.	6" Tree
27+78	Dora Avenue	Rt.	4" Tree
38+98	Dora Avenue	Rt.	4" Tree
39+05	Dora Avenue	Rt.	Bush
39+12	Dora Avenue	Rt.	6" Tree
44+71	Dora Avenue	Rt.	Bush
62+68	Seneca Street	Rt.	8" Tree
66+88	Osage Avenue	Rt.	4" Tree
67+15	Osage Avenue	Lt.	10" Tree
67+38	Osage Avenue	Lt.	10" Tree
68+15	--	Lt.	4" Tree
68+38	--	Lt.	4" Tree
73+95	McLean Boulevard	Lt.	6" Tree

LARGE TREES REMOVED

RCBC STATION	STREET	SIDE	TREE SIZE
20+35	Dora Avenue	Rt.	20" Tree
20+57	Dora Avenue	Rt.	20" Tree
20+76	Dora Avenue	Rt.	20" Tree
20+95	Dora Avenue	Rt.	24" Tree
21+15	Dora Avenue	Rt.	24" Tree
51+62	Exposition Avenue	Rt.	24" Tree
68+55	--	Rt.	24" Tree

Drawing File: E:\eng\Meridian Drainage\Recap.dwg

November 2009

Design: TPV
Drawn: TPV
Approved: TPV
Scale: None

Project No. 08-02-E038 CAPITAL IMPROVEMENT PROJECT

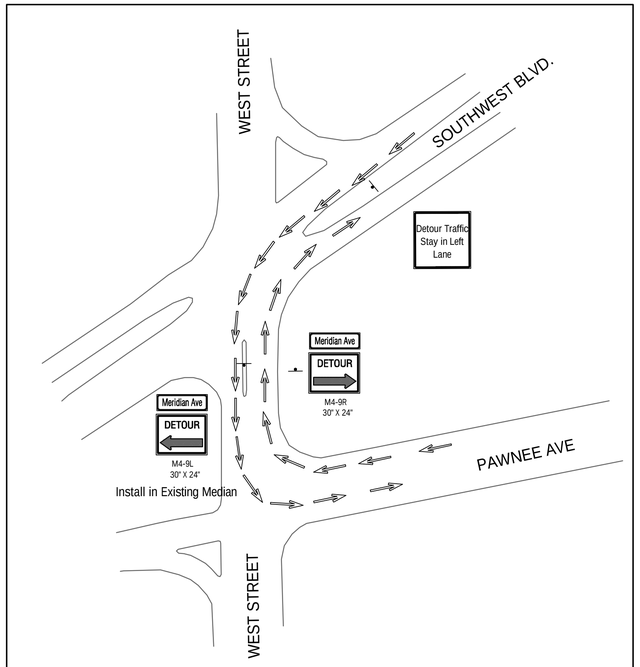
QUANTITY RECAPITULATIONS

MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT

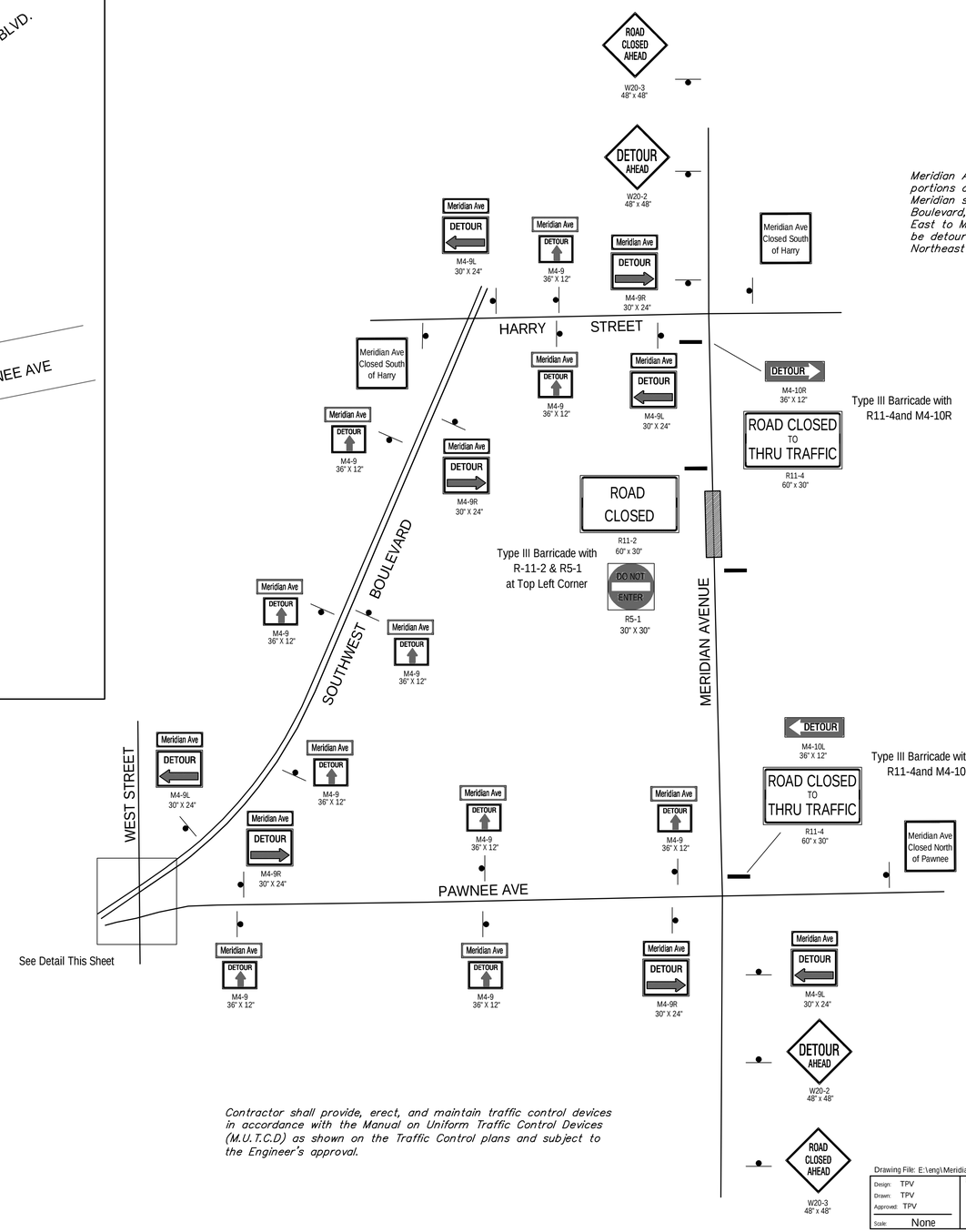
Baughman Company , P.A.
315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149
ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

SHEET

OF

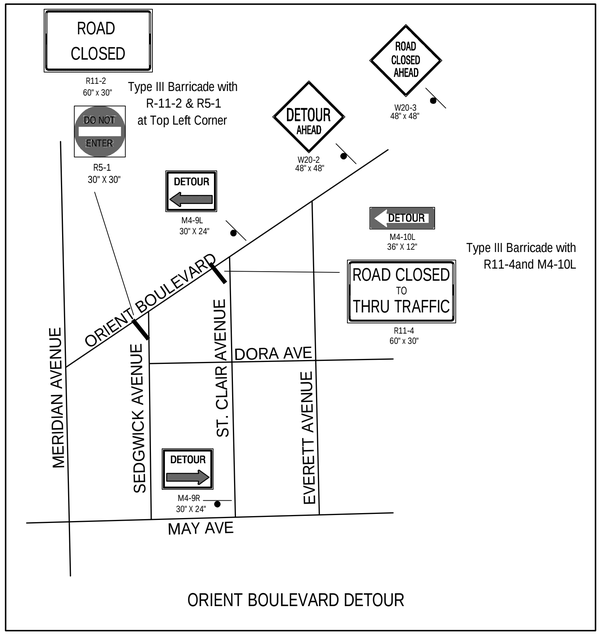


WEST STREET, SOUTHWEST BOULEVARD &
PAWNEE AVENUE INTERESECTION DETOUR DETAIL



Meridian Avenue will be closed to through traffic during portions of the construction. South-bound traffic on Meridian shall be detoured at Harry, West to Southwest Boulevard, then Southwest to Pawnee, and then back East to Meridian. North-bound traffic on Meridian shall be detoured at Pawnee, West to Southwest Boulevard, Northeast to Harry, and then back East to Meridian.

Contractor shall provide, erect, and maintain traffic control devices in accordance with the Manual on Uniform Traffic Control Devices (M.U.T.C.D) as shown on the Traffic Control plans and subject to the Engineer's approval.

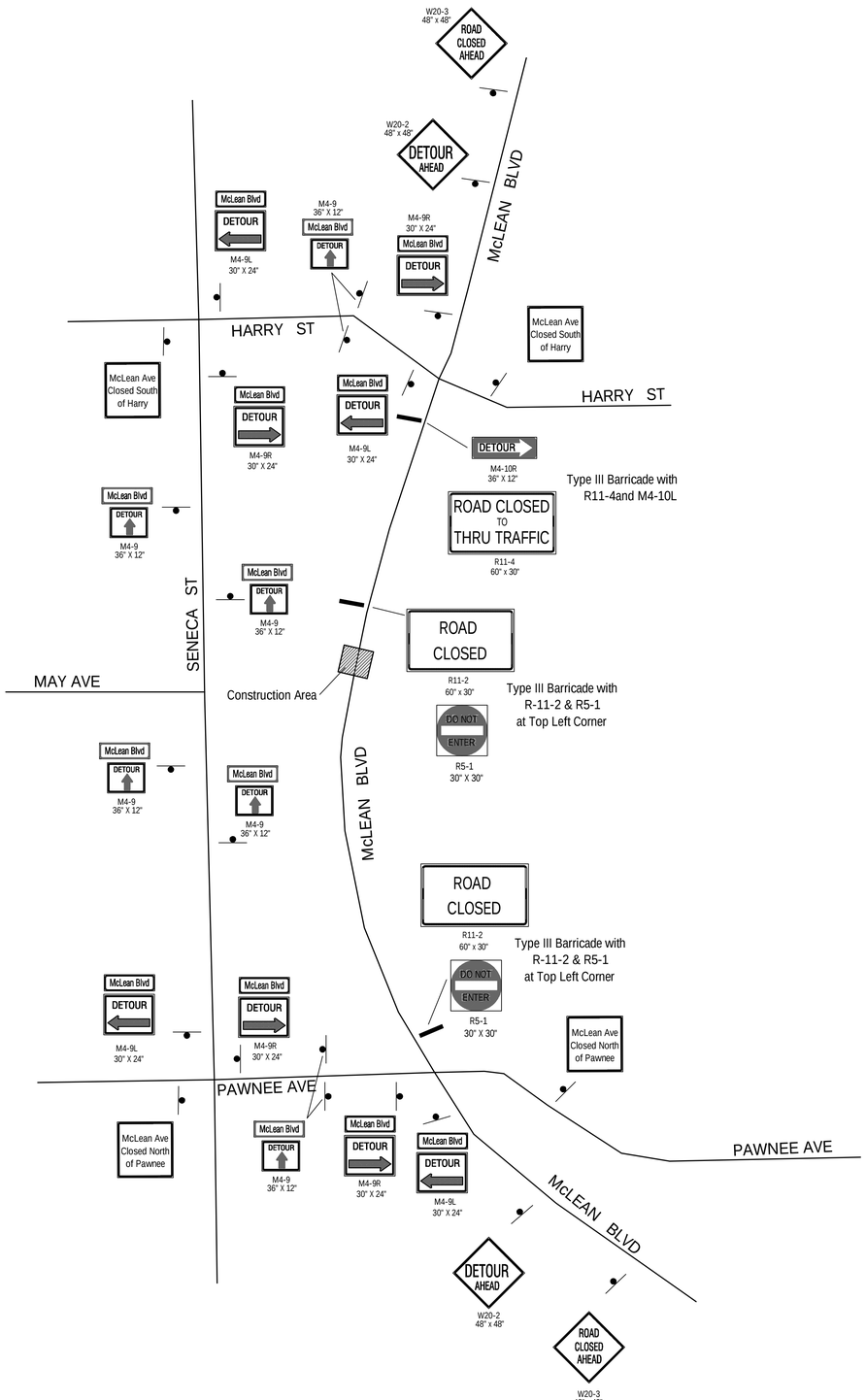


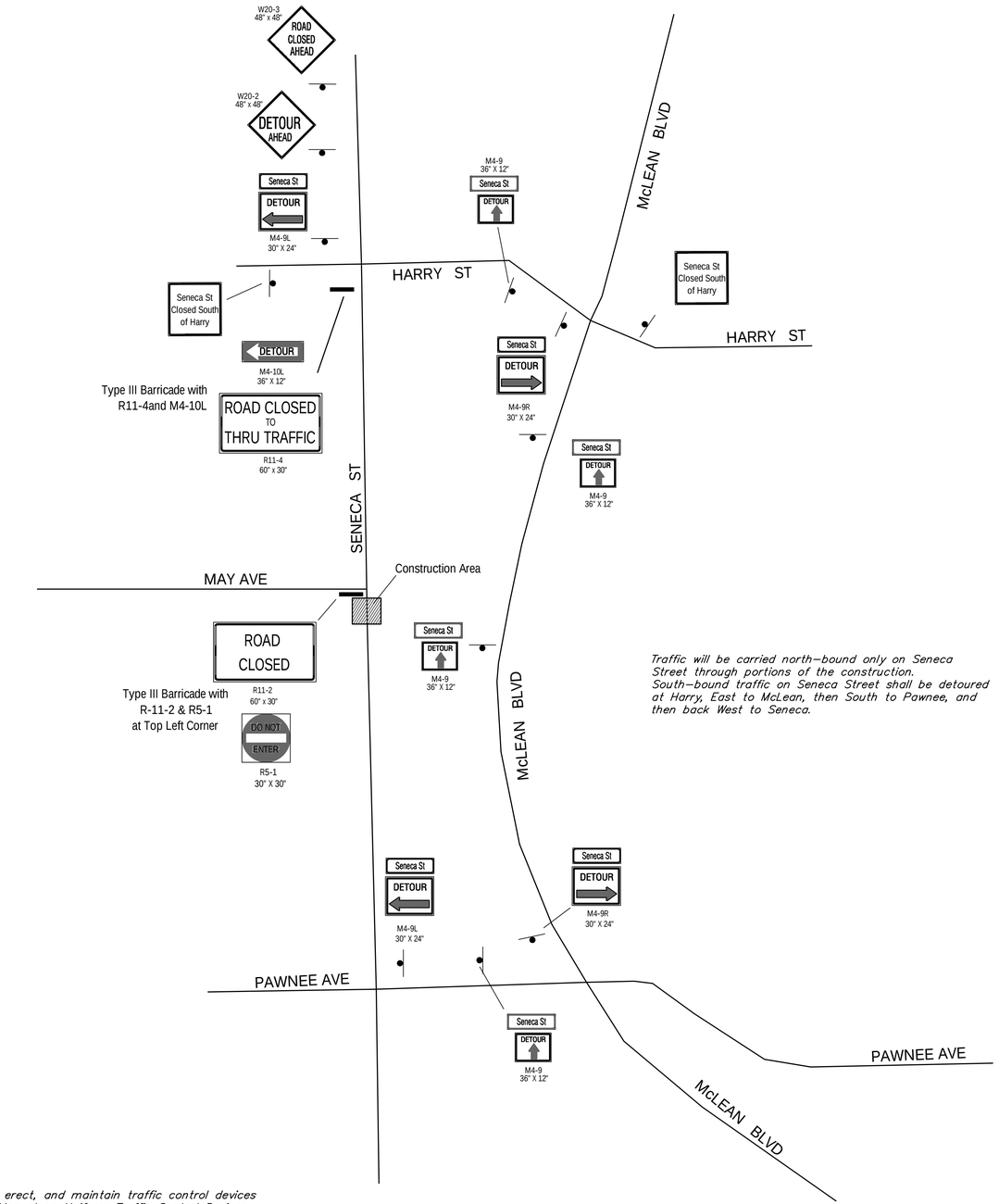
ORIENT BOULEVARD DETOUR

Drawing File: E:\eng\Meridian Drainage\Traffic\Detour.dwg

November 2009

Design: TPV Drawn: TPV Approved: TPV Scale: None	Project No. 08-02-E038 CAPITAL IMPROVEMENT PROJECT MERIDIAN AVENUE DETOUR PLAN MERIDIAN AVENUE DRAINAGE OUTFALL PROJECT	Baughman Company , P.A. 315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149 ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE SHEET OF





Traffic will be carried north-bound only on Seneca Street through portions of the construction. South-bound traffic on Seneca Street shall be detoured at Harry, East to McLean, then South to Pawnee, and then back West to Seneca.

Contractor shall provide, erect, and maintain traffic control devices in accordance with the Manual on Uniform Traffic Control Devices (M.U.T.C.D) as shown on the Traffic Control plans and subject to the Engineer's approval.

Drawing File: E:\eng\Meridian Drainage\Traffic\Detour.dwg

December 2012

Design: TPV Drawn: TPV Approved: TPV Scale: None	Project No. 08-02-E038 CAPITAL IMPROVEMENT PROJECT McLean Blvd. & Seneca St. Detour Plans MERIDIAN DRAIANGE OUTFALL PROJECT	Baughman Company , P.A. 315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149 ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

SHEET

OF

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS		2012	XX	XXX

1. MUTCD COMPLIANCE:

ALL TEMPORARY TRAFFIC CONTROL DEVICES AND THEIR INSTALLATION AND MAINTENANCE SHALL COMPLY WITH THE LATEST EDITION OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) FOR STREETS AND HIGHWAYS WHICH HAS BEEN ADOPTED BY THE SECRETARY OF TRANSPORTATION. WHENEVER THE TEMPORARY TRAFFIC CONTROL STANDARDS CONFLICT WITH THE MUTCD, THE STANDARDS SHALL GOVERN.

2. DESIGN SPEED:

THOSE ITEMS DELEGATED TO TEMPORARY TRAFFIC CONTROL SHOULD BE DESIGNED AND INSTALLED USING THE POSTED/LEGAL SPEED OF THE ROADWAY PRIOR TO WORK STARTING.

3. CLEAR ZONE:

ALL CONSTRUCTION EQUIPMENT (INCLUDING VEHICLES), MATERIALS, AND DEBRIS SHALL BE STORED OUT OF THE CLEAR ZONE. WHERE THIS CANNOT BE ACHIEVED, THE CONTRACTOR SHALL PLACE APPROPRIATE SIGNS, OBJECT IDENTIFIERS, AND/OR BARRICADES AS DESIGNATED BY THE ENGINEER. TEMPORARY TRAFFIC CONTROL DEVICES NEEDED FOR THIS CONDITION SHALL BE CONSIDERED SUBSIDIARY TO OTHER BID ITEMS.

4. MINIMUM LANE WIDTHS:

LANE WIDTHS SHALL BE A MINIMUM OF 11' (MEASURED BETWEEN CENTERLINES OF PAVEMENT MARKINGS) OR AS SHOWN ON THE PLANS, OR AS DIRECTED BY THE ENGINEER. A LANE WIDTH LESS THAN 11' MAY REQUIRE RESTRICTED ROADWAY WIDTH SIGNING.

5. FLAGGER:

A MINIMUM OF ONE FLAGGER SHALL BE STATIONED WITHIN EACH MULTI-LANE ROADWAY ACTIVITY AREA WHERE WORK IS IN A CLOSED LANE ADJACENT TO TRAFFIC AND NOT SEPARATED BY A CONCRETE SAFETY BARRIER SYSTEM.

6. PAVEMENT MARKING:

WHEN THE WORK WILL OCCUPY A LOCATION MORE THAN THREE DAYS, ALL CONFLICTING PAVEMENT MARKINGS SHALL BE REMOVED OR MASKED AND ALL TRANSITION TAPERS, CROSSOVERS, AND EDGE LINES ALONG CHANNELIZING DEVICES SHALL BE MARKED WITH SOLID 4" WIDE PAVEMENT MARKING.

7. FIRST MODULE OF IBS:

THE FIRST MODULE OF EACH INERTIAL BARRIER SYSTEM (IBS) SHALL HAVE A MINIMUM OF 2 SQ. FT. OF FLUORESCENT ORANGE ASTM TYPE IV SHEETING FACING TRAFFIC. EITHER A VERTICAL RECTANGLE OR DIAMOND SHAPE MAY BE USED.

8. PEDESTRIAN / BICYCLE SAFETY:

WORK ZONE SIGNS SHALL NOT INHIBIT PEDESTRIAN AND BICYCLE TRAFFIC ON SIDEWALKS OR OTHER AREAS DESIGNATED FOR PEDESTRIAN OR BICYCLE USE.

CONSIDERATION SHOULD BE MADE TO SEPARATE PEDESTRIAN AND BICYCLE MOVEMENTS FROM BOTH WORK SITE ACTIVITY AND VEHICULAR TRAFFIC. UNLESS A REASONABLE SAFE ROUTE THAT DOES NOT INVOLVE CROSSING THE ROADWAY CAN BE PROVIDED, PEDESTRIANS AND BICYCLISTS SHOULD BE APPROPRIATELY DIRECTED WITH ADVANCE SIGNING THAT ENCOURAGES THEM TO CROSS TO THE OPPOSITE SIDE OF THE ROADWAY. IN URBAN AND SUBURBAN AREAS WITH HIGH VEHICULAR TRAFFIC VOLUMES, THESE SIGNS SHOULD BE PLACED AT INTERSECTIONS (RATHER THAN MIDBLOCK LOCATIONS) SO THAT PEDESTRIANS AND BICYCLISTS ARE NOT CONFRONTED WITH MIDBLOCK WORK SITES THAT WILL INDUCE THEM TO ATTEMPT SKIRTING THE WORK SITE OR MAKING A MIDBLOCK CROSSING.

WHEN EXISTING PEDESTRIAN FACILITIES ARE DISRUPTED, CLOSED, OR RELOCATED, THE TEMPORARY FACILITIES SHALL BE DETECTABLE AND INCLUDE ACCESSIBILITY FEATURES CONSISTENT WITH THE FEATURES PRESENT IN THE EXISTING PEDESTRIAN FACILITY.

9. CHANGED STOP CONDITIONS:

ATTACH TWO FLUORESCENT RED-ORANGE FLAGS AND A RED TYPE "B" HIGH INTENSITY WARNING LIGHT TO ANY STOP SIGN THAT CREATES A NEW STOP CONDITION OR MOVES THE STOP CONDITION TO A NEW LOCATION. LEAVE FLAGS AND LIGHTS IN PLACE FOR AT LEAST THE FIRST 30 DAYS. INSTALL W3-1 (SYMBOLIC STOP AHEAD) SIGN IN ADVANCE OF STOP SIGN IF STOP SIGN IS NOT VISIBLE FOR A MINIMUM OF DISTANCE 'A' (SEE CHART ON TE710) OR IF STOP CONDITION IS MOVED TO LESS THAN DISTANCE 'A' FROM AN EXISTING STOP AHEAD SIGN.

10. LUMP SUM BIDDING:

WHEN TRAFFIC CONTROL IS BID LUMP SUM, ADDITIONAL DEVICES WILL BE PAID FOR AS EXTRA WORK.

11. NIGHTTIME LIGHTING:

WHEN NIGHTTIME WORK IS REQUIRED, FLOODLIGHTS SHOULD BE USED TO ILLUMINATE FLAGGER STATIONS, EQUIPMENT CROSSINGS, AND OTHER AREAS WHERE EXISTING LIGHTING IS NOT ADEQUATE FOR THE WORK TO BE PERFORMED SAFELY.

IN NO CASE SHALL FLOODLIGHTS BE PERMITTED TO CREATE A DISABLING GLARE FOR THE DRIVER. THE ADEQUACY OF THE FLOODLIGHT PLACEMENT AND ELIMINATION OF POTENTIAL GLARE SHOULD BE CHECKED BY DRIVING THROUGH THE PROJECT.

12. NCHRP REPORT 350 CRASHWORTHY REQUIREMENTS:

TRAFFIC CONTROL DEVICES SHALL MEET THE EVALUATION CRITERIA IN NCHRP REPORT 350 OR IN MASH REPORT 2009 AS SUPPLEMENTED BY FHWA MEMORANDUM "IDENTIFYING ACCEPTABLE HIGHWAY SAFETY FEATURES," DATED JULY 25, 1997. AVAILABLE ON THE INTERNET AT http://safety.fhwa.dot.gov/roadway_dept/policy_guide/road_hardware/policy_memo/

ANY DEVICE NOT ADDRESSED BY THE TE STANDARDS MAY BE APPROVED ON A CASE BY CASE BASIS BY THE ENGINEER. THE DEVICE SHALL BE ACCOMPANIED BY AND INSTALLED ACCORDING TO MASH REPORT 2009. ANY DEVICE ACCEPTED PRIOR TO THE ADOPTION OF MASH REPORT 2009 USING CRITERIA FROM NCHRP REPORT 350 MAY REMAIN IN PLACE AND CONTINUE TO BE USED. ANY TRAFFIC CONTROL DEVICE ACCEPTED USING NCHRP REPORT 350 CRITERIA IS NOT REQUIRED TO BE TESTED UNDER MASH REPORT 2009. HOWEVER, NEW TRAFFIC CONTROL DEVICES NOT PREVIOUSLY EVALUATED MUST UTILIZE MASH REPORT 2009 FOR TESTING AND EVALUATION.

THE CONTRACTOR SHALL:

1) PROVIDE TO THE ENGINEER A COPY OF THE MANUFACTURER'S SELF-CERTIFICATION THAT ANY CATEGORY 1 (i.e. - PLASTIC CONICAL DELINEATORS, TUBULAR MARKERS, DRUMS WITHOUT ATTACHMENTS) AND CATEGORY 2 (i.e. - PORTABLE SIGN STANDS (WITH SIGNS), TYPE II AND III BARRICADES, AND VERTICAL PANELS) DEVICES USED ON THE PROJECT ARE NCHRP REPORT 350 OR MASH REPORT 2009 COMPLIANT.

2) PROVIDE TO THE ENGINEER A COPY OF THE ENTIRE FHWA ACCEPTANCE LETTER (WZ-xxx) FOR ANY CATEGORY 2 DEVICE (i.e. - PORTABLE SIGN STANDS (WITH SIGNS), TYPE II AND III BARRICADES, AND VERTICAL PANELS) USED ON THE PROJECT. WORK ZONE FHWA ACCEPTANCE LETTERS (WZ-xxx) ARE AVAILABLE ON THE INTERNET AT: http://safety.fhwa.dot.gov/roadway_dept/policy_guide/road_hardware/wzd/

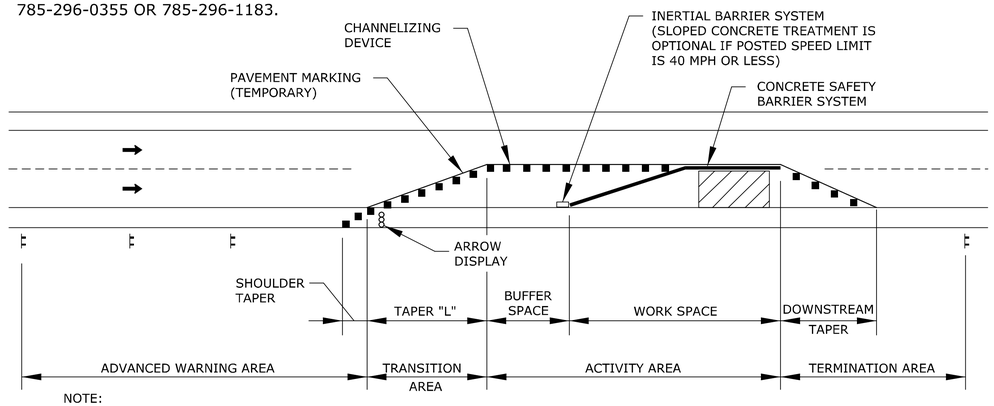
3) CERTIFY THAT THE TRUCK MOUNTED ATTENUATORS (TMA'S) (WHICH ARE DEFINED AS CATEGORY 3 DEVICES BY THE FHWA MEMORANDUM) MEET CURRENT CRASHWORTHY SPECIFICATIONS AS DEFINED ABOVE AND INCLUDE A COPY OF THE ENTIRE FHWA ACCEPTANCE LETTER. ALL CATEGORY 1 & 2 DEVICES SHALL BE NCHRP REPORT 350 OR MASH REPORT 2009 COMPLIANT.

13. LEAD IN CHANNELIZING DEVICES ON CENTERLINE:

TEMPORARY RUMBLE STRIPS MAY BE USED IN LIEU OF LEAD IN CENTERLINE CHANNELIZING DEVICES WHEN THE ROADWAY IS LESS THAN OR EQUAL TO 30' (FEET) INCLUDING PAVED SHOULDERS. WHEN EXTENUATING CIRCUMSTANCES EXIST, THE AREA ENGINEER MAY ELECT TO ELIMINATE BOTH THE LEAD IN CHANNELIZERS AND THE RUMBLE STRIPS.

14. TEMPORARY RUMBLE STRIPS:

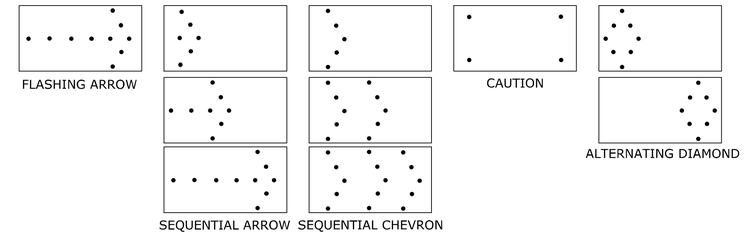
ALTERNATIVE TEMPORARY RUMBLE STRIP OPTIONS MAY BE AVAILABLE. PLEASE CONTACT THE TEMPORARY TRAFFIC CONTROL UNIT FOR MORE INFORMATION AT 785-296-0355 OR 785-296-1183.



NOTE:
REFER TO STD. TE702 FOR TAPER "L" FORMULA.

TYPICAL WORK ZONE COMPONENTS

ARROW DISPLAYS



ARROW DISPLAY ELEMENTS SHALL BE CAPABLE OF A MINIMUM 50 PERCENT DIMMING FROM THEIR FULL-RATED LAMP VOLTAGE. FULL LAMP VOLTAGE SHOULD BE USED DURING THE DAY AND DIMMED MODE SHALL BE USED AT NIGHT. FOR SHOULDER WORK, ROADSIDE WORK NEAR THE SHOULDER, BLOCKING THE SHOULDER, OR FOR TEMPORARY CLOSING ONE LANE ON A TWO-LANE, TWO-WAY ROADWAY, AN ARROW PANEL SHALL BE USED ONLY IN THE CAUTION MODE.

BUFFER SPACE

SPEED (MPH) ✳	*20*	*25*	*30*	*35*	*40*	*45*	*50*	*55*	*60*	*65*	*70*	*75*
LENGTH (ft)	*115*	*155*	*200*	*250*	*305*	*360*	*425*	*495*	*570*	*645*	*730*	*820*

✳ POSTED SPEED PRIOR TO WORK STARTING

NEITHER WORK ACTIVITY NOR STORAGE OF EQUIPMENT, VEHICLES, OR MATERIAL SHOULD OCCUR IN THE BUFFER SPACE. WHEN A PROTECTION VEHICLE IS PLACED IN ADVANCE OF THE WORK SPACE, ONLY THE SPACE UPSTREAM OF THE VEHICLE CONSTITUTES THE BUFFER SPACE.

IF TEMPORARY CONCRETE SAFETY BARRIER SYSTEM IS USED TO SEPARATE APPROACHING TRAFFIC FROM THE WORK SPACE, THE BARRIER SYSTEM SHALL BE CONSIDERED PART OF THE ACTIVITY AREA. A FULL LANE WIDTH SHOULD BE AVAILABLE THROUGHOUT THE LENGTH OF THE BUFFER SPACE. SEE TYPICAL WORK ZONE COMPONENTS.

NO.	DATE	REVISIONS	BY	APP'D
3	10/16/12	Removed Note 13. Added Alternating Diamonds	J.A.M.	K.P.
2	10/4/11	Modified Notes 9,12 & 15. Added Note 15	J.A.M.	K.P.
1	11/30/09	Added Note 14	J.A.M.	A.A.A.

KANSAS DEPARTMENT OF TRANSPORTATION

GENERAL TRAFFIC CONTROL

TE700

FHWA APPROVAL			10/16/12	APP'D	Kristina Pyle		
DESIGNED	B.A.H.	DETAILED	B.A.H.	QUANTITIES		TRACED	
DESIGN CK.		DETAIL CK.		QUAN. CK.		TRACE CK.	

