BLUFFTON, INDIANA

BLUFFTON STANDARDS

THE CITY of BLUFFTON

COMMON COUNCIL

RICK ELWELL

JOSH HUNT

SCOTT MENTZER

JANELLA STRONCZEK

CHANDLER GERBER

JOHN WHICKER, MAYOR

INDEX – 1st ISSUED 6/4/2002; LATEST REVISION 6/6/2023

DIRECTIONS FOR USE

1. These 24" x 36" formatted specification sheets are for the convenience of design firms to attach to any proposed development or project that must adhere to the City of Bluffton Standards.
2. Altering of any information published by the City of Bluffton in these 24x36 Construction Specifications is prohibited.
3. Details prepared by outsides sources shall not be included in the Construction Drawings when said details cover work which is covered by Bluffton Standards.
4. Individual Standards that do not apply may be crossed-out by Design Engineer through the placement of a single large X over the detail. Minor reference notations may be placed adjacent to Individual Standard Titles for coordination however, The Standards Themselves shall not be modified in any way.
5. Details prepared by outside sources covering work which is not covered by Bluffton Standards are the sole responsibility of the Design Engineer and shall be placed on sheets other than the Bluffton Standards sheets.
6. Failure to properly execute the above directions for use will not effect the applicability nor the enforcement of the Bluffton Standards.

COMPREHENSIVE DEVELOPMENT NOTES

1. The standards, provisions, restrictions, rules, and conditions set forth in the Bluffton Standards shall be used in accordance with the Wells County Zoning Ordinance [WCZO] and Wells County Subdivision Control Ordinance [WCSCO]. If there are conflicts between the standards, provisions, restrictions, rules, and conditions of the Bluffton Standards and standards, provisions, restrictions, rules, and conditions of the WCZO or WCSCO, then the standards, provisions, restrictions, rules, and conditions of the Bluffton Standards shall be controlling.
2. The City of Bluffton and the Wells County Area Plan Commission [APC] encourages having a New Projects Meetings during the Pre-Development phase to discuss the proposed petition or plan prior to the start of plan development.
3. These Standards have been established because they have proven the most beneficial way to incorporate new development and infrastructure into this community. For City Engineering to grant a request for a variance of a Bluffton Standard, a Variance Request Form must be completed.
4. A requested variance of the Bluffton Standards shall be filed by the landowner and/or developer at the time that the applicable petition or plans are submitted to the APC. Requests for variances of these standards shall be submitted to City Engineering and the APC using the Variance Request Form.
5. Variance Request Process
   - A competed Variance Request Form shall be submitted to City Engineering and APC. https://blufftonindiana.net/city-engineer/
   - City Engineering will review the variance and will either approve the request, approve the request with modifications agreed to by the landowner and/or developer or deny the request.
   - If the request is denied by City Engineering, it will be brought to the Board of Public Works and Safety (BOPW) for final approval on City Engineering's recommendation.
   - The Variance Request Form along with the written response of City Engineering/BOPW shall be forwarded to the APC office and the landowner and/or developer.
6. The developer or contractor shall submit construction drawings to City Engineering for review and approval and shall be filed by the landowner and/or developer at the time that the applicable petition or plans are submitted to the APC. Details in the construction drawings prepared shall adhere to applicable standards, provisions, restrictions, rules, and conditions set forth in the **Bluffton Standards**.
7. The landowner and/or developer of any petition or plan shall enter into a written agreement with the City of Bluffton detailing the distribution of responsibilities and costs and any other arrangements, if any, for petition or plan prior to the APC or City of Bluffton issuing any permits, or the start of construction of the petition or plan.
8. Contractor shall verify the exact location of all existing utilities at least twenty-four (24) hours prior to any construction or excavation. During construction, all utilities shall be adequately supported to minimize damage. The contractor shall be responsible for repairing or replacing damaged utilities to the satisfaction of the City of Bluffton and the owner of the affected utility.
9. Installation of or provisions for the installation of all underground utilities (including service laterals) to be placed under pavement areas shall be completed prior to the construction of the pavements, unless agreed to otherwise in writing with the City.
10. Survey and plat standards shall adhere to the provisions prescribed in the WCSCO.
11. Representatives of any proposed Development Plan, Major Subdivision, or PUD are responsible for contacting City Engineering about any revision or changes to design plans reviewed and approved by the City and securing the necessary response if a subsequent review and approval is deemed necessary. A Variance Request Form will need to be submitted to City Engineering prior to installation if there is a change needed to the City Standards during construction.
12. All Benchmarks and Elevations Shall be the following:
    - Horizontal or geometric datum - North American Datum of 1983 (NAD 83)
    - Vertical datum - North American Vertical Datum of 1988 (NAVD 88)
7. AS-BUILT DRAWINGS - As-Built drawings shall be submitted in digital format to City Engineering. As-Builts shall be delivered to City Engineering within thirty (30) days after all testing has been successfully completed and prior to acceptance of street infrastructure by the City.

REVISIONS		
Rev. No.	Description	Date

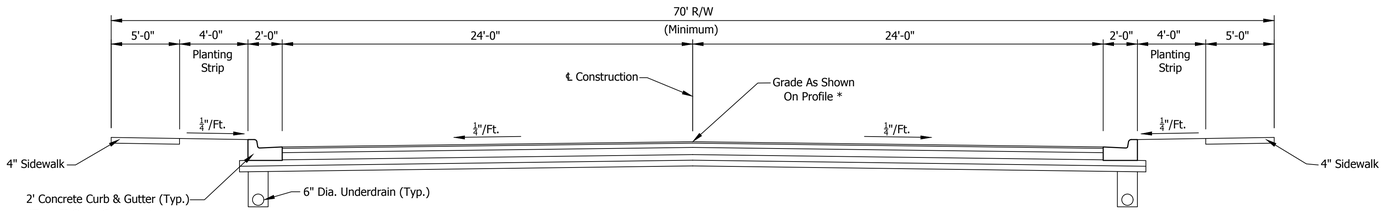
KAMERYN I. WRIGHT REGISTERED No. PE11900310 STATE OF INDIANA PROFESSIONAL ENGINEER

RECOMMENDED FOR APPROVAL — DESIGN ENGINEER — 6/6/2023 DATE

CITY OF BLUFFTON

DIRECTIONS FOR USE AND COMPREHENSIVE DEVELOPMENT NOTES

SHEET 1 OF 18



MINOR ARTERIAL STREETS

Scale: None

* Minimum 0.25 % Grade @ Curb Flowline

The City of Bluffton's road classification is derived from the Federal Functional Classifications (FFC) set by the Federal Highway Administration of United States Department of Transportation (USDOT).

ADT - Average Daily Trips (estimated)
Minor Arterial Streets 2,500+ ADT
Major Collector Streets 1,000 - 2,499 ADT
Minor Collector Streets 400 - 999 ADT
Local Streets 0-399 ADT

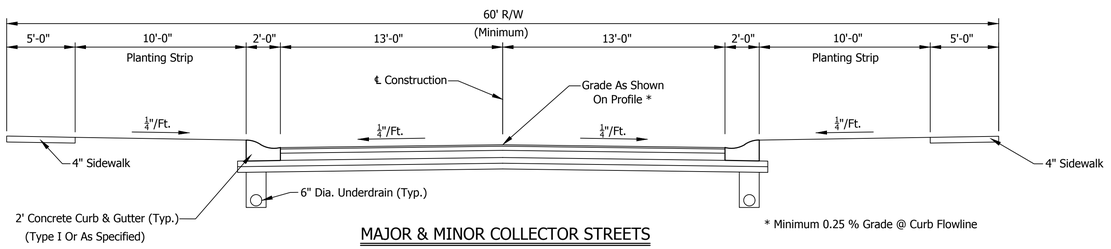
New residential streets to be accepted by the City of Bluffton shall be designed according to the traffic volumes as designated per street classification based on the following TRIP GENERATION RATES (Daily Rates).

- Single-Family Detached Housing 9 trips per dwelling unit
- Multi-Family Housing (1 to 2-story) 7 trips per dwelling unit
- Multi-Family Housing (3 to 10-story) 5 trips per dwelling unit
- Mobile Home 5 trips per dwelling unit

Dwelling Unit:
Duplex = 2 dwelling units
4 adjoining townhouses/condos = 4 dwelling units
8-apartment building = 8 dwelling units

Any challenge to the listed Trip Generation Numbers or a Trip Generation rate for a development type other than these listed examples must reference the most recent **ITE Trip Generation Manual**.

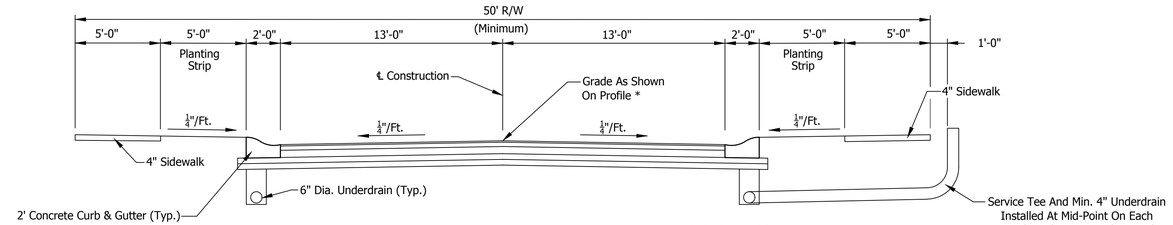
Any challenge to the City's road classification or the Bluffton Trip Generation Numbers for a project shall require the challenging party to pay for a Traffic Impact Study done by a licensed engineer prior to start of project construction.