KDOT Graphics Certified 10-23-2012

Sheet __ of ___

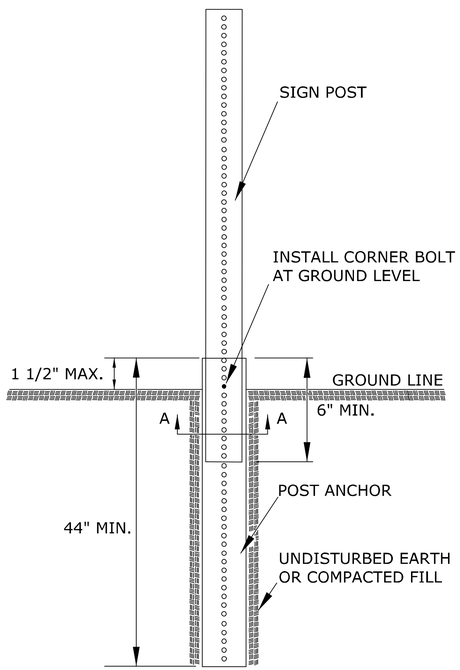
KDOT Graphics Certified

Plotted : 24-OCT-2012 07:53
Traffic

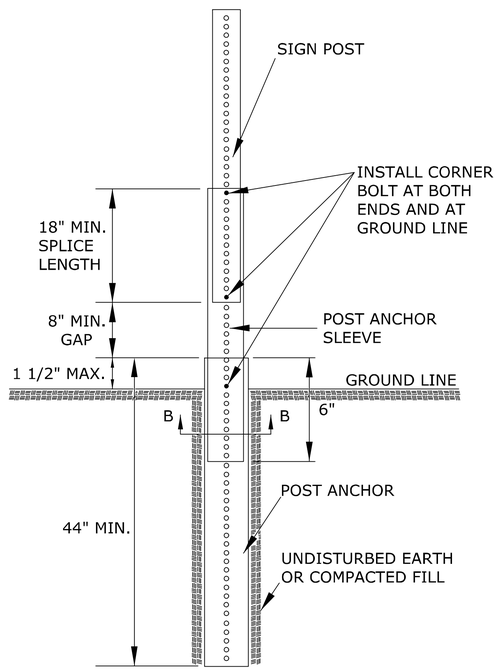
Drawn By : jmadrid
File : te700.dgn

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS		2012	XX	XXX

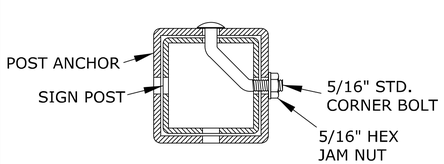
PERFORATED SQUARE STEEL TUBE (P.S.S.T.) POST SETUP



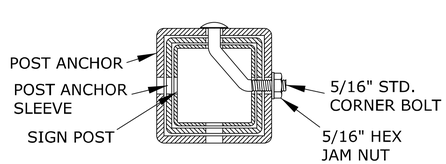
P.S.S.T. DETAIL



TELESCOPING P.S.S.T. DETAIL



SECTION A-A

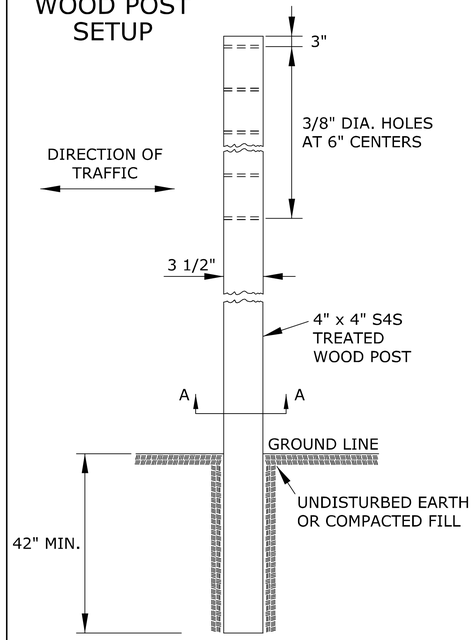


SECTION B-B

DETAILS FOR 2", 2 1/4", OR 2 1/2" SIGN POST

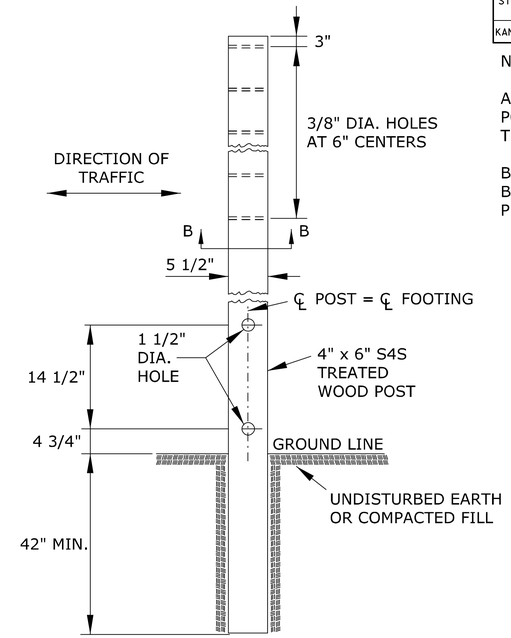
PLACE BOLTS IN THE SAME CORNER ALONG EACH SIGN POST.

WOOD POST SETUP



SIDE ELEVATION

4" X 4" WOOD POST IN SOIL



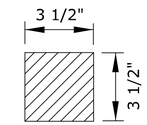
SIDE ELEVATION

4" X 6" WOOD POST IN SOIL

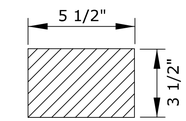
NOTES:

ALL SIGN MOUNTING HOLES IN THE WOOD POSTS SHALL BE DRILLED PRIOR TO TREATING.

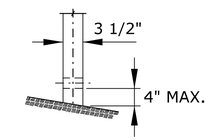
BREAKAWAY HOLES AND FIELD CUTS SHALL BE TREATED IN ACCORDANCE WITH THE PRESERVATIVE TREATMENT SPECIFICATIONS.



SECTION A-A

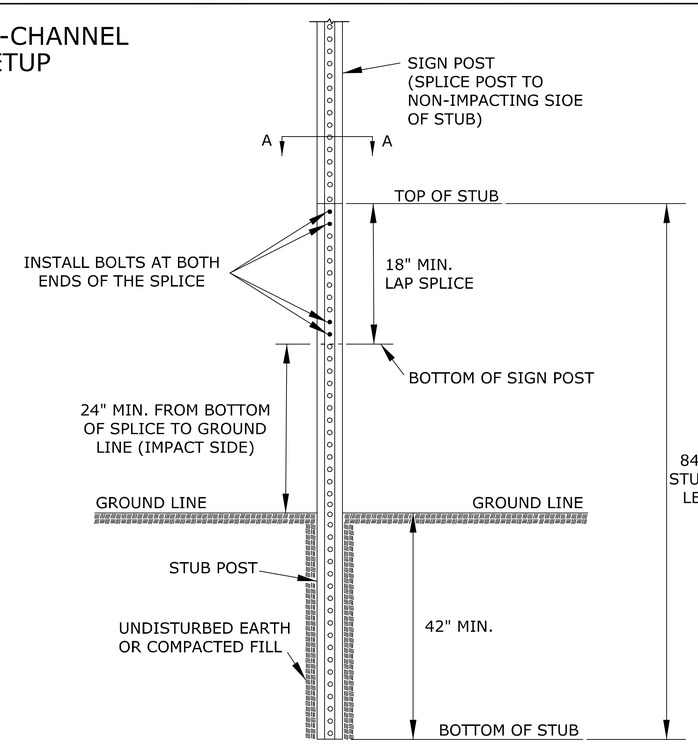


SECTION B-B



FRONT ELEVATION

3 LB/F U-CHANNEL SETUP

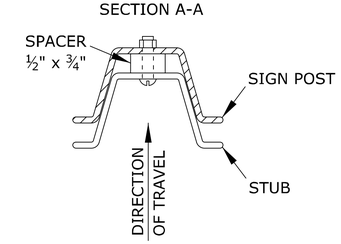


NOTES:

PLACE TWO BOLTS AT BOTH ENDS OF THE SPLICE THROUGH THE HOLES NEAREST THE ENDS OF THE SPLICE.

SPACERS WILL BE USED OVER THE BOLTS BETWEEN THE SPLICED PIECES OF U-CHANNEL. THREADED OR UNTHREADED SPACERS MAY BE USED. DO NOT SUBSTITUTE PIPE OR OTHER "ITEMS" FOR THE SPACERS.

SECTION A-A



NO.	DATE	REVISIONS	BY	APP'D
3	10/16/12	Added Spacer Dimension, Removed PSST Note	J.A.M.	K.P.
2	10/4/11	Removed Washer On PSST Detail	J.A.M.	K.P.
1	6/1/10	Modified Post Anchor Sleeve Dimension	J.A.M.	A.A.A.

KANSAS DEPARTMENT OF TRANSPORTATION

APPROVED TEMPORARY POST SETUPS

TE712

FHWA APPROVAL		10/16/12	APP'D	Kristina Pyle	
DESIGNED	B.A.H.	DETAILED	B.A.H.	QUANTITIES	TRACED
DESIGN CK.		DETAIL CK.		QUAN. CK.	TRACE CK.

KDOT Graphics Certified 10-23-2012

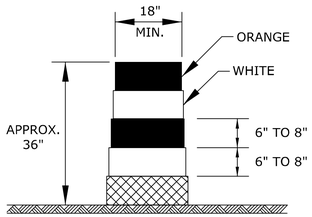
Sheet __ of ___

KDOT Graphics Certified

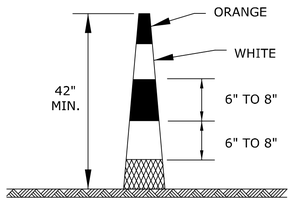
Plotted : 24-OCT-2012 07:53
Traffic

Drawn By : jmadrid
File : te712.dgn

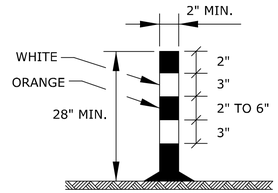
STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS		2012	XX	XXX



DRUM



CONICAL DELINEATOR



TUBULAR MARKER

TAPER FORMULAS:

L = WS FOR SPEEDS OF 45 MPH OR MORE

$L = WS^2/60$ FOR SPEEDS OF 40 MPH OR LESS

WHERE: L = MINIMUM LENGTH OF TAPER IN FEET
S = NUMERICAL VALUE OF POSTED SPEED PRIOR TO WORK STARTING IN MPH
W = WIDTH OF OFFSET IN FEET

DRUMS AND CONICAL DELINEATORS SHALL HAVE AT LEAST TWO ORANGE AND TWO WHITE 6" TO 8" WIDE RETROREFLECTIVE STRIPES. ADDITIONAL STRIPES MAY BE NON-RETROREFLECTIVE. IF THERE ARE NON-RETROREFLECTIVE SPACES BETWEEN ADJACENT STRIPES, THEY SHALL BE NO MORE THAN 3" WIDE.

ALL RETROREFLECTIVE STRIPES ON DRUMS SHALL BE ASTM TYPE III SHEETING. THE WHITE STRIPES ON CONICAL DELINEATORS SHALL BE ASTM TYPE III SHEETING. ORANGE STRIPES ON ALL CONICAL DELINEATORS SHALL BE FLUORESCENT ORANGE ASTM TYPE IV SHEETING.

THE TWO WHITE RETROREFLECTIVE STRIPES SHALL BE ASTM TYPE III SHEETING. STRIPING AS SHOWN FOR UP TO 42".

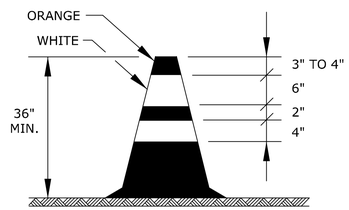
CHANNELIZER PLACEMENT:

(A) THE SPACING BETWEEN DEVICES IN TRANSITION AREA (TAPER) SHOULD NOT EXCEED A DISTANCE IN FEET EQUAL TO 1/2 THE POSTED SPEED LIMIT IN MPH PRIOR TO WORK STARTING.

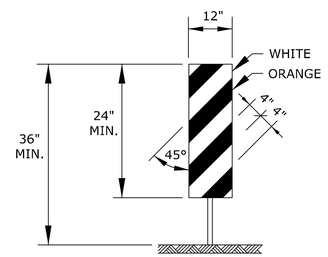
(B) THE SPACING BETWEEN DEVICES IN THE ADVANCED WARNING AREA AND THE ACTIVITY AREA SHOULD NOT EXCEED A DISTANCE IN FEET EQUAL TO TWO TIMES THE POSTED SPEED LIMIT IN MPH PRIOR TO WORK STARTING.

(C) CHANNELIZING DEVICES SHALL BE PLACED FOR OPTIMUM VISIBILITY, NORMALLY AT RIGHT ANGLES TO THE TRAFFIC FLOW.

(D) CHANNELIZING DEVICES PLACED ALONG SHOULDER EDGES OR IN DROPOFFS SHALL HAVE A MINIMUM OF 24" FROM THE TOP OF THE CHANNELIZING DEVICE TO THE TOP OF THE PAVEMENT.



TRAFFIC CONE



VERTICAL PANEL

TRAFFIC CONES MAY BE USED AS CHANNELIZING DEVICES FOR DAYTIME OPERATIONS ONLY. THEY WILL NOT BE PAID FOR SEPARATELY, BUT WILL BE SUBSIDIARY TO OTHER TRAFFIC CONTROL BID ITEMS. THE ENGINEER MAY REQUIRE THAT TRAFFIC CONES BE SUPPLEMENTED BY OTHER TRAFFIC CONTROL DEVICES IN CERTAIN SITUATIONS.

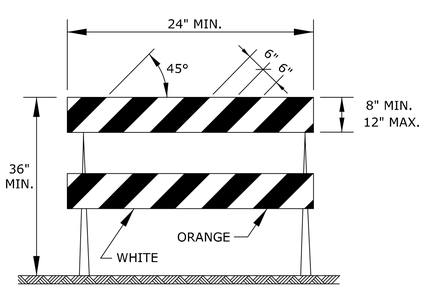
THE ENTIRE AREA OF VERTICAL PANELS, BOTH FRONT AND BACK, SHALL HAVE ASTM TYPE III SHEETING. THE STRIPES SHALL SLOPE DOWNWARD TO THE TRAFFIC SIDE FOR CHANNELIZATION.

ITEM	LOCATION	CROSS-OVERS	SHOOFLY DIVERSIONS	TANGENTS	TAPERS	RAMPS	HEAD TO HEAD	OBJECT IDENTIFIER	LEAD IN DEVICES	GORES
PORTABLE										
	DRUMS	YES	YES	YES	YES	YES	(1)	YES	YES	YES
	CONICAL DELINEATORS	YES	YES	YES	YES	YES	(1)	YES	YES	YES
	VERTICAL PANELS	(2)	(2)	(2)	(2)	(2)	(1,2)	YES	(2)	(2)
	DIRECTION INDICATOR BARRICADE	NO	NO	NO	YES	NO	NO	NO	NO	NO
	TYPE II BARRICADE	(2)	(2)	(2)	(2)	NO	NO	YES	NO	NO
FIXED										
	TUBULAR MARKERS	(3)	(3)	(3)	NO	(3)	YES	NO	YES	YES
	VERTICAL PANELS	(3)	(3)	(3)	(3)	(3)	(3)	YES	(2,3)	(2)

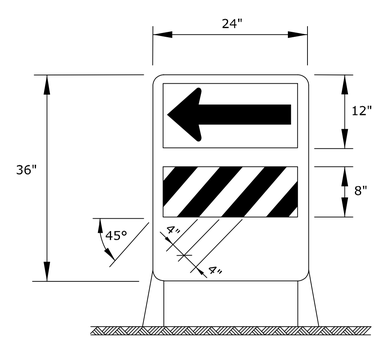
(1) NOT ALLOWED ON CENTERLINE DELINEATION ALONG FREEWAYS OR EXPRESSWAYS.

(2) THE STRIPES SHALL SLOPE DOWNWARD TO THE TRAFFIC SIDE FOR CHANNELIZATION.

(3) MAY BE USED UPON THE APPROVAL OF THE ENGINEER.



TYPE II BARRICADE



DIRECTION INDICATOR BARRICADE

FOR RAILS LESS THAN 36" LONG, 4" WIDE STRIPES MAY BE USED.

THE ENTIRE AREA OF BARRICADE RAILS, BOTH FRONT AND BACK, SHALL BE ASTM TYPE III SHEETING.

THE STRIPES SHALL SLOPE DOWNWARD TO THE TRAFFIC SIDE FOR CHANNELIZATION.

THE ARROW PANEL SHALL BE BLACK ON FLUORESCENT ORANGE ASTM TYPE IV SHEETING. THE STRIPES SHALL BE ORANGE AND WHITE ASTM TYPE III SHEETING SLOPING DOWNWARD IN THE DIRECTION TRAFFIC IS TO PASS.

THE DIRECTION INDICATOR BARRICADE SHALL BE USED IN SERIES TO DIRECT THE MOTORIST INTO THE INTENDED LANE OF TRAVEL.

THE ARROW PANEL SHOULD NOT BE VISIBLE TO OPPOSING TRAFFIC.

NO.	DATE	REVISIONS	BY	APP'D
3	10/16/12	Added Lead In Devices Into Matrix Table	J.A.M.	K.P.
2	10/4/11	Added Dimension To Tubular Marker Detail	J.A.M.	K.P.
1	4/20/09	Channelizer Placement & Traffic Cone Detail	J.A.M.	A.A.A.

KANSAS DEPARTMENT OF TRANSPORTATION

CHANNELIZING DEVICES

TE702

FHWA APPROVAL		10/16/12	APP'D	Kristina Pyle	
DESIGNED	L.E.R.	DETAILED	B.A.H.	QUANTITIES	TRACED
DESIGN CK.		DETAIL CK.		QUAN. CK.	TRACE CK.

KDOT Graphics Certified 10-23-2012

Sheet __ of ___

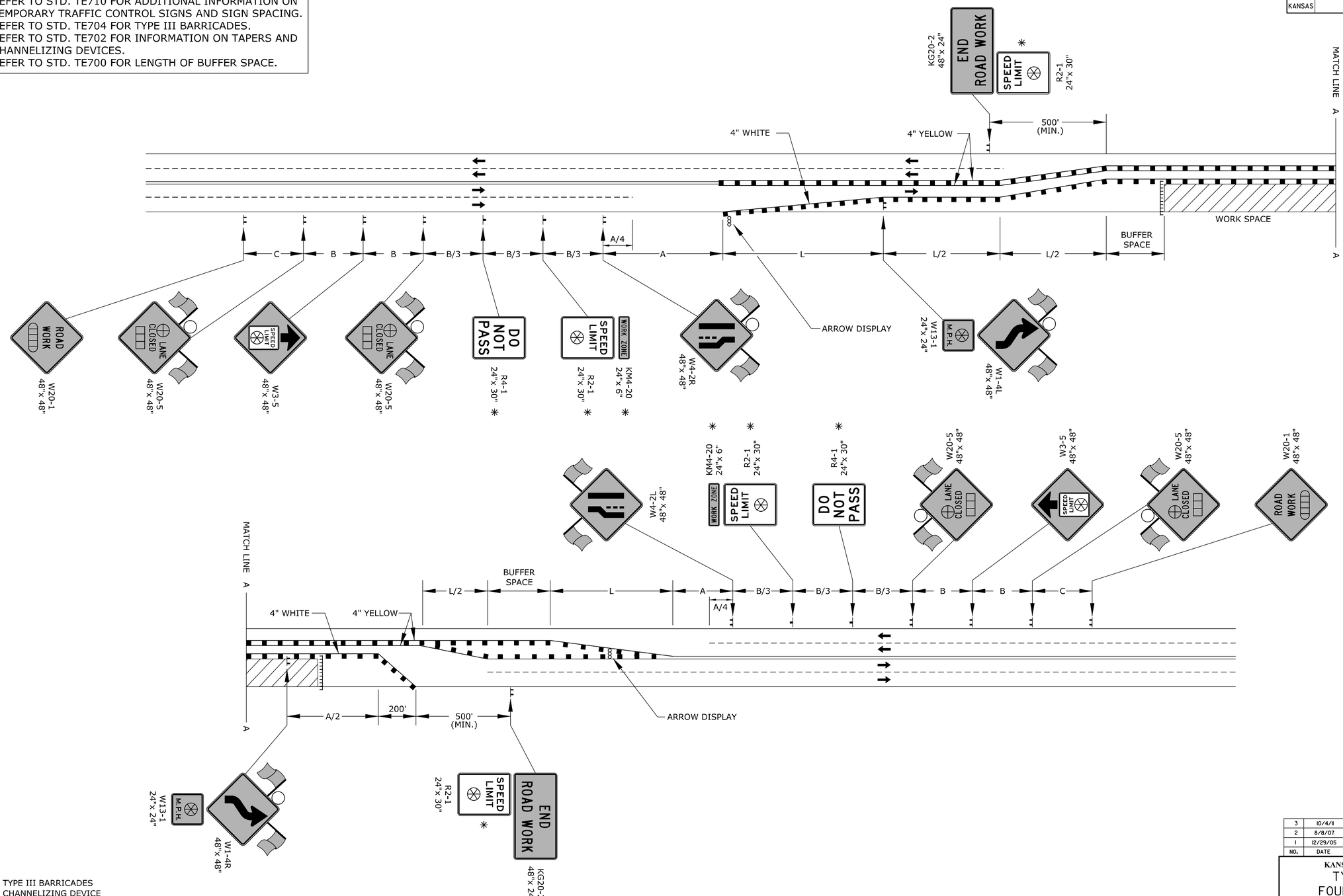
KDOT Graphics Certified

Plotted : 24-OCT-2012 07:53
Traffic

Drawn By : jmadrid
File : te702.dgn

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS		2012	XX	XXX

REFER TO STD. TE710 FOR ADDITIONAL INFORMATION ON TEMPORARY TRAFFIC CONTROL SIGNS AND SIGN SPACING.
REFER TO STD. TE704 FOR TYPE III BARRICADES.
REFER TO STD. TE702 FOR INFORMATION ON TAPERS AND CHANNELIZING DEVICES.
REFER TO STD. TE700 FOR LENGTH OF BUFFER SPACE.



TYPE III BARRICADES
CHANNELIZING DEVICE
AHEAD, 1500 FT, OR 1 MILE
AHEAD, 1000 FT, 1500 FT, OR ½ MILE
RIGHT OR LEFT
SPEED TO BE DETERMINED BY THE ENGINEER
TYPE "A" LOW INTENSITY WARNING LIGHT

✳ FOR SPEEDS GREATER THAN 45 MPH USE FREEWAY / EXPRESSWAY SIZE SIGNS.

NO.	DATE	REVISIONS	BY	APP'D
3	10/4/11	Adjusted R2-1 and KM4-20 Sign Sizes	J.A.M.	K.P.
2	8/8/07	Sign Spacing Change	M.B.	A.A.A.
1	12/29/05	M4-20 Changed To KM4-20	M.B.	A.A.A.

KANSAS DEPARTMENT OF TRANSPORTATION

TYPICAL TRAFFIC CONTROL FOUR-LANE UNDIVIDED HIGHWAY ONE-HALF ROADWAY CLOSED

TE748

FHWA APPROVAL		10/4/11	APP'D	Kristina Pyle	
DESIGNED	B.A.H.	DETAILED	B.A.H.	QUANTITIES	TRACED
DESIGN CK.		DETAIL CK.		QUAN. CK.	TRACE CK.

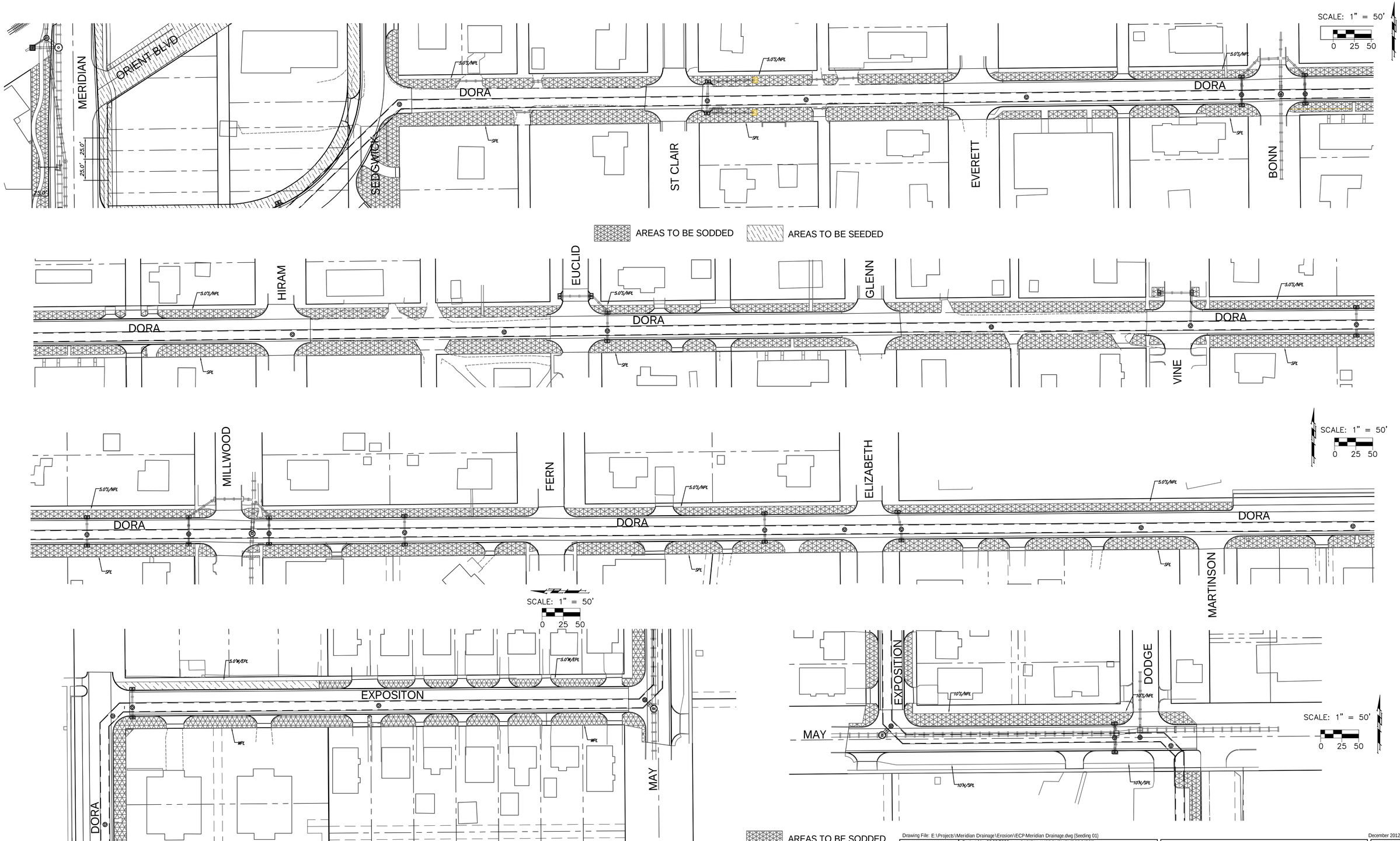
KDOT Graphics Certified 10-23-2012

Sheet __ of ___

KDOT Graphics Certified

Plotted : 24-OCT-2012 07:54
Traffic

Drawn By : jmadrid
File : te748.dgn



Drawing File: E:\Projects\Meridian Drainage\Erosion\ECP-Meridian Drainage.dwg [Seeding 01]

December 2012

Design: TPV
Drawn: STAFF
Approved: TPV
Scale: NOTED

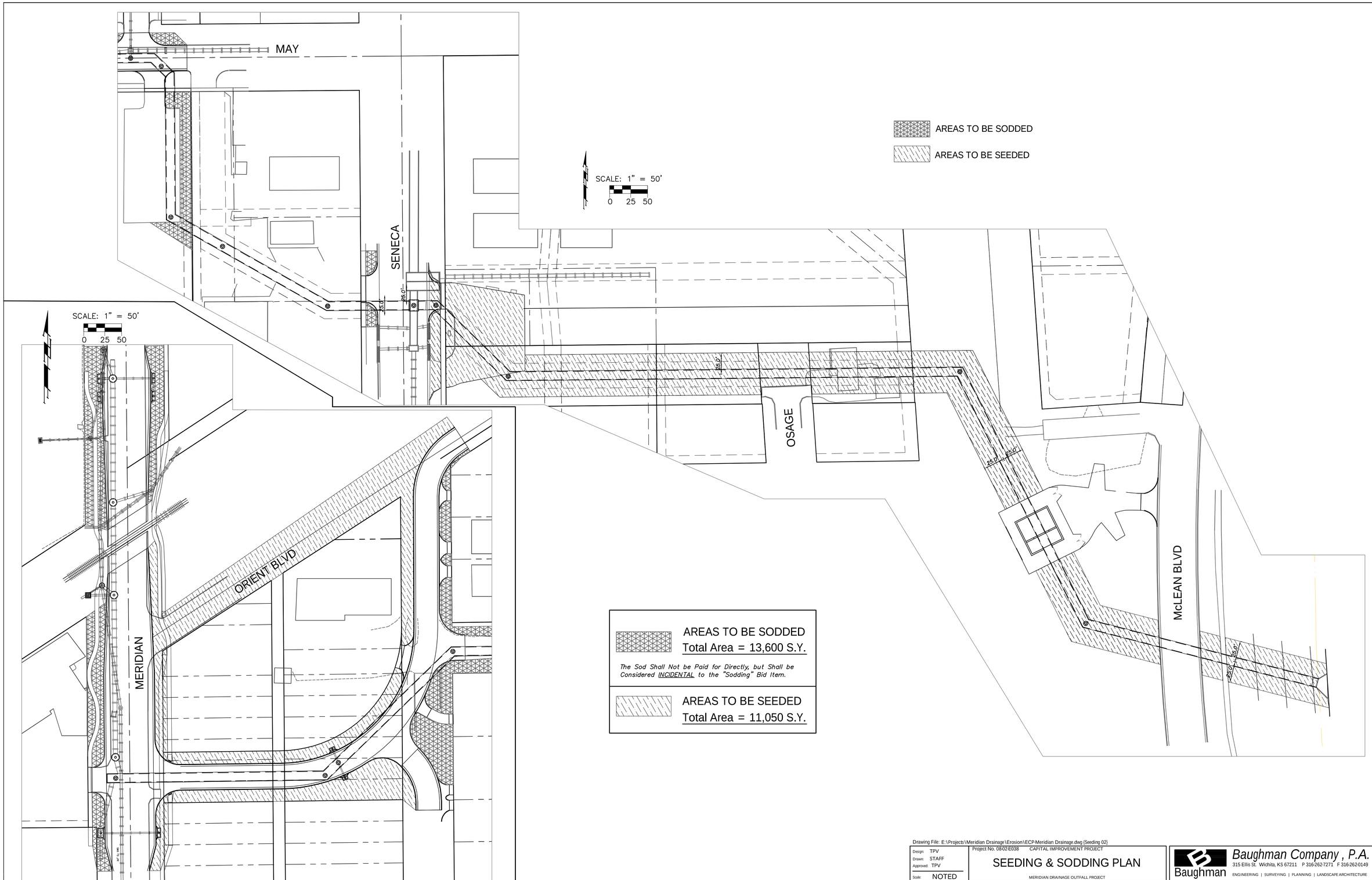
Project No. 08-02-E038 CAPITAL IMPROVEMENT PROJECT

SEEDING & SODDING PLAN

MERIDIAN DRAINAGE OUTFALL PROJECT

Baughman Company , P.A.
315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149
ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

SHEET
OF



Drawing File: E:\Projects\Meridian Drainage\Erosion\ECP-Meridian Drainage.dwg [Seeding 02]

December 2012

Design: TPV
Drawn: STAFF
Approved: TPV
Scale: NOTED

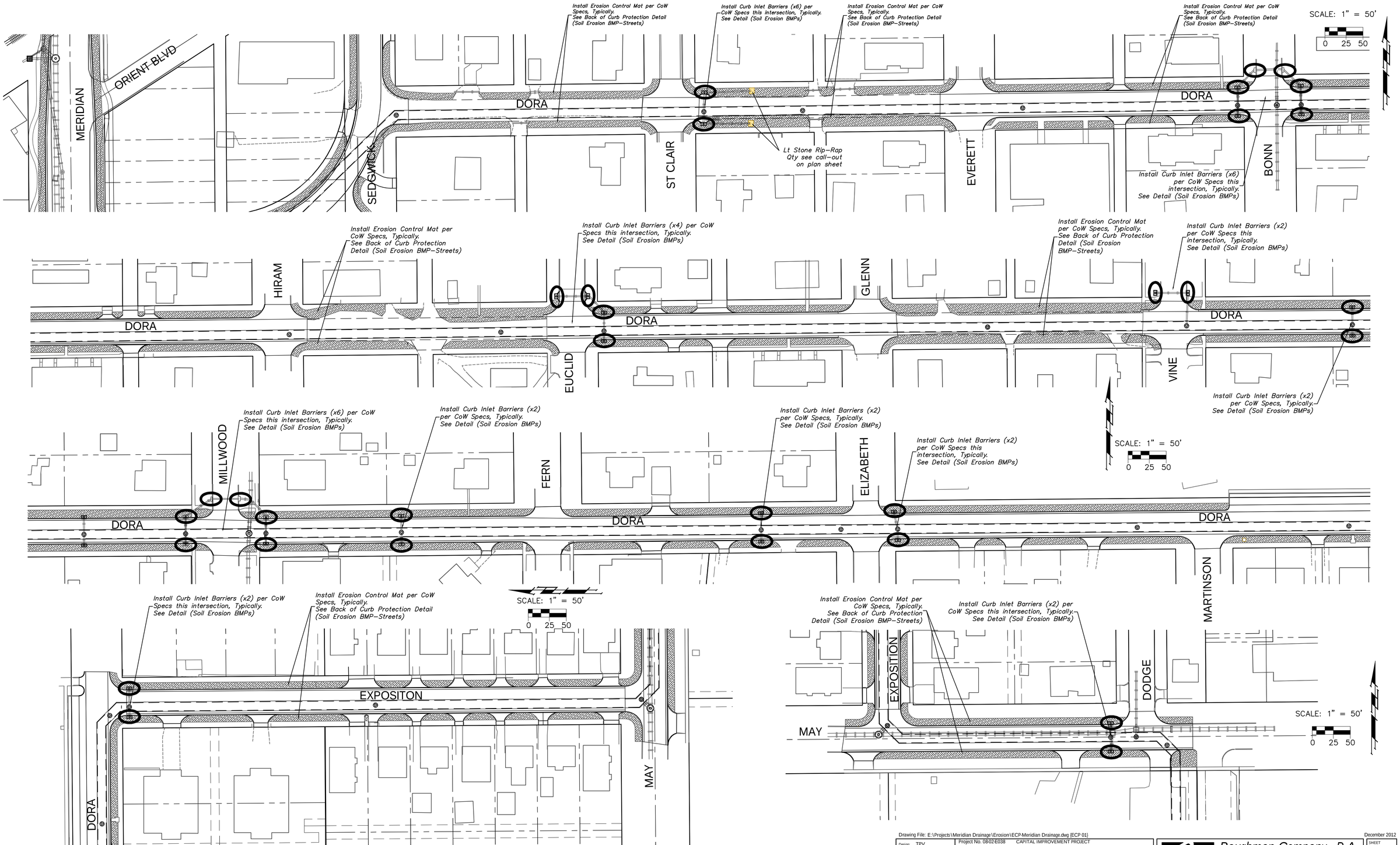
Project No. 0802-E038 CAPITAL IMPROVEMENT PROJECT

SEEDING & SODDING PLAN

MERIDIAN DRAINAGE OUTFALL PROJECT

Baughman Company , P.A.
315 Ellis St Wichita, KS 67211 P 316-262-7271 F 316-262-0149
ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

SHEET
OF



Drawing File: E:\Projects\Meridian Drainage\Erosion\ECP-Meridian Drainage.dwg [ECP 01]

December 2012

Design: TPV Drawn: STAFF Approved: TPV Scale: NOTED	Project No. 08-02-E038 CAPITAL IMPROVEMENT PROJECT EROSION CONTROL PLAN MERIDIAN DRAINAGE OUTFALL PROJECT	Baughman Company , P.A. 315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149 ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

SHEET

OF

EROSION CONTROL MEASURE	UNITS	QUANTITY
SILT FENCE	L.F.	225
RIPRAP	S.Y.	**
DROP INLET BARRIER	EA.	2
CURB INLET BARRIER	EA.	44
STRAW BALE DITCH CHECK	EA.	--
EARTHEN DIKES	L.F.	--
BACK OF CURB PROTECTION	L.F.	13,500
POND E.C. BLANKET	S.Y.	--
CONSTRUCTION ENTRANCE	EA.	4
QUANTITIES ARE FOR INFORMATION ONLY! CONTRACTOR SHALL VERIFY QUANTITIES PER SPECIFIC ENGINEERING PLAN SHEET.		