MAJOR & MINOR COLLECTOR STREETS

Scale: None

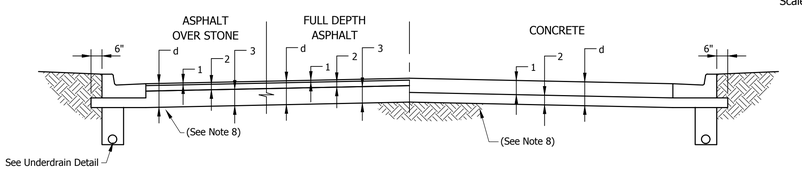
* Minimum 0.25 % Grade @ Curb Flowline



LOCAL STREETS

Scale: None

* Minimum 0.25 % Grade @ Curb Flowline



LOCAL STREETS

d=10.5"
1. 165 lbs/sys (1.5"), QC/QA-HMA, 2, 64, Surface, 9.5mm
2. 330 lbs/sys (3.0"), QC/QA-HMA, 2, 64, Inter., 19.0mm
3. 6" Compacted Aggregate No. 53 (2 Lifts)

d=8"
1. 165 lbs/sys (1.5"), QC/QA-HMA, 2, 64, Surface, 9.5mm
2. 330 lbs/sys (3.0"), QC/QA-HMA, 2, 64, Inter., 19.0mm
3. 385 lbs/sys (3.5"), QC/QA-HMA, 2, 64, Base, 19.0mm

d=10"
1. 6", PCCP
2. 4" Compacted Aggregated No. 53 (See Note 2)

MINOR COLLECTOR STREETS

d=12"
1. 220 lbs/sys (2.0"), QC/QA-HMA, 2, 64, Surface, 12.5mm
2. 275 lbs/sys (2.5"), QC/QA-HMA, 2, 64, Inter., 19.0mm Over 385 lbs/sys (3.5"), QC/QA-HMA, 2, 64, Base, 25.0mm
3. 4" Compacted Aggregate No. 53

d=10"
1. 220 lbs/sys (2.0"), QC/QA-HMA, 2, 64, Surface, 12.5mm
2. 275 lbs/sys (2.5"), QC/QA-HMA, 2, 64, Inter., 19.0mm
3. 275 lbs/sys (2.5"), QC/QA-HMA, 2, 64, Base, 19.0mm Over 330 lbs/sys (3.0"), QC/QA-HMA, 2, 64, Base, 25.0mm

d=11"
1. 7", PCCP
2. 4" Compacted Aggregated No. 53

MAJOR COLLECTOR & MINOR ARTERIAL STREETS

d=13"
1. 220 lbs/sys (2.0"), QC/QA-HMA, 3, 76, Surface, 12.5mm
2. 275 lbs/sys (2.5"), QC/QA-HMA, 3, 64, Inter., 19.0mm Over 385 lbs/sys (3.5"), QC/QA-HMA, 3, 64, Base, 25.0mm
3. 5" Compacted Aggregate No. 53

d=12"
1. 220 lbs/sys (2.0"), QC/QA-HMA, 3, 76, Surface, 12.5mm
2. 330 lbs/sys (3.0"), QC/QA-HMA, 3, 64, Inter., 19.0mm
3. 330 lbs/sys (3.0"), QC/QA-HMA, 3, 64, Base, 25.0mm Over 440 lbs/sys (4.0"), QC/QA-HMA, 3, 64, Base, 25.0mm

d=12"
1. 8", PCCP
2. 4" Compacted Aggregated No. 53

PAVEMENT CONSTRUCTION

Not To Scale

The standards contained herein are minimum design standards. The City of Bluffton may increase these requirements where existing or anticipated conditions indicate that enough truck traffic to be carried by the public way, or commercial or industrial use of the public way does or will warrant higher standards for pavement construction.

PAVEMENT CONSTRUCTION

1.) Subbase and subgrade shall be at least 95% of the maximum dry density in accordance with A.A.S.H.T.O. T99. Compaction test shall be at the contractor's expense and shall be performed by a third party and independent laboratory. Tests results shall be submitted to Bluffton City Engineering prior to placing any material on the subbase subgrade. One-in place density test shall be completed for each lift for every 400 linear feet of traffic lanes.

2.) For local streets with concrete pavement compacted aggregate base #53 shall be constructed to a depth specified by the city if the subgrade is determined to be inadequate. Adequacy of subgrade shall be determined solely by Bluffton City Engineering based on a contractor performed proofroll in accordance with INDOT Standards Specification Section 203.26.

3.) Place trackless tack coat in accordance with the most recent INDOT standard specifications for asphalt pavement sections.

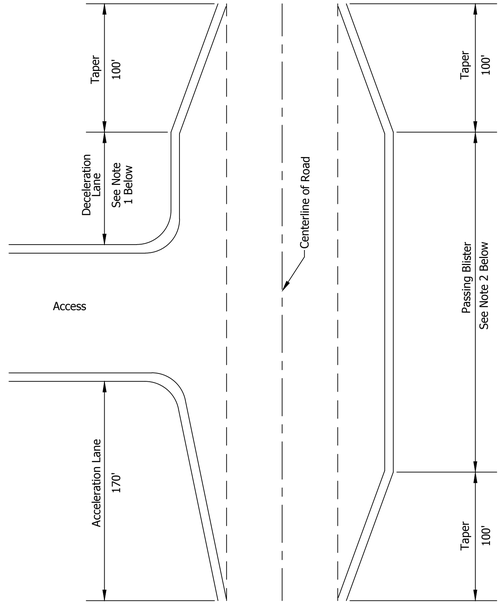
4.) Wherever rigid pavement is to be used, the contractor shall submit a detailed paving plan to the street commissioner. The paving plan shall show the location and type of jointing to be used in the construction. The location and type of jointing shall meet the requirements of the most recent INDOT standard details.

5.) Core samples may be required on a new roadway before the City accepts said roadway as a City dedicated street. Bluffton City Engineering shall determine if core sampling is in the best interest of the City prior to the Primary Approval by the APC of any development plan for a proposed new roadway. Sampling criteria shall be established by Bluffton City Engineering and submitted in writing to the affected project representatives and the APC prior to the Primary Approval.

6.) Hot poured joint adhesive shall be applied to longitudinal joints construction between two adjacent HMA surface and intermediate courses in accordance with the most recent INDOT Standard Specifications.

7.) Liquid asphalt sealant shall be applied to longitudinal joints a minimum width of 24 In., centered on the joint line in accordance with the most recent INDOT Standard Specifications.

8.) The proposed pavement mix design shall be submitted to Bluffton City Engineering for approval. Upon approval of the mix design chemical modification of soils per INDOT Standard Specification section 215, shall be performed to a minimum depth of 14 inches. Following soil modification, compaction shall be performed until the modified layer has a density not less than 100% of the maximum dry density or the zone below the modified layer has a density not less than 95% of the maximum dry density. Maximum dry densities shall be determined in accordance with AASHTO T99. The mix design shall be determined in accordance with INDOT design procedures for soil modification or stabilization. The proposed design and construction procedures shall be submitted to the City. Unsatisfactory soil modifications, as determined by the City, may require an increase in depth of the aggregate base or binder. Tensar TX160 geogrid may be used in lieu of, or in conjunction with, the chemical modification of soils, as directed by the City in conjunction with the usage of Tensar TriAx Geogrid, a modified pavement section may be provided by the City.



ACCELERATION & DECELERATION LANES AND PASSING BLISTERS

Scale: None

NOTES:

1.) Deceleration lane full width length

Minor Arterials	200 feet
Major Collectors	200 feet
Minor Collectors	100 feet
Local	0 feet

2.) Passing blister length

Minor Arterials	570 feet
Major Collectors	570 feet
Minor Collectors	470 feet
Local	370 feet

GENERAL NOTES

1.) INSPECTION DURING CONSTRUCTION. Contractor shall allow Bluffton City Engineering the opportunity to inspect the installation of streets to be released to the City. Bluffton City Engineering shall be given twenty-four (24) hours notice prior to the contractor's intent to lay (1) the base layer, (2) each subsequent layer to be compacted, and (3) each layer of asphalt, unless agreed to otherwise in writing. Bluffton City Engineering shall be given notice twenty-four (24) hours prior to the contractor's intent to install street underdrain or storm water infrastructure which accompanies the street being installed, unless agreed to otherwise in writing.

2.) All electrical installations must conform to the Indiana State Electrical Code, as prescribed in Indiana Administrative Code, Title 675 Fire Prevention and Building Safety Commission, Article 17.

3.) The developer of a Major Subdivision or a PUD shall place a sign to identify the Major Subdivision or PUD at all points of ingress/egress off a preexisting public way into the Major Subdivision or PUD, unless agreed to otherwise in writing with the Bluffton City Council. The sign shall meet the sign requirements as defined in the WCZO and the Bluffton Standards.

4.) Within sixty (60) days after the APC has granted the first permit for a primary structure of a Major Subdivision, PUD, or Development Plan, the City shall install the necessary street signs and traffic control signs. Such signage shall be the expense of the developer.

REVISIONS		
Rev. No.	Description	Date

KAMERYN I. WRIGHT REGISTERED No. PE11900310 STATE OF INDIANA PROFESSIONAL ENGINEER

RECOMMENDED FOR APPROVAL — DESIGN ENGINEER — 6/6/2023 DATE

CITY OF BLUFFTON

RIGHT-OF-WAY AND PAVEMENT DETAILS & NOTES

SHEET 2 OF 18

STREET CUTS

1. Trench backfill within streets, alleys or sidewalks shall be installed per **Detail R09, Trench Backfill - Type I Granular Fill.**

2. The contractor shall notify Bluffton Street Commissioner at least 24 hours in advance prior to beginning backfill of excavation. If the permanent patch placement is to be a separate operation, the contractor shall also notify Bluffton Street Commissioner 24 hours in advance prior to placement of patch.

3. The contractor shall be responsible to maintain and repair any and all open cuts permitted within the City of Bluffton for a period of one year upon final acceptance by the City.

4. STREET/CURB CUTS: Neither access for the purpose of providing ingress and/or egress of a vehicle onto a City street or alley from private property nor cutting of an existing or newly constructed curb or street shall be permitted without prior approval by Bluffton Street Commissioner in the form of a "Street/Trail Cut Permit" as defined by Chapter 12.04 of the City Code of Bluffton.

SIDEWALK CONSTRUCTION

1. Sidewalks shall be constructed along all new streets in Development Plans approved by the Wells County Area Plan Commission.

2. Sidewalks shall meet the requirements of the Americans with Disabilities Act (ADA), the most recent INDOT Standard Specifications, and the City of Bluffton's most recent Standards.

3. Installation of sidewalks within a City easement or right-of-way requires prior to construction a "Street/Trail Cut Permit" to be approved by Bluffton Street Commissioner.

4. The City shall determine the need for sidewalks on one or both sides of a new street.

5. Sidewalk shall be:

   - Six (6) inches reinforced concrete through residential driveways
   - Eight (8) inches reinforced concrete through commercial or industrial driveways or driveways to other uses which the Wells County Area Plan Commission has determined to be a traffic generator as defined by the Wells County Zoning Ordinance.

CURB RAMP CONSTRUCTION

1. All Curb Ramps Shall Meet The Requirements Of The Americans With Disabilities Act, The Most Recent INDOT Standard Specifications And The City Of Bluffton's Most Recent Standards. Curb Swipes Required For Handicap Ramps Shall Be Provided With Initial Curb Construction.

2. Minimum Width Of Curb Ramp Shall Be 4 Feet, Not Including Flares. Maximum Slope Of Ramps Shall Be 8.33% (12:1). Handicap Ramps Are To Be Located As Shown On The Plans, Or As Directed By Bluffton City Engineering.

3. Type E Ramps Shall Be Provided At The Center Line Of The Radius At All Corners Of Every Street Intersection Where There Is An Existing Or Proposed Sidewalk And Curb. In Case Of "T" Intersection, A Type C Ramp Shall Be Provided Adjacent To Each Corner Ramp. Type C Ramps Also Shall Be Provided At Walk Locations At Mid-Block In Hospital, Medical Center Or Athletic Stadium Vicinities. The Use Of Details Contrary To Those Shown Hereon Shall Require The Prior Written Approval Of Bluffton City Engineering.

4. Surface Texture Of The Ramp Shall Be That Obtained By A Coarse Brooming Transverse To The Slope Of The Ramp.

5. Ramps Shall Be Provided Where The Driveway Curb Extends Across The Sidewalk.

6. Care Shall Be Taken To Assure A Uniform Grade On All Ramps With No Grade Breaks.

7. Drainage Structures Shall Not Be Placed In Line With The Ramps Except Where Existing Drainage Structures Are Being Utilized In The New Construction. Location Of The Ramps Shall Take Precedence Over Location Of Drainage Structures.

8. The Normal Gutter Line Profile Shall Be Maintained Through The Area Of The Ramp.

9. Expansion Joint For The Ramp Shall Be A Maximum 1/2" Wide. The Top Of The Joint Filler For All Ramp Types Shall Be Flush With Adjacent Concrete.

10. Slope Of Ramp May Be Warped When Field Conditions Warrant And When Approved By Bluffton City Engineering.

GENERAL NOTES

1. No Applicant shall make or cause to be made any Street Cut without first having applied for and received written permission from Bluffton Street Commissioner in the form of the "Street/Trail Cut Permit". A "Street/Trail Cut Permit" authorizes the Applicant to excavate a part of a City Street or Trail under the terms and conditions approved by the Board of Public Works and Safety of the City of Bluffton, Indiana.

2. No Applicant shall make or cause to be made any access intended to facilitate the entry of a vehicle onto a City Street, (including an alley) from a private right of way (including but not necessarily limited to parking lots, driveways, private roads, platted roads intended to be dedicated to the City as part of a development plan or subdivision plat, or any other privately owned property) without first having applied for and received written permission from Bluffton Street Commissioner in the form of a Street Access Permit, and if necessary, a "Street/Trail Cut Permit". A Street Access Permit authorizes the Applicant to create an access onto a City Street under the terms and conditions approved by the Board of Public Works and Safety of the City of Bluffton, Indiana. A Street Access Permit does not authorize a Street Cut.

3. **A "Street/Trail Cut Permit" is NOT valid until accompanied by a certificate of insurance and bond and until approved by the City of Bluffton Street Commissioner.**

4. The Right-Of-Way Widths, Pavement Widths, And Easement Widths Indicated On Sheet 2 Are Minimum Distances Required By the City of Bluffton. Greater Widths May Be Provided. The Contractor Shall Review The Plat And The Plans To Confirm The Various Widths Indicated On Sheet 2 And Shall Report Any Discrepancy To Bluffton City Engineering Prior To Proceeding With Construction.

5. The Location Of Proposed Utilities As Indicated Hereon Are Based Upon The Experience Of The City of Bluffton And Are So Indicated To Ensure The Orderly Development Of The Land. Strict Adherence To The Indicated Location Is Required. Requests To Change The Location Of The Proposed Utilities Shall Be Submitted In Writing To Bluffton City Engineering. Utilities Not Meeting These Requirements Shall Be Removed And Replaced As Directed By Bluffton City Engineering.

6. Local Residential Streets Require Only Stop Bars And Crosswalk Marking. Markings Shall Be Thermoplastic In Accordance With The Most Recent INDOT Standard Specification. Refer To Such Drawings Covering Pavement Markings, Street Signs, And Traffic Control Signs. A Plan Of Proposed Pavement Markings Shall Be Submitted To Bluffton City Engineering For Approval. For Streets Requiring Resurfacing With Surface Overlay, Mill 8 Feet Wide Along Sides Of Street To A Depth Of 2". Overlay Terminations Shall Also Be Milled 2".

7. Vertical Curves Of A Minimum Length Of 20 Feet Shall Be Provided At All Grade Changes. For Phased Development, The Vertical Curve Shall Be Constructed To The EVC.

8. Provide A Minimum 0.5% Grade At Curb Flowlines.

9. Selection Of Combination Of Sidepath, Sidewalk, And Planting Strip Widths Shall Be Selected And Approved By Bluffton City Engineering.

10. All Regulatory Signs Shall Be High Intensity And In Accordance With The Indiana Manual On Uniform Traffic Control Devices, Most Recent Edition.

11. All Pavement Markings Shall Be White Thermoplastic And Span Across Approach Lanes.

12. Signs S3-1 & W14-2 To Be Installed When Required By Bluffton City Engineering.

13. Where Pedestrian Cross Traffic Is Not Established, School Crossing Pavement Markings And Sign "S1-1" May Be Omitted At The Discretion Of Bluffton City Engineering.

TRAILS

1. Trails shall meet the requirements of the Americans with Disabilities Act (ADA), the most recent INDOT Standard Specifications, and the City of Bluffton's most recent Standards.

2. Design and construction of an asphalt trail and path shall be based on type of use, terrain, maintenance, and cost and shall incorporate proper drainage, proper sub-grade compaction, adequate pavement thickness, and adequate pavement compaction as determined by the City of Bluffton per proposed trail or path.

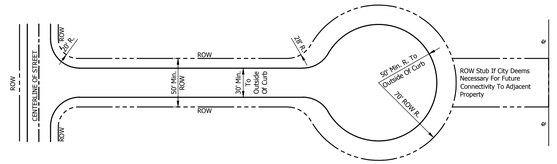
3. Unless determined otherwise in writing by the City, any driveway that crosses an existing hard surfaced trail located within a City easement or right-of-way shall require the following:

   - Termination of said hard surfaced trail at any drive or approach shall be accomplished with a six-foot (6') minimum length of concrete sidewalk transition (increase concrete sidewalk transition as required to meet the 12:1 maximum slope requirement) so that the hard surfaced trail meets the concrete sidewalk transition at a neat line perpendicular to the trail alignment.
   - Concrete sidewalk shall extend through drives or approaches to connect the two transition areas.
   - City of Bluffton may require a specific type of finished concrete texture to be consistent with existing transitions located on affected hard surfaced trail.
   - Detectable warnings are required at all hazardous vehicular ways unless otherwise agreed to in writing by Bluffton City Engineering.
   - Reference INDOT Drawing E-604-SDWK-03 Sidewalk Driveway Crossing. The more stringent width dimension of Bluffton Standards or INDOT shall apply.

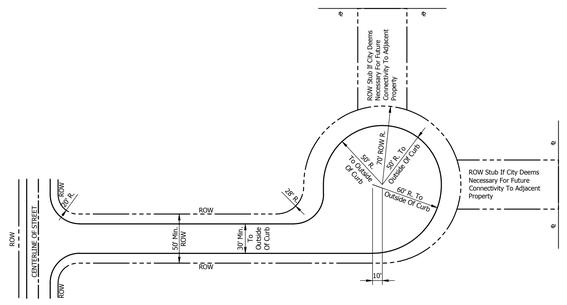
TRAILS (CONTINUED)

4. Any alteration or connection to an existing hard surfaced trail located within a city easement or right-of-way requires prior to construction a "Street/Trail Cut Permit" to be approved by Bluffton Street Commissioner.

5. The repair or replacement of any proposed cut or excavation of an existing hard surfaced trail shall adhere to the construction specifications for the original construction drawings or the most recent rebuilding plans for the affected trail. Said drawings and specifications shall be provided by the City with the approval on any "Street/Trail Cut Permit".



TYPICAL CUL-DE-SAC
Scale: None



TURNAROUND VARIATION FOR A CUL-DE-SAC
Scale: None

REVISIONS		
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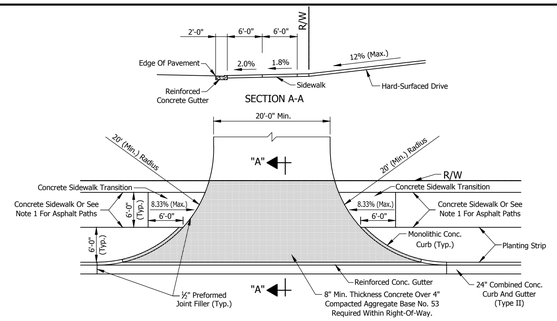
KAMERYN I. WRIGHT REGISTERED No. PE11900310 STATE OF INDIANA PROFESSIONAL ENGINEER

RECOMMENDED FOR APPROVAL — DESIGN ENGINEER — 6/6/2023 DATE

CITY OF BLUFFTON

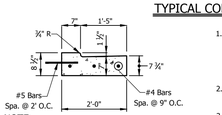
ROADWAY (R) NOTES

SHEET 3 OF 18



TYPICAL COMMERCIAL PRIVATE DRIVE

Scale: None



NOTE:
Reinforced Concrete Gutter Is Req'd. At All Private Drives That Intersect A Public Road With Type II 24" Combined Concrete Curb And Gutter Or Similar.

REINFORCED CONCRETE GUTTER

Scale: None

1.) Asphalt Path Terminations Within The Public Right-Of-Way At Commercial Drives, Private Drives, Or Approaches Shall Be Accomplished With A 6' Minimum Length Of Concrete Sidewalk Transition (Increase Length Of Concrete Sidewalk Transition As Required To Meet The 8.33% (12:1) Maximum Slope Requirement) So That The Asphalt Path Meets The Concrete Sidewalk Transition At A Neat Line Perpendicular To The Path Alignment.