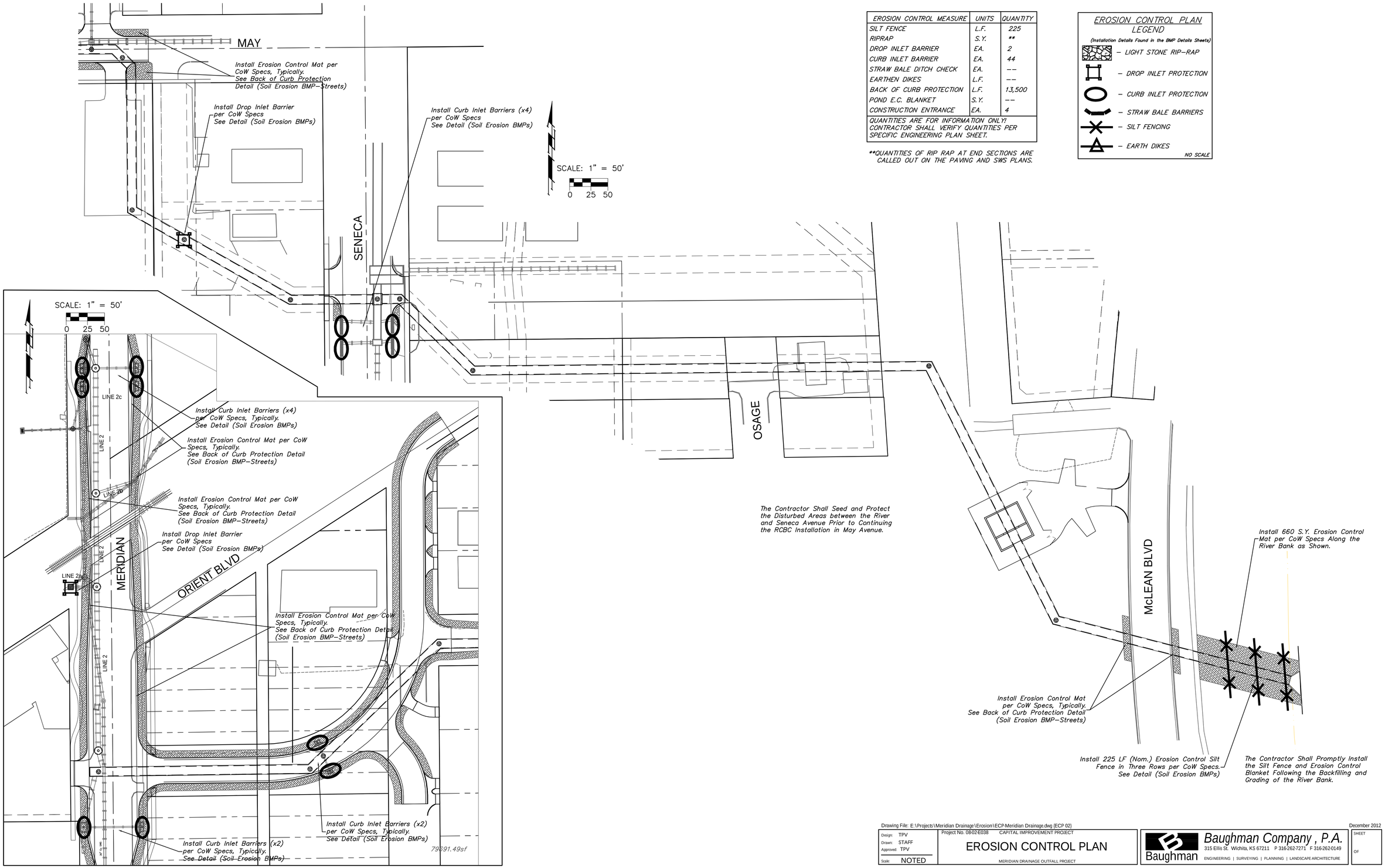
**QUANTITIES OF RIP RAP AT END SECTIONS ARE CALLED OUT ON THE PAVING AND SWS PLANS.

EROSION CONTROL PLAN LEGEND

(Installation Details Found in the BMP Details Sheets)

- LIGHT STONE RIP-RAP
- DROP INLET PROTECTION
- CURB INLET PROTECTION
- STRAW BALE BARRIERS
- SILT FENCING
- EARTH DIKES

NO SCALE



Drawing File: E:\Projects\Meridian Drainage\Erosion\ECP-Meridian Drainage.dwg [ECP 02]

December 2012

Design: TPV
Drawn: STAFF
Approved: TPV
Scale: NOTED

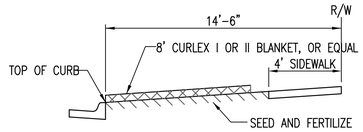
Project No. 0802-E038 CAPITAL IMPROVEMENT PROJECT

EROSION CONTROL PLAN

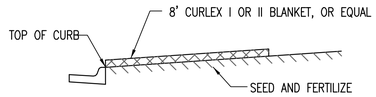
MERIDIAN DRAINAGE OUTFALL PROJECT

Baughman Company , P.A.
315 Ellis St Wichita, KS 67211 P 316-262-7271 F 316-262-0149
ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

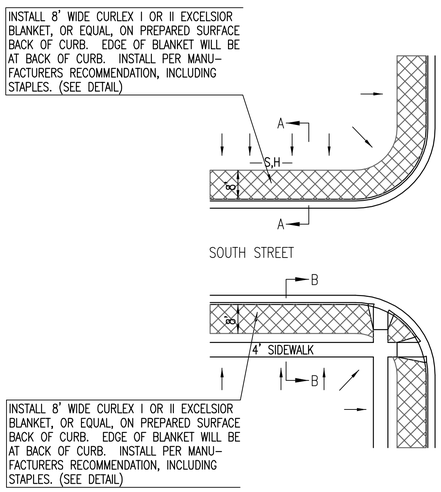
SHEET
OF



SECTION B-B



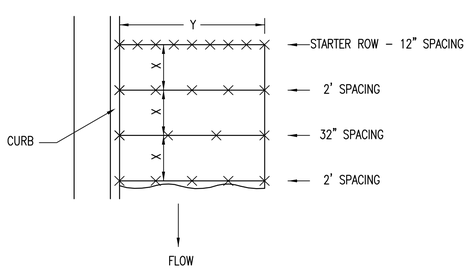
SECTION A-A



GENERAL NOTES

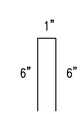
1. EXCELSIOR MAT TO BE INSTALLED WHEN SOD IS NOT SPECIFIED ON PROJECT.
2. EXCELSIOR BLANKET TO BE INSTALLED OVER SEED AND FERTILIZER, AS SPECIFIED IN THE PROJECT SPECIFICATIONS.
3. AFTER INSTALLATION OF EXCELSIOR BLANKET, AT LOCATIONS WHERE CONCENTRATED FLOW CARRIES SEDIMENT OVER THE CURB AND INTO THE GUTTER, SUPPLEMENTAL EROSION CONTROL DEVICES WILL BE INSTALLED BY THE CONTRACTOR AS NEEDED, TO FIX THE PROBLEM.

BACK OF CURB PROTECTION DETAIL



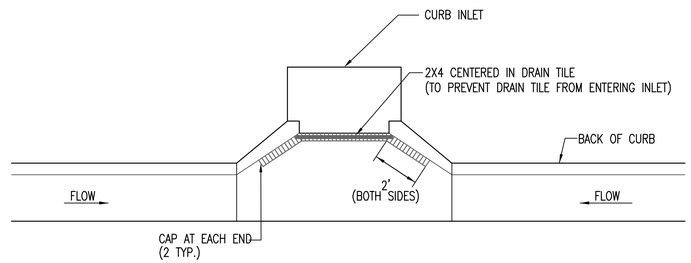
STAPLE PATTERN

NOTES: USE 6" SEAM OVERLAP
(X & Y = RECOMMENDED BY MANUFACTURE)



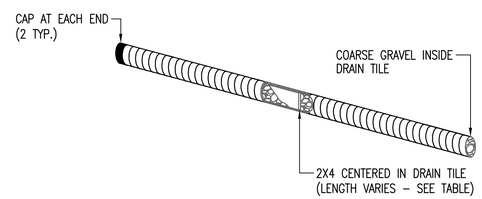
STAPLE

DETAILS FOR APPROVED EROSION CONTROL MAT



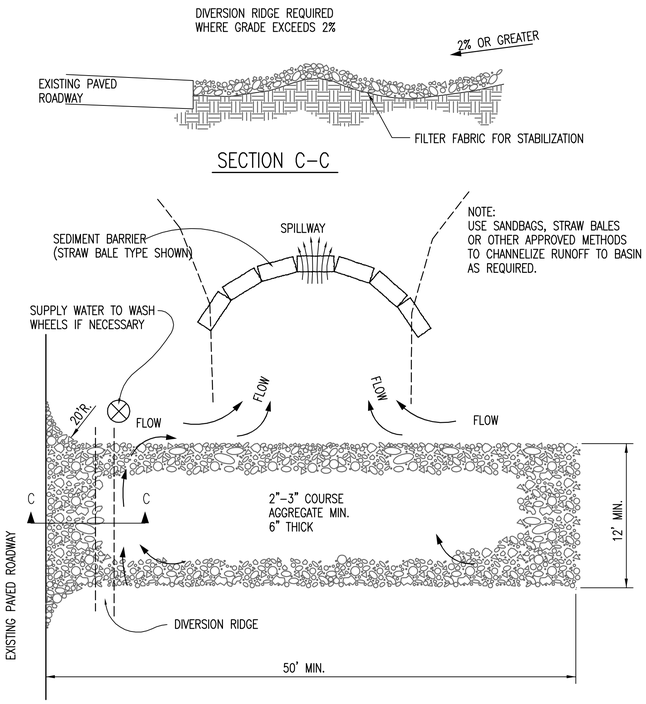
NOTE:
PLACE 4" PERFORATED PVC PIPE, FILLED WITH 1/2"-1" DIA. GRAVEL, IN FRONT OF CURB INLET AS SHOWN.

2X4 LENGTH	INLET TYPE	INLET OPENING
5'-6"	1-A	5'-0"
10'-6"	1-A	10'-0"
15'-6"	1-A	15'-0"



CURB INLET PROTECTION

4" PERFORATED PIPE W/ GRAVEL



STABILIZED CONSTRUCTION ENTRANCE

GENERAL NOTES

1. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE TOP DRESSING, REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT.
2. WHEN NECESSARY, WHEELS SHALL BE CLEANED PRIOR TO ENTRANCE ONTO PUBLIC RIGHT-OF-WAY.
3. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE THAT DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN, AS SHOWN ABOVE.
4. DRIVE ENTRANCES ONTO RESIDENTIAL LOTS WILL NOT BE REQUIRED TO HAVE THE SEDIMENT BARRIER SHOWN, BUT WHEEL WASHING MAY BE REQUIRED IF STABILIZED ENTRANCE IS NOT SUFFICIENT TO KEEP MUD FROM BEING TRACKED ONTO ADJACENT STREET. ENTRANCE SHALL EXTEND FROM BACK OF CURB TO DWELLING.

CITY OF WICHITA
PUBLIC WORKS & UTILITIES
ENGINEERING DIVISION

BACK OF CURB PROTECTION, CURB INLET PROTECTION AND CONSTRUCTION ENTRANCE

INTERIM CITY ENGINEER
GARY JANZEN, P.E.

PROJECT NUMBER	OCA NUMBER	DATE
		__/20__

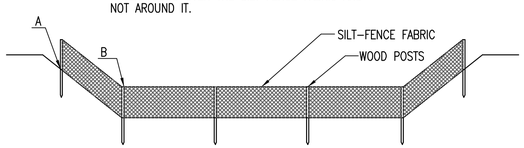
CITY ENGINEER'S OFFICE
CITY HALL - SEVENTH FLOOR
455 NORTH MAIN STREET
WICHITA, KANSAS 67202-1620
(316) 268-4501

DESIGN	DRAWN

SHEET
_ of _

SW-501

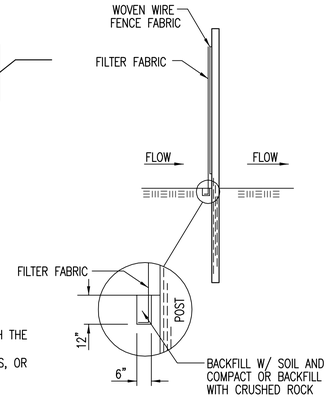
NOTE: POINT A MUST BE HIGHER THAN POINT B SO THAT WATER FLOWS OVER THE SILT FENCE FABRIC AND NOT AROUND IT.



ELEVATION

SILT FENCE DITCH CHECKS

(STREAM PROTECTION)



ANCHOR TRENCH DETAIL

MATERIAL SPECIFICATION:

SILT FENCE FABRIC SHOULD CONFORM TO THE AASHTO M288 96 SILT FENCE SPECIFICATION.
THE POSTS USED TO SUPPORT THE SILT FENCE FABRIC SHOULD BE A HARDWOOD MATERIAL WITH THE FOLLOWING MINIMUM DIMENSIONS: 2" SQUARE (NOMINAL) BY 4' LONG.
SILT FENCE FABRIC SHOULD BE ATTACHED TO THE WOODEN POSTS WITH STAPLES, WIRE, ZIP TIES, OR NAILS.

PLACEMENT:

PLACE SILT FENCE IN DITCHES WHERE IT IS UNLIKELY THAT IT WILL BE OVERTOPPED.
WATER SHOULD FLOW THROUGH A SILT FENCE DITCH CHECK, NOT OVER IT. SILT FENCE DITCH CHECKS OFTEN FAIL WHEN OVERTOPPED.
SILT FENCE DITCH CHECKS SHOULD BE PLACED PERPENDICULAR TO THE FLOWLINE OF THE DITCH.
THE SILT FENCE SHOULD EXTEND FAR ENOUGH SO THAT THE GROUND LEVEL AT THE ENDS OF THE FENCE IS HIGHER THAN THE TOP OF THE LOW POINT OF THE FENCE. THIS PREVENTS WATER FROM FLOWING AROUND THE CHECK.
SILT FENCE DITCH CHECKS SHOULD NOT BE PLACED IN DITCHES WHERE HIGH FLOWS ARE EXPECTED. ROCK CHECKS SHOULD BE USED INSTEAD.
SILT FENCE SHOULD BE PLACED IN DITCHES WITH SLOPES OF 6% OR LESS. FOR SLOPES STEEPER THAN 6%, ROCK CHECKS SHOULD BE USED.

THE FOLLOWING TABLE PROVIDES CHECK SPACING FOR A GIVEN DITCH GRADE:

DITCH CHECK DITCH GRADE (%)	SPACING CHECK SPACING (FEET)
0.5	200
1.0	200
2.0	100
3.0	65
4.0	50
5.0	40
6.0	30

PROPER INSTALLATION METHOD:

EXCAVATE A TRENCH PERPENDICULAR TO THE DITCH FLOWLINE THAT IS AT LEAST 12" DEEP BY 6" WIDE.
EXTEND THE TRENCH IN A STRAIGHT LINE ALONG THE ENTIRE LENGTH OF THE PROPOSED DITCH CHECK.
PLACE THE SOIL ON THE UPSTREAM SIDE OF THE TRENCH FOR LATER USE.
ROLL OUT A CONTINUOUS LENGTH OF SILT FENCE FABRIC ON THE DOWNSTREAM SIDE OF THE TRENCH.
PLACE THE EDGE OF THE FABRIC IN THE TRENCH STARTING AT THE TOP UPSTREAM EDGE OF THE TRENCH.
LINE TWO SIDES OF THE TRENCH WITH THE FABRIC AS SHOWN ON DETAIL. BACKFILL OVER THE FABRIC IN THE TRENCH WITH THE EXCAVATED SOIL AND COMPACT. AFTER FILLING THE TRENCH, APPROXIMATELY 24" TO 36" OF SILT FENCE FABRIC SHOULD REMAIN EXPOSED.
LAY THE EXPOSED SILT FENCE ON THE UPSTREAM SIDE OF THE TRENCH TO CLEAR AN AREA FOR DRIVING IN THE POSTS. JUST DOWNSTREAM OF THE TRENCH, DRIVE POSTS INTO THE GROUND TO A DEPTH OF AT LEAST 24". PLACE POSTS NO MORE THAN 4' APART.
ATTACH THE SILT FENCE TO THE ANCHORED POST WITH STAPLES, WIRE, ZIP TIES, OR NAILS.

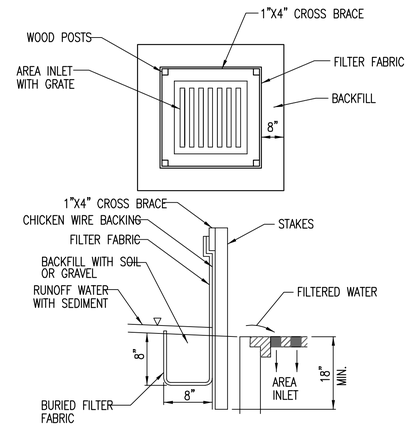
LIST OF COMMON PLACEMENT/INSTALLATION MISTAKES TO AVOID:

WATER SHOULD FLOW THROUGH A SILT FENCE DITCH CHECK–NOT OVER IT. PLACE SILT FENCE IN DITCHES WHERE IT IS UNLIKELY THAT IT WILL BE OVERTOPPED. SILT FENCE INSTALLATIONS QUICKLY DETERIORATE WHEN WATER OVERTOPS THEM.
DO NOT PLACE SILT FENCE POSTS ON THE UPSTREAM SIDE OF THE SILT FENCE FABRIC. IN THIS CONFIGURATION, THE FORCE OF THE WATER IS NOT RESTRICTED BY THE POSTS, BUT ONLY BY THE STAPLES (WIRE, ZIP TIES, NAILS, ETC.). THE SILT FENCE WILL RIP AND FAIL.
DO NOT PLACE A SILT FENCE DITCH CHECK DIRECTLY IN FRONT OF A CULVERT OUTLET. IT WILL NOT STAND UP TO THE CONCENTRATED FLOW.
DO NOT PLACE SILT FENCE DITCH CHECKS IN DITCHES THAT WILL LIKELY EXPERIENCE HIGH FLOWS. THEY WILL NOT STAND UP TO CONCENTRATED FLOW.
FOLLOW PRESCRIBED DITCH CHECK SPACING GUIDELINES. IF SPACING GUIDELINES ARE EXCEEDED, EROSION WILL OCCUR BETWEEN THE DITCH CHECKS.
DO NOT ALLOW WATER TO FLOW AROUND THE DITCH CHECK. MAKE SURE THAT THE DITCH CHECK IS LONG ENOUGH SO THAT THE GROUND LEVEL AT THE ENDS OF THE FENCE IS HIGHER THAN THE LOW POINT ON THE TOP OF THE FENCE.
DO NOT PLACE SILT FENCE DITCH CHECKS IN CHANNELS WITH SHALLOW SOILS UNDERLAIN BY ROCK. IF THE CHECK IS NOT ANCHORED SUFFICIENTLY, IT WILL WASH OUT.

INSPECTION AND MAINTENANCE:

SILT FENCE DITCH CHECKS SHOULD BE INSPECTED EVERY 7 DAYS AND WITHIN 24 HOURS OF A RAINFALL OF 1/2" OR MORE. THE FOLLOWING IS A LIST OF QUESTIONS THAT SHOULD BE ADDRESSED DURING EACH INSPECTION:

DOES WATER FLOW AROUND THE DITCH CHECK?
DOES WATER FLOW UNDER THE DITCH CHECK?
DOES THE SILT FENCE SAG EXCESSIVELY?
HAS THE SILT FENCE TORN OR BECOME DETACHED FROM THE POSTS?
DOES SEDIMENT NEED TO BE REMOVED FROM BEHIND THE DITCH CHECK?



SILT FENCE BARRIERS FOR AREA INLETS

(INLET PROTECTION)

MATERIAL SPECIFICATION:

SILT FENCE FABRIC SHOULD CONFORM TO THE AASHTO M288 96 SILT FENCE SPECIFICATION.
THE WIRE OR POLYMERIC MESH BACKING USED TO HELP SUPPORT THE SILT FENCE FABRIC SHOULD CONFORM TO THE AASHTO M288 96 SILT FENCE SPECIFICATION.
THE POSTS USED TO SUPPORT THE SILT FENCE FABRIC SHOULD BE A HARDWOOD MATERIAL WITH THE FOLLOWING MINIMUM DIMENSIONS: 2" SQUARE (NOMINAL) BY 4' LONG.
THE MATERIAL USED TO FRAME THE TOPS OF THE POSTS SHOULD BE 1" BY 4" BOARDS.
SILT FENCE FABRIC AND SUPPORT BACKING SHOULD BE ATTACHED TO THE WOODEN POSTS AND FRAME WITH STAPLES, WIRE, ZIP TIES, OR NAILS.

PLACEMENT:

PLACE A SILT FENCE DROP INLET BARRIER IN A LOCATION WHERE IT IS UNLIKELY TO BE OVERTOPPED.
WATER SHOULD FLOW THROUGH SILT FENCE, NOT OVER IT. SILT FENCE BARRIERS FOR AREA INLETS OFTEN FAIL WHEN REPEATEDLY OVERTOPPED.
WHEN USED AS A BARRIER FOR AREA INLETS, SILT FENCE FABRIC AND POSTS MUST BE SUPPORTED AT THE TOP BY A WOODEN FRAME.
WHEN A SILT FENCE BARRIER FOR AREA INLETS IS LOCATED NEAR AN INLET THAT HAS STEEP APPROACH SLOPES, THE STORAGE CAPACITY BEHIND THE BARRIER IS DRASTICALLY REDUCED. TIMELY REMOVAL OF SEDIMENT MUST OCCUR FOR A BARRIER TO OPERATE PROPERLY IN THIS LOCATION.

PROPER INSTALLATION METHOD:

EXCAVATE A TRENCH AROUND THE PERIMETER OF THE AREA INLET THAT IS AT LEAST 8" DEEP BY 8" WIDE.
DRIVE POSTS TO A DEPTH OF AT LEAST 18" AROUND THE PERIMETER OF THE AREA INLET.
THE DISTANCE BETWEEN POSTS SHOULD BE 4' OR LESS. IF THE DISTANCE BETWEEN TWO ADJACENT CORNER POSTS IS MORE THAN 4', ADD ANOTHER POST(S) BETWEEN THEM.
CONNECT THE TOPS OF ALL THE POSTS WITH A WOODEN FRAME MADE OF 1" BY 4" BOARDS. USE NAILS OR SCREWS FOR FASTENING.
ATTACH THE WIRE OR POLYMERIC–MESH BACKING TO THE OUTSIDE OF THE POST/FRAME STRUCTURE WITH STAPLES, WIRE, ZIP TIES, OR NAILS.
ROLL OUT A CONTINUOUS LENGTH OF SILT FENCE FABRIC LONG ENOUGH TO WRAP AROUND THE PERIMETER OF THE AREA INLET. ADD MORE LENGTH FOR OVERLAPPING THE FABRIC JOINT. PLACE THE EDGE OF THE FABRIC IN THE TRENCH, STARTING AT THE OUTSIDE EDGE OF THE TRENCH. LINE ALL THREE SIDES OF THE TRENCH WITH THE FABRIC. BACKFILL OVER THE FABRIC IN THE TRENCH WITH THE EXCAVATED SOIL AND COMPACT. AFTER FILLING THE TRENCH, APPROXIMATELY 24" TO 36" OF SILT FENCE FABRIC SHOULD REMAIN EXPOSED.
ATTACH THE SILT FENCE TO THE OUTSIDE OF THE POST/FRAME STRUCTURE WITH STAPLES, WIRE, ZIP TIES, OR NAILS. THE JOINT SHOULD BE OVERLAPPED TO THE NEXT POST.

NOTE: WHEN A SILT FENCE BARRIER FOR AREA INLET IS PLACED IN A SHALLOW MEDIAN DITCH, MAKE SURE THAT THE TOP OF THE BARRIER IS NOT HIGHER THAN THE PAVED ROAD. IN THIS CONFIGURATION, WATER MAY SPREAD ONTO THE ROADWAY CAUSING A HAZARDOUS CONDITION.

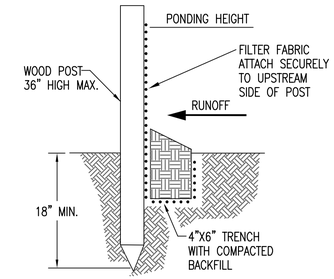
LIST OF COMMON PLACEMENT/INSTALLATION MISTAKES TO AVOID:

WATER SHOULD FLOW THROUGH A SILT FENCE BARRIER FOR AREA INLET–NOT OVER IT. PLACE A SILT FENCE BARRIER FOR AREA INLET IN A LOCATION WHERE IT IS UNLIKELY TO BE OVERTOPPED. SILT FENCE BARRIER FOR AREA INLETS OFTEN FAIL WHEN REPEATEDLY OVERTOPPED.
DO NOT PLACE POSTS ON THE OUTSIDE OF THE SILT FENCE BARRIER FOR AREA INLET. IN THIS CONFIGURATION, THE FORCE OF THE WATER IS NOT RESISTED BY THE POSTS, BUT ONLY BY THE STAPLES (WIRE, ZIP TIES, NAILS, ETC.). THE SILT FENCE WILL RIP AND FAIL.
DO NOT INSTALL SILT FENCE BARRIER FOR AREA INLETS WITHOUT FRAMING THE TOP OF THE POSTS.
THE CORNER POSTS AROUND AREA INLETS ARE STRESSED IN TWO DIRECTIONS WHEREAS A NORMAL SILT FENCE IS ONLY STRESSED IN ONE DIRECTION. THIS ADDED STRESS REQUIRES MORE SUPPORT.

INSPECTION AND MAINTENANCE:

SILT FENCE BARRIER FOR AREA INLETS SHOULD BE INSPECTED EVERY 7 DAYS AND WITHIN 24 HOURS OF A RAINFALL OF 1/2" OR MORE. THE FOLLOWING IS A LIST OF QUESTIONS THAT SHOULD BE ADDRESSED DURING EACH INSPECTION:

DOES WATER FLOW UNDER THE SILT FENCE?
DOES THE SILT FENCE SAG EXCESSIVELY?
HAS THE SILT FENCE TORN OR BECOME DETACHED FROM THE POSTS?
DOES SEDIMENT NEED TO BE REMOVED FROM BEHIND THE AREA INLET BARRIER?



SILT FENCE BARRIERS

MATERIAL SPECIFICATION:

SILT FENCE FABRIC SHOULD CONFORM TO THE AASHTO M288 96 SILT FENCE SPECIFICATION.
THE POSTS USED TO SUPPORT THE SILT FENCE FABRIC SHOULD BE A HARDWOOD MATERIAL WITH THE FOLLOWING MINIMUM DIMENSIONS: 2" SQUARE (NOMINAL) BY 4' LONG.
SILT FENCE FABRIC SHOULD BE ATTACHED TO THE WOODEN POSTS WITH STAPLES, WIRE, ZIP TIES, OR NAILS.

PLACEMENT:

A SLOPE BARRIER SHOULD BE USED AT THE TOE OF A SLOPE WHEN A DITCH DOES NOT EXIST. THE SLOPE BARRIER SHOULD BE PLACED ON NEARLY LEVEL GROUND 5' TO 10' AWAY FROM THE TOE OF A SLOPE. THE BARRIER IS PLACED AWAY FROM THE TOE OF THE SLOPE TO PROVIDE ADEQUATE STORAGE FOR SETTLING OUT SEDIMENT.
WHEN PRACTICABLE, SILT FENCE SLOPE BARRIERS SHOULD BE PLACED ALONG CONTOURS TO AVOID A CONCENTRATION OF FLOW.
SILT FENCE SLOPE BARRIERS CAN ALSO BE PLACED ALONG RIGHT–OF–WAY FENCE LINES TO KEEP SEDIMENT FROM CROSSING ONTO ADJACENT PROPERTY. WHEN PLACED IN THIS MANNER, THE SLOPE BARRIER WILL NOT LIKELY FOLLOW CONTOURS.

PROPER INSTALLATION METHOD:

EXCAVATE A TRENCH THE LENGTH OF THE PLANNED SLOPE BARRIER THAT IS 6" DEEP BY 4" WIDE.
MAKE SURE THAT THE TRENCH IS EXCAVATED ALONG A SINGLE CONTOUR. WHEN PRACTICABLE, SLOPE BARRIERS SHOULD BE PLACED ALONG CONTOURS TO AVOID A CONCENTRATION OF FLOW. PLACE THE SOIL ON THE UPSLOPE SIDE OF THE TRENCH FOR LATER USE.
ROLL OUT A CONTINUOUS LENGTH OF SILT FENCE FABRIC ON THE DOWNSLOPE SIDE OF THE TRENCH.
PLACE THE EDGE OF THE FABRIC IN THE TRENCH STARTING AT THE TOP UPSLOPE EDGE. LINE ALL THREE SIDES OF THE TRENCH WITH THE FABRIC. BACKFILL OVER THE FABRIC IN THE TRENCH WITH THE EXCAVATED SOIL AND COMPACT. AFTER FILLING THE TRENCH, APPROXIMATELY 24" TO 36" OF SILT–FENCE FABRIC SHOULD REMAIN EXPOSED.
LAY THE EXPOSED SILT FENCE UPSLOPE OF THE TRENCH TO CLEAR AN AREA FOR DRIVING IN THE POSTS. JUST DOWNSLOPE OF THE TRENCH, DRIVE POSTS INTO THE GROUND TO A DEPTH OF AT LEAST 18".
PLACE POSTS NO MORE THAN 4' APART.
ATTACH THE SILT FENCE TO THE ANCHORED POST WITH STAPLES, WIRE, ZIP TIES, OR NAILS.

LIST OF COMMON PLACEMENT/INSTALLATION MISTAKES TO AVOID:

WHEN PRACTICABLE, DO NOT PLACE SILT FENCE SLOPE BARRIERS ACROSS CONTOURS. SLOPE BARRIERS SHOULD BE PLACED ALONG CONTOURS TO AVOID A CONCENTRATION OF FLOW. WHEN THE FLOW CONCENTRATES, IT OVERTOPS THE BARRIER AND THE SILT FENCE SLOPE BARRIER QUICKLY DETERIORATES.
DO NOT PLACE SILT–FENCE POSTS ON THE UPSLOPE SIDE OF THE SILT FENCE FABRIC. IN THIS CONFIGURATION, THE FORCE OF THE WATER IS NOT RESTRICTED BY THE POSTS, BUT ONLY BY THE STAPLES (WIRE, ZIP TIES, NAILS, ETC.). THE SILT FENCE WILL RIP AND FAIL.
DO NOT PLACE SILT FENCE SLOPE BARRIERS IN AREAS WITH SHALLOW SOILS UNDERLAIN BY ROCK. IF THE BARRIER IS NOT SUFFICIENTLY ANCHORED, IT WILL WASH OUT.
SILT FENCE SLOPE BARRIERS MUST BE DUG INTO THE GROUND–SILT FENCE AT GROUND LEVEL DOES NOT WORK BECAUSE WATER WILL FLOW UNDERNEATH.

INSPECTION AND MAINTENANCE:

SILT FENCE SLOPE BARRIERS SHOULD BE INSPECTED EVERY 7 DAYS AND WITHIN 24 HOURS OF A RAINFALL OF 1/2" OR MORE. THE FOLLOWING IS A LIST OF QUESTIONS THAT SHOULD BE ADDRESSED DURING EACH INSPECTION:

ARE THERE ANY POINTS ALONG THE SLOPE BARRIER WHERE WATER IS CONCENTRATING?
DOES WATER FLOW UNDER THE SLOPE BARRIER?
DO THE SILT FENCES SAG EXCESSIVELY?
HAS THE SILT FENCE TORN OR BECOME DETACHED FROM THE POSTS?
DOES SEDIMENT NEED TO BE REMOVED FROM BEHIND THE SLOPE BARRIER?

CITY OF WICHITA
PUBLIC WORKS & UTILITIES ENGINEERING DIVISION

SILT FENCE DITCH CHECK AND BARRIER DETAILS

INTERIM CITY ENGINEER
GARY JANZEN, P.E.

PROJECT NUMBER	OCA NUMBER	DATE
___-_____	_____	__/20__

CITY ENGINEER'S OFFICE
CITY HALL - SEVENTH FLOOR
455 NORTH MAIN STREET
WICHITA, KANSAS 67202-1620
(316) 268-4501

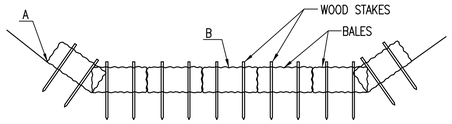
DESIGN | DRAWN

SHEET _ of _

SW–502

Saved 10-15-2012 8:13:12 AM by TYLER
Plot Scale 1:1 12-05-2012 10:30:55 AM by TYLER
E:\Projects\Meridian Drainage\Erosion\SW-502-Silt Fc Dt Check and Barr Dtls

NOTE: POINT A MUST BE HIGHER THAN POINT B
SO THAT WATER FLOWS OVER THE BALES AND
NOT AROUND THEM.



STRAW BALE DITCH CHECKS

MATERIAL SPECIFICATION:

BALE DITCH CHECKS MAY BE CONSTRUCTED OF WHEAT STRAW, OAT STRAW, PRAIRIE HAY, OR BROMEGRASS HAY THAT IS FREE OF WEEDS DECLARED NOXIOUS BY THE KANSAS STATE BOARD OF AGRICULTURE.
THE STAKES USED TO ANCHOR THE BALES SHOULD BE A HARDWOOD MATERIAL WITH THE FOLLOWING MINIMUM DIMENSIONS: 2" SQUARE (NOMINAL) BY 4' LONG.
OPTIONAL: THE DOWNSTREAM SCOUR APRON SHOULD BE CONSTRUCTED OF A DOUBLE-NETTED STRAW EROSION-CONTROL BLANKET AT LEAST 6' WIDE.
OPTIONAL: THE METAL LANDSCAPE STAPLES USED TO ANCHOR THE EROSION-CONTROL BLANKET SHOULD BE AT LEAST 8" LONG.

PLACEMENT:

BALE DITCH CHECKS SHOULD BE PLACED PERPENDICULAR TO THE FLOWLINE OF THE DITCH.
THE DITCH CHECK SHOULD EXTEND FAR ENOUGH SO THAT THE GROUND LEVEL AT THE ENDS OF THE CHECK IS HIGHER THAN THE TOP OF THE LOWEST CENTER BALE. THIS PREVENTS WATER FROM FLOWING AROUND THE CHECK.
STRAW BALE DITCH CHECKS SHOULD NOT BE PLACED IN DITCHES WHERE HIGH FLOWS ARE EXPECTED. ROCK CHECKS SHOULD BE USED INSTEAD.
BALES SHOULD BE PLACED IN DITCHES WITH SLOPES OF 6% OR LESS. FOR SLOPES STEEPER THAN 6%, ROCK CHECKS SHOULD BE USED.
THE FOLLOWING TABLE PROVIDES CHECK SPACING FOR A GIVEN DITCH GRADE:

DITCH CHECK SPACING

DITCH GRADE (%)	CHECK SPACING (FEET)
0.5	200
1.0	200
2.0	100
3.0	65
4.0	50
5.0	40
6.0	30

PROPER INSTALLATION METHOD:

EXCAVATE A TRENCH PERPENDICULAR TO THE DITCH FLOWLINE THAT IS 4" DEEP AND A BALE'S WIDTH WIDE. EXTEND THE TRENCH IN A STRAIGHT LINE ALONG THE ENTIRE LENGTH OF THE PROPOSED DITCH CHECK. PLACE THE SOIL ON THE UPSTREAM SIDE OF THE TRENCH-IT WILL BE USED LATER.
OPTIONAL: ON THE DOWNSTREAM SIDE OF THE TRENCH, ROLL OUT A LENGTH OF EROSION-CONTROL BLANKET (SCOUR APRON) EQUAL TO THE LENGTH OF THE TRENCH. PLACE THE UPSTREAM EDGE OF THE EROSION-CONTROL BLANKET ALONG THE BOTTOM UPSTREAM EDGE OF THE TRENCH. THE EROSION CONTROL BLANKET SHOULD BE ANCHORED IN THE TRENCH WITH ONE ROW OF 8" LANDSCAPE STAPLES PLACED ON 18" CENTERS. THE REMAINDER OF THE EROSION-CONTROL BLANKET (THE PORTION THAT IS NOT LYING IN THE TRENCH) WILL SERVE AS THE DOWNSTREAM SCOUR APRON. THIS SECTION OF THE BLANKET SHOULD BE ANCHORED TO THE GROUND WITH 8" LANDSCAPE STAPLES PLACED AROUND THE PERIMETER OF THE BLANKET ON 18" CENTERS. THE REMAINDER OF THE BLANKET SHOULD BE ANCHORED USING TWO EVENLY SPACED ROWS OF 8" LANDSCAPE STAPLES ON 18" CENTERS PLACED PERPENDICULAR TO THE FLOWLINE OF THE DITCH.
PLACE THE BALES IN THE TRENCH, MAKING SURE THAT THEY ARE BUTTED TIGHTLY. TWO STAKES SHOULD BE DRIVEN THROUGH EACH BALE ALONG THE CENTERLINE OF THE DITCH CHECK, APPROXIMATELY 6" TO 8" IN FROM THE BALE ENDS. STAKES SHOULD BE DRIVEN AT LEAST 12" INTO THE GROUND.
ONCE ALL THE BALES HAVE BEEN INSTALLED AND ANCHORED, PLACE THE EXCAVATED SOIL AGAINST THE UPSTREAM SIDE OF THE CHECK AND COMPACT IT. THE COMPACTED SOIL SHOULD BE NO MORE THAN 3" TO 4" DEEP AND EXTEND UPSTREAM NO MORE THAN 24".

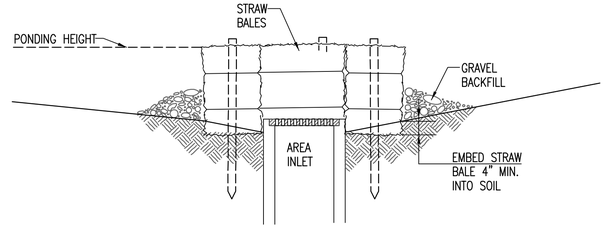
LIST OF COMMON PLACEMENT/INSTALLATION MISTAKES TO AVOID:

DO NOT PLACE A BALE DITCH CHECK DIRECTLY IN FRONT OF A CULVERT OUTLET. IT WILL NOT STAND UP TO THE CONCENTRATED FLOW.
DO NOT PLACE BALE DITCH CHECKS IN DITCHES THAT WILL LIKELY EXPERIENCE HIGH FLOWS. THEY WILL NOT STAND UP TO CONCENTRATED FLOW.
FOLLOW PRESCRIBED DITCH-CHECK SPACING GUIDELINES. IF SPACING GUIDELINES ARE EXCEEDED, EROSION WILL OCCUR BETWEEN THE DITCH CHECKS.
DO NOT ALLOW WATER TO FLOW AROUND THE DITCH CHECK. MAKE SURE THAT THE DITCH CHECK IS LONG ENOUGH SO THAT THE GROUND LEVEL AT THE ENDS OF THE CHECK IS HIGHER THAN THE TOP OF THE LOWEST CENTER BALE.
DO NOT PLACE BALE DITCH CHECKS IN CHANNELS WITH SHALLOW SOILS UNDERLAIN BY ROCK. IF THE CHECK IS NOT ANCHORED SUFFICIENTLY, IT WILL WASH OUT.
BALE DITCH CHECKS MUST BE DUG INTO THE GROUND. BALES AT GROUND LEVEL DO NOT WORK BECAUSE THEY ALLOW WATER TO FLOW UNDER THE CHECK.

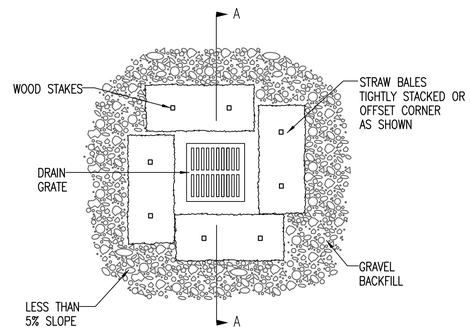
INSPECTION AND MAINTENANCE:

BALE DITCH CHECKS SHOULD BE INSPECTED EVERY 7 DAYS AND WITHIN 24 HOURS OF A RAINFALL OF 1/2" OR MORE. THE FOLLOWING IS A LIST OF QUESTIONS THAT SHOULD BE ADDRESSED DURING EACH INSPECTION:

DOES WATER FLOW AROUND THE DITCH CHECK?
DOES WATER FLOW UNDER THE DITCH CHECK?
DOES WATER FLOW THROUGH SPACES BETWEEN ABUTTING BALES?
ARE ANY BALES AND/OR SCOUR APRONS (OPTIONAL) DISLODGED?
ARE BALES DECOMPOSING DUE TO AGE AND/OR WATER DAMAGE?
DOES SEDIMENT NEED TO BE REMOVED FROM BEHIND THE DITCH CHECK?



SECTION A-A



STRAW BALE BARRIERS FOR AREA INLETS

(INLET PROTECTION)

MATERIAL SPECIFICATION:

BALE AREA INLET BARRIERS SHOULD BE CONSTRUCTED OF WHEAT STRAW, OAT STRAW, PRAIRIE HAY, OR BROMEGRASS HAY THAT IS FREE OF WEEDS DECLARED NOXIOUS BY THE KANSAS STATE BOARD OF AGRICULTURE.
THE STAKES USED TO ANCHOR THE BALES SHOULD BE A HARDWOOD MATERIAL WITH THE FOLLOWING MINIMUM DIMENSIONS: 2" SQUARE (NOMINAL) BY 4' LONG.
TWINE SHOULD BE USED TO BIND BALES. THE USE OF WIRE BINDING IS PROHIBITED BECAUSE IT DOES NOT BIODEGRADE READILY.

PLACEMENT:

BALE AREA INLET BARRIERS SHOULD BE PLACED DIRECTLY AROUND THE PERIMETER OF A DROP INLET.
WHEN A BALE AREA INLET BARRIER IS LOCATED NEAR AN INLET THAT HAS STEEP APPROACH SLOPES, THE STORAGE CAPACITY BEHIND THE BARRIER IS DRASTICALLY REDUCED. TIMELY REMOVAL OF SEDIMENT MUST OCCUR FOR A BARRIER TO OPERATE PROPERLY IN THIS LOCATION.

PROPER INSTALLATION METHOD:

EXCAVATE A TRENCH AROUND THE PERIMETER OF THE AREA INLET THAT IS AT LEAST 4" DEEP BY A BALE'S WIDTH WIDE.
PLACE THE BALES IN THE TRENCH, MAKING SURE THAT THEY ARE BUTTED TIGHTLY. SOME BALES MAY NEED TO BE SHORTENED TO FIT INTO THE TRENCH AROUND THE AREA INLET. TWO STAKES SHOULD BE DRIVEN THROUGH EACH BALE, APPROXIMATELY 6" TO 8" IN FROM THE BALE ENDS.
STAKES SHOULD BE DRIVEN AT LEAST 12" INTO THE GROUND.
ONCE ALL THE BALES HAVE BEEN INSTALLED AND ANCHORED, PLACE THE EXCAVATED SOIL AGAINST THE RECEIVING SIDE OF THE BARRIER AND COMPACT IT. THE COMPACTED SOIL SHOULD BE NO MORE THAN 3" TO 4" DEEP.
NOTE: WHEN A BALE AREA INLET BARRIER IS PLACED IN A SHALLOW MEDIAN DITCH, MAKE SURE THAT THE TOP OF THE BARRIER IS NOT HIGHER THAN THE PAVED ROAD. IN THIS CONFIGURATION, WATER MAY SPREAD ONTO THE ROADWAY CAUSING A HAZARDOUS CONDITION.

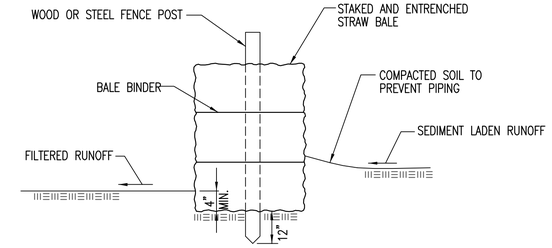
LIST OF COMMON PLACEMENT INSTALLATION MISTAKES TO AVOID:

BALES SHOULD BE PLACED DIRECTLY AGAINST THE PERIMETER OF THE AREA INLET. THIS ALLOWS OVERTOPPING WATER TO FLOW DIRECTLY INTO THE INLET INSTEAD OF ONTO NEARBY SOIL CAUSING SCOUR.
BALE AREA INLET BARRIERS MUST BE DUG INTO THE GROUND. BALES AT GROUND LEVEL DO NOT WORK BECAUSE THEY ALLOW WATER TO FLOW UNDER THE BARRIER.

INSPECTION AND MAINTENANCE:

BALE AREA INLET BARRIERS SHOULD BE INSPECTED EVERY 7 DAYS AND WITHIN 24 HOURS OF A RAINFALL 1/2" OR MORE. THE FOLLOWING IS A LIST OF QUESTIONS THAT SHOULD BE ADDRESSED DURING EACH INSPECTION:

DOES WATER FLOW UNDER THE AREA INLET BARRIER?
DOES WATER FLOW THROUGH SPACES BETWEEN ABUTTING BALES?
ARE ANY BALES DISLODGED?
ARE BALES DECOMPOSING DUE TO AGE AND/OR WATER DAMAGE?
DOES SEDIMENT NEED TO BE REMOVED FROM BEHIND THE AREA INLET BARRIER?



STRAW BALE BARRIERS

MATERIAL SPECIFICATION:

BALE SLOPE BARRIERS MAY BE CONSTRUCTED OF WHEAT STRAW, OAT STRAW, PRAIRIE HAY, OR BROMEGRASS HAY THAT IS FREE OF WEEDS DECLARED NOXIOUS BY THE KANSAS STATE BOARD OF AGRICULTURE.
THE STAKES USED TO ANCHOR THE BALES SHOULD BE A HARDWOOD MATERIAL WITH THE FOLLOWING MINIMUM DIMENSIONS: 2" SQUARE (NOMINAL) BY 4' LONG.
TWINE SHOULD BE USED TO BIND BALES. THE USE OF WIRE BINDING IS PROHIBITED BECAUSE IT DOES NOT BIODEGRADE READILY.

PLACEMENT:

A SLOPE BARRIER SHOULD BE USED AT THE TOE OF A SLOPE WHEN A DITCH DOES NOT EXIST. THE SLOPE BARRIER SHOULD BE PLACED ON NEARLY LEVEL GROUND 5' TO 10' AWAY FROM THE TOE OF A SLOPE. THE BARRIER IS PLACED AWAY FROM THE TOE OF THE SLOPE TO PROVIDE ADEQUATE STORAGE FOR SETTLING OUT SEDIMENT.
WHEN PRACTICABLE, BALE SLOPE BARRIERS SHOULD BE PLACED ALONG CONTOURS TO AVOID A CONCENTRATION OF FLOW.
BALE SLOPE BARRIERS CAN ALSO BE PLACED ALONG RIGHT-OF-WAY FENCE LINES TO KEEP SEDIMENT FROM CROSSING ONTO ADJACENT PROPERTY. WHEN PLACED IN THIS MANNER, THE SLOPE BARRIER WILL NOT LIKELY FOLLOW CONTOURS.

PROPER INSTALLATION METHOD:

EXCAVATE A TRENCH THE LENGTH OF THE PLANNED SLOPE BARRIER THAT IS 4" DEEP AND A BALE'S WIDTH WIDE. MAKE SURE THAT THE TRENCH IS EXCAVATED ALONG A SINGLE CONTOUR. WHEN PRACTICABLE, SLOPE BARRIERS SHOULD BE PLACED ALONG CONTOURS TO AVOID A CONCENTRATION OF FLOW. PLACE THE SOIL ON THE UPSLOPE SIDE OF THE TRENCH FOR LATER USE.
PLACE THE BALES IN THE TRENCH, MAKING SURE THAT THEY ARE BUTTED TIGHTLY. TWO STAKES SHOULD BE DRIVEN THROUGH EACH BALE ALONG THE CENTERLINE OF THE DITCH CHECK, APPROXIMATELY 6" TO 8" IN FROM THE BALE ENDS. STAKES SHOULD BE DRIVEN AT LEAST 12" INTO THE GROUND.
ONCE ALL THE BALES HAVE BEEN INSTALLED AND ANCHORED, PLACE THE EXCAVATED SOIL AGAINST THE UPSLOPE SIDE OF THE CHECK AND COMPACT IT. THE COMPACTED SOIL SHOULD BE NO MORE THAN 3" TO 4" DEEP.

LIST OF COMMON PLACEMENT/INSTALLATION MISTAKES TO AVOID:

WHEN PRACTICAL, DO NOT PLACE BALE SLOPE BARRIERS ACROSS CONTOURS. SLOPE BARRIERS SHOULD BE PLACED ALONG CONTOURS TO AVOID A CONCENTRATION OF FLOW. CONCENTRATED FLOW OVER A SLOPE BARRIER CREATES A SCOUR HOLE ON THE DOWNSLOPE SIDE OF THE BARRIER. THE SCOUR HOLE EVENTUALLY UNDERMINES THE BALES AND THE BARRIER FAILS.
DO NOT PLACE BALE SLOPE BARRIERS IN AREAS WITH SHALLOW SOILS UNDERLAIN BY ROCK. IF THE BARRIER IS NOT ANCHORED SUFFICIENTLY, IT WILL WASH OUT.
BALE SLOPE BARRIERS MUST BE DUG INTO THE GROUND. BALES AT GROUND LEVEL DO NOT WORK BECAUSE THEY ALLOW WATER TO FLOW UNDER THE BARRIER.

INSPECTION AND MAINTENANCE:

BALE SLOPE BARRIERS SHOULD BE INSPECTED EVERY 7 DAYS AND WITHIN 24 HOURS OF A RAINFALL OF 1/2" OR MORE. THE FOLLOWING IS A LIST OF QUESTIONS THAT SHOULD BE ADDRESSED DURING EACH INSPECTION:

ARE THERE ANY POINTS ALONG THE SLOPE BARRIER WHERE WATER IS CONCENTRATING?
DOES WATER FLOW UNDER THE SLOPE BARRIER?
DOES WATER FLOW THROUGH SPACES BETWEEN ABUTTING BALES?
ARE ANY BALES DISLODGED?
ARE BALES DECOMPOSING DUE TO AGE AND/OR WATER DAMAGE?
DOES SEDIMENT NEED TO BE REMOVED FROM BEHIND THE SLOPE BARRIER?

CITY OF WICHITA
PUBLIC WORKS & UTILITIES ENGINEERING DIVISION

STRAW BALE DITCH CHECK AND BARRIER DETAILS

INTERIM CITY ENGINEER
GARY JANZEN, P.E.

PROJECT NUMBER	OCA NUMBER	DATE
___-___	_____	__/20__

CITY ENGINEER'S OFFICE
CITY HALL - SEVENTH FLOOR
455 NORTH MAIN STREET
WICHITA, KANSAS 67202-1620
(316) 268-4501

DESIGN	DRAWN

SHEET
_ of _

SW-503

Saved 08-13-2012 11:16:06 AM by TERESA STEWART
Plot Scale 1:1 12-05-2012 10:31:56 AM by TYLER
E:\Projects\Meridian Drainage\Erosion\SW-503-Straw Bale Dt Check and Barr Dtls

GENERAL NOTES

1. THIS SHEET IS INTENDED TO PROVIDE GUIDELINES AS TO WHAT TYPES OF EROSION CONTROL DEVICES WILL BE INSTALLED DURING THE CONSTRUCTION PROCESS. CONTRACTORS ARE EXPECTED TO BID PROJECTS ACCORDINGLY.

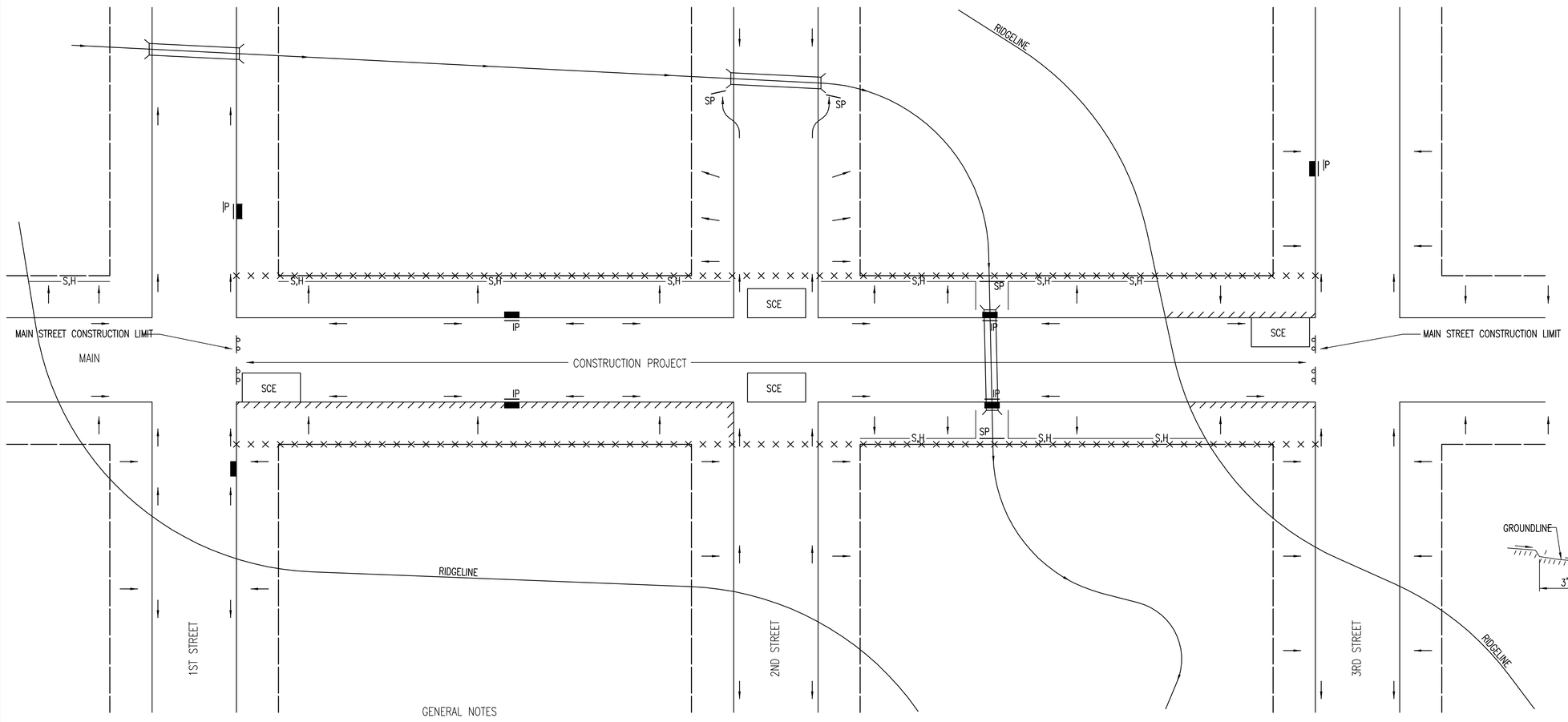
2. EROSION CONTROL DEVICES MUST BE MAINTAINED BY THE CONTRACTOR THROUGHOUT THE CONSTRUCTION PROCESS AND UNTIL THE DISTURBED EARTH IS RESTABILIZED.

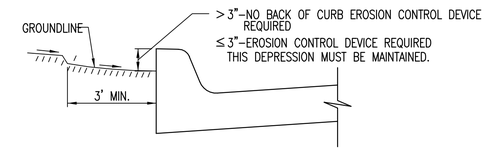
3. IF THE PROJECT WILL DISTURB 1 ACRE OR MORE, A FEDERAL/STATE NPDES STORMWATER PERMIT IS REQUIRED. A DETAILED STORMWATER POLLUTION PREVENTION PLAN, IS REQUIRED. THE EROSION CONTROL DEVICES SHOWN ON THIS SHEET ARE CONSIDERED TO BE THE MINIMUM TO BE SHOWN IN THE POLLUTION PREVENTION PLAN.

4. FOR PROJECTS DISTURBING LESS THAN 1 ACRE, CONTRACTORS ARE ENCOURAGED TO PREPARE STORMWATER POLLUTION PREVENTION PLANS PRIOR TO CONSTRUCTION. EROSION CONTROL DEVICES MUST BE USED ON ALL PROJECTS.

5. FAILURE TO USE AND MAINTAIN EROSION CONTROL DEVICES IS A VIOLATION OF SECTION 16.32 OF THE CITY CODE AND WILL SUBJECT THE CONTRACTOR TO THE PENALTIES PROVIDED FOR THEREIN.

6. THE APPLICATION OF EROSION CONTROL DEVICES SHOWN ON THIS SHEET IS FOR SITUATIONS NORMALLY ENCOUNTERED. FROM TIME TO TIME, SITUATIONS WILL ARISE THAT MAY REQUIRE A DIFFERENT DEVICE OTHER THAN THOSE SHOWN. EROSION CONTROL DEVICES, OTHER THAN THOSE SHOWN, MAY BE UTILIZED AS LONG AS THEY ARE EFFECTIVE AND MAINTAINED.





CURB BACKFILL DETAIL

THIS IS A TEMPORARY MEASURE ONLY, WHEN APPROVED BY THE PROJECT ENGINEER. THE DIRT GRADE BEHIND THE CURB SHALL BE BROUGHT TO THE TOP OF CURB, WITH TEMPORARY EROSION CONTROL MAT OR PERMANENT VEGETATION PLACED, PRIOR TO THE COMPLETION OF ALL PROJECTS.

LEGEND

— — — —	R–O–W LIMITS
→	DRAINAGE FLOW PATH
× × × × ×	R/W LIMIT WITHIN CONSTRUCTION LIMIT
▬	STORM WATER INLETS
IP	INLET PROTECTION
—S,H—	SILT FENCE OR HAY BALE BARRIER
SP	STREAM PROTECTION
SCE	STABILIZED CONSTRUCTION ENTRANCE
//////	BACK OF CURB PROTECTION

GENERAL NOTES

1. THE INTENT OF ALL EROSION CONTROL DEVICES IS TO KEEP ALL SEDIMENT CONFINED TO THE CONSTRUCTION SITE, AND OUT OF ALL UNDERGROUND PIPES, DITCHES, LAKES, AND OTHER DRAINAGE FACILITIES, AND OFF OF STREETS.

2. THE POINT OF COMPLIANCE IS GENERALLY THE RIGHT–OF–WAY LINES WITHIN THE LIMITS OF CONSTRUCTION.

3. EROSION CONTROL DEVICES WILL BE REQUIRED AT ALL POINTS ALONG THE PROJECT WHERE DISTURBED EARTH CAN DRAIN ONTO PRIVATE PROPERTY.

4. INLET PROTECTION DEVICES WILL BE REQUIRED WHEREVER WATER CAN DRAIN OFF THE PROJECT SITE INTO AN INLET, INCLUDING ANY SIDE STREET INLETS.

5. EROSION CONTROL DEVICES SHALL BE INSTALLED AT CREEK CROSSINGS SO AS TO PREVENT SEDIMENT FROM ENTERING THEREIN.

6. STABILIZED CONSTRUCTION ENTRANCES SHALL BE PROVIDED, AS NEEDED, TO PREVENT MUD FROM TRACKING ONTO STREETS NOT UNDER CONSTRUCTION AND ON STREETS WITHIN THE PROJECT LIMITS IF TRAFFIC IS BEING MAINTAINED THROUGH THE PROJECT.

7. ANY MUD TRACKED ONTO STREETS MUST BE REMOVED AT THE END OF EACH WORK DAY.

8. THE CONTACTOR WILL BE REQUIRED TO PLACE EROSION CONTROL DEVICES BACK OF CURB, WHENEVER WATER CAN DRAIN OVER CURB, TO KEEP ERODED SOIL OUT OF THE GUTTERLINES, IN ACCORDANCE WITH THE FOLLOWING:
   A. THE DEVICE REQUIRED WILL BE APPROVED EROSION CONTROL MAT LISTED ON THE CITY'S APPROVED MATERIAL LIST. SAID BLANKET SHALL BE PLACED OVER THE APPROPRIATE SEED AND FERTILIZER, AS SPECIFIED IN THE PROJECT SPECIFICATIONS. (SEE SOIL EROSION BMPs – BACK OF CURB SEDIMENT BARRIER DETAILS)
   B. THIS DEVICE SHALL BE INSTALLED IMMEDIATELY WHENEVER THE CURB IS BACKFILLED TO WITHIN 3" OF THE TOP OF CURB. (SEE CURB BACKFILL DETAIL) OTHER BMP'S MAY BE REQUIRED AT LOCATIONS WHERE CONCENTRATED FLOW CARRIES SEDIMENT OVER THE CURB.
   C. ADDITIONALLY, OTHER EROSION CONTROL DEVICES (HAY BALES, SILT FENCE, ETC.) WILL BE INSTALLED AT LOCATIONS OF CONCENTRATED FLOW RESULTING IN SEDIMENT OVERRUNNING THE MAT.
   D. SHOULD THE PROJECT PLANS SPECIFY THAT THE RIGHT–OF–WAY IS TO BE SODDED, THE EXCELSIOR MAT WILL NOT BE REQUIRED SO LONG AS THE SOD IS PLACED WITHIN 48 HOURS AFTER CURB BACKFILL REACHES A HEIGHT OF 3" OR LESS FROM TOP OF CURB. (SEE CURB BACKFILL DETAIL)

CITY OF WICHITA
PUBLIC WORKS & UTILITIES ENGINEERING DIVISION

STREET IMPROVEMENT PROJECTS

INTERIM CITY ENGINEER
GARY JANZEN, P.E.

PROJECT NUMBER	OCA NUMBER	DATE
		08/2012

CITY ENGINEER'S OFFICE
CITY HALL - SEVENTH FLOOR
455 NORTH MAIN STREET
WICHITA, KANSAS 67202-1620
(316) 268-4501

DESIGN	DRAWN

SHEET
_ of _

SW–504

KANSAS STORMWATER 2015 ANNUAL REPORT FORM FOR MUNICIPAL SEPARATE STORM SEWER SYSTEMS (MS4s)

Check box if this is a new name, address, phone, etc.