2.) The Maximum Algebraic Difference In Grades For Any 10 Foot Interval Shall Not Exceed 8% For Crests, Nor 10% For Sags.

3.) Concrete Drives Require Control Joints At A Maximum Of Every 10 Feet Each Way.

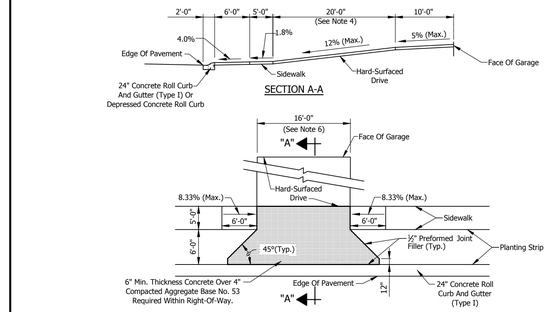
4.) Use Actual Setback As Shown On Plat And As Provided By The City of Bluffton Zoning Ordinance.

5.) Bluffton City Engineering May Approve Alternate Paving Materials Matching Suitable Mainline Pavement.

PRIVATE DRIVE CULVERT PIPE AND END SECTIONS

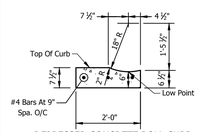
1.) Except With The Prior Written Approval Of Bluffton City Engineering, Culvert Pipe, And End Sections For New Installations Shall Be Reinforced Concrete Pipe In Accordance With The City Standards. Zinc Coated Or Aluminum Coated Corrugated Metal Pipe Culverts, Couplers, And End Sections In Accordance With The Most Recent INDOT Specification May Be Permitted For Replacement Culverts In Areas Where Reinforced Concrete Pipe Is Used By One-Third Or Less Of 3 Properties Upstream And Downstream Of The Subject Replacement On The Same Side Of The Subject Street.

ROADWAY DETAIL – R01



TYPICAL RESIDENTIAL PRIVATE DRIVE

Scale: None



DEPRESSED CONCRETE ROLL CURB

Scale: None

1.) The Maximum Algebraic Difference In Grades For Any 10 Foot Interval Shall Not Exceed 8% For Crests, Nor 10% For Sags.

2.) Frontage Of Lots Shall Drain To Adjacent Streets Except With The Prior Approval Of Bluffton City Engineering.

3.) Concrete Drives Require Control Joints At A Maximum Of Every 10 Feet Each Way.

4.) Use Actual Setback As Shown On Plat And As Provided By The City of Bluffton Zoning Ordinance.

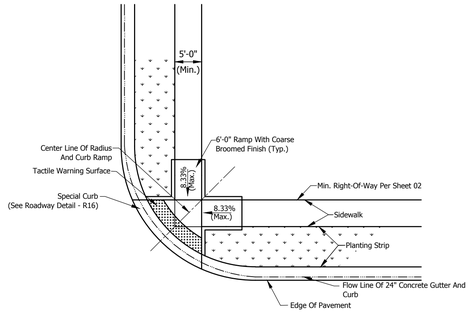
5.) Bluffton City Engineering May Approve Depressed Concrete Roll Curb And Alternate Paving Materials.

6.) A Minimum Width Of 16 Feet Is Required And A Maximum Width Of 24 Feet May Be Approved By Bluffton City Engineering.

PRIVATE DRIVE CULVERT PIPE AND END SECTIONS

1.) Except With The Prior Written Approval Of Bluffton City Engineering, Culvert Pipe, And End Sections For New Installations Shall Be Reinforced Concrete Pipe In Accordance With The City Standards. Zinc Coated Or Aluminum Coated Corrugated Metal Pipe Culverts, Couplers, And End Sections In Accordance With The Most Recent INDOT Specification May Be Permitted For Replacement Culverts In Areas Where Reinforced Concrete Pipe Is Used By One-Third Or Less Of 3 Properties Upstream And Downstream Of The Subject Replacement On The Same Side Of The Subject Street.

ROADWAY DETAIL – R02

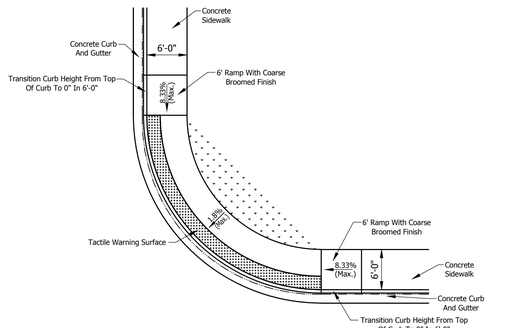


CURB RAMP, TYPE E

Scale: None

NOTES:
1.) See Curb Ramp Construction Notes On Sheet 03 Of Bluffton Standards.
2.) Transition Gutter Flowline To Midpoint Of Concrete Curb And Gutter At Curb Ramp.

ROADWAY DETAIL – R03

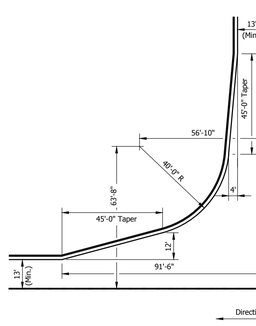


CURB RAMP, TYPE F

Scale: None

NOTES:
1.) See Curb Ramp Construction Notes On Sheet 03 Of Bluffton Standards.
2.) Transition Gutter Flowline To Midpoint Of Concrete Curb And Gutter At Curb Ramp.

ROADWAY DETAIL – R04



PUBLIC ROAD APPROACH/INDUSTRIAL TRUCK ENTRANCE

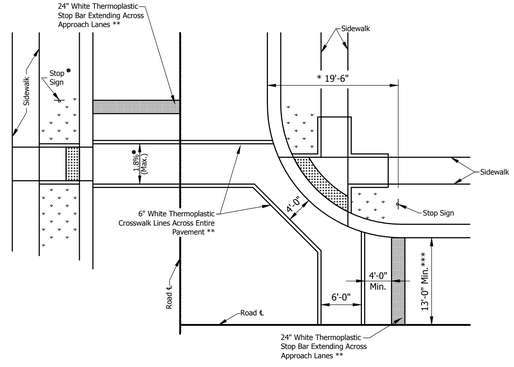
Scale:1/32"=1'-0"

1.) Public Road Approaches And Commercial Private Drives Shall Accommodate Semi-Trailers And Other Large Vehicles Where Right-Turn Movements Are Expected.

2.) Design And Pavement Material Of Public Roads Shall Be Developed Per Sheet 02 And 03 Of The City Standards. Design And Pavement Material Of Typical Commercial Private Drives Shall Be Per Typical Commercial Private Drive Detail On This Sheet.

3.) Minimum Recommended Dimensions Are Indicated. Approaches Should Be Adjusted For Angled Intersections, Functional Class Of Intersecting Routes, And Location Of Intersection.

ROADWAY DETAIL – R05



(See Curb Ramp Construction Notes On Sheet 03 Of Bluffton Standards)

PUBLIC ROAD APPROACH-RESIDENTIAL

Scale: None

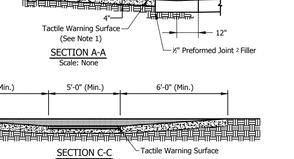
* Distance To Be Adjusted For Acute Angle Intersections

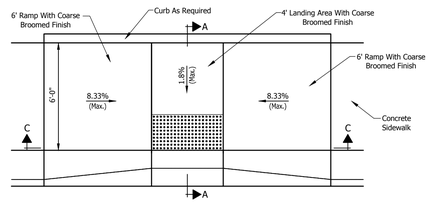
** See General Note 6 On Sheet 03 For Thermoplastic Requirements

*** Unless Otherwise Approved By Bluffton City Engineering

● Ped. Crossing Sign Shall Be Used And A 5.0% Max Cross Slope Is Allowed If Intersection Is Not Stop Or Yield Controlled

ROADWAY DETAIL – R06



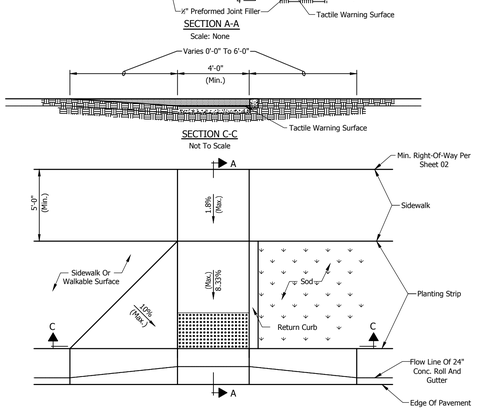


CURB RAMP, TYPE K

Scale: None

NOTES:
1.) See Curb Ramp Construction Notes On Sheet 03 Of Bluffton Standards.
2.) Transition Gutter Flowline To Midpoint Of Concrete Curb And Gutter At Curb Ramp.

ROADWAY DETAIL – R07



CURB RAMP, TYPE C

Scale: None

NOTES:
1.) See Curb Ramp Construction Notes On Sheet 03 Of Bluffton Standards.
2.) Transition Gutter Flowline To Midpoint Of Concrete Curb And Gutter At Curb Ramp.

ROADWAY DETAIL – R08

REVISIONS		
Rev. No.	Description	Date

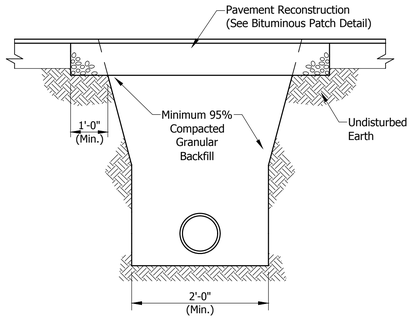
KAMERYN I. WRIGHT REGISTERED No. PE11900310 STATE OF INDIANA PROFESSIONAL ENGINEER

RECOMMENDED FOR APPROVAL — DESIGN ENGINEER — 6/6/2023 DATE

CITY OF BLUFFTON

ROADWAY (R) DETAILS

SHEET 4 OF 18



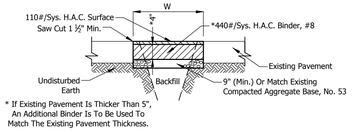
TRENCH BACKFILL - TYPE I GRANULAR FILL

Scale: None

NOTES:

1. Saw cut existing pavement so that cut provides a vertical, neat and uniform edge.
2. Trench spoil is to be removed from the work site and disposed of out of the right-of-way.