Permittee Information and Reporting Period

Permittee (Agency Name):	City of Wichita, Kansas	☐
Mailing Address:	Department of Public Works & Utilities/Stormwater Mgmt	☐
City:	455 N Main – 8th Floor	☐
State:	Wichita, Kansas	☐
Zip Code:	67202	☐
Contact person:	Jim Hardesty	☐
Contact E-Mail address:	JHardesty@wichita.gov	☐
Contact Phone Number:	(316) 298-8317 Cell# (316) 312-5464	☐
Kansas Permit Number:	M-AR94-S001 (Example) M-MC21-SU01	

Reporting period covers activities from January 1, 2015 through December 31, 2015.

This annual report must be submitted to the Kansas Department of Health and Environment (KDHE) by February 28, 2016. This annual report must be submitted as a word or PDF file to KDHE on a standard compact disk (CD). A paper copy of the report may, in addition to the CD, be submitted if the permittee so desires but is not required.

The permit establishes several reporting requirements, please review "PART V REPORTING" within the permit and ensure the various items which must be reported with the annual report are included with the report.

B. Executive Summary

Append an executive summary to this report which briefly covers the major aspects of the MS4 stormwater management program enacted during the year. In completing the executive summary, the preparer should address the following questions:

1. Were there any aspects of the program that appeared especially effective at reducing pollutants in your stormwater discharge?
2. Were there any aspects of the program that provided unsatisfactory results?
3. What was the most successful part of the program?
4. What was the most challenging aspect of the program?

The executive summary does not need to be extensive and detailed. It is anticipated the executive summaries will range from one half of a page to two pages in length depending on the scope of the program.

C. Stormwater Management Program

	Place a check mark in the appropriate box.		
	Yes	No	Not Applicable
1. Has the Stormwater Management Program (SMP) been developed?	☒	☐	
2. Has the SMP been modified during this reporting period?	☐	☒	
3. If the answer to question 2 above was "yes", has the modified SMP been submitted to KDHE for review?	☐	☐	☒

If the answer to item 3 is "No" a copy of the modified SMP must be submitted with this annual report. If it is anticipated a measurable goal cannot be met in the next year the SMP should be modified and submitted to KDHE for review. The modifications may include different BMPs and/or revised goals to avoid being in a position of non-compliance

D. Total Maximum Daily Load (TMDL) Best Management Practices

	Place a check mark in the appropriate box.		
	Yes	No	Not Applicable
1. Were any best management practices (BMPs) intended to attenuate the discharge of TMDL regulated pollutants implemented? See your permit to determine if TMDL regulated pollutants are listed for the receiving stream affected by your stormwater system.	☒	☐	☐
2. List all of the BMPs intended to attenuate the discharge of TMDL regulated pollutants as identified in the SMP and provide the requested information on the following table on the following pages			

D. Total Maximum Daily Load (TMDL) Best Management Practices (Table)

BMP ID NUMBER	Brief BMP Description	Regulated TMDL Parameter	Measurable Goal(s)	Progress Achieving Goal(s) (Measured Result)
1A	Video messages and graphics will be placed on the City's Cable Channel 7, or other video outlets, for viewing by the community. This activity will take the form of periodic repeating video presentations or graphics informing citizens of the importance of preventing stormwater pollution and individual actions citizens can take to reduce their impact on stormwater.	Nutrients, Sediment, Bacteria	A repeating video or graphic designed to inform the public on stormwater pollution prevention will be run at least twice per year on the City's Cable Channel 7, and continue for the Permit duration.	In 2015, the following stormwater information was disseminated via Cable Channel 7 and/or press releases. • Announcement of the 15th Annual River Trash Round Up. • As of 2015, 5057 storm-inlet medallions 'No Dumping-Drains To Arkansas River' have been installed. Of those, 300 are in Spanish. • The EPA video 'Reduce Runoff', "After The Storm", and the locally produced 'Dog Doogity' video were aired over 100 times.
1B	An informational brochure on stormwater quality designed for residents will be developed by the City.	Nutrients, Sediment, Bacteria	Brochures have been developed and will be distributed by a variety of means, including brochure racks in City buildings, educational events, mailings, etc.	Stormwater contracted a firm to accomplish a public education program that includes 7 new brochures, which target specific audiences and pollutants. The brochures, approximately 500 of which have been distributed, are found in Appendix C.

3G	Regulate septic system installation and usage, via our existing Ordinance, and respond to complaints regarding improper discharges related to septic systems. The City will seek City Council approval to 'order in' municipal services as a result of failed septic systems.	Nutrients, Sediment, Bacteria	Regulation of septic systems in accordance with Code of Ordinances Title 16 during the entire Permit term. Records will be maintained to document the number of complaints received and disposition of problems found will be reported in the Annual Report. The number of 'order in' requests is demand driven.	In 2015: • 80 on-site wastewater systems were evaluated for title transfers. • 35 newly installed or replaced on-site systems were inspected and approved. • 37 on-site system permit applications were reviewed and approved. • 1 property was connected to sanitary sewer.
7A	Develop and maintain a list of industrial facilities that may be contributing a substantial pollutant loading to the MS4. The list shall include municipal industrial facilities and municipal landfills; hazardous waste treatment, disposal, or recovery facilities; and facilities that are subject to section 313 of title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA).	Nutrients, Sediment, Bacteria	List will be updated as available from KDHE, and included in the Annual Report.	The listing can be found in Appendix C.

7B	Annually, at least two facilities listed above shall be identified as high priority facilities and an inspection shall be conducted and sampling of stormwater run-off.	Nutrients, Sediment, Bacteria	Inspections and wet weather sampling will be completed at two facilities.	Inspection results of two facilities are found in Appendix C, wet weather sampling data are found in Appendix B. Summaries are found in Appendix D.

7C	The permittee shall provide an updated SMP document which discusses the structural and non-structural BMP's that have been or will be implemented to reduce discharge of TMDL pollutants from the MS4 significantly contributing to or causing an exceedance of the water quality standard.	Nutrients, Sediment, Bacteria	The governing ordinance, Chapter 16.32 contains the requirements listed in the Permit as reflected in the City of Wichita/Sedgwick County Stormwater Manual, which is available in hard copy and on the City website. Occasional revisions are made to the Manual, and the Manual is updated. Revisions and updates will be included in the Annual Report. The number of BMPs implemented in a reporting year, and the number of completed bi-annual BMP inspections will be reported in the Annual Report. The most current SMP will be included in the Annual Report.	The Wichita/Sedgwick County Stormwater Manual is available for download in a digital format for free at: http://www.wichita.gov/Government/Departments/PWU/Pages/Regulations.aspx The Wichita/Sedgwick County Stormwater Manual has been fully implemented, and is reviewed and updated via meetings with the Stormwater Advisory Board. Updates are posted on the City website. The Stormwater Manual includes the following: • Inspection report every 2 years • Inspection Certification submitted to City/County • 19 Structural BMP's to select from • 5 Non-Structural BMP's • Requirements to permit Proprietary Systems In 2015, City staff reviewed, and issued Stormwater Permits for 62 sites, totaling 637 acres of Development or Redevelopment, that contained 85 new or existing BMPs. The City issued 42 Bi-annual inspection notifications and has

				received 38 responses. As of this writing, the remaining 4 have been issued an NOV.
7D	Measurable goals for reducing pollutants contributed by MS4s shall be expressed in quantifiable values to reduce the concentration of pollutants, reduce the total mass of pollutants, a combination of the above methods and expressed as average and median values (percent reduction of inflow volume, reduction in pollutant concentration or mass loading) or for bacteria as a geometric mean.	Nutrients, Sediment, Bacteria	WINSLAMM or other appropriate modeling software will be used to calculate the required values.	WINSLAMM modeling shows that in 2015, BMP's reduced pollutant loading by 2,699,869 tons of TSS, 1,927 tons of Total Phosphorous, and 8,189 tons of Total Nitrogen. Detailed analysis and results can be found in Appendix C.
7E	Maps illustrating: Permit area, boundaries of drainage basins and primary sub-basins, locations of structural BMPs, stormwater BMP influent/effluent, lake and stream monitoring locations, storm sewer collection system which includes the outfalls within the Permit area where the MS4 drains to TMDL listed impaired streams or lakes.	Nutrients, Sediment, Bacteria	Updated GIS-based maps can be accessed at the City's FTP site upon request, and maps in PDF format will be included in the Annual Report.	Updated maps in PDF format are found in Appendix C.

7F	Storm event monitoring shall be implemented in accordance with Part III of the Permit.	Nutrients, Sediment, Bacteria	Instream monitoring of the 6 main streams entering and leaving the jurisdictional Permit area will occur as detailed in Part III of the Permit.	Sampling requirements were met in 2015. Results are found in Appendix A and Appendix B.

E. Stormwater Management Program Requirements (Six Minimum Control Measures)

1. Public Education and Outreach (Table)

List all of the public education and outreach BMPs as identified in the SMP and provide the requested information in the following table.

BMP ID Number	Brief BMP Description	Measurable Goal(s)	Progress Achieving Goal(s) (Measured Result)
1A	Video messages and graphics will be placed on the City's Cable Channel 7, or other video outlets, for viewing by the community. This activity will take the form of periodic repeating video presentations or graphics informing citizens of the importance of preventing stormwater pollution and individual actions citizens can take to reduce their impact on stormwater.	A repeating video or graphic designed to inform the public on stormwater pollution prevention will be run at least twice per year on the City's Cable Channel 7, and continue for the Permit duration.	In 2015, the following stormwater information was disseminated via Cable Channel 7 and/or press releases. • Announcement of the 15th Annual River Trash Round Up. • As of 2015, 5057 storm-inlet medallions 'No Dumping-Drains To Arkansas River' have been installed. Of those, 300 are in Spanish. • The EPA video 'Reduce Runoff', "After The Storm", and the locally produced 'Dog Doogity' video were aired over 100 times.
1B	An informational brochure on stormwater quality designed for residents will be developed by the City.	Brochures have been developed and will be distributed by a variety of means, including brochure racks in City buildings, educational events, mailings, etc.	Stormwater contracted a firm to accomplish a public education program that includes 7 new brochures, which target specific audiences and pollutants. The brochures, approximately 500 of which have been distributed, are found in Appendix C.

1C	The City will continue to place stormwater education materials on the City of Wichita website ("www.wichita.gov").	Website is operational, currently includes educational material, and additional material will be added as it is developed.	Stormwater pollution prevention information is available at: http://www.wichita.gov/Government/Departments/PWU/Pages/Documents.aspx?Paged=TRUE&p_SortBehavior=0&p_FileLeafRef=Instructions%20on%20how%20to%20use%20the%20floodplain%20mapREVISED2016%2epdf&p_ID=147&PageFirstRow=31&&View={8E4BCF41-F641-4F8C-8BB9-162A36028180}
1D	Stormwater pollution prevention, water conservation and water quality education programs will continue to be developed and provided to schools and other interested organizations.	The City will continue contact with interested school officials and organization leaders. Programs and assistance will continue to be provided through ongoing programs at the W.A.T.E.R center and other locations, and will reach a minimum of 500 persons annually.	In 2015, W.A.T.E.R Center staff presented 54 talks and tours focusing on water quality issues that were attended by 1084 children and adults. Staff also gave out 728 pieces of water quality educational materials.
1E	Annually, each BMP and corresponding measurable goal provided in the SMP will be evaluated and progress or actions will be reported in the Annual Report as required by the KDHE NPDES permit.	As required by the KDHE NPDES permit, an Annual Report will be submitted to KDHE by February 28, of each year for the previous calendar year. The Annual Report will be posted on the City's stormwater website.	This Annual Report will be submitted on or before February 28, 2016.

1. Public Involvement and Participation (Table)

List all of the public involvement and participation BMPs as identified in the SMP and provide the requested information in the following table.

BMP ID Number	Brief BMP Description	Measurable Goal(s)	Progress Achieving Goal(s) (Measured Result)
2A	Public comments, recommendations and requested changes for this management plan will be solicited through the City's webpage. Citizens will be able to submit comments, questions, and recommendations directly to the office of Stormwater Management. Additionally, the webpage will have telephone and mail contact information.	Citizen input will be addressed when submitted, and results will be included in the Annual Report.	The final Stormwater Management Plan is posted on the City's website. In 2015, no public comments or suggestions were submitted to Stormwater Management.
2B	The City will conduct at least one volunteer cleanup day with citizen and group volunteers.	An Arkansas River (and/or tributaries) cleanup will be held at least once each year. Results will be documented in the Annual Report.	Co-hosted by City staff and community partners, the annual River Trash Roundup collected 1.8 tons of trash collected by 855 volunteers in the area by the Sims Park walking bridge and the Broadway 'John Mack' bridge on the Arkansas River.
2C	The City will sponsor meetings of a Stormwater Management Advisory Board (SWAB). This advisory board will contain appointed representatives from the community, and is open to the public for comments as well.	SWAB information, including agendas and attendance information will be included in the Annual Report and on the City of Wichita website.	The Stormwater Advisory Board (SWAB) met regularly throughout 2015. Meeting agendas, attendance information, and any public comments are included in Appendix C, and http://www.wichita.gov/Government/Departments/PWU/Pages/Stormwater.aspx

2. Illicit Discharge Detection and Elimination

Place a check mark in the appropriate box.

		Yes	No	Not Applicable
1.	Has a program/plan been developed and is it presently implemented to detect and address illicit/prohibited discharges into the MS4?	☒	☐	
2.	The permit requires the permittee enact ordinances resolutions or regulations. Have any ordinances, resolutions or regulations to prohibit non-stormwater discharges into the MS4 been enacted?	☒	☐	☐
	Effective Date: January 1999			
	Has the ordinance, resolution or regulation been modified? Effective Date: November 2010			
3.	Have the ordinances, resolutions or regulations and/or modifications been submitted to KDHE for review?	☒	☐	
4.	Have public employees, business, and the general public been informed of the hazards associated with illegal discharges and improper disposal of waste?	☒	☐	
5.	Have public employees, business, and the general public been informed of the hazards associated with illegal discharges and improper disposal of waste?	☒	☐	
6.	Have stormwater inlets & detention ponds been inspected?	☒	☐	
7.	Are restaurant waste grease areas inspected?	☒	☐	
8.	Are septic systems inspected?	☒	☐	
9.	Are the streets swept frequently?	☒	☐	
10.	Is there a yard waste management program?	☒	☐	
11.	Are snow removal activities inspected?	☒	☐	
12.	List all of the illicit discharge detection and elimination BMPs as identified in the SMP and provide the requested information in the table on the following pages.			

3. Illicit Discharge Detection and Elimination (Table)

BMP ID Number	Brief BMP Description	Measurable Goal(s)	Progress Achieving Goal(s) (Measured Result)
3A	Develop, implement, and enforce a program to detect and eliminate illicit discharges into the MS4.	Each permit year the City will televise 45,000 linear feet of stormwater conduit in an effort to find illicit connections or discharges. Any illicit discharges found will be investigated with actions documented, and included in the Annual Report.	In 2015, City staff televised 111,829 linear feet of storm conduit, and 991,733 linear feet of conduit were cleaned. No illicit connections were reported.
3B	Develop a stormwater system map of the permittee's MS4, showing the location of all outfalls, either pipes or open channel drainage, showing the names and location of all streams or lakes that receive discharges from those outfalls. A copy of the map shall be submitted to KDHE. This map may be submitted as a PDF file(s) on a computer disk.	A complete GIS stormwater system map has been completed, and will be maintained, and updated throughout the year. A GIS map layer of the stormwater system was made available for public use in 2015, and is available on the City of Wichita website.	By the end of 2015, 71,859 stormwater structures and 1,371 miles of conduit have been put on a GIS layer. The City is continuing to collect new projects and is reviewing quality control, and collecting the open channel drainage systems.
3C	Enact ordinances or resolutions to prohibit non-stormwater discharges into the stormwater system and implement appropriate enforcement procedures and actions. A copy of the ordinances or resolutions shall be submitted to KDHE.	An ordinance prohibiting non-stormwater discharges is currently in place, Chapter 16.32, and will be maintained and updated as necessary throughout the effective dates of this permit. A copy of the ordinance will be provided in the Annual Report.	Title 16, Chapter 16.32 in the City Code of Ordinances was adopted by City Council in 1998, and most recently updated in November of 2010. A copy of the ordinance is submitted in Appendix C.

3D	Inform public employees, businesses, and the general public of hazards associated with illegal discharges and improper disposal of waste.	A free, regional Household Hazardous Waste disposal site will be maintained for all residents to use. The number of citizens and quantity of materials disposed of, will be included in the Annual Report. Additionally, an informational HHW video will be aired at least 6 times on the City's Cable Channel 7.	The City and County operate a free household hazardous waste disposal site. In 2015 the site had 23,338 visitors, collected 1,092,052 pounds of hazardous waste. The site is promoted on brochures, Cable City 7, and the web site is: http://www.sedgwickcounty.org/environment/householdhazardouswaste.asp
3E	Develop and implement a plan to detect and address prohibited non-stormwater discharges, including illegal dumping, as required by the current NPDES Permit.	Permittee will perform at least 30,000 storm structure inspections and cleanings each year. Additionally, a minimum of 300,000 linear feet of sanitary sewer pipe will be televised in each year of the permit's duration. Results will be included in the Annual Report.	In 2015, City staff cleaned 98,547 storm structures, cleaned 991,733 linear feet of conduit, and inspected 1,037 storm structures. In 2015 City staff televised 514,952 linear feet of sanitary sewer line, and 99,381 linear feet were rehabilitated or replaced, and, 147 lines repaired resulting in 32,340 linear feet of repairs were completed.
3F	Inspect restaurants to verify that grease is not being discharged to the municipal storm drains. These inspections are incorporated into the regular restaurant inspection system and are accomplished by City inspectors.	Inspections of restaurant grease handling is an existing program within the Water & Sewer Department. There will be a minimum of 160 inspections performed each year of the Permit. Results will be reported in our Annual Report. If changes are necessary with this program, KDHE will be informed.	In 2015, restaurant grease interceptor inspectors performed 525 inspections, issued 151 NOV's, granted 122 variances, and documented an 85% on-time pump rate.

3G	Regulate septic system installation and usage, via our existing Ordinance, and respond to complaints regarding improper discharges related to septic systems. The City will seek City Council approval to 'order in' municipal services as a result of failed septic systems.	Regulation of septic systems in accordance with Code of Ordinances Title 16 during the entire Permit term. Records will be maintained to document the number of complaints received and disposition of problems found will be reported in the Annual Report. The number of 'order in' requests is demand driven.	In 2015: • 80 on-site wastewater systems were evaluated for title transfers. • 35 newly installed or replaced on-site systems were inspected and approved. • 37 on-site system permit applications were reviewed and approved. • 1 property was connected to sanitary sewer.

3. Illicit Discharge Detection and Elimination

Place a check mark in the appropriate box.

		Yes	No	Not Applicable
1.	The permit requires the permittee to enact ordinances, resolutions or regulations. Has an ordinance, resolutions or regulation to address construction site runoff from new development and redevelopment projects been enacted? Effective Date: January 1999	☒	☐	☐
2.	Has a copy of the ordinance, resolution or regulation been submitted to KDHE for review?	☒	☐	
3.	Has a procedure or program been developed requiring construction site owners and/or operators to implement appropriate erosion and sediment control best management practices?	☒	☐	
4.	Has a procedure or program been developed requiring construction site owners and/or operators to control waste such as discarded building materials, concrete truck washout, chemicals, paint, litter and sanitary waste at construction sites likely to cause adverse impacts to water quality?	☒	☐	
5.	Has a procedure been developed and implemented requiring site plan approval of erosion control and debris container locations incorporating consideration of potential water quality impacts?	☒	☐	
6.	After approval, is a construction site permit issued?	☒	☐	
7.	Has a procedure been developed for the receipt and consideration of information submitted by the public?	☒	☐	
8.	Has a procedure been developed and implemented for construction site inspection and enforcement of the control measures?	☒	☐	
9.	Are construction site inspection and enforcement actions successful?	☒	☐	
10.	Are site owners and/or operators provided instruction On proper construction site erosion and waste control?	☒	☐	
11.	List all the construction site stormwater runoff control BMPs as identified in the SMP and provide the requested information in the table on the following pages			

4. Construction Site Stormwater Runoff Control (Table)

BMP ID Number	Brief BMP Description	Measurable Goal(s)	Progress Achieving Goal(s) (Measured Result)
4A	Permittees which have the authority to enact ordinances or resolutions shall enact such ordinances or resolutions to require erosion and sediment controls, as well as sanctions to ensure compliance, to the extent allowable under State and local law.	Ordinance is currently in place, Chapter 16.32, and will be maintained and updated as necessary throughout the effective dates of this permit.	Title 16, Chapter 16.32 in the City Code of Ordinances was adopted by City Council in 1998, and revised in November 2010.
4B	Requirements for construction site owners or operators to implement appropriate erosion and sediment control best management practices.	The governing ordinance, Chapter 16.32, contains the requirements specified, and will be submitted with the Annual Report.	Title 16, Chapter 16.32 in the City Code of Ordinances was adopted by City Council in 1998, and revised in November 2010.
4C	Requirements for construction site owners and operators to control waste such as discarded building materials, concrete truck washout, chemicals, litter, and sanitary waste at the construction site that are likely to cause adverse impacts to water quality.	The governing ordinance, Chapter 16.32, contains the requirements specified, and will be submitted with the Annual Report.	Title 16, Chapter 16.32 in the City Code of Ordinances was adopted by City Council in 1998, and revised in November 2010.
4D	Procedures for site plan review which incorporate consideration of potential water quality impacts.	The procedure for plan approval includes review by City staff, and certification by the design engineer as to adherence to Chapter 16.32. The number of plans approved each year will be submitted in the Annual Report.	In 2015, City staff reviewed, and issued Stormwater Permits for 62 sites, totaling 637 acres of Development or Redevelopment, that contained 85 new or existing BMPs.

4E	Procedure for receipt and consideration of information submitted by the public.	The City will sponsor meetings of a Stormwater Advisory Board (SWAB). This advisory board will contain appointed representatives from the community, and is open to the public for comments as well. SWAB information, including public comments, meeting agendas and attendance information will be posted to the City of Wichita website, and will be included in the Annual Report.	In 2015, SWAB met 6 times. Attendance, agenda information, and any public comments received are attached in Appendix C, and http://www.wichita.gov/Government/Departments/PWU/Pages/Stormwater.aspx
4F	Procedure for construction site inspection and enforcement of control measures.	An inspection procedures document will be included in the Annual Report. Additionally, the City will perform at least 600 inspections each year of the permit, and violations/citations will be written as necessary. Results will be included in the Annual Report.	In 2015, City stormwater staff performed 1009 inspections of private projects, and issued 373 Notices Of Violation, resulting in a 37% NOV rate. City engineering personnel oversaw BMP implementation on 165 publicly bid City construction sites, these sites continue to be monitored daily by 23 City inspectors throughout the duration of construction. The City's Manual of Inspection Procedures is included in Appendix C. City field personnel in other departments have also been trained to notify Stormwater Staff if they see any potential stormwater violations.

5. Post-Construction Site Stormwater Management in New Development and Redevelopment.

Place a check mark in the appropriate box.

		Yes	No
1.	The permit requires the permittee to enact a program to address post-construction site stormwater runoff from new development and redevelopment. The program developed to manage stormwater in new development and redevelopment projects must include the following elements: a. Strategies which include a combination of structural and/or Non-structural BMPs, b. Measures to ensure adequate long-term operation and maintenance of BMPs, c. Site Owner or operator name and telephone number Responsible to ensure adequate long-term operation Maintenance of BMPs, d. BMPs to prevent or minimize adverse water impacts.		
2.	Has a post-construction stormwater runoff program been Implemented?	☒	☐
3.	Have post-construction sites been inspected?	☒	☐
4.	Have there been post-construction violations?	☒	☐
5.	List all the post-construction site stormwater management in new development and redevelopment BMPs as identified in the SMP and provide the requested information in the table on the following pages.		

5. Post-Construction Site Stormwater Management in New Development and Redevelopment Table

BMP ID Number	Brief BMP Description	Measurable Goal(s)	Progress Achieving Goal(s) (Measured Result)
5 a b c d	**a:** Strategies which include a combination of structural and/or non-structural BMPs, **b:** Measures to ensure adequate long-term operation and maintenance of BMPs, **c:** Site owner or operator name and telephone responsible to ensure adequate long-term operation maintenance of BMP's, **d:** BMPs to prevent or minimize adverse water impacts.	The governing ordinance, Chapter 16.32 contains these requirements as reflected in the City of Wichita/Sedgwick County Stormwater Manual, which is available in hard copy and on the City website. Occasional revisions are made to the Manual, and the Manual is updated. Revisions and updates will be included in the Annual Report. The number of BMPs implemented in a reporting year, and the number of completed bi-annual BMP inspections will be reported in the Annual Report.	The Wichita/Sedgwick County Stormwater Manual is available for download in a digital format for free at: http://www.wichita.gov/Government/Departments/PWU/Pages/Regulations.aspx The Wichita/Sedgwick County Stormwater Manual has been fully implemented, and is reviewed and updated via meetings with the Stormwater Advisory Board. Updates are posted on the City website. The Stormwater Manual includes the following: • Inspection report every 2 years • Inspection Certification submitted to City/County • 19 Structural BMP's to select from • 5 Non-Structural BMP's • Requirements to permit Proprietary Systems In 2015, City staff reviewed, and issued Stormwater Permits for 62 sites, totaling 637 acres of Development or Redevelopment, that contained 85 new or existing BMPs. The City issued 42 Bi-annual inspection notifications and has received 38 responses. As of this writing, the remaining 4 have been issued an NOV.

6. Municipal Pollution Prevention/Housekeeping.

Place a check mar in the appropriate box.

1. The permit requires the permittee to enact a program to address Pollution Prevention/Good Housekeeping for Municipal Operations.

		Yes	No
2.	Has an operation & maintenance program to reduce Pollutant runoff and an audits /inspection program been adopted?	☒	☐
3.	Has a municipal employee training program been established?	☒	☐
4.	Are oil, hazardous wastes, chemicals and municipal debris properly deposed?	☒	☐
5.	Are snow and ice removal material and chemicals properly managed to prevent runoff?	☒	☐
6.	Are municipal streets swept on a regular basis?	☒	☐
7.	Are municipal stormwater inlets and drains inspected and cleaned?	☒	☐
8.	Do municipal snow piles have controlled drainage to prevent runoff pollution?	☒	☐

List all the Municipal Pollution Prevention/Housekeeping BMPs as identified in the SMP and provide the requested information in the table on the following pages.

7. *PHASE I OPERATORS ONLY* - Monitoring Industrial and High Risk Run-off

Place a check mark in the appropriate box.

		Yes	No
1.	Has the permitee developed and maintained a list of the municipal industrial facilities contributing to the pollutant loading to the municipal storm sewer system?	☒	☐
2.	Has at least two municipal industrial facilities on the list had an inspection and sampling conducted?	☒	☐

If the answer to items 1 and 2 is "No" provide a statement on the Phase I operator form Appendix B as to why monitoring and control has not occurred.

Complete Monitoring form in Appendix B.

6. Municipal Pollution Prevention/Housekeeping Table

BMP ID Number	Brief BMP Description	Measurable Goal(s)	Progress Achieving Goal(s) (Measured Result)
6A	The City will continue a training program for employees on pollution prevention at all Municipal Industrial Facilities, and inspect those facilities annually.	In accordance with the Stormwater Pollution Prevention Plan for each City Municipal Industrial Facility, employee training and facility inspections will be documented and reported in the Annual Report.	In 2015, City staff updated SWP3's, and performed Inspections, at all Municipal Industrial Facilities, which are: *Central Maintenance Facility *West Substation *Northeast Substation *Brooks Landfill *Sewage Treatment Plant 1 *Sewage Treatment Plant 2 *Wichita Transit Center *K-96 & Hillside Reclamation Facility Documentation is found in Appendix C.
6B	City will continue the existing street sweeping program to reduce pollutant loadings to the storm sewer.	One round of residential street sweeping, four rounds of arterial street sweeping, and two rounds per week of downtown street sweeping will be completed annually by the City. This effort is currently underway, and will continue throughout the permit term.	In 2015, City staff swept 27,126 lane miles, completed 2 rounds of residential street sweeping, 3 rounds of arterial street sweeping, and 98 rounds of downtown street sweeping. Additionally, all Municipal Industrial Facilities are swept 12 times/year. This sweeping removed 15,970 tons of dirt and debris from City streets.
6C	Drainage control of Municipal snow piles.	In the event that large Municipal snow piles become necessary, the City will evaluate BMPs to control and mitigate effects of runoff pollution to the maximum extent practicable.	In 2015, the City did not produce any large Municipal snow piles. The City continues to deploy a brine mixture in advance of freezing precipitation.

6D	The City has a program to ensure proper application of pesticides and herbicides are applied at municipal parks and properties.	The City will continue the existing program that requires all City employed applicators of pesticides and/or herbicides to be licensed or directly supervised by licensed personnel. Records shall be maintained as required by local, state and federal laws for application events and licensed personnel shall be trained periodically to ensure proper management and application of the pesticides and/or herbicides.	City staff includes 27 KS. Dept. of Agriculture certified applicators of pesticides and/or herbicides. Records are maintained by the Parks and Recreation Department as required by local, state and federal laws for pesticide/herbicide application events. Records can be found in Appendix C.

7. Additional Control Measures, TMDL and Industrial Run-Off:

BMP ID Number	Brief BMP Description	Measurable Goal(s)	Progress Achieving Goal(s) (Measured Result)
7A	Develop and maintain a list of industrial facilities that may be contributing a substantial pollutant loading to the MS4. The list shall include municipal industrial facilities and municipal landfills; hazardous waste treatment, disposal, or recovery facilities; and facilities that are subject to section 313 of title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA).	List will be updated as available from KDHE, and included in the Annual Report.	Listing can be found in Appendix C.
7B	Annually, at least two facilities listed above shall be identified as high priority facilities and an inspection shall be conducted and sampling of stormwater run-off.	Inspections and wet weather sampling will be completed at two facilities.	Inspection results for two facilities are found in Appendix C, wet weather sampling data are found in Appendix B. Summaries are found in Appendix D.

7C	The permittee shall provide an updated SMP document which discusses the structural and non-structural BMP's that have been or will be implemented to reduce discharge of TMDL pollutants from the MS4 significantly contributing to or causing an exceedance of the water quality standard.	The governing ordinance, Chapter 16.32 contains the requirements listed in the Permit as reflected in the City of Wichita/Sedgwick County Stormwater Manual, which is available in hard copy and on the City website. Occasional revisions are made to the Manual, and the Manual is updated. Revisions and updates will be included in the Annual Report. The number of BMPs implemented in a reporting year, and the number of completed bi-annual BMP inspections will be reported in the Annual Report. The most current SMP will be included in the Annual Report.	The Wichita/Sedgwick County Stormwater Manual is available for download in a digital format for free at: http://www.wichita.gov/Government/Departments/PWU/Pages/Regulations.aspx The Wichita/Sedgwick County Stormwater Manual has been fully implemented, and is reviewed and updated via monthly meetings with the Stormwater Advisory Board. Updates are posted on the City website. The Stormwater Manual includes the following: • Inspection report every 2 years • Inspection Certification submitted to City/County • 19 Structural BMP's to select from • 5 Non-Structural BMP's • Requirements to permit Proprietary Systems In 2015, City staff reviewed, and issued Stormwater Permits for 62 sites, totaling 637 acres of Development or Redevelopment, that contained 85 new or existing BMPs. The City issued 42 Bi-annual inspection notifications and has received 38 responses. As of this writing, the remaining 4 have been issued an NOV.

7D	Measurable goals for reducing pollutants contributed by MS4s shall be expressed in quantifiable values to reduce the concentration of pollutants, reduce the total mass of pollutants, a combination of the above methods and expressed as average and median values (percent reduction of inflow volume, reduction in pollutant concentration or mass loading) or for bacteria as a geometric mean.	WINSLAMM or other appropriate modeling software will be used to calculate the required values.	WINSLAMM modeling shows that in 2015, BMP's reduced pollutant loading by 2,699,869 tons of TSS, 1,927 tons of Total Phosphorous, and 8,189 tons of Total Nitrogen. Detailed analysis and results can be found in Appendix C.
7E	Maps illustrating: Permit area, boundaries of drainage basins and primary sub-basins, locations of structural BMPs, stormwater BMP influent/effluent, lake and stream monitoring locations, storm sewer collection system which includes the outfalls within the Permit area where the MS4 drains to TMDL listed impaired streams or lakes.	Updated GIS-based maps can be accessed at the City's FTP site upon request, and maps in PDF format will be included in the Annual Report.	Updated maps in PDF format are found in Appendix C.

F. Recordkeeping and Reporting

Attach a report which addresses the following subjects:

1. A general assessment of the appropriateness of the various BMPs included for each of the major program elements as follows:
   a. TMDL regulated pollutants (Appendix A contains TMDL Report Forms)
   b. Public Education and Outreach
   c. Public Involvement and Participation
   d. Illicit Discharge Detection and Elimination
   e. Construction Site Stormwater Runoff Control
   f. Post-Construction Site Stormwater Management in New Development and Redevelopment
   g. Pollution Prevention/Good Housekeeping for Municipal Operations

   Issues which may be addressed include:
   a. Are the BMPs appropriate for local population? *Bilingual information will be available when appropriate.*
   b. Are the BMPs appropriate for the pollution sources? *With little or no control over BMPs on private property, we believe Municipal BMPs are appropriate.*
   c. Are there specific concerns related to the local receiving waters that may justify a change in BMPs? *There are no specific concerns at this time, however, evaluation is ongoing, and will be addressed when necessary.*

2. An assessment of the effectiveness of the BMPs towards achieving the statutory goal of reducing the discharge of pollutants to the Maximum Extent Practicable (MEP).