ROADWAY DETAIL – R09



* BITUMINOUS PATCH

Scale: None

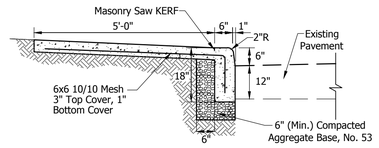
NOTES:

1. Saw cuts shall provide a vertical, neat and uniform edge.
2. All materials shall comply with specifications as required by the City.
3. The existing vertical edge of pavement is to be tack coated prior to the laying of new asphalt. Tack coat is to be applied as specified in the latest Standard INDOT Specifications, Sections 406 and 902.
4. The new surface pavement grade shall match the existing surface pavement grade.
5. A two (2) inch wide band of crack sealant is to be applied along the joint between the existing and new asphalt surface. Sealant is to be applied in accordance with INDOT Specifications, section 305.
6. Refer to pavement restoration table for W.

PAVEMENT RESTORATION TABLE	
UTILITY DEPTH RANGE (FEET)	MAXIMUM TRENCH WIDTH AT FINISHED GRADE, W (FEET)
0 To 5	O.D. +5
5 To 8	O.D. +8
8 To 10	O.D. +10
10 To 12	O.D. +12
12 To 14	O.D. +14
14 To 16	O.D. +16
16 To 18	O.D. +18
18 To 20	O.D. + 20

O.D. = Pipe Or Conduit Outside Diameter

ROADWAY DETAIL – R10



MONOLITHIC CONCRETE CURB AND SIDEWALK

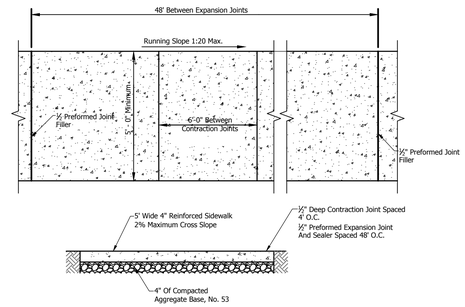
Scale: None

NOTES:

Sidewalk shall be (1) 6 inches reinforced concrete through residential driveways and (2) 8 inches reinforced concrete through commercial or industrial driveways or driveways to other uses which the Wells County Area Plan Commission has determined to be a traffic generator as defined by the Wells County Zoning Ordinance. Monolithic curb and sidewalk shall also be subject to the following requirements:

1. 4000 PSI concrete shall be utilized.
2. Concrete shall have a broom or swirl finish.
3. Provide longitudinal joint (½" deep masonry saw kerf) at 6" back from curb edge.
4. Provide transverse joints (½" masonry saw kerfs) at 6'-0" spacing.
5. Expansion joints shall be placed a maximum of 48'-0" apart.
6. Expansion joint shall be placed between new concrete and any existing concrete.
7. Concrete to be covered with visqueen for 2 days following pouring or use membrane sealer in place of Visqueen cover.
8. All sidewalks placed in Bluffton Right-Of-Way shall be ADA compliant

ROADWAY DETAIL – R11



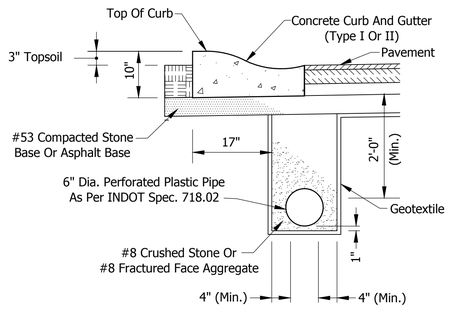
TYPICAL SIDEWALK

Scale: None

NOTES:

1. All sidewalks placed in Bluffton Right-Of-Way shall be ADA compliant.

ROADWAY DETAIL – R12

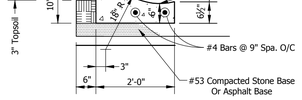


UNDERDRAIN DETAIL

Scale: None

Note:
A manufacturer filter sock underdrain product may be used in lieu of underdrain with a stone envelope and geotextile. Product should be submitted to Bluffton City Engineering for approval.

ROADWAY DETAIL – R13

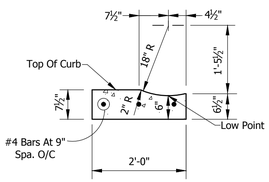


TYPE I

2' CONCRETE ROLL CURB & GUTTER

Scale: None

Note: Curb cuts will not be allowed when Type I Roll Curb and Gutter is installed

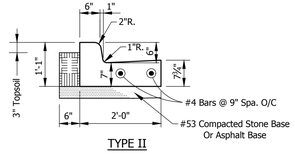


DEPRESSED CONCRETE ROLL CURB

Scale: None

Note: Reinforced concrete gutter is required at all private drives that intersect a public road with Type I, 24" combined concrete curb and gutter or similar.

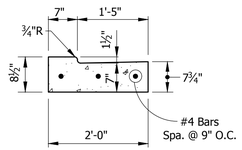
ROADWAY DETAIL – R14



TYPE II

2' COMBINED CONCRETE CURB & GUTTER

Scale: None

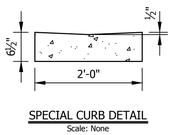


REINFORCED CONCRETE GUTTER

Scale: None

Note: Reinforced concrete gutter is required at all private drives that intersect a public road with Type II, 24" combined concrete curb and gutter or similar.

ROADWAY DETAIL – R15



SPECIAL CURB DETAIL

Scale: None

ROADWAY DETAIL – R16

REVISIONS		
Rev. No.	Description	Date

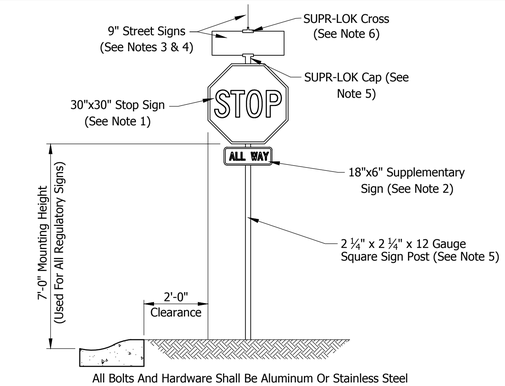
KAMERYN I. WRIGHT REGISTERED No. PE11900310 STATE OF INDIANA PROFESSIONAL ENGINEER

RECOMMENDED FOR APPROVAL — DESIGN ENGINEER — 6/6/2023 DATE

CITY OF BLUFFTON

ROADWAY (R) DETAILS

SHEET 5 OF 18



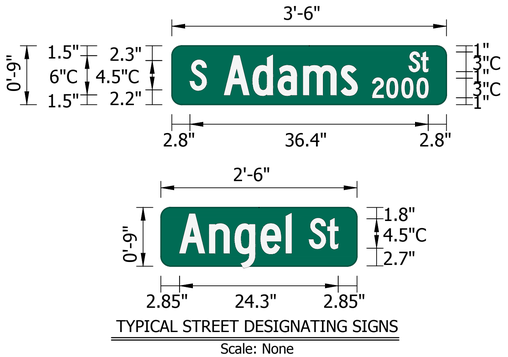
All Bolts And Hardware Shall Be Aluminum Or Stainless Steel

TYPICAL REGULATORY/WARNING SIGN REQUIREMENTS

Scale: None

1.) Stop Sign (R1-1) Shall Be High Intensity And In Accordance With Most Recent Indiana Manual On Uniform Traffic Control Devices.
2.) A Multi-Way Stop Intersection Requires An "ALL WAY" (R1-3P) Supplementary Sign 18" Wide By 6" Tall In Accordance With Said Manual.
3.) Streets Shall Be So Signed At Non-Signalized Intersections With Two Such Street Sign Assemblies Typically Required. Separate 12' Square Sign Post For Street Signs Permitted Only At Signalized Intersections.
4.) Street Signs Shall Be 9" Tall Extruded Aluminum (6063-T6) Green Background With White Letters.
5.) Regulatory Signs, Other Than Stop Signs, Shall Be Mounted On 12' - 2 ¼" x 2 ¼" x 12 Gauge Square Sign Posts. SUPR-LOK Cap Shall Be Model #975QX. Regardless If Material For Posts Is Other Than As Shown Hereon, Mounting Height Shall Be 7'-0" From Roadway Edge Of Pavement
6.) SUPR-LOK Cross Shall Be Model #990X. For Non-Urban Intersections, Stop Sign To Be Placed A Minimum Of 6' From Cross-Street.
7.) For Urban Intersections See Handicap Ramp Detail On Sheet 4 Of The City Standards.

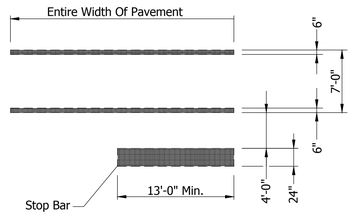
ROADWAY DETAIL – R17



TYPICAL STREET DESIGNATING SIGNS

Scale: None

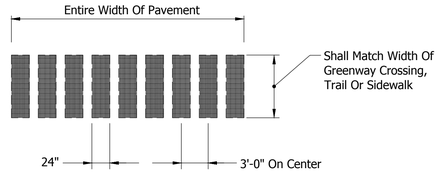
ROADWAY DETAIL – R18



INTERSECTION CROSSWALK DETAIL

Not To Scale

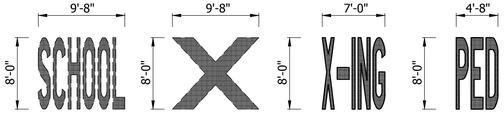
ROADWAY DETAIL – R19



SPECIAL CROSSWALK DETAIL

Not To Scale

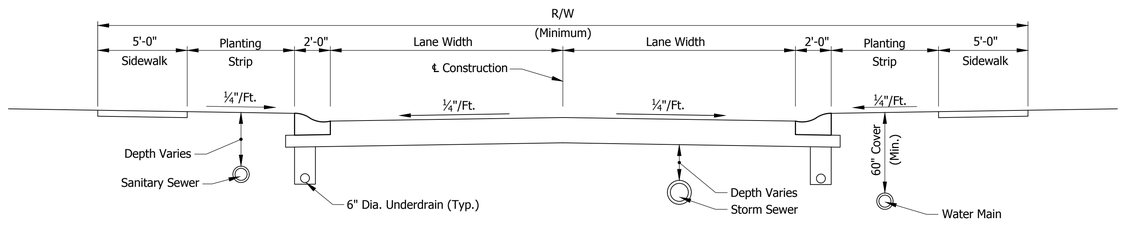
ROADWAY DETAIL – R20



PAVEMENT MARKING DETAIL

Not To Scale

ROADWAY DETAIL – R21



TYPICAL ROAD UTILITY SECTION

Scale: ¼"=1'-0"

Note:
1.) Utility easements located along a Street Right-of-Way shall have a minimum width of fifteen (15) feet, provided, however, the first five (5) feet of such utility easement measured from the Street Right-of-Way shall be reserved exclusively for use as a City utility easement for sewer and water.