   The general assessment of the community's stormwater conduits, in-town streams and rivers are being maintained in a pro-active manner that has resulted in a reduction of pollutants to the MS4 to the maximum extent practicable.

   For new development and redevelopment, the 2010 implementation of the county-wide Stormwater Manual and adoption of associated Ordinances has helped achieve the goal of reducing the pollutants to the maximum extent practicable. The City has implemented a program that requires inspections of post-construction BMPs on a biennial basis to ensure the BMPs are functioning as they were intended when the BMP design was approved. That program was implemented in December 2013. Inspection notices are sent every year to whichever developments are on that particular year's 2-year inspection rotation cycle.

3. Provide a summary of results of information collected and analyzed, if any, during the reporting period, including any monitoring data used to assess the success of the SMP.

   In 2014, new requirements were established that wet weather samples are collected from streams (not outfalls). In 2015, The City met all Permit sampling requirements. Analysis of sampling data and adjustments to Best Management Practices will occur in subsequent years when sufficient data from the new sample locations and new sample constituents are accumulated. The full 2015 wet weather data set, and summary graphs, are found in Appendix A and Appendix B.

4. Provide a summary of the planned changes in stormwater activities which are scheduled to be undertaken during the next annual reporting cycle. This should address the implementation of new BMPs and/or the deletion of BMPs and include a projected schedule for the month or quarter when the BMP will be either implemented or discontinued. Please note a revised SMP document should be submitted for KDHE review if BMPs are revised.

   The City is planning to implement an Alternative Stormwater Offsite Pollution Reduction Program during 2016, as per Section E4 of the Permit. This effort has been under development, with KDHE's guidance, for the last few years.

   Stormwater management is, and will continue to be, a dynamic process with changes in priorities, technology, and techniques. The City of Wichita and, The Department of Public Works & Utilities in particular, strive to administer the most effective and functional program possible. In working towards that goal, we evaluate and if appropriate, will implement changes we believe will have strong positive impacts on water quality in the Wichita area.

5. Provide a list of other municipalities/contractors, if any, which will be responsible for implementing any of the program areas of the SMP.

   Continental Analytical Services (CAS) Laboratories is contracted to analyze wet weather samples.

The various documents which are required to be included in the annual report may be attached as appendices with this Annual Report document. The permit requires various monitoring results be reported. The additional Water Monitoring Results documents found in Appendices A and B include report forms to be used for this Annual Report. Appendix A is to be used by both Phase I and Phase II MS4s. Appendix B is to be used by Phase I MS4s. Additional copies of the forms may be generated as necessary to provide reports of all results. Include the annual report file along with all appendices and other required documents on the CD submission of the Annual Report. The permit establishes several reporting requirements, please review "PART V REPORTING" within the permit and ensure the various items which must be reported with the annual report are included with the report. Updated Stormwater Management Program documents, i.e., the plan or SMP, must be submitted with the Annual Report.

G. Certification

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Signature of Permittee: _____ Date Signed: 2/16/2016
(Legally responsible person)

Name (Printed): Jim Hardesty Title: Interim Stormwater Division Manager

40 CFR 122.22 Signatories to permit applications and reports.
(a) Application. All permit applications shall be signed by either a principal executive officer or ranking elected official.

All reports required by permits, and other information requested by the Director shall be signed by a person described in paragraph (a) of this section, or by a duly authorized representative of that person.
Submit this report to:

KANSAS DEPARTMENT OF HEALTH & ENVIRONMENT
Municipal Programs Section
1000 SW Jackson Street, Suite 420
Topeka, Kansas 66612-1367

Hardesty, James

From: Hardesty, James
Sent: Wednesday, March 04, 2015 1:19 PM
To: Hardesty, James
Subject: Municipal Industrial Facility Training Video

https://www.youtube.com/watch?v=Qqo2nGULxCA

STORM WATER POLLUTION PREVENTION PLAN

NORTHEAST SUBSTATION

Prepared for

CITY OF WICHITA

March 2010

TABLE OF CONTENTS

1 INTRODUCTION 4
1.1 SWPPP Pollution Prevention Team 4

2 FACILITY DESCRIPTION AND STORM WATER DRAINAGE 6
2.1 Facility Drainage 6
2.2 Inventory of Exposed Materials 6
2.3 Significant Spills and Leaks 7

3 OUTFALL INVENTORY 8
3.1 Non-Storm Water Discharges 12
3.2 Description of Potential Pollution Sources 12
3.2.1 Public Works Fueling Area 12
3.2.2 Roadwork Materials Area 13
3.2.3 Water and Parks Department Fueling Area 14
3.2.4 Salt Dome 15
3.3 Existing Storm Water Sampling Data 15

4 POLLUTION PREVENTION MEASURES AND CONTROLS (BMPs) 16
4.1 Good Housekeeping 16
4.2 Spill Prevention and Response Procedures 16
4.3 Inspections 16
4.4 Employee Training 17
4.5 Erosion Control Measures 17
4.6 Record Keeping and Internal Reporting Procedures 17

5 MONITORING, REPORTING, AND RECORD KEEPING REQUIREMENTS .. 18
5.1 Sampling Requirements 18
5.2 Comprehensive Site Compliance Evaluation and Report 18

6 REFERENCES 20

APPENDIX A. SWPPP Development Worksheets
APPENDIX B. Monthly Site Inspections
APPENDIX C. Comprehensive Site Compliance Evaluation Reports
APPENDIX D. Employee Training
APPENDIX E. Significant Spills and Leaks
APPENDIX F. KDHE Storm Water Pollution Prevention Plan Requirements and Guidelines
APPENDIX G. Extra SWPPP Worksheets

LIST OF TABLES

Table 1-1 Requirements of the SWPPP 5

LIST OF FIGURES

Figure 3-1. Outfall 1 8
Figure 3-2. Outfall 2 - North of perimeter wall 9
Figure 3-3. Outfall 2 - South of the perimeter wall 9
Figure 3-4. Outfall 3 - North of wall 10
Figure 3-5. Outfall 3 – South of wall 10
Figure 3-6. Outfall 4 – West of wall 11
Figure 3-7. Outfall 4 – East of wall 11
Figure 3-8. Public Works Fueling Area 13
Figure 3-9. Roadwork Material Area 13
Figure 3-10. Water and Parks Department Fueling Area 14
Figure 3-11. Salt Dome 15

1 INTRODUCTION

The purpose of this Storm Water Pollution Prevention Plan (SWPPP) is to prevent contamination of storm water runoff as a result of industrial activities conducted at the Northeast Substation. The City of Wichita owns and operates this facility at 2901 E. 33rd Street North in Wichita, Kansas. The goals of this SWPPP are as follows:

1. Identify potential sources of pollution that may be reasonably expected to contribute to the contamination of storm water runoff.
2. Establish Best Management Practices (BMP) that eliminate or effectively reduce the routes for contamination to enter the storm water runoff.

The United States Environmental Protection Agency (USEPA) has developed regulations to reduce the introduction of pollutants into storm water from industrial sites. These regulations have been delegated to the Kansas Department of Health and Environment (KDHE) to administer. Currently, KDHE considers an industrial facility to be in compliance if the owner has submitted a Notice of Intent (NOI) for Storm Water Discharges Associated with Industrial Activity under the General Permit and has developed a SWPPP. This SWPPP was prepared according to the requirements stated within the USEPA and the KDHE guidance documents (Appendix F).

1.1 SWPPP Pollution Prevention Team

The members of the Northeast Substation Pollution Prevention Team (Appendix A, Worksheet #1) are responsible for the day-to-day tasks related to storm water runoff pollution prevention. The members of the SWPPP Pollution Prevention Team will conduct employee training programs, ensure implementation of BMPs, complete all site inspections, and supervise the day-to-day operations at the site which negatively affect storm water quality. Collectively, the SWPPP Pollution Prevention Team is responsible for the following tasks:

- Performing scheduled inspections.
- Training facility personnel.
- Ensuring that the BMPs in the plan are being implemented.
- Maintaining records.
- Revising the SWPPP to reflect changes to the BMPs employed and to the applicable regulations.
- Preparing the Comprehensive Site Compliance Evaluation for insertion into Appendix C of this document once each year.

The following individuals are designated as the primary members of the SWPPP Pollution Prevention Team at the Northeast Substation:

Individual: Aaron Henning
Title: Assistant Maintenance Engineer
Phone: (316) 268-4087

Individual: Don Cradduck
Title: Street Maintenance Supervisor
Phone: (316) 268-4091

These individuals (or persons in their positions) must maintain and update this SWPPP. The Pollution Prevention Team must also coordinate between "front line" employees and management concerning pollution prevention issues. The Pollution Prevention Team is responsible for carrying out the requirements of the SWPPP as summarized in the following table.

Table 1-1 Requirements of the SWPPP

Activity	Frequency
1. Site Inspections	Monthly, records in Appendix B, recordkeeping requirement of 3 years
2. Comprehensive Site Compliance Evaluation	Annually
Comprehensive Site Compliance Evaluation Report	Completed within 2 weeks following Evaluation and inserted in Appendix C
Comprehensive Site Compliance Evaluation Report Implementation	Performed within 12 weeks of the Evaluation Report
3. Visual Inspection of Storm Water	Periodically during wet weather events. Results included in Comprehensive Site Compliance Evaluation Report
4. Employee Training	Annually, keep record of training in Appendix D, Employee Training
5. Spill Reporting	If spill occurs, documented in Appendix E, Significant Spills and Leaks
6. SWPPP recertification	Once every five years by a Kansas P.E., Appendix F

2 FACILITY DESCRIPTION AND STORM WATER DRAINAGE

2.1 Facility Description

The Northeast Substation is located at 2901 E. 33rd Street North in Sedgwick County, Wichita, Kansas. The main function of this site is to provide road maintenance services to the Northeast Quadrant of the City. The Standard Industrial Classification (SIC) for this facility is 4225. This plan covers activities where contaminants could possibly be introduced into the storm water runoff such as refueling and maintenance of vehicles and storage of materials. Contaminants of concern used in these activities include diesel, gasoline, motor oil, and particulate matter, such as sand, soil, and gravel. A site map is presented following Worksheet #2 in Appendix A. The important features identified on the site map include the locations of the potential stormwater pollution activities and the stormwater outfalls.

2.2 Facility Drainage

The site map is divided into four drainage areas: drainage area 1 (DA1), 0.9 ac; drainage area 2 (DA2), 1.5 ac; drainage area 3 (DA3), 2.2 ac; and drainage area 4 (DA4), 2.0 ac. The SWPPP site map will be updated by the SWPPP Pollution Prevention Team whenever changes are made that would affect storm water runoff.

2.3 Inventory of Exposed Materials

Materials which could potentially come into contact with precipitation and contaminate storm water runoff have been summarized in the Material Inventory worksheet presented in Appendix A, Worksheet #3. Currently, there are not any significant quantities of materials exposed to storm water. Materials currently stored at this facility that could possibly come in contact with storm water include diesel, gasoline, salt, and sediment from roadwork materials; however, all of these materials are unlikely to come into contact with storm water as described in Worksheet #3.

If during the Comprehensive Site Compliance Evaluation (Section 5.2), it is determined that a material has been added or removed from the Northeast Substation, the Materials Inventory worksheet should be updated. New worksheets should be added to the SWPPP when a new material is introduced to the site. If the use of a material is discontinued, it should be crossed out on the worksheet, and the date its use was discontinued should be noted. The changes should be initialed by the appropriate member of the SWPPP Pollution Prevention Team.

2.4 Significant Spills and Leaks

According to facility personnel there have been no spills or leaks of toxic or hazardous pollutants in reportable quantities for three years preceding the date of the site visit, March 3, 2010 (Appendix A, Worksheet #4). In Appendix G, a blank Worksheet #4 should be completed and included in Appendix E if any spills occur in the future.

3 OUTFALL INVENTORY

Four storm water outfalls convey drainage from the site at the Northeast Substation. Outfall 1 is a curb on the northwest corner of site, which discharges into a roadside ditch along 33rd Street, which then flows into a creek west of the facility. Runoff from this area reaches Outfall 1 by overland flow across paved and grassed-surfaces before leaving the site.

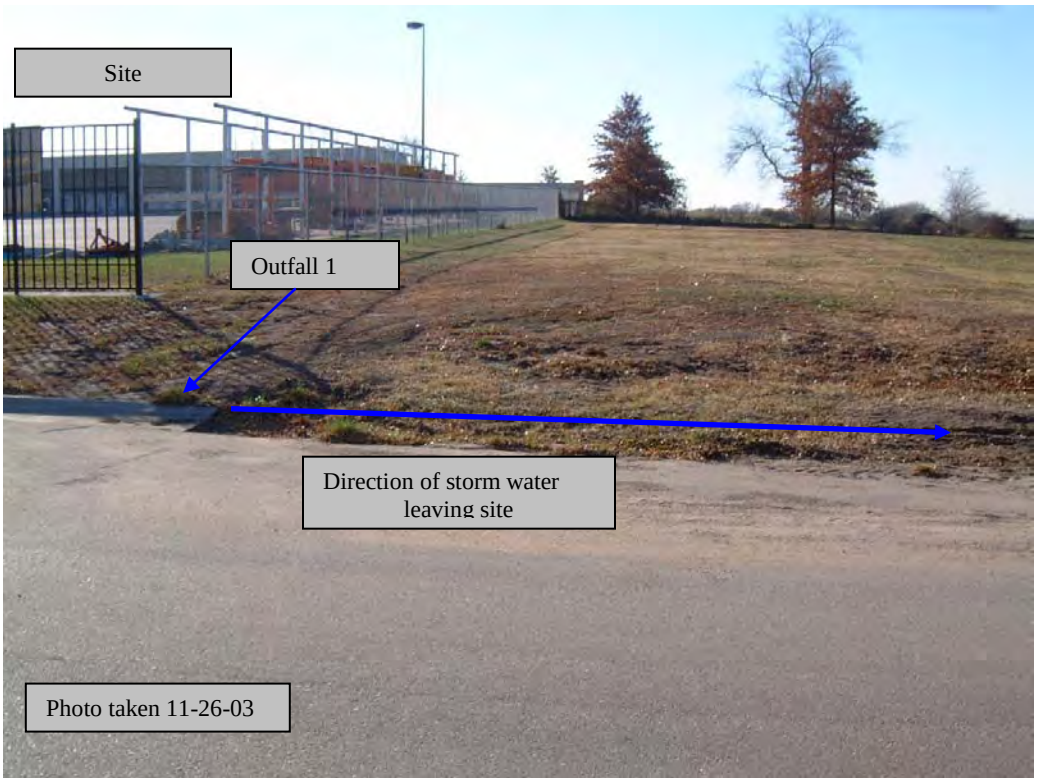


Figure 3-1. Outfall 1

Outfall 2, which is an inlet covered by sheet metal just south of the vehicle fueling area, receives storm water by overland flow from the paved areas north of it. The outfall discharges into a ditch beside SR-96, which then flows to the west into the same creek as Outfall 1. It receives storm water from the Public Works fueling area and the roadwork material area.

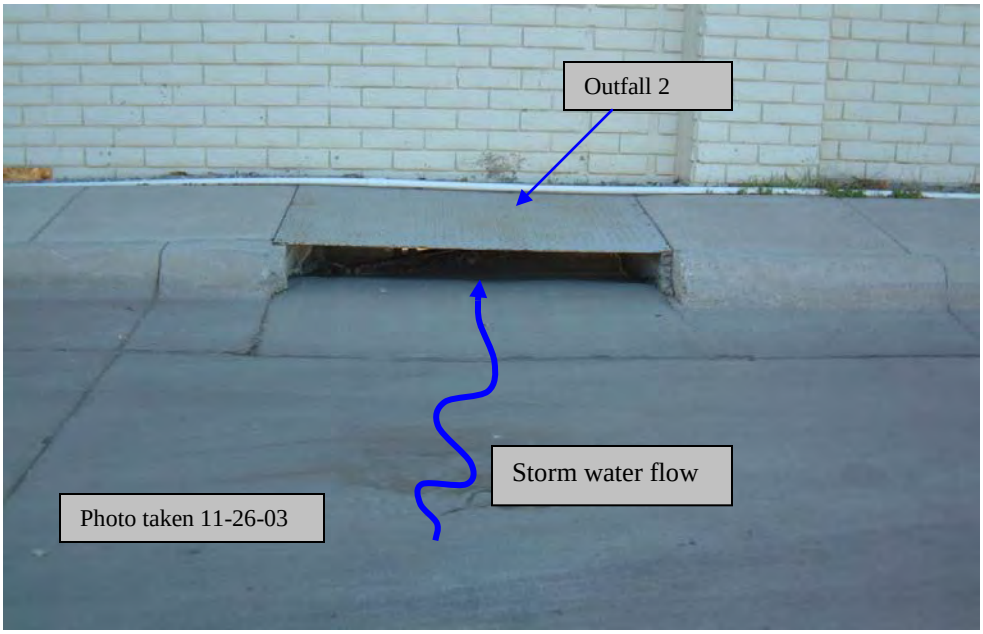


Figure 3-2. Outfall 2 - North of perimeter wall

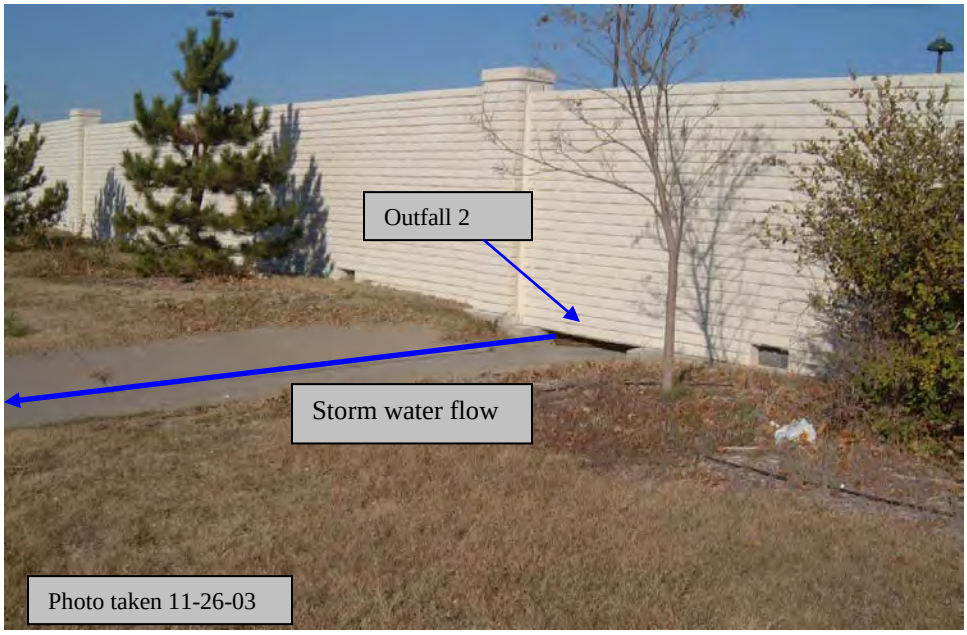


Figure 3-3. Outfall 2 - South of the perimeter wall

Outfall 3, which receives storm water by overland flow from the paved areas north of it, is an inlet covered by sheet metal east of the administration building. The outfall discharges into the same ditch beside SR-96 as Outfall 2.

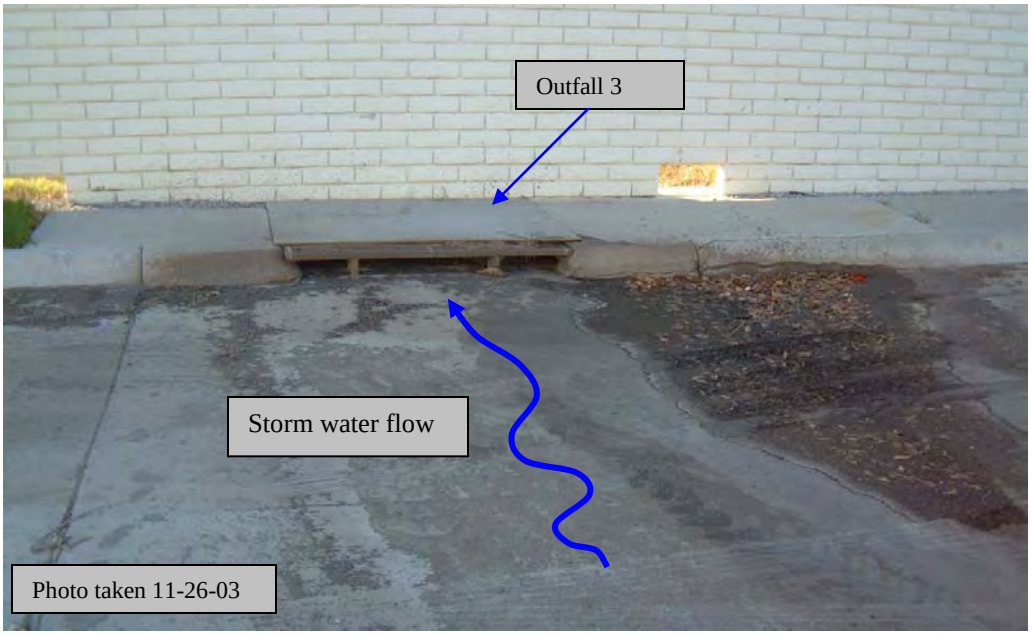


Figure 3-4. Outfall 3 - North of wall

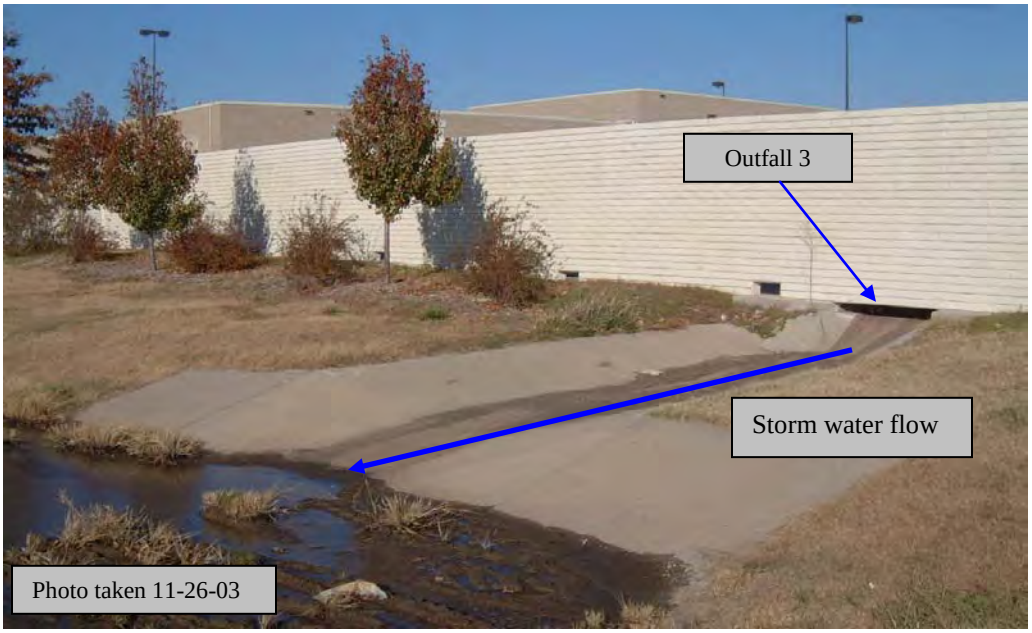


Figure 3-5. Outfall 3 – South of wall

Outfall 4 is an area inlet located at the far southeast corner of the site that receives storm water by overland flow from the paved areas to the north and west of it. The outfall discharges into a ditch beside SR-96, which then flows to the east into a pipe under SR-96.

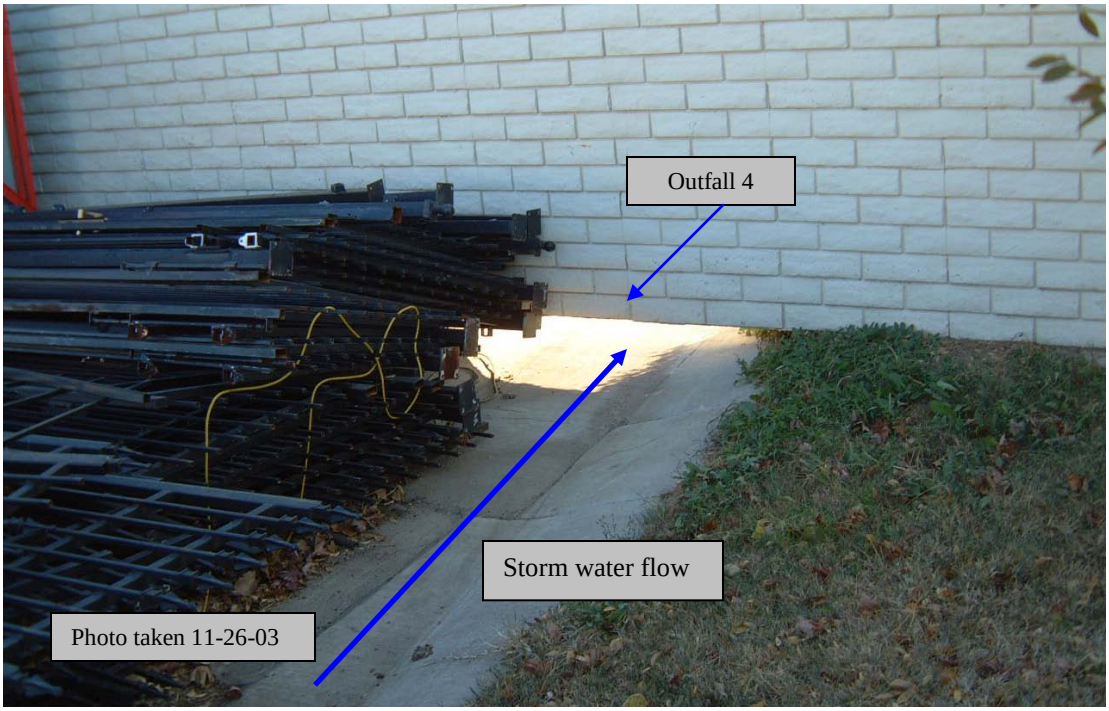


Figure 3-6. Outfall 4 – West of wall

Figure 3-7. Outfall 4 – East of wall

3.1 Non-Storm Water Discharges

The Northeast Substation site was inspected for the presence of non-storm water discharges on March 3, 2010 (Appendix A, Worksheets #5 & #6). A visual inspection of the site's storm water outfalls revealed no non-storm water discharges for that particular day; however, the facility should be inspected periodically to verify this conclusion is valid throughout the year. It is most convenient to conduct these inspections concurrently with the routine monthly inspections of the facilities.

The inspector should walk the site and trace the sources of any flows leaving the site that occur during dry weather. Non-storm water flows may result from illicit connections to the sanitary sewer system or from overland flow of process water. All storm sewer outfalls should be checked for the presence of non-storm water flows.

3.2 Description of Potential Pollution Sources

The locations of three activities where potential contaminants could come in contact with storm water are identified on the site map. They are (1) the Public Works Fueling Area, (2) the Public Works Roadwork Material, and (3) Water and Park Department Fueling Area (Appendix A, Worksheet #7).

3.2.1 Public Works Fueling Area

This area is located in the south central end of the facility. The fuel pumps in this area are used to supply diesel, gasoline, and propane fuel to public works vehicles and equipment. The pumps are not covered so any residual fuel spilled from the pump could possibly be discharged with the storm water; however, the quantity of fuel is likely to be small. At this time, the Northeast Substation has an absorbent material onsite that is used if there are visible oil marks on the concrete or if gasoline is spilled from the fuel pumps. After use, the absorbing material is removed and disposed. If in the future additional BMPs are required, the following options could be evaluated: covered the fueling areas or installing drip pans below the fueling areas. Below is a photograph of the fuel pumps.

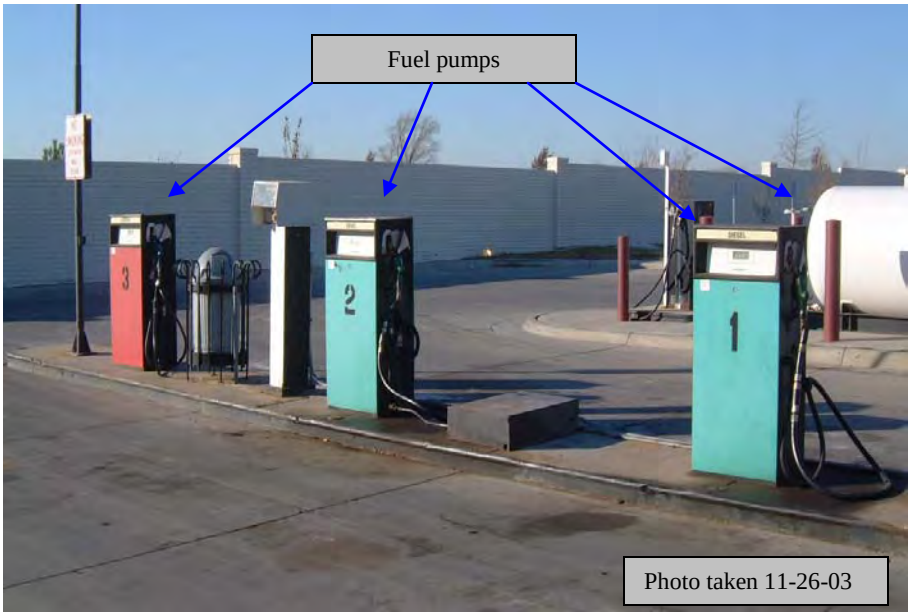


Figure 3-8. Public Works Fueling Area

3.2.2 Roadwork Materials Area

This area is located in the north central section of the site. It consists of a storage area for the roadwork materials that the Public Works department uses to perform road repairs. These materials consist of sand, soil, and gravel. Since the materials are covered, it is unlikely that significant quantities of these materials would come in contact with storm water runoff.

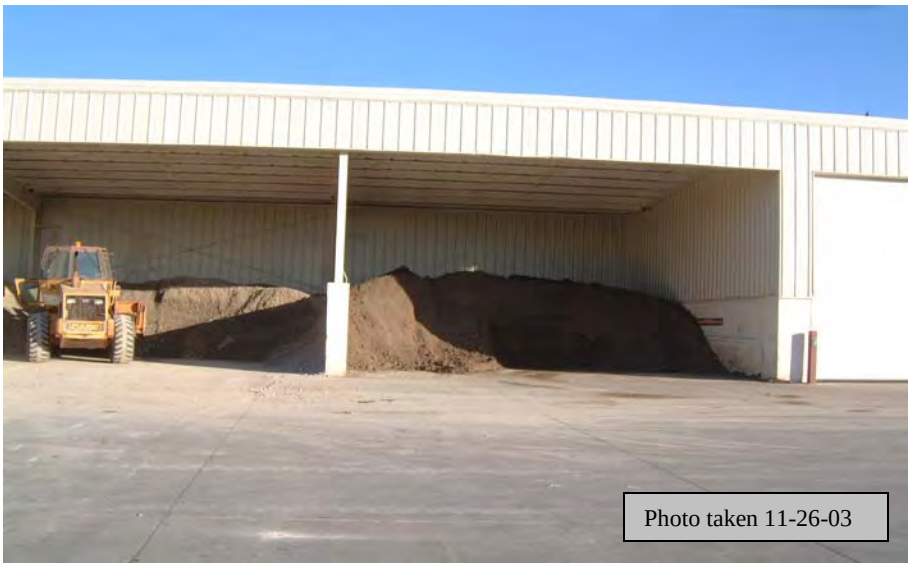


Figure 3-9. Roadwork Material Area

3.2.3 Water and Parks Department Fueling Area

This area is located south of the Water and Parks Department truck storage area, approximately 150 feet west of Outfall 4. The fuel pump in this area is used to supply gasoline to public works vehicles and equipment. The pumps are not covered so any residual fuel spilled from the pump could possibly be discharged with the storm water; however, the quantity of fuel is likely to be small. At this time, the Northeast Substation has an absorbent material onsite that is used if there are visible oil marks on the concrete or if gasoline is spilled from the fuel pump. After use, the absorbing material is removed and disposed. If in the future additional BMPs are required, the following options could be evaluated: covered the fueling areas or installing drip pans below the fueling areas. Below is a photograph of the tank.

Figure 3-10. Water and Parks Department Fueling Area

3.2.4 Salt Dome

The Salt Dome is located west of the Roadwork Materials Area. The salt dome is used to store salt for road application during periods of snow and ice. Since the dome covers the salt, it is unlikely that this material could come into contact with storm water. Below is a photograph of the dome.