ROADWAY DETAIL – R22

REVISIONS		
Rev. No.	Description	Date

KAMERYN I. WRIGHT
REGISTERED
No. PE11900310
STATE OF INDIANA
PROFESSIONAL ENGINEER

RECOMMENDED FOR APPROVAL — DESIGN ENGINEER — DATE 6/6/2023

CITY OF BLUFFTON

ROADWAY (R) DETAILS

SHEET 6 OF 18

STORM SEWER GENERAL NOTES

A. Absolutely no detention is allowed on any City of Bluffton right-of-way.

B. A proposed Project's drainage information shall be provided to Bluffton City Engineering, including development site plans and drainage calculations showing existing and proposed drainage patterns (including contours). This shall be available in the secondary approval of a Major Subdivision or PUD or the approval of a Development Plan.

C. Any diversion of water flow to a City right-of-way shall be fully identified and explained in writing to Bluffton City Engineering. There shall not be any increase to flows unless the development drains to an adjacent waterway of adequate capacity to convey any augmented and future development drainage.

D. The contractor of a proposed Project shall submit information to Bluffton City Engineering showing conformance with these specifications upon request.

E. The smallest permissible storm sewer not installed for underdrain requirements is twelve (12) inches in diameter.

F. INSPECTION DURING CONSTRUCTION. Contractor shall allow Bluffton City Engineering personnel the opportunity to inspect the installation of the storm water appurtenances prior to proceeding with backfilling. Bluffton City Engineering shall be given twenty-four (24) hours notice of the contractor's intent to install storm water piping and structures, unless agreed to otherwise in writing. Such a written request shall follow guidelines established for submission of a request for a variance of a Bluffton Standard**.**

G. All storm water castings shall be cleaned and trimmed. All open grated storm water castings shall include the following language "Dump No Waste Drains To Waterway".

H. Once testing standards have been satisfied and As-Builts have been accepted by Bluffton City Engineering for a Project's storm water infrastructure, City Council can be petitioned in writing to accept Project's storm water infrastructure. No storm water infrastructure or portion thereof shall be accepted by the City Council as part of the City of Bluffton's public storm water system except by resolution of the City Council upon recommendation of Bluffton City Engineering.

I. Requests to install storm sewer pipe of other material or material not meeting the City of Bluffton's Storm Water specifications or for any other variance of these Standards and Specifications shall be submitted in writing to Bluffton City Engineering. This written request shall follow guidelines established for submission of a request for a variance of a Bluffton Standard**.**

J. Storm water complaints or nuisances shall follow the process prescribed in Indiana Code 36-9-28.7 STORM WATER NUISANCES.

K. For typical storm sewer layout and residential lot grading plan, See **Detail SW01, Typical Storm Sewer Layout and Detail SW02, Typical Residential Lot Grading Plan.**

STORM SEWER CORRUGATED POLYPROPYLENE (PP) PIPE

A. 1.) 12-inch through 60-inch Pipe Shall Be Smooth Interior And Annular Exterior Corrugated Polypropylene (PP) Pipe Meeting The Requirements Of ASTM F2764, ASTM F2881 or AASHTO M330 Type S (Double-Wall) Or D (Triple-Wall), For Respective Diameters.

B. 2.) Material For Pipe And Fitting Production Shall Be An Impact Modified Copolymer Meeting The Material Requirements Of ASTM F2764, ASTM F2881 And AASHTO M330, For Respective Pipe Diameters.

C. 3.) Watertight Joints Shall Be Bell-And-Spigot Meeting The Watertight Requirements Of ASTM D3212. Gaskets Shall Comply With The Requirements Of ASTM F477. Gaskets Shall Be Installed By The Pipe Manufacturer And Covered With A Removable Wrap To Ensure The Gasket Is Free From Debris. A Joint Lubricant Supplied By The Manufacturer Shall Be Used On The Gasket And Bell During Assembly.

D. 4.) Fittings Shall Conform To ASTM F2764, ASTM F2881 Or AASHTO M330, With The Exception Of Meeting The Watertight Joint Performance Requirements Of ASTM D3212. Gasketed Bell And Spigot Connections Shall Utilize A Spun-on, Welded Or Integral Bell And Spigot With Gaskets Meeting ASTM F477.

E. 4.) Each Pipe Section Shall Be Marked With Nominal Pipe Size, Class Size And Wall, Date of Manufacture, Trademark or Tradename and ASTM Specification

F. 5.) Installation Shall Be In Accordance With ASTM D2321 And Manufacture's Recommended Installation Guidelines.

STORM SEWER REINFORCED CONCRETE PIPE

A. Reinforced concrete pipe shall be Class III, IV or V as specified in ASTM C76.

B. Reinforced elliptical concrete pipe shall be Class HE-III or HE-IV as specified in ASTM C507.

C. Lift holes are not allowed for pipe less than twenty-four (24) inches in diameter. A maximum of two (2) lift holes are allowed for pipe twenty-four (24) inches in diameter or larger. Lift holes shall be repaired according to most recent INDOT standard specifications

D. Fittings and specialties shall be in accordance with the specifications for the type of pipe being used.

E. Each pipe section shall be marked with date of manufacturer, size and class of pipe, specification designation, manufacturer and plant identification.

F. Pipe shall be furnished with a bell or groove on one end of a unit of pipe and a spigot or tongue on the adjacent end of the adjoining pipe. All joints shall have a groove on the spigot for placement of a rubber "o"-ring or profile gasket in accordance with ASTM C-443. The gasket shall be a continuous ring which fits snugly into the annular space between the overlapping surfaces less than or equal to 36" in diameter of the assembled pipe joint.

G. Reinforced concrete pipe shall be bedded per **Detail SW03, Reinforced Concrete Pipe Bedding.**

H. Precast flared reinforced concrete end sections shall be used at exposed pipe ends and shall adhere to **Detail SW05, Precast Concrete Pipe End Section**. Concrete toe anchors shall be required. Revetment riprap in accordance with the most recent INDOT Channel Design Guide set on geotextile in accordance with the most recent INDOT Standards Specifications shall be required at inlet and outlet precast flared reinforced concrete end sections.

STORM SEWER POLYVINYL CHLORIDE (PVC) PIPE

A. Pipe diameters of twelve (12) inches through fifteen (15) inches shall meet or exceed all the requirements of ASTM D3034 and shall have a minimum cell classification of 12454. Pipe diameters greater than fifteen (15) inches shall meet or exceed all requirements of ASTM F679 and shall have a minimum cell classification of 12454. PVC ribbed sewer pipe shall meet or exceed all requirements of ASTM F794 and shall have a minimum cell classification of 12454. Reference should be made to ASTM D1784 for a summarization of cell class properties.

B. The minimum wall thickness of pipe twelve (12) inches through fifteen (15) inches in diameter shall conform to SDR-35, Type PSM, as specified in ASTM D3034. The minimum wall thickness for pipe greater than fifteen (15) inches in diameter shall conform to PS 46 as specified in ASTM F679. PVC pipe shall have a minimum pipe stiffness of forty-six (46) pounds per square inch for each diameter when measured at five (5) percent deflection and tested in accordance with ASTM D2412.

C. Pipe joints shall have a bell wall, gasket groove, and spigot which are integral with the pipe. The assembly of joints shall be in accordance with pipe manufacturers' recommendations and ASTM D3212. No solvent cement joints shall be allowed. Gasket material shall be constructed of styrene butadiene or butyl rubber and meet the requirement with ASTM F477.

D. Each pipe section shall be marked with name of manufacturer, trademark or tradename, nominal pipe size, production/extrusion code, material and cell classification, and ASTM number.

E. Installation shall be in accordance with ASTM Recommended Practice D2321.

F. Metal end sections shall be used at exposed pipe ends and shall adhere to **Detail SW06**, **End Section**. Toe plate anchors shall be required. Revetment riprap in accordance with the most recent INDOT Channel Design Guide set on Geotextile in accordance with the most recent INDOT Standard Specifications shall be required at inlet and outlet end sections.

G. PVC pipe twelve (12) inches through thirty (30) inches in diameter may be used within a City of Bluffton public right-of-way subject to the bedding requirements shown in **Detail SW04, Flexible Pipe**. PVC pipe greater than thirty (30) inches in diameter shall not be allowed for use within a City of Bluffton public right-of-way.

STORM SEWER HIGH DENSITY POLYETHYLENE (HDPE) CORRUGATED PIPE

A. Requirements for test methods, dimensions, and markings are those found in AASHTO M-252 and M-294.

B. Pipe and fittings shall be made of polyethylene compounds which meet or exceed the requirements of Type III, Category 4 or 5, Grade P33 or P34, Class C per ASTM D1248.

C. Minimum pipe stiffness values shall be in accordance with AASHTO M-294.

D. The HDPE corrugated pipe shall have an integrally formed smooth interior.

E. Male and female pipe ends which allow the construction of overlapping, gasketed joints shall be made in conformance with ASTM D3212. Neoprene gaskets shall meet ASTM F477.

F. Installation shall be in accordance with ASTM Recommended Practice D2321.

G. Metal end sections shall be used at exposed pipe ends and shall adhere to Detail 10-6, End Section. Toe plate anchors shall be required. Revetment riprap in accordance with the most recent INDOT Channel Design Guide set on Geotextile in accordance with the most recent INDOT Standard Specifications shall be required at inlet and outlet end sections.