Figure 3-11. Salt Dome

3.3 Existing Storm Water Sampling Data

According to the SWPPP Pollution Prevention Team, storm water monitoring has not been conducted at the Northeast Substation. It is not anticipated that KDHE will require monitoring of storm water in the future.

4 POLLUTION PREVENTION MEASURES AND CONTROLS (BMPs)

The following section identifies BMPs that will be implemented as part of this SWPPP (Appendix A, Worksheet #8).

4.1 Good Housekeeping

The most elementary, yet one of the most effective, of all BMPs is the practice of good housekeeping. For the Northeast Substation, this consists of the following:

(1) Debris exposed to stormwater should be collected and removed from the site.
(2) Work area cleanup should follow any task, no matter how small.

Currently, the lead site maintenance worker conducts weekly site inspections to ensure good housekeeping at the site. Good housekeeping will be stressed to the employees during their annual employee training. Particular attention should be paid to the areas around fuel dispensing stations and the roadwork materials storage area.

4.2 Spill Prevention and Response Procedures

Spills of diesel fuel, motor oil, or any of the other material could contribute pollutants to storm water discharges. If such an event occurs, having proper procedures in place can prevent a spill from becoming a potentially large environmental problem. Currently, the Northeast Substation does not have any Spill Prevention and Response Procedures in place; however, during the site inspection on March 3, 2010 the general manager of the site indicated that there had not been a spill of any significant amount of material in the past three years. Despite this excellent performance, spill prevention and response procedures should be developed for an event that may occur in the future. Worksheet #4 in Appendix F can be used to record the date and time of any future spills.

4.3 Inspections

Inspections involve visually checking the potential sites of pollution on a periodic basis to confirm that good housekeeping procedures on being followed. The inspection currently occurs weekly by the lead site maintenance worker; however, it is not currently documented. To comply with KDHE Storm water Pollution Prevention Plan guidelines, a monthly record of the inspections should be kept for a period of three years in Appendix B, and a set of follow-up procedures should be in place so that corrective actions can occur if needed (A blank inspection form is included at the end of Appendix G).

4.4 Employee Training

All Northeast Substation employees that are responsible for storm water pollution prevention at the facility will receive training, and this training will be thoroughly documented. Training will address the following subjects:

(1) Familiarization with all BMPs in place and ensuring that employees understand the requirements and contents of the SWPPP.
(2) Proper handling of all materials used or commonly encountered at the facility.

Employee training will be conducted initially when the SWPPP is presented to the facility. Annual refresher and new hire training will be conducted by the SWPPP Pollution Prevention Team. Worksheet #10 included in Appendix D can be used to document training.

4.5 Erosion Control Measures

For sites that are largely unpaved without adequate ground cover, soil erosion can transport large quantities of suspended sediment into the downstream waterways. However, during the site visit, it was not apparent that soil erosion is a significant problem at the Northeast Substation. The relatively small unpaved areas and the mild slopes keep erosion from becoming a significant problem. However, future Comprehensive Site Compliance Evaluations by the Pollution Prevention Team should include looking for signs of erosion and assess the need for implementation of erosion-control BMPs.

4.6 Record Keeping and Internal Reporting Procedures

Accurate and thorough records of all activities are essential to maintaining the SWPPP and storm water quality. Records of the monthly inspections (Appendix B), the Comprehensive Site Compliance Evaluation Reports (Appendix C), employee training records (Appendix D), and any future spills or leaks that occur (Appendix E) will be kept on site with the SWPPP. These records will be readily available for review by regulatory agencies.

5 MONITORING, REPORTING, AND RECORD KEEPING REQUIREMENTS

5.1 Sampling Requirements

At this time, KDHE is not requiring that quantative chemical analysis be conducted on the storm water leaving the site; however, periodically during wet weather events, storm water should be visually inspected for the presence of pollutants. It is recommended that the visual inspection of the storm water be conducted periodically during the spring when wet weather events are typically frequent. Each of the four storm water outfalls identified in Section 3 should be observed. The inspection should indicate whether an oil sheen, foam, suspended solids, or floating solids are present and the color and clarity of the storm water. The results of the visual inspection of the storm water will be included in the Comprehensive Site Compliance Evaluation Report (Appendix C).

5.2 Comprehensive Site Compliance Evaluation and Report

A Comprehensive Site Compliance Evaluation inspection should be conducted on an annual basis to determine whether site conditions have changed, whether the SWPPP needs to be revised, and whether the SWPPP procedures are effective. The SWPPP should be modified if any deficiencies are identified based on the evaluation or additional BMPs could be implemented. If a BMP is identified that will be implemented, Worksheet #9 (a blank form is included in Appendix G) should be utilized and included with the Comprehensive Site Compliance Evaluation Report. Examples of changes that would result in a revision are regrading of the existing site, an additional material added to the site that could contribute to storm water pollution, or a request for chemical analysis of storm water by KDHE.

The inspection should target the four storm water outfalls and the areas that could potentially contribute to storm water pollution; the road work materials area, the public works fueling area, the water / park department fueling area, and the salt dome (identified on the Site Map, Appendix A). In addition, the inspection should look for signs of erosion around the site.

It is recommended that the Northeast Substation develop a report format for this inspection or utilize Worksheet #11 in Appendix C. The report should contain the following information: the cleanliness of the areas, a visual inspection of the storm water outfalls, confirming that non-storm water discharges are not present, the documented visual analysis of the storm water runoff from each of the outfalls, and if there were any

changes to site map. These changes should be identified and the site map updated. The report must be included in Appendix C within two weeks of the Comprehensive Site Compliance Evaluation inspection. If the report identifies additional measures that should be taken to reduce storm water pollution, the measures must be implemented within 12 weeks, and the update recorded on Worksheet #12 (a blank form is included in Appendix G). The updated worksheet should be included with the Comprehensive Site Compliance Evaluation Report.

6 REFERENCES

USEPA, Storm Water Management for Industrial Activities – Developing Pollution Prevention Plans and Best Management Practices, 1992.

KDHE, Storm Water Pollution Prevention Plan Requirements and Guidelines, Attachment A, no date.

STORM WATER POLLUTION PREVENTION PLAN

Northeast Substation

Prepared by

CITY OF WICHITA

March 2010

Worksheet #1 POLLUTION PREVENTION TEAM MEMBER ROSTER	Facility name: Northeast Substation Completed by: Jim Hardesty Title: Stormwater Specialist Date: 03/04/10

Leader: Aaron Henning

Title: Assistant Maintenance Engineer

Office Phone: 316-268-4087

Responsibilities:

1) Signatory authourity; 2) Coordinate employee training program; 3) Ensure that all SWPPP requirements are performed

Members:

(1) Don Cradduck

Title: Road Maintenance Supervisor

Office Phone: 316-268-4091

Responsibilities:

1) Conduct annual site evaluations; 2) Perform employee training; 3) Conduct weekly site inspections

(2) _____

Title: _____

Office Phone: _____

Responsibilities:

(3) _____

Title: _____

Office Phone: _____

Responsibilities:

(4) _____

Title: _____

Office Phone: _____

Responsibilities:

Worksheet #2 DEVELOPING A SITE MAP	Facility name: Northeast Substation Completed by: Jim Hardesty Title: Stormwater Specialist Date: 03/04/10

Instructions: Draw a map of your site including a footprint of all buildings, structures, paved areas, and parking lots. The information below describes additional elements required by EPA's General Permit.

EPA's General Permit requires the following features on the site map:

- All outfalls and storm water discharges
- Drainage areas of each storm water outfall
- Structural storm water pollution control measures, such as:
  - Flow diversion structures
  - Retention/detention ponds
  - Vegetative swales
  - Sediment traps
- Name of receiving waters (or if through a Municipal Separate Storm Sewer System)
- Locations of exposed significant materials
- Locations of past spills and leaks
- Locations of high-risk, waste-generating areas and activities common on industrial sites such as:
  - Fueling stations
  - Vehicle/equipment washing and maintenance areas
  - Area for unloading/loading materials
  - Above-ground tanks for liquid storage
  - Industrial waste management areas (landfills, waste piles, treatment plants, disposal areas)
  - Outside storage areas for raw materials, by-products, and finished products
  - Outside manufacturing areas
  - Other areas of concern (specify: _____)

Worksheet #3 MATERIAL INVENTORY	Facility name: Northeast Substation Completed by: Jim Hardesty Title: Stormwater Specialist Date: 03/04/10

Instructions: List all materials used, stored, or produced onsite. Assess and evaluate these materials for their potential to contribute pollutants to storm water runoff. Also complete Worksheet 3A if the material has been exposed during the last 3 years.

Material	Purpose/Location	Quantity (gallons)			Quantity Exposed in Last 3 Years	Likelihood of contact with storm water. If yes, describe reason.	Past Significant Spill or Leak	
		Used	Produced	Stored			Yes	No
Soil, sand, gravel	Roadwork Material / Public Roadwork Material	varies			None	Not likely, material covered by shelter		No
Unleaded Gasoline	Fuel / Public Works & Water and Park Fueling Areas	varies		2000	Small amount of spillage	Not likely, fuel is stored in underground storage tank.		No
Diesel	Fuel / Public Works Fueling Area	varies		10,000	Small amount of spillage	Not likely, fuel is stored in underground storage tank.		No
Road Salt	Road deicing / Road	varies			None	Not likely, material is covered		No
	Salt Dome							
Waste Oil	Oil from vehicles / Waste Oil UST	varies			None	Not likely, material is stored in underground storage tank.		No

Worksheet #4

LIST OF SIGNIFICANT SPILLS AND LEAKS

Facility name: Northeast Substation
Completed by: Jim Hardesty
Title: Stormwater Specialist
Date: 03/04/10

Directions: Record below all significant spills and significant leaks of toxic or hazardous pollutants that have occurred at the facility in the three years prior to the effective date of the permit.

Definitions: Significant spills include, but are not limited to, releases of oil or hazardous substances in excess of reportable quantities.

1st Year Prior

Date (month/day/year)	Spill	Leak	Location (as indicated on site map)	Description				Response Procedure		Preventive Measures Taken
				Type of Material	Quantity	Source, If Known	Reason	Amount of Material Recovered	Material No Longer Exposed to Storm Water (True/False)	
None										

2nd Year Prior

Date (month/day/year)	Spill	Leak	Location (as indicated on site map)	Description				Response Procedure		Preventive Measures Taken
				Type of Material	Quantity	Source, If Known	Reason	Amount of Material Recovered	Material No Longer Exposed to Storm Water (True/False)	

3rd Year Prior

Date (month/day/year)	Spill	Leak	Location (as indicated on site map)	Description				Response Procedure		Preventive Measures Taken
				Type of Material	Quantity	Source, If Known	Reason	Amount of Material Recovered	Material No Longer Exposed to Storm Water (True/False)	

Worksheet #5 NON-STORM WATER DISCHARGE ASSESSMENT AND CERTIFICATION	Facility name: Northeast Substation Completed by: Jim Hardesty Title: Stormwater Specialist Date: 03/04/10

Date of Test or Evaluation	Outfall Directly Observed During the Test (identify as indicated on the site map)	Method Used to Test or Evaluate Discharge	Describe Results from Test for the Presence of Non-Storm Water Discharge	Identify Potential Significant Sources	Name of Person Who Conducted the Test or Evaluation
03/03/10	Outfall 1	Visual	No discharge observed	Water & Park Department Fueling Area	Jim Hardesty
03/03/10	Outfall 2	Visual	No discharge observed	Truck Fueling Area and Road Work Material Storage Area	Jim Hardesty
03/03/10	Outfall 3	Visual	No discharge observed		Jim Hardesty
03/03/10	Ourfall 4	Visual	No discharge observed		Jim Hardesty

CERTIFICATION

I, (responsible corporate official), certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

A. Name & Official Title (type or print)	B. Area Code and Telephone No.
C. Signature	D. Date Signed

Worksheet #6 NON-STORM WATER DISCHARGE ASSESSMENT AND FAILURE TO CERTIFY NOTIFICATION	Facility name: Northeast Substation Completed by: Jim Hardesty Title: Stormwater Specialist Date: 03/04/10

Directions: If you cannot feasibly test or evaluate an outfall, fill in the table below with the appropriate information and sign this form to certify the accuracy of the included information.

List all outfalls not tested or evaluated, describe any potential sources of non-storm water pollution from listed outfalls, and state the reason(s) why certification is not possible. Use the key from your site map to identify each outfall.

Important Notice: A copy of this notification must be signed and submitted to the Director within 180 days of the effective date of this permit.

Identify Outfall Not Tested/Evaluated	Description of Why Certification Is Infeasible	Description of Potential Sources of Non-Storm Water Pollution
All outfalls evaluated		

CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations, and that such notification has been made to the Director within 180 days of _____ (date permit was issued), the effective date of this permit.

A. Name & Official Title (type or print)	B. Area Code and Telephone No.
C. Signature	D. Date Signed

Worksheet #7	Facility:	Northeast Substation
	Completed By:	Jim Hardesty
	Title:	Stormwater Specialist
Pollutant Source Identification	Date:	03/04/10

Instructions: List all identified stormwater pollutant sources and describe existing management practices that address those sources. In the third column, list Best Management Practice (BMP) options that can be incorporated into the plan to address remaining sources of pollutants.

Storm Water Pollutant Sources	Existing Management Practices	Description of New BMP Options
1 Gasoline and Diesel Fuel from fueling stations	Absorbent material used for cleanup	1) Potentially covering the fueling areas 2) Potentially installing drip pans in area
2 Roadwork materials (sand, gravel, soil)	Covered storage	None required
3 Salt	Covered storage	None required
4		
5		
6		

Worksheet #8	Facility: Northeast Substation
	Completed By: Jim Hardesty
BMP Identification	Title: Stormwater Specialist
	Date: 03/04/10 pg. 2

Instructions: Describe the Best Management Practices (BMP's) that have been selected to be included in the plan. For each of the baseline BMP's, describe actions that will be incorporated into facility operations. Also describe any additional BMP's (activity-specific and site-specific BMP's) that have been selected. Attach additional sheets if necessary.

BMP's	Brief Description of Activities
Record Keeping and Internal Reporting Procedures	1) Keep records of revisions to the SWPPP, inspection reports, employee training records, and any spills or leaks that occur onsite.
Covered Storage	1) The Northeast Substation has already done an excellent job of covering potential stormwater pollution contributors by covering the roadwork materials, vehicle storage, and salt storage areas. The vehicle fueling areas could be covered at a later date or drip pans installed to further eliminate potential stormwater pollution.

Worksheet #8	Facility: Northeast Substation
	Completed By: Jim Hardesty
BMP Identification	Title: Stormwater Specialist
	Date: 03/04/10 pg. 1

Instructions: Describe the Best Management Practices (BMP's) that have been selected to be included in the plan. For each of the baseline BMP's, describe actions that will be incorporated into facility operations. Also describe any additional BMP's (activity-specific and site-specific BMP's) that have been selected. Attach additional sheets if necessary.

BMP's	Brief Description of Activities
Good Housekeeping	1) Debris should be collected and removed from the site 2) Work area cleanup should follow any task, no matter how small
Inspections	1) Monthly visual inspection of Potential Pollution sources and Stormwater Outfalls
Employee Training	1) Familiarization with all BMPs in place and ensuring that employees understan the requirements and contents of the SWPPP 2) Proper handling of all materials used or commonly encountered at the facility. 3) Must be conducted annually

Worksheet #9 BMP Implementation	Facility: Northeast Substation Completed By: Jim Hardesty		
BMP	**Action Required for Implementation**	**Completion Date:**	**Person Responsible:**
Sweeping of lot.	Sweeping of the lot area, as needed, to remove sand and dirt.	On going	Aaron Henning
Spill kit	Spill kit must be obtained, and deployed at the Water and Parks Dept fueling area.	5/1/2010	Aaron Henning

KARL'S TIRE DOWNTOWN, INC.
401 S. MARKET
WICHITA, KS 67202
PHONE (316) 264-5385

September 15, 2015

Mark A. Hall, CISEC
Compliance Officer
Stormwater Management and Compliance
455 N. Main 8th Floor
Wichita Ks. 67202

Dear Mark:

I am enclosing copies of meeting notes for the first stormwater awareness meeting we have held. I used information from the video you suggested would be useful, prepared a questionnaire and held a meeting to cover the video and hold a short discussion of the importance of always being aware of what could end up in our stormwater, and the negative effects it will cause. I will set a reminder to hold meetings quarterly and inform you of the meeting completion beginning 3 months from now (December, 2015; March, 2016; June, 2016; etc.)
Thank you for your help with the information; I found it very useful and will probably expand on this theme with additional videos I found online when viewing this one. If you have other information you feel would be helpful, I'll always be open to suggestions. Thanks, again.

Sincerely,

Joseph Doubrava
General Manager

jrd

Karl's Tire & Auto Service, Inc.
Stormwater Pollution Employee Meeting
DATE: 9 / 11 / 15

KARL'S TIRE DOWNTOWN INC.
401 S. MARKET
WICHITA KS

Attendance:

Leader- JOSEPH DOUBRAVA

THOMAS McGUIRE

MICHAEL TAYLOR

MARCO DUNN

TERRY WILKINS T.W.

Activities:

STORM WATER SERVICES VIDEO AND PREPARED QUESTIONNAIRE COMPLETED BY ALL EMPLOYES AT THIS LOCATION. DISCUSSION OF NEED FOR STORM WATER POLLUTION CAUSES AS THEY RELATE TO OUR BUSINESS.

Completion Certified:

Leader 9 / 11 / 15 **Date**

Karl's Tire & Auto Service, Inc.
Stormwater Pollution Employee Meeting
DATE: 9/12/15

Attendance:

Leader- Tim Briggs
Jim Plympton
Jesus Hernandez
Larry McNeill

Activities:

all Employes Viewed the Video "Stormwater Pollution Prevention Basics" I went over what it means to do our part in Preventing our Waste from Polluting our waterways all Employees took a test to insure They understand

Completion Certified:

Tim Briggs 9/14/15
Leader **Date**

Karl's Tire & Auto Service, Inc. **Name: _____ Date: __/__/__**

Storm Water Pollution Control and Prevention (revised)

Choose the best answer for each of the following questions:

1. **Which of the following is NOT an acceptable way to dispose of latex paint?**

   a. Let it dry and dispose of it with household trash.

   b. Use cat litter to absorb it and dispose of it with household trash.

   c. Dilute it and pour it down the drain.

   d. Take it to a local recycling center.

2. **The only thing that should go down a storm drain is rain. TRUE or FALSE ?**

3. **The two most significant pollutants are: (choose two)**

   a. Yard waste that enters storm sewers.

   b. Sediments that enter waterways.

   c. Fecal coliform bacteria.

   d. Pesticides sprayed on yards and crops.

4. **The first rule of pollution prevention is that...**

   a. Mowing your lawn weekly is vital.

   b. Your vehicle should always be maintained properly.

   c. Anything that goes down storm drains goes directly to our streams and lakes.

   d. There is not much you can personally do to make a difference.

5. **People can make a huge difference in prevention of stormwater pollution. TRUE or FALSE ?**

6. **Large scale fecal coliform pollution is usually the result of...**

   a. Sanitary sewer overflows.

   b. Migrating flocks of birds.

   c. Animal waste gone unchecked.

   d. Poor municipal water treatment practices.

7. **When maintaining your vehicle for best stormwater pollution prevention, it helps to...**

   a. Wash your car on your lawn.

   b. Keep your vehicle maintained to prevent oil and fluid leakage.

   c. Wash your car at a professional car wash.

   d. All of the above.

8. **Sediment comes from...**

   a. Sand and salt put on roads in the winter.

   b. Mud and dirt that falls off vehicles.

   c. Soil erosion from land under development.

   d. Asphalt erosion

9. **The first step in stormwater pollution prevention is to become aware of the potential pollutants you may find around your home and workplace. TRUE or FALSE ?**

10. **Some ways to help prevent stormwater pollution are...**

    a. Install a rain barrel to collect runoff when it rains.

    b. Pick up after your pets when out walking.

    c. Put hot cooking oil in glass jars or cans and dispose of in the household trash.

    d. Take household hazardous waste to a local recycling center.

    e. All of the above.

11. **In addition to taking wise pollution control measures it is important to report any stormwater pollution problems to local and state authorities. TRUE of FALSE ?**

12. **The second step in stormwater pollution prevention is ...**

    a. Throw all potentially hazardous materials in the trash so you don't have them around.

    b. Write to your congressman to encourage the enactment of more punitive laws for polluters.

    c. Organize a broad community awareness campaign so that people know about pollution.

    d. Change personal practices that can have a potentially negative impact on our storm water.

DEPARTMENT OF PARK & RECREATION INTEROFFICE MEMORANDUM

TO: **Rebecca Lewis, Environmental Services Compliance Manager**

FROM: **David McGuire, Superintendent Park & Recreation**

DATE: **January 22, 2016**

SUBJECT: **NPDES Annual Report for 2015**

Listed below are employees or staff supervisors that are currently certified or working as required by the Kansas pesticide law. If you have any questions, please contact me at 268-4222.

GOLF DIVISION PESTICIDE CERTIFICATIONS

Name	Number	Category	Exp. Dates
Ron Mosher	#9134	3A, 3B	12/31/17
Ron Reese	#10476	3B	12/31/17
Grant West	#17003	3B	12/31/17
Seth Davis	#16820	3B	12/31/17
David Buschschulte	#23326	3B	12/31/17
Neil White	#22376	3A, 3B	12/31/16

PARK MAINTENANCE and FORESTRY CERTIFICATIONS

Name	Number	Category	Exp. Dates
Tom Crain	#18016	3A, 3B	12/31/18
Tom Crain	#18016	6	12/31/18
Richard (Brian) Meeks	#10017	3A, 3B, 9A	12/31/16
Warren McCoskey	#18015	9A	12/31/18
Tom Nordick	#12327	9A	12/31/16
John Allred	#10959	9A	12/31/17
Craig Beaver	#10346	3A, 3B	12/31/17
Luke Fulton	#18812	3A, 3B, 9A	12/31/16
Sue Oxendine	#20316	3B, 9A	12/31/16
Lee Ann Sack	#24766	9A	12/31/16
James Bauman	#25596	3A, 3B	12/31/17
Yvonne Pino-Lashay	#25594	3A, 3B	12/31/17

Seth Macy	#25684	3A, 3B	12/31/17
Timothy Jason Hale	#25589	3A, 3B	12/31/17
Michelle Richards	#26007	3A, 3B	12/31/17

Site 1 :Spill entered creek via storm drain here
Site 2: Confluence Chisholm creek & Ark River
Site 3: Hydraulic St Bridge – Upstream site
Site 4 MacArthur Bridge site Downstream site
Arkansas River
Arkansas River
Chapin Park
Lamp Lighter Mobile Home Park
Google
135

Hardesty, James

Subject: FW: Plant 1 _ Influent Bypass into Canal Route
Attachments: Plant%201%20bypas(1).xlsx; Plant One Bypass sampling map.pptx

-----Original Message-----
From: Lewis, Rebecca
Sent: Saturday, August 29, 2015 4:14 PM
To: Henry, Don; a_k_king@msn.com; King, Alan; Pajor, Joseph; Belden, Jamie; Koontz, Larry; Nelson, Ben
Cc: Hardesty, James; Perkins, Bill
Subject: RE: Plant 1 _ Influent Bypass into Canal Route

Attached are analytical results and a location map of the sites. While bacti results were elevated and most likely impacted by the bypass as well as recent rain events, ammonia and dissolved oxygen results, which have the most impact to stream inhabitants were within acceptable ranges. Please let us know if you would like to see additional samples on Monday.

From: Lewis, Rebecca
Sent: Saturday, August 29, 2015 12:38 PM
To: Henry, Don; a_k_king@msn.com; King, Alan; Pajor, Joseph; Belden, Jamie; Koontz, Larry; Nelson, Ben
Cc: Hardesty, James; Perkins, Bill
Subject: RE: Plant 1 _ Influent Bypass into Canal Route

On site observation of the chisholm creek and Arkansas River at 9:30 am on Saturday morning, August 29th, reveled active biota in the stream with good clarity. The same conditions existed downstream in the Arkansas River at Macarthur and 47th streets bridge crossings. Bacti results for samples collected yesterday will be done incubating by 3:30 this afternoon. Samples were not collected this morning.

Plant 1 Bypass

	Location	Time	Temp	pH	Do	E. Coli	NH-3 mg/L	BOD	TSS
Site 3	Big Ark @ Hydraulic	2:25P	29.4°C	7.64	7.97	110.25	0.025	Data not available yet	
Site 1	Plant 1 Bypass	1:35P	27.3°C	6.29	No samp	>2419.2	4.41		
Site 2	Chisholm/ Ark Confluence	1:50P	32.2°C	6.85	3.55	>2419.2	4.08		
Site 4	Big Ark @ MacArthur	2:15P	29.4°C	7.66	8.17	>2419.2	0.19		

Observations: All locations had higher than normal flows

KANSAS DEPARTMENT OF HEALTH AND ENVIRONMENT
WASTEWATER INCIDENT REPORT FORM

Definitions are available at http://www.kdheks.gov/water/tech.html

Collection System Bypass ☒ | In-Plant Diversion ☐ | Upset ☐ | In-Plant Flow Through ☐ | Spill ☐

1. FACILITY NAME: Wichita Combined WWTP1 and 2 Kansas Permit # M-AR94_IO01
2. Within 24 hours of discovery, notify the KDHE Central Office (email – cseeds@kdheks.gov), (fax 785.296.0086), (telephone 785.296.5517) or your local KDHE district office. Written notification is required within 5 days of discovery. If the incident is not corrected within 5 days, send a written notification to KDHE indicating the status. This form is to be sent to KDHE when the incident ends.

IF THE INCIDENT IS AFTER HOURS AND REPRESENTS A SIGNIFICANT PUBLIC HEALTH THREAT CALL 785.296.1679 IMMEDIATELY

KDHE Person Contacted: John Goetz Date: 8/28/15 Time: 1:40 PM

3. Date Incident Discovered: 8/28/15 Time: 12:45 PM
4. Date Incident Ended: 8/28/2015 Time: 1:41 PM
5. Total estimated gallons bypassed, spilled, or routed through failed equipment for all locations on this form: ~150, 000
6. If rainfall induced event, approximate inches of rainfall _____

   If multiple locations listed below due to rain event, check here ☐

7. Incident Location: (check all that apply)
   - ☒ Plant
   - ☐ Lift/Pump Station
   - ☐ Peak Flow Basin
   - ☐ Manhole(s)
   - ☐ City Collection Line (Line Break / Joint)
   - ☐ Private Sewer Line
   - ☐ Basement
   - ☐ Other (specify below)

   Identify **All** Incident Locations by Name, Street Address or Manhole Number as appropriate.
   Grove Street Pump Station (Plant 1) 3100 S. Grove

8. Cause of Incident:
   - ☐ Intentional Bypass for Repair/Construction
   - ☐ Excessive Rainfall, Snow Melt
   - ☐ Unplanned Construction Related Break
   - ☒ City Line Break (Not Construction Related)
   - ☐ City Line Blockage
   - ☐ Private Line Break
   - ☐ Private Line Blockage
   - ☐ Lagoon High Level
   - ☐ Equipment Failure
   - ☐ Control System Failure
   - ☒ Power Related Failure
   - ☐ Operations Related Failure
   - ☐ Maintenance Related Failure
   - ☐ Vandalism
   - ☐ Other

   Additional explanation of reason for Incident: (use additional page if necessary)
   See Attached Page.

9. Corrective Action, if any: (use additional page if necessary)
   See Attached Page.

Name: Jamie G. Belden Date: 9/2/2015

Title: Operations Supervisor Phone 316-303-8721

When Completed, E-mail to: cseeds@kdheks.gov

Or Mail to: Kansas Department of Health & Environment – Attn: Chris Seeds
1000 SW Jackson St.., Suite 420, Topeka , KS 66612-1367
Fax 785.296.0086

REV 20150505

8. Additional explanation of reason for Incident.

On 8-28-2015 at approximately 12:45, City staff was notified of a power outage at the Grove Street Pump Station (Plant 1). Supervision immediately responded to the location and dispatched City Electrical Staff and Westar emergency services. Electrical staff found that a large power surge had tripped the main power to the tie breakers. The Plant was reenergized by approximately 1:20 PM. The pump station was then placed on line and staff began pumping to Plant 2 as well as the extraneous flow to get wet well levels lowered quickly. The discharged stopped at approximately 1:40 PM.

While Electrical Staff was performing their assessment and bringing power back on to the facility, operations staff and supervision performed checks of the facility to assess potential impacts. The bypass outfall to the canal had no discharge or signs of a discharge. However, a plume of dark water was noticed coming from the North. Staff followed the plume and identified that it was being discharged from a storm sewer outfall to the canal. After this discovery, Sewer Maintenance Staff and Stormwater Staff were contacted to assist in determining the nature of the discharge.

Sewer Maintenance, Stormwater, and Sewage Treatment crews worked collectively to identify the cause of the discharge into the storm sewer. CCTV of the afore-mentioned storm sewer was performed that afternoon and identified some voids in the pipe which passes through two sewer vaults. When the power failure occurred, wastewater backed up into the collection system raising the level of the vaults and discharged through the voids in the storm sewer pipe to the canal.

After this determination was made, Operations staff changed pump staging for Plant 1 pumping to keep wet well levels lower to minimize the risk of another occurrence while a determination could be made about the next steps and the repair. Plant 1 rounds were also increased to visually inspect wet well levels and the point of bypass.

KANSAS DEPARTMENT OF HEALTH AND ENVIRONMENT
WASTEWATER INCIDENT REPORT FORM

Definitions are available at http://www.kdheks.gov/water/tech.html

Collection System Bypass ☒ | In-Plant Diversion ☐ | Upset ☐ | In-Plant Flow Through ☐ | Spill ☐

1. FACILITY NAME: Wichita Combined WWTP1 and 2 Kansas Permit # M-AR94_IO01
2. Within 24 hours of discovery, notify the KDHE Central Office (email – cseeds@kdheks.gov), (fax 785.296.0086), (telephone 785.296.5517) or your local KDHE district office. Written notification is required within 5 days of discovery. If the incident is not corrected within 5 days, send a written notification to KDHE indicating the status. This form is to be sent to KDHE when the incident ends.

IF THE INCIDENT IS AFTER HOURS AND REPRESENTS A SIGNIFICANT PUBLIC HEALTH THREAT CALL 785.296.1679 IMMEDIATELY

KDHE Person Contacted: John Goetz Date: 8/28/15 Time: 1:40 PM

3. Date Incident Discovered: 8/28/15 Time: 12:45 PM
4. Date Incident Ended: 8/28/2015 Time: 1:41 PM
5. Total estimated gallons bypassed, spilled, or routed through failed equipment for all locations on this form: ~150, 000
6. If rainfall induced event, approximate inches of rainfall _____

   If multiple locations listed below due to rain event, check here ☐

7. Incident Location: (check all that apply)
   - ☒ Plant
   - ☐ Lift/Pump Station
   - ☐ Peak Flow Basin
   - ☐ Manhole(s)
   - ☐ City Collection Line (Line Break / Joint)
   - ☐ Private Sewer Line
   - ☐ Basement
   - ☐ Other (specify below)

   Identify **All** Incident Locations by Name, Street Address or Manhole Number as appropriate.
   Grove Street Pump Station (Plant 1) 3100 S. Grove

8. Cause of Incident:
   - ☐ Intentional Bypass for Repair/Construction
   - ☐ Excessive Rainfall, Snow Melt
   - ☐ Unplanned Construction Related Break
   - ☒ City Line Break (Not Construction Related)
   - ☐ City Line Blockage
   - ☐ Private Line Break
   - ☐ Private Line Blockage
   - ☐ Lagoon High Level
   - ☐ Equipment Failure
   - ☐ Control System Failure
   - ☒ Power Related Failure
   - ☐ Operations Related Failure
   - ☐ Maintenance Related Failure
   - ☐ Vandalism
   - ☐ Other

   Additional explanation of reason for Incident: (use additional page if necessary)
   See Attached Page.

9. Corrective Action, if any: (use additional page if necessary)
   See Attached Page.

Name: Jamie G. Belden Date: 9/2/2015

Title: Operations Supervisor Phone 316-303-8721

When Completed, E-mail to: cseeds@kdheks.gov

Or Mail to: Kansas Department of Health & Environment – Attn: Chris Seeds
1000 SW Jackson St.., Suite 420, Topeka , KS 66612-1367
Fax 785.296.0086

REV 20150505

8. Additional explanation of reason for Incident.

On 8-28-2015 at approximately 12:45, City staff was notified of a power outage at the Grove Street Pump Station (Plant 1). Supervision immediately responded to the location and dispatched City Electrical Staff and Westar emergency services. Electrical staff found that a large power surge had tripped the main power to the tie breakers. The Plant was reenergized by approximately 1:20 PM. The pump station was then placed on line and staff began pumping to Plant 2 as well as the extraneous flow to get wet well levels lowered quickly. The discharged stopped at approximately 1:40 PM.

While Electrical Staff was performing their assessment and bringing power back on to the facility, operations staff and supervision performed checks of the facility to assess potential impacts. The bypass outfall to the canal had no discharge or signs of a discharge. However, a plume of dark water was noticed coming from the North. Staff followed the plume and identified that it was being discharged from a storm sewer outfall to the canal. After this discovery, Sewer Maintenance Staff and Stormwater Staff were contacted to assist in determining the nature of the discharge.

Sewer Maintenance, Stormwater, and Sewage Treatment crews worked collectively to identify the cause of the discharge into the storm sewer. CCTV of the afore-mentioned storm sewer was performed that afternoon and identified some voids in the pipe which passes through two sewer vaults. When the power failure occurred, wastewater backed up into the collection system raising the level of the vaults and discharged through the voids in the storm sewer pipe to the canal.

After this determination was made, Operations staff changed pump staging for Plant 1 pumping to keep wet well levels lower to minimize the risk of another occurrence while a determination could be made about the next steps and the repair. Plant 1 rounds were also increased to visually inspect wet well levels and the point of bypass.

Site 1 :Spill entered creek via storm drain here
Site 2: Confluence Chisholm creek & Ark River
Site 3: Hydraulic St Bridge – Upstream site
Site 4 MacArthur Bridge site Downstream site
Arkansas River
Arkansas River
Chapin Park
Lamp Lighter Mobile Home Park
Google
135

Hardesty, James

Subject: FW: Plant 1 _ Influent Bypass into Canal Route
Attachments: Plant%201%20bypas(1).xlsx; Plant One Bypass sampling map.pptx

-----Original Message-----
From: Lewis, Rebecca
Sent: Saturday, August 29, 2015 4:14 PM
To: Henry, Don; a_k_king@msn.com; King, Alan; Pajor, Joseph; Belden, Jamie; Koontz, Larry; Nelson, Ben
Cc: Hardesty, James; Perkins, Bill
Subject: RE: Plant 1 _ Influent Bypass into Canal Route

Attached are analytical results and a location map of the sites. While bacti results were elevated and most likely impacted by the bypass as well as recent rain events, ammonia and dissolved oxygen results, which have the most impact to stream inhabitants were within acceptable ranges. Please let us know if you would like to see additional samples on Monday.

From: Lewis, Rebecca
Sent: Saturday, August 29, 2015 12:38 PM
To: Henry, Don; a_k_king@msn.com; King, Alan; Pajor, Joseph; Belden, Jamie; Koontz, Larry; Nelson, Ben
Cc: Hardesty, James; Perkins, Bill
Subject: RE: Plant 1 _ Influent Bypass into Canal Route

On site observation of the chisholm creek and Arkansas River at 9:30 am on Saturday morning, August 29th, reveled active biota in the stream with good clarity. The same conditions existed downstream in the Arkansas River at Macarthur and 47th streets bridge crossings. Bacti results for samples collected yesterday will be done incubating by 3:30 this afternoon. Samples were not collected this morning.

Plant 1 Bypass

	Location	Time	Temp	pH	Do	E. Coli	NH-3 mg/L	BOD	TSS
Site 3	Big Ark @ Hydraulic	2:25P	29.4°C	7.64	7.97	110.25	0.025	Data not available yet	
Site 1	Plant 1 Bypass	1:35P	27.3°C	6.29	No samp	>2419.2	4.41		
Site 2	Chisholm/ Ark Confluence	1:50P	32.2°C	6.85	3.55	>2419.2	4.08		
Site 4	Big Ark @ MacArthur	2:15P	29.4°C	7.66	8.17	>2419.2	0.19		

Observations: All locations had higher than normal flows

8. Additional explanation of reason for Incident.

On 8-28-2015 at approximately 12:45, City staff was notified of a power outage at the Grove Street Pump Station (Plant 1). Supervision immediately responded to the location and dispatched City Electrical Staff and Westar emergency services. Electrical staff found that a large power surge had tripped the main power to the tie breakers. The Plant was reenergized by approximately 1:20 PM. The pump station was then placed on line and staff began pumping to Plant 2 as well as the extraneous flow to get wet well levels lowered quickly. The discharged stopped at approximately 1:40 PM.

While Electrical Staff was performing their assessment and bringing power back on to the facility, operations staff and supervision performed checks of the facility to assess potential impacts. The bypass outfall to the canal had no discharge or signs of a discharge. However, a plume of dark water was noticed coming from the North. Staff followed the plume and identified that it was being discharged from a storm sewer outfall to the canal. After this discovery, Sewer Maintenance Staff and Stormwater Staff were contacted to assist in determining the nature of the discharge.

Sewer Maintenance, Stormwater, and Sewage Treatment crews worked collectively to identify the cause of the discharge into the storm sewer. CCTV of the afore-mentioned storm sewer was performed that afternoon and identified some voids in the pipe which passes through two sewer vaults. When the power failure occurred, wastewater backed up into the collection system raising the level of the vaults and discharged through the voids in the storm sewer pipe to the canal.

After this determination was made, Operations staff changed pump staging for Plant 1 pumping to keep wet well levels lower to minimize the risk of another occurrence while a determination could be made about the next steps and the repair. Plant 1 rounds were also increased to visually inspect wet well levels and the point of bypass.

Stormwater Management Division

Wastewater Spill into Wichita Drainage Canal

Self-Reporting letter

Kansas Department of Health & Environment

1000 SW Jackson St

Suite 420

Topeka, KS 66612-1367

Re: Wastewater spill into drainage canal

Dear Rance Walker,

The following is a description of the actions taken by the City of Wichita Stormwater Management Division as a result of the Wastewater Incident Report at the Wichita Drainage Canal (attached).

The City of Wichita observed wastewater flowing from one of its storm drain lines into the Wichita Drainage Canal on Friday August 28, 2015 at approximately 12:45 p.m.

Power was restored to the sanitary lift station, and the wastewater discharge to the Drainage Canal stopped. Approximately 50,000 gallons of untreated wastewater is estimated to have been released. Recovery operations began by deploying a sample crew upstream and downstream on the Arkansas River to collect samples and make observations .

Emergency meetings were held Monday, August 31st to develop a repair plan. Also on Monday, Jim Hardesty, Interim Stormwater Division Manager called KDHE and spoke with both Mr. Rance Walker in Topeka and Mr. John Paul Goetz in the Southcentral Office about the spill occurrence.

On the afternoon of the occurrence, the City televised the discharging storm conduit back to a conflict manhole structure with a 78” sanitary sewer. Passing through that manhole are two 30” stormwater conduits. Televising showed holes in the top of one of those stormwater conduits. Wastewater was able to enter the holes in the stormwater conduit and flow to its outfall in the canal.

Adjacent to the 78” conflict manhole, there is a second conflict manhole for a 60” sanitary line. That second manhole has the same two 30” stormwater conduits passing through. Neither storm conduit in the 2nd sanitary manhole is damaged.

To summarize, 2 sanitary conflict manholes, each with the same pair of storm conduits passing through. One of the 4 storm conduits is damaged. As a safegaurd, all 4 storm conduits will be replaced.

The City has begun replacing all storm conduits that pass through the conflict manholes, with C-905 high pressure 30” PVC piping. The City is proceeding under Public Exigency emergency procurement procedures to hire a contractor to install the new storm conduits. To accelerate the project, the City has directly ordered the necessary piping. Emergency Bids are expected to be received from the contractors by the close of business on Wednesday, September 2, 2015. Contractor mobilization is expected by Friday, September 4, 2015, with onsite work commencing on Saturday, September 5, 2015. The replacement pipe is expected to be delivered to the site on Sunday, September 6, 2015.

As a precaution, the City has placed plugs upstream in both stormwater conduits. And, the City has put 2 plugs in each of the stormwater conduits downstream of the conflict manholes. Double plugging each line ensures redundancy to protect the outfall.

In case of rainfall, the City stands ready to emergency bypass pump stormwater from an upstream stormwater manhole around these plugs and into the Drainage Canal.

The location of this event is at North Latitude 37.65 degrees and West Longitude 97.31 degrees. The structure inventory number of the storm manhole at this location is 5644-0086.

The City will follow up on this matter upon the completion of the final repairs to the stormwater system.

Please contact me with any questions,

Jim Hardesty
Interim Division Manager
City of Wichita
455 N. Main 8th Floor
Wichita, KS. 672002
316-268-8317
Jhardesty@wichita.gov

cc: Mike Tate

Rod Geisler

Allison Herring

John Goetz

Alan King

Joe Pajor

Don Henry

Bill Perkins

STORM WATER POLLUTION PREVENTION PLAN

SEWAGE TREATMENT PLANT No. 1

Prepared by

CITY OF WICHITA

September 2010

Management Commitment of Resources

The City of Wichita is committed to the implementation of the procedures outlined in this SWPPP and the prevention of pollutants to navigable waters of the United States. This Plan has the full approval of management at a level of authority to commit the resources necessary to implement the SWPP Plan. A copy of this SWPP Plan shall be maintained at the facility at all times and will be made available to the EPA or State of Kansas for on-site review during normal working hours.

Authorized Management Representative Name: _____

Signature: _____

Title: _____

Date: _____

STORM WATER POLLUTION PREVENTION PLAN

SEWAGE TREATMENT Plant No. 1

Prepared by

CITY OF WICHITA

September 2010

TABLE OF CONTENTS

1 INTRODUCTION 4
1.1 SWPPP Pollution Prevention Team 4

2 FACILITY DESCRIPTION AND STORM WATER DRAINAGE 6
2.1 Facility Drainage 6
2.2 Inventory of Exposed Materials 6
2.3 Significant Spills and Leaks 7

3 OUTFALL INVENTORY 8
3.1 Non-Storm Water Discharges 8
3.2 Description of Potential Pollution Sources 8
3.2.1 Tank Farm and Fueling Area 10
3.2.2 Process Chemical Area Area 9
3.3 Existing Storm Water Sampling Data 11

4 POLLUTION PREVENTION MEASURES AND CONTROLS (BMPs) 12
4.1 Good Housekeeping 12
4.2 Spill Prevention and Response Procedures 12
4.3 Inspections 12
4.4 Employee Training 13
4.5 Erosion Control Measures 13
4.6 Record Keeping and Internal Reporting Procedures 13

5 MONITORING, REPORTING, AND RECORD KEEPING REQUIREMENTS .. 14
5.1 Sampling Requirements 14
5.2 Comprehensive Site Compliance Evaluation and Report 14

6 REFERENCES 16

APPENDIX A. SWPPP Development Worksheets
APPENDIX B. Monthly Site Inspections
APPENDIX C. Comprehensive Site Compliance Evaluation Reports
APPENDIX D. Employee Training
APPENDIX E. Significant Spills and Leaks
APPENDIX F. KDHE Storm Water Pollution Prevention Plan Requirements and Guidelines
APPENDIX G. Extra SWPPP Worksheets

LIST OF TABLES

Table 1-1 Requirements of the SWPPP 5

LIST OF FIGURES

Figure 3-1. Site Map ..... ….17
Figure 3-2. Tank Farm and Fueling Area 10
Figure 3-3. Process Chemical Area 11

1 INTRODUCTION

The purpose of this Storm Water Pollution Prevention Plan (SWPPP or SWP3) is to prevent contamination of storm water runoff as a result of industrial activities conducted at the Sewage Treatment Plant No. 1. The City of Wichita owns and operates this facility at 3100 S. Grove in Wichita, Kansas. The goals of this SWPPP are as follows:

1. Identify potential sources of pollution that may be reasonably expected to contribute to the contamination of storm water runoff.
2. Establish Best Management Practices (BMP) that eliminate or effectively reduce the routes for contamination to enter the storm water runoff.

The United States Environmental Protection Agency (USEPA) has developed regulations to reduce the introduction of pollutants into storm water from industrial sites. These regulations have been delegated to the Kansas Department of Health and Environment (KDHE) to administer. Currently, KDHE considers an industrial facility to be in compliance if the owner has submitted a Notice of Intent (NOI) for Storm Water Discharges Associated with Industrial Activity under the General Permit and has developed a SWPPP. This SWP3 was prepared according to the requirements stated within the USEPA and the KDHE guidance documents (Appendix F).

1.1 SWPPP Pollution Prevention Team

The members of the Sewage Treatment Plant No. 1 Pollution Prevention Team (Appendix A, Worksheet #1) are responsible for the day-to-day tasks related to storm water runoff pollution prevention. The members of the SWP3 Pollution Prevention Team will conduct employee training programs, ensure implementation of BMPs, complete all site inspections, and supervise the day-to-day operations at the site which negatively affect storm water quality. Collectively, the SWP3 Pollution Prevention Team is responsible for the following tasks:

- Performing scheduled inspections.
- Training facility personnel.
- Ensuring that the BMPs in the plan are being implemented.
- Maintaining records.
- Revising the SWPPP to reflect changes to the BMPs employed and to the applicable regulations.
- Preparing the Comprehensive Site Compliance Evaluation for insertion into Appendix C of this document once each year.

The following individuals are designated as the primary members of the SWP3 Pollution Prevention Team at the Sewage Treatment Plant No. 1:

Individual: Jade Dundas
Title: Superintendant
Phone: (316) 303-8702

Individual: Mike Hess
Title: Maintenance Supervisor
Phone: (316) 303-8783

These individuals (or persons in their positions) must maintain and update this SWPPP. The Pollution Prevention Team must also coordinate between "front line" employees and management concerning pollution prevention issues. The Pollution Prevention Team is responsible for carrying out the requirements of the SWPPP as summarized in the following table.

Table 1-1 Requirements of the SWPPP

Activity	Frequency
1. Site Inspections	Monthly, records in Appendix B, recordkeeping requirement of 3 years
2. Comprehensive Site Compliance Evaluation	Annually
Comprehensive Site Compliance Evaluation Report	Completed within 2 weeks following Evaluation and inserted in Appendix C
Comprehensive Site Compliance Evaluation Report Implementation	Performed within 12 weeks of the Evaluation Report
3. Visual Inspection of Storm Water	Periodically during wet weather events. Results included in Comprehensive Site Compliance Evaluation Report
4. Employee Training	Annually, keep record of training in Appendix D, Employee Training
5. Spill Reporting	If spill occurs, documented in Appendix E, Significant Spills and Leaks
6. SWPPP recertification	Once every five years by a Kansas P.E., Appendix F

2 FACILITY DESCRIPTION AND STORM WATER DRAINAGE

2.1 Facility Description

The Sewage Treatment Plant No. 1 is located at 3100 S. Grove in Sedgwick County, Wichita, Kansas. This site was formerly the primary location for sewage treatment serving the Wichita metropolitan area. Currently, this is a non-discharging facility, and the main function of this site is to act as a lift station for transport of sewage to Sewage Treatment Plant No. 2. The Standard Industrial Classification (SIC) for this facility is 4952. This plan covers activities where contaminants could possibly be introduced into the storm water runoff such as refueling and maintenance of vehicles, and storage of materials. Contaminants of concern used in these activities include diesel, which is used for operation of equipment, and hypochlorite, which is used for odor reduction. A site map is presented following Worksheet #2 in Appendix A. The important features identified on the site map include the locations of the potential stormwater pollution activities and the stormwater outfall.

2.2 Facility Drainage

There are seven primary drainage structures from the site, including six outfalls to the Wichita Central Drainage Channel and one ditch outfall to the Arkansas River. As shown on the map, stormwater from the northern portions of the site drains to a ditch immediately south of Interstate I-135. Stormwater from the center of the site drains by means of a drainage swale to the Arkansas River. Stormwater from the eastern portion of the site drains east by a series of surface inlets and drain pipes to the Wichita Central Drainage Channel.

A large portion of the site does not produce rainfall runoff. Approximately 19 acres of open wastewater treatment structures exist onsite. Rain falling within these structures becomes part of the wastewater pumping operation. Therefore, for permit purposes, the effective total drainage area for this site has been reduced from approximately 58 acres to approximately 39 acres of effective site area.

The SWPPP site map will be updated by the SWPPP Pollution Prevention Team whenever changes are made that would affect storm water runoff.

2.3 Inventory of Exposed Materials

Materials which could potentially come into contact with precipitation and contaminate storm water runoff have been summarized in the Material Inventory worksheet presented

in Appendix A, Worksheet #3. Currently, there are not any significant quantities of materials exposed to storm water. Materials currently stored at this facility that could possibly come in contact with storm water include diesel, gear oil, and hypochlorite; however, these materials are unlikely to come into contact with storm water as described in Worksheet #3.

If during the Comprehensive Site Compliance Evaluation (Section 5.2), it is determined that a material has been added or removed from the Sewage Treatment Plant No. 1, the Materials Inventory worksheet should be updated. New worksheets should be added to the SWPPP when a new material is introduced to the site. If the use of a material is discontinued, it should be crossed out on the worksheet, and the date its use was discontinued should be noted. The changes should be initialed by the appropriate member of the SWPPP Pollution Prevention Team.

2.4 Significant Spills and Leaks

According to facility personnel there have been no spills or leaks of toxic or hazardous pollutants in reportable quantities for the previous three years (Appendix A, Worksheet #4). In Appendix G, a blank Worksheet #4 should be completed and included in Appendix E if any spills occur in the future.

3 OUTFALL INVENTORY

As detailed in Section 2.2, there are six outfalls to the Wichita Central Drainage Channel and one ditch outfall to the Arkansas River. A site map, Figure 3.1, is presented following Worksheet #2 in Appendix A. The important features identified on the site map include the locations of the potential stormwater pollution activities and the stormwater outfalls.

3.1 Non-Storm Water Discharges

The Sewage Treatment Plant No. 1 site was inspected for the presence of non-storm water discharges (Appendix A, Worksheets #5 & #6). A visual inspection of the site's storm water outfalls revealed no non-storm water discharges; however, the facility should be inspected periodically to verify this conclusion is valid throughout the year. It is most convenient to conduct these inspections concurrently with the routine monthly inspections of the facilities.

The inspector should walk the site and trace the sources of any flows leaving the site that occur during dry weather. Non-storm water flows may result from illicit connections to the sanitary sewer system or from overland flow of process water.

3.2 Description of Potential Pollution Sources

There are three locations of activities where potential contaminants could come in contact with storm water. They are (1) the Tank Farm, (2) and the Process Chemical Storage areas, (Appendix A, Worksheet #7).

3.2.1 Tank Farm

This area is located immediately north of the sludge drying beds, and consists of one 300 gallon and one 500 gallon AST. The fuel is used to supply diesel for maintenance activities, and is dispensed via gravity feed. The AST's are not covered and any residual fuel spilled from the tank should be immediately cleaned up. The AST's are located within concrete secondary containment. At this time, Sewage Treatment Plant No. 1 does not have absorbent material onsite to be used if there are visible oil marks on the concrete or if gasoline is spilled from the fuel tanks. After use, the absorbing material should be removed and disposed. If in the future additional BMPs are required, available options will be evaluated. Below is a photograph of the fuel tanks.

Figure 3-2. Fueling Area

3.2.2 Process Chemical Storage

There are two above ground tanks of hypochlorite, an odor reducing chemical dispensed into the sewage stream as it flows to Treatment Plant 2. Both tanks, one a 500 gallon tank, the other a 2000 gallon tank, are located within concrete containment. The smaller tank is immediately south of the administrative building, the larger tank is immediately north of the administrative building.

Below are pictures of the areas.

Figure 3-3a. 500 gallon hypochlorite tank

Figure 3-3b. 2000 gallon hypochlorite tank

3.3 Existing Storm Water Sampling Data

Sewage Treatment Plant 1 was sampled during two rain events in 1991. The results of that sampling are contained the City's original Permit application dated September 1992. It is not anticipated that KDHE will require monitoring of storm water at this site in the future.

4 POLLUTION PREVENTION MEASURES AND CONTROLS (BMPs)

The following section identifies BMPs that will be implemented as part of this SWPPP (Appendix A, Worksheet #8).

4.1 Good Housekeeping

The most elementary, yet one of the most effective, of all BMPs is the practice of good housekeeping. For the Sewage Treatment Plant No. 1, this consists of the following:

(1) Debris exposed to stormwater should be collected and removed from the site.
(2) Work area cleanup should follow any task, no matter how small.

Currently, the lead site maintenance worker conducts weekly site inspections to ensure good housekeeping at the site. Good housekeeping will be stressed to the employees during their annual employee training.

4.2 Spill Prevention and Response Procedures

Spills of diesel fuel, motor oil, or any of the other material could contribute pollutants to storm water discharges. If such an event occurs, having proper procedures in place can prevent a spill from becoming a potentially large environmental problem. There has not been a spill of any significant amount of material in the past three years. Despite this excellent performance, employees should know proper spill prevention and response procedures should an event occur in the future. Worksheet #4 in Appendix F can be used to record the date and time of any future spills.

4.3 Inspections

Inspections involve visually checking the potential sites of pollution on a periodic basis to confirm that good housekeeping procedures on being followed. The inspection currently occurs weekly by the lead site maintenance worker; however, it is not currently documented. To comply with KDHE Storm water Pollution Prevention Plan guidelines, a monthly record of the inspections should be kept for a period of three years in Appendix B, and a set of follow-up procedures should be in place so that corrective actions can occur if needed (A blank inspection form is included at the end of Appendix G).

4.4 Employee Training

All Sewage Treatment Plant No. 1 employees that are responsible for storm water pollution prevention at the facility will receive training, and this training will be thoroughly documented. Training will address the following subjects:

(1) Familiarization with all BMPs in place and ensuring that employees understand the requirements and contents of the SWPPP.
(2) Proper handling of all materials used or commonly encountered at the facility.

Employee training will be conducted initially when the SWPPP is presented to the facility. Annual refresher and new hire training will be conducted by the SWPPP Pollution Prevention Team. Worksheet #10 included in Appendix D can be used to document training.

4.5 Erosion Control Measures

For sites that are largely unpaved without adequate ground cover, soil erosion can transport large quantities of suspended sediment into the downstream waterways. However, during the site visit, it was not apparent that soil erosion is a significant problem at the Sewage Treatment Plant No. 1. The relatively small unpaved areas and the mild slopes keep erosion from becoming a significant problem. However, future Comprehensive Site Compliance Evaluations by the Pollution Prevention Team should include looking for signs of erosion and assess the need for implementation of erosion-control BMPs.

4.6 Record Keeping and Internal Reporting Procedures

Accurate and thorough records of all activities are essential to maintaining the SWPPP and storm water quality. Records of the monthly inspections (Appendix B), the Comprehensive Site Compliance Evaluation Reports (Appendix C), employee training records (Appendix D), and any future spills or leaks that occur (Appendix E) will be kept on site with the SWPPP. These records will be readily available for review by regulatory agencies.

5 MONITORING, REPORTING, AND RECORD KEEPING REQUIREMENTS

5.1 Sampling Requirements

At this time, KDHE is not requiring that quantative chemical analysis be conducted on the storm water leaving the site; however, periodically during wet weather events, storm water should be visually inspected for the presence of pollutants. It is recommended that the visual inspection of the storm water be conducted periodically during the spring when wet weather events are typically frequent. The outfalls identified in Section 3 should be observed. The inspection should indicate whether an oil sheen, foam, suspended solids, or floating solids are present and the color and clarity of the storm water. The results of the visual inspection of the storm water will be included in the Comprehensive Site Compliance Evaluation Report (Appendix C).

5.2 Comprehensive Site Compliance Evaluation and Report

A Comprehensive Site Compliance Evaluation inspection should be conducted on an annual basis to determine whether site conditions have changed, whether the SWPPP needs to be revised, and whether the SWPPP procedures are effective. The SWPPP should be modified if any deficiencies are identified based on the evaluation or additional BMPs could be implemented. If a BMP is identified that will be implemented, Worksheet #9 (a blank form is included in Appendix G) should be utilized and included with the Comprehensive Site Compliance Evaluation Report. Examples of changes that would result in a revision are re-grading of the existing site, any additional material added to the site that could contribute to storm water pollution, or a request for chemical analysis of storm water by KDHE.

The inspection should target the storm water outfall and the areas that could potentially contribute to storm water pollution; the fueling area, and the waste oil storage area. (identified on the Site Map, Appendix A). In addition, the inspection should look for signs of erosion around the site.

It is recommended that the Sewage Treatment Plant No. 1 develop a report format for this inspection or utilize Worksheet #11 in Appendix C. The report should contain the following information: the cleanliness of the areas, a visual inspection of the storm water outfall, confirming that non-storm water discharges are not present, the documented visual analysis of the storm water runoff from the outfall, and if there were any changes to site map. These changes should be identified and the site map updated. The report

must be included in Appendix C within two weeks of the Comprehensive Site Compliance Evaluation inspection. If the report identifies additional measures that should be taken to reduce storm water pollution, the measures must be implemented within 12 weeks, and the update recorded on Worksheet #12 (a blank form is included in Appendix G). The updated worksheet should be included with the Comprehensive Site Compliance Evaluation Report.

6 REFERENCES

USEPA, Storm Water Management for Industrial Activities – Developing Pollution Prevention Plans and Best Management Practices, 1992.

KDHE, Storm Water Pollution Prevention Plan Requirements and Guidelines, Attachment A, no date.

Worksheet #1 POLLUTION PREVENTION TEAM MEMBER ROSTER	Facility name: Sewage Treatment Plant 1 Completed by: Jim Hardesty Title: Storm Water Specialist Date: 09/6/10

Leader: Jade Dundas

Title: Superintendent

Office Phone: 316-303-8702

Responsibilities:

1) Signatory authourity; 2) Coordinate employee training program; 3) Ensure that all SWPPP requirements are performed

Members:

(1) Mike Hess

Title: Maintenance Supervisor

Office Phone: 316-303-8783

Responsibilities:

1) Conduct annual site evaluations; 2) Perform employee training; 3) Conduct weekly site inspections

(2) _____

Title: _____

Office Phone: _____

Responsibilities:

(3) _____

Title: _____

Office Phone: _____

Responsibilities:

(4) _____

Title: _____

Office Phone: _____

Responsibilities:

Worksheet #2 DEVELOPING A SITE MAP	Facility name: Sewage Treatment Plant #1 Completed by: Jim Hardesty Title: Date: 9/6/10

Instructions: Draw a map of your site including a footprint of all buildings, structures, paved areas, and parking lots. The information below describes additional elements required by EPA's General Permit.

EPA's General Permit requires the following features on the site map:

- All outfalls and storm water discharges
- Drainage areas of each storm water outfall
- Structural storm water pollution control measures, such as:
  - Flow diversion structures
  - Retention/detention ponds
  - Vegetative swales
  - Sediment traps
- Name of receiving waters (or if through a Municipal Separate Storm Sewer System)
- Locations of exposed significant materials
- Locations of past spills and leaks
- Locations of high-risk, waste-generating areas and activities common on industrial sites such as:
  - Fueling stations
  - Vehicle/equipment washing and maintenance areas
  - Area for unloading/loading materials
  - Above-ground tanks for liquid storage
  - Industrial waste management areas (landfills, waste piles, treatment plants, disposal areas)
  - Outside storage areas for raw materials, by-products, and finished products
  - Outside manufacturing areas
  - Other areas of concern (specify: _____)

Worksheet #3 MATERIAL INVENTORY	Facility name: Sewage Treatment Plant #1 Completed by: Jim Hardesty Title: Storm Water Specialist Date: 9/6/10

Instructions: List all materials used, stored, or produced onsite. Assess and evaluate these materials for their potential to contribute pollutants to storm water runoff. Also complete Worksheet 3A if the material has been exposed during the last 3 years.

Material	Purpose/Location	Quantity (gallons)			Quantity Exposed in Last 3 Years	Likelihood of contact with storm water. If yes, describe reason.	Past Significant Spill or Leak	
		Used	Produced	Stored			Yes	No
Diesel	Fuel/ Tank Farm	varies		500	None	Not likely, fuel is stored within secondary containment.		No
Diesel	Fuel/ Tank Farm	varies		300	None	Not likely, fuel is stored within secondary containment.		No
Hypochlorite	Odor Reduction	varies		2000	None	Not likely, chemical is stored within secondary containment.		No

Worksheet #4

LIST OF SIGNIFICANT SPILLS AND LEAKS

Facility name: Sewage Treatment Plant #1
Completed by: Jim Hardesty
Title:
Date: 9/6/10

Directions: Record below all significant spills and significant leaks of toxic or hazardous pollutants that have occurred at the facility in the three years prior to the effective date of the permit.

Definitions: Significant spills include, but are not limited to, releases of oil or hazardous substances in excess of reportable quantities.

1st Year Prior

Date (month/day/year)	Spill	Leak	Location (as indicated on site map)	Description				Response Procedure		Preventive Measures Taken
				Type of Material	Quantity	Source, If Known	Reason	Amount of Material Recovered	Material No Longer Exposed to Storm Water (True/False)	
None										

2nd Year Prior

Date (month/day/year)	Spill	Leak	Location (as indicated on site map)	Description				Response Procedure		Preventive Measures Taken
				Type of Material	Quantity	Source, If Known	Reason	Amount of Material Recovered	Material No Longer Exposed to Storm Water (True/False)	

3rd Year Prior

Date (month/day/year)	Spill	Leak	Location (as indicated on site map)	Description				Response Procedure		Preventive Measures Taken
				Type of Material	Quantity	Source, If Known	Reason	Amount of Material Recovered	Material No Longer Exposed to Storm Water (True/False)	

Worksheet #5 NON-STORM WATER DISCHARGE ASSESSMENT AND CERTIFICATION	Facility name: Sewage Treatment Plant #1 Completed by: Jim Hardesty Title: Date: 9/6/10

Date of Test or Evaluation	Outfall Directly Observed During the Test (identify as indicated on the site map)	Method Used to Test or Evaluate Discharge	Describe Results from Test for the Presence of Non-Storm Water Discharge	Identify Potential Significant Sources	Name of Person Who Conducted the Test or Evaluation
09/3/10	7 Outfalls observed	Visual	No discharge observed	Fuel and waste oil.	Jim Hardesty

CERTIFICATION

I, (responsible corporate official), certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

A. Name & Official Title (type or print)	B. Area Code and Telephone No.
C. Signature	D. Date Signed

Worksheet #6 NON-STORM WATER DISCHARGE ASSESSMENT AND FAILURE TO CERTIFY NOTIFICATION	Facility name: Sewage Treatment Plant #1 Completed by: Jim Hardesty Title: Date: 9/6/10

Directions: If you cannot feasibly test or evaluate an outfall, fill in the table below with the appropriate information and sign this form to certify the accuracy of the included information.

List all outfalls not tested or evaluated, describe any potential sources of non-storm water pollution from listed outfalls, and state the reason(s) why certification is not possible. Use the key from your site map to identify each outfall.

Important Notice: A copy of this notification must be signed and submitted to the Director within 180 days of the effective date of this permit.

Identify Outfall Not Tested/Evaluated	Description of Why Certification Is Infeasible	Description of Potential Sources of Non-Storm Water Pollution

CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations, and that such notification has been made to the Director within 180 days of _____ (date permit was issued), the effective date of this permit.

A. Name & Official Title (type or print)	B. Area Code and Telephone No.
C. Signature	D. Date Signed

Worksheet #7	Facility:	Sewag Treatment Plant 1
	Completed By:	Jim Hardesty
Pollutant Source Identification	Title:	Storm Water Specialst
	Date:	9/6/10

Instructions: List all identified stormwater pollutant sources and describe existing management practices that address those sources. In the third column, list Best Management Practice (BMP) options that can be incorporated into the plan to address remaining sources of pollutants.

Storm Water Pollutant Sources	Existing Management Practices	Description of New BMP Options
1 Diesel Fuel from fueling station	None	Spill Kit must be obtained
2		
3		
4		
5		
6		

Worksheet #8	Facility: Sewage Treatment Plant #1
	Completed By: Jim Hardesty
BMP Identification	Title:
	Date: 9/6/10 (page 1)

Instructions: Describe the Best Management Practices (BMP's) that have been selected to be included in the plan. For each of the baseline BMP's, describe actions that will be incorporated into facility operations. Also describe any additional BMP's (activity-specific and site-specific BMP's) that have been selected. Attach additional sheets if necessary.

BMP's	Brief Description of Activities
Good Housekeeping	1) Debris should be collected and removed from the site 2) Work area cleanup should follow any task, no matter how small
Inspections	1) Monthly visual inspection of Potential Pollution sources and Stormwater Outfall
Employee Training	1) Familiarization with all BMPs in place and ensuring that employees understan the requirements and contents of the SWPPP 2) Proper handling of all materials used or commonly encountered at the facility. 3) Must be conducted annually

Worksheet #8	Facility: Sewage Treatment Plant #1
	Completed By: Jim Hardesty
BMP Identification	Title:
	Date: 9/6/10 (page 2)

Instructions: Describe the Best Management Practices (BMP's) that have been selected to be included in the plan. For each of the baseline BMP's, describe actions that will be incorporated into facility operations. Also describe any additional BMP's (activity-specific and site-specific BMP's) that have been selected. Attach additional sheets if necessary.

BMP's	Brief Description of Activities
Record Keeping and Internal Reporting Procedures	1) Keep records of revisions to the SWPPP, inspection reports, employee training records, and any spills or leaks that occur onsite.
Spill kits	Plant 1 needs to obtain and deploy an adquate spill kit for the fueling area.

Worksheet #9 BMP Implementation	Facility: Treatment Plant 1 Completed By: Jim Hardesty		
BMP	**Action Required for Implementation**	**Completion Date:**	**Person Responsible:**
Spill kit for fueling station	Place spill kit at fueling pumps	11/1/2010	Mike Hess