H. HDPE pipe twelve (12) inches through thirty (30) inches in diameter may be used within a City of Bluffton public right-of-way subject to the bedding requirements shown in **Detail SW04, Flexible Pipe.** HDPE pipe greater than thirty (30) inches in diameter shall not be allowed for use within a City of Bluffton public right-of-way.

STORM SEWER DEFLECTION TESTING AND TELEVISING

A. Deflection testing is required for all mainline flexible pipe and Bluffton City Engineering shall be given written notice twenty-four (24) hours prior to the deflection testing. An allowable deflection of five (5) percent inside pipe diameter will be acceptable after all backfilling has been in place for thirty (30) days. A nine-point "Go-No-Go" mandrel shall be used for the deflection test. A proving ring shall be provided for each mandrel. All pipe exceeding the allowable deflection shall be televised to determine the extent of replacement or rerounding required. The reworked section shall be retested thirty (30) days after completion. Contractor shall bear all testing costs. The "Go-No-Go" mandrel shall be manually pulled without the use of mechanical devices.

B. Televising is required for pipe that fails Mandrel Testing and Bluffton City Engineering shall be given written notice twenty-four (24) hours prior to the televising. A camera equipped with remote control devices to adjust light intensity and one thousand linear feet (1000') of sewer cable shall be provided. The camera shall transmit a continuous image to the television monitor as it is being pulled through the pipe. The image shall be clear enough to enable Bluffton City Engineering representative and others viewing the monitor to easily evaluate the interior condition of the pipe. The camera shall stamp the video tape with linear footage and project number, and an audio voice-over shall be made during the inspection identifying problems. Contractor shall bear all televising costs.

C. The pipe shall be thoroughly cleaned before installing camera and commencing televising.

D. If any pipe and/or joint is found to be leaking in such a way as soil migration is likely in the sole judgment of Bluffton City Engineering, the contractor shall repair that portion of the work to the satisfaction of Bluffton City Engineering.

STORM SEWER MANHOLES AND INLETS

A. Manholes

1) Manholes shall conform to ASTM C478. Joints shall conform to ASTM C443. The use of cast-in-place concrete structures shall require the prior written approval of Bluffton City Engineering.

- Manholes shall be installed per **Detail SW07, Manhole Type C; Detail SW08, Manhole Type H; or Detail SW09, Manholes - Types J, K, L, M & N.**
- Type J, K, L, M, and N manholes require a certain minimum depth. In cases where the depth of the storm sewer is not sufficient to meet the minimum depth as required by **Detail SW09**, "F" diameter manhole sections may be used throughout the depth of the manhole.

2) Manholes shall not have ladder rungs

3) Castings for manholes which do not collect surface water shall be Neenah R-1772-2302 or East Jordan Iron Works EJ 1022Z1 or as approved by Bluffton City Engineering.

B. Inlets

1) Castings which drain Type II Curbing, combined curb (raised) and gutter,

- shall be Neenah R-3287-10V or EJ 7505Z1/T4 and M3 or as approved by Bluffton City Engineering and
- shall require Inlet Type B as shown in **Detail SW011, Inlet - Type B.**
- a precast round 30" inlet as shown in **Detail SW014, Inlet - Round 30"** may be used in lieu of inlet - Type B. Casting for round 30" inlet shall be Neenah R-3010 or EJ 7010 or as approved by Bluffton City Engineering.

2) Castings which drain Type I Curbing, combined roll curb and gutter,

- shall be Neenah R-3501-TR/TL or EJ 7495Z and M1, or M2, M4 or as approved by Bluffton City Engineering, and
- shall require Inlet Type A as shown in **Detail SW010, Inlet - Type A.**

3) Casting-grate style for raised curb may be used to drain Type I Curbing when installed per **Detail SW012, Inlet Depression Detail** and when approved by Bluffton City Engineering.

4) Manholes shall NOT be used to drain any combined curb and gutter, either Type I or Type II Curbing.

5) Castings which drain open pavement areas without curbing shall be Neenah R-3402-E or as approved by Bluffton City Engineering.

6) Castings for manholes which drain open pavement areas without curbing shall be Neenah R-2502-D or EJ 1022 M1 or M3 as approved by Bluffton City Engineering.

7) Castings for use on inlets or manholes which drain swales or dry bottom detention basins shall be Neenah R-4342 or EJ 6489N or as approved by Bluffton City Engineering.

8) A two-foot (2') sump is required on any inlet, Type A, Type B, or Round 30" which drains directly to a mainline pipe. Connection of inlet pipe to mainline pipe shall occur at a manhole. Please reference **Detail SW10, Inlet - Type A**, **Detail SW11, Inlet - Type B, or Detail SW14, Inlet - Round 30".**

STORM WATER SWALES/DITCHES

A. If access, as determined by Bluffton City Engineering, is needed over a drainage ditch or swale to allow servicing of manholes or inlet structures, access shall be installed and conform to INDOTS Latest Standard for a field entrance plus any other modifications deemed necessary by Bluffton City Engineering.

B. Swales shall be constructed with a minimum of five-tenths percent (0.5%) profile grade provided that a six-inch (6") diameter underdrain is incorporated with swales that are less than one percent (1%) profile grade per **Detail SW13, Swale Underdrain Detail**.

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CITY OF BLUFFTON

STORM WATER (SW) NOTES

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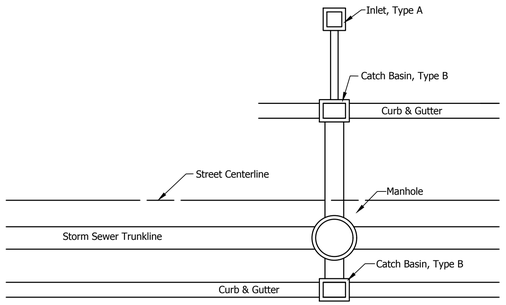
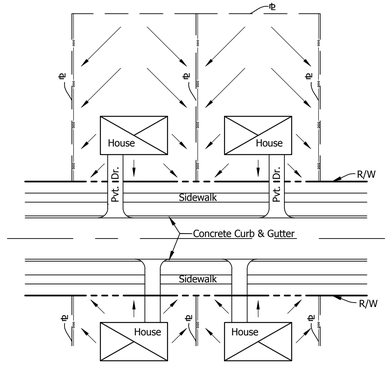


TYPICAL STORM SEWER LAYOUT

Scale: None



LEGEND

Drainage Swale

Runoff Direction Of Flow

TYPICAL RESIDENTIAL LOT GRADING PLAN

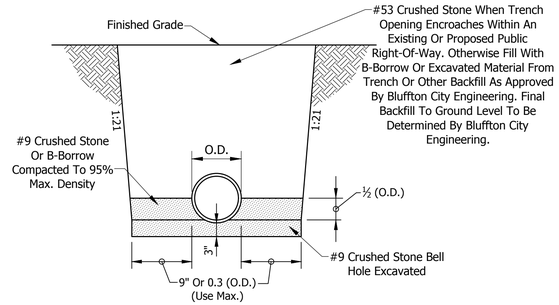
Scale: None

NOTES:

1.) No rear yard swales permitted without prior written approval from Bluffton City Engineering.

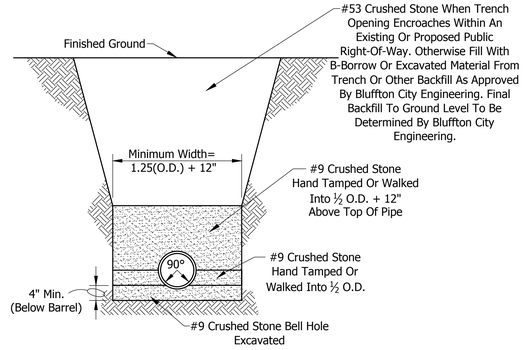
2.) Residential sump pumps shall discharge directly to storm sewers.

3.) Subsurface drainage from house sump pumps, slab footer drains, downspouts, etc. shall be ran in a separate trench than the sanitary lateral.



RCP PIPE BEDDING DETAIL

Scale: None



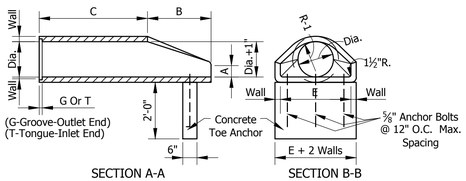
Pipe Size	10" TO 15"	18" And Over
Bedding Below The Pipe Barrel	O.D./4 Min.=4"	O.D./4 Max.=8"

FLEXIBLE (PVC, PP & HDPE) PIPE BEDDING

Scale: None

STORM WATER DETAIL – SW01

PLAN



SECTION A-A

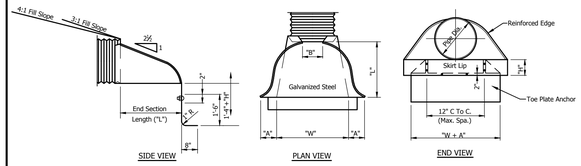
SECTION B-B

PRECAST CONCRETE PIPE END SECTION

Scale: None

DIA.	WALL	G or T	WT. SEC.	A	B	C	D	E	DIA.+1"	R-1	R-2	SKIRT
12	2	1 1/2	530	4	24	48 7/8	72 7/8	24	13	10 1/16	9	3 1/2
15	2 1/4	2	740	6	27	46	73	30	16	12 1/2	11	3 1/2
18	2 1/2	2 1/2	990	9	27	46	73	36	19	15 1/2	12	4
21	2 3/4	2 1/2	1280	9	35	38	73	42	22	16 1/8	13	4
24	3	2 1/2	1520	9 1/2	43 1/2	30	73 1/2	48	25	16 11/16	14	4 1/2
27	3 1/4	2 1/2	1930	10 1/2	48	25 1/2	73 1/2	54	28	17 3/4	14 1/2	4 1/2
30	3 1/2	3	2190	12	54	19 3/4	73 3/4	60	31	18 5/16	15	5
33	3 3/4	3 3/8	3150	13 1/2	58 1/2	39 1/4	97 3/4	66	34	23 3/4	17 1/2	5 1/2
36	4	3 1/2	4100	15	63	34 3/4	97 3/4	72	37	24 1/16	20	5 1/2

STORM WATER DETAIL – SW02



PIPE END SECTION

Scale: None

PIPE END SECTION								
Pipe Dia.	T In.	DIMENSIONS A. (1"±)	B (Max.)	W (1"±)	L (1"±)	W (2"±)	Slope Approx.	Body
12"	.064	6"	6"	6"	21"	24"	2½	1 Pc
15"	.064	7"	8"	6"	26"	30"	2½	1-Pc
18"	.064	8"	10"	6"	31"	36"	2½	1 Pc
21"	.064	9"	12"	6"	36"	42"	2½	1 Pc
24"	.064	10"	13"	6"	41"	48"	2½	1 Pc
30"	.079	12"	16"	8"	51"	60"	2½	1 Pc
36"	.079	14"	19"	9"	60"	72"	2½	2 Pc

NOTES:

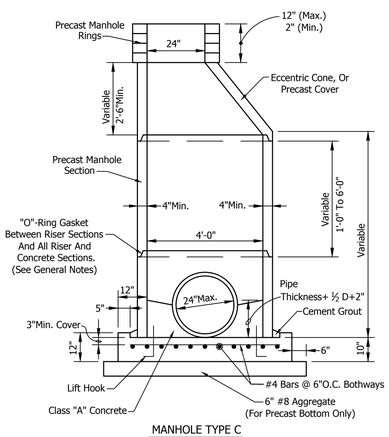
1.) End sections and toe plate anchors shall conform to all applicable requirements as set out in the standard specifications.

2.) Multiple panel bodies shall have lap seams which shall be tightly jointed with ⅛" ø galvanized rivets or bolts.

3.) The toe plate anchor shall be constructed of 0.138" thickness galvanized steel and be required on all steel pipe end sections. It shall be matched-punched to fit holes in skirt lip and supplied loose, complete with ⅜" ø galvanized bolts.

4.) Pimpled connection bond may be used to connect pipe end section to helically corrugated pipe.

STORM WATER DETAIL – SW03

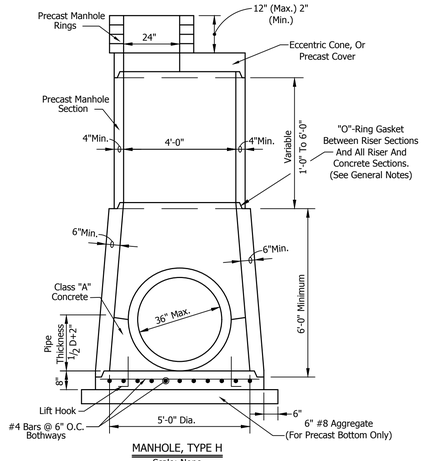


MANHOLE TYPE C

Scale: None

MAXIMUM PIPE SIZE	
Pipe Entering / Pipe Existing At 0°-45° Bend	Pipe Entering / Pipe Existing At 45°-90° Bend
24"	21"

STORM WATER DETAIL – SW04



MANHOLE, TYPE H

Scale: None

MAXIMUM PIPE SIZE	
Pipe Entering / Pipe Exiting At 0°-45° Bend	Pipe Entering / Pipe Exiting At 45°-90° Bend
36"	30"

STORM WATER DETAIL – SW05

STORM WATER DETAIL – SW06

STORM WATER DETAIL – SW07

STORM WATER DETAIL – SW08

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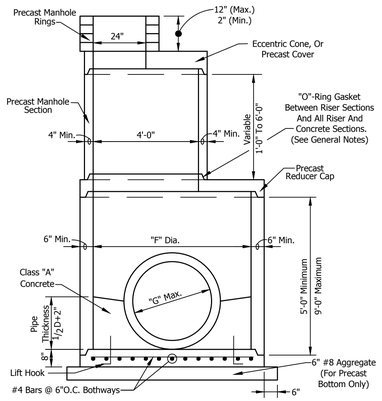
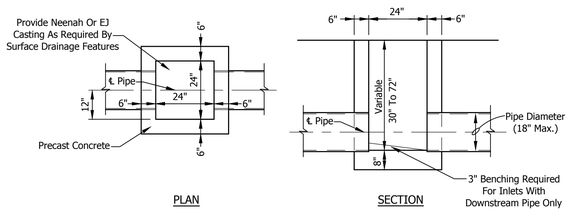


MANHOLES - TYPE J, K, L, M & N

Scale: None

Manhole Type	Manhole Diameter "F"	MAXIMUM PIPE SIZE "G"	
		Pipe Entering / Pipe Existing At 0°-45° Bend	Pipe Entering / Pipe Existing At 45°-90° Bend
J	60"	36"	33"
K	72"	48"	36"
L	96"	54"	48"
M	102"	72"	66"
N	108"	84"	72"

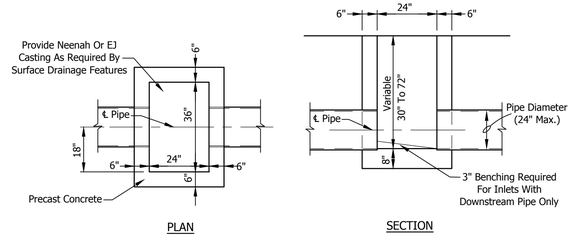
STORM WATER DETAIL – SW09



INLET, TYPE A

Scale: None

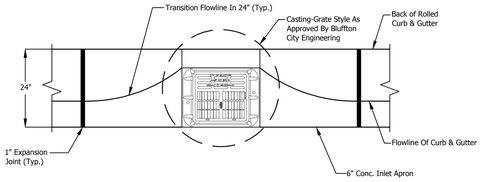
STORM WATER DETAIL – SW10



INLET, TYPE B

Scale: None

STORM WATER DETAIL – SW11

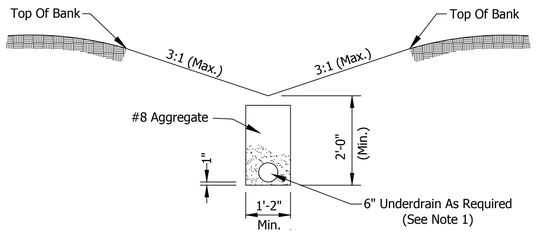


INLET DEPRESSION DETAIL

Scale: None

Note:
Front Edge Of Casting To Be Depressed 1" to 1 ½" Below Normal Street Surface, With Smooth Transition Of Paving To Create Warp As Shown

STORM WATER DETAIL – SW12



SWALE UNDERDRAIN

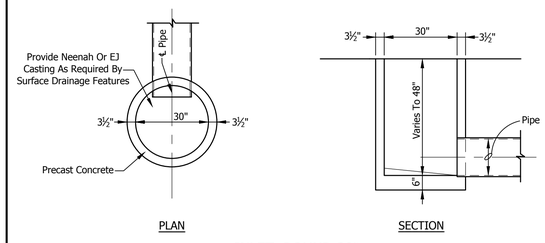
Scale: None

NOTES:

1.) Swales Shall Be Constructed With A Minimum 0.5 Percent Profile Grade Provided That A 6 Inch Diameter Underdrain Is Provided For Swales With Less Than A 1.0 Percent Profile Grade.

2) Rear Yard Swales Are Only Allowed With Prior Written Approval From Bluffton City Engineering.

STORM WATER DETAIL – SW13



INLET, ROUND 30"

Scale: None

STORM WATER DETAIL – SW14

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STORM WATER (SW) DETAILS

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SANITARY SEWER POLYVINYL CHLORIDE (PVC) PIPE

A. GRAVITY PIPE

1) PVC pipe diameters of four (4) inches through fifteen (15) inches shall meet or exceed all the requirements of ASTM D3034, and shall have a minimum cell classification of 12454. Reference should be made to ASTM D1784 for a summarization of cell class properties. PVC pipe diameters greater than fifteen (15) inches shall meet or exceed all requirements of ASTM F679 and shall have a minimum cell classification of 12454.
2) The minimum wall thickness of PVC pipe four (4) inches through fifteen (15) inches in diameter shall conform to SDR-35, Type PSM, as specified in ASTM D3034. The minimum wall thickness for PVC pipe greater than fifteen (15) inches in diameter shall conform PS 46 as specified in ASTM F679. PVC pipe shall have a minimum pipe stiffness of forty-six (46) pounds per square inch for each diameter when measured at 5% deflection and tested in accordance with ASTM D2412.
3) Pipe joints shall have a bell wall, gasket groove, and spigot which is integral with the pipe. The assembly of joints shall be in accordance with pipe manufacturers' recommendations and ASTM D3212. Solvent cement joints shall not be allowed for mainline pipe.
4) Pipe fittings shall be SDR-26 manufactured fittings made of PVC plastic having a minimum cell classification of 12454 as defined in ASTM D1784. Saddle connections shall not be allowed for new construction or Vitrified Clay Pipe (VCP) connections.
5) Each pipe section shall be marked with the name of manufacturer, trademark or trade name, nominal pipe size, production/extrusion code, material and cell classification, and ASTM number.
6) Installation shall be in accordance with ASTM Recommended Practice D2321. PVC pipe shall be bedded per **Detail SS01, PVC Pipe Bedding.**
7) All PVC pipe entering a manhole, pump station, or lift station shall have a watertight gasket or boot firmly clamped around the pipe exterior.

B. PRESSURE PIPE

1) Pipe for force mains shall conform to latest revision of ASTM D2241, AWWA CI51, HDPE AWWA C906, PVC AWWA C900, or Bluffton City Engineering approved Equal.
2) Fittings shall comply with AWWA C-110 (ANSI A21.10) and AWWA C-153 (ANSI A-21.53). Fittings within a structure shall be flanged, all other fittings shall be mechanical joint type. Ductile fittings for wastewater service shall be lined with PROTECTO 401 and shall be applied per the manufacturer's recommendations. Rubber gaskets for fitting joints shall comply with AWWA C-111 (ANSI A-21.11). Rubber gaskets for flanged ductile fittings shall be either ring or full face and shall be 1/8" thick. Bolts and nuts shall be corrosion resistant and shall conform to ANSI B18.2.1 and ANSI B18.2.2. All screws and exposed threads shall receive not less than two (2) coats of asphaltic paint after joint has been tightened and approved.
3) Installation shall be in accordance with ASTM Recommended Practice D2774. PVC force main shall be bedded per **Detail SS01, PVC Pipe Bedding**. Force main shall be installed with Trace Wire as detailed in the next section.

C. TRACE WIRE AND TEST STATIONS FOR PRESSURE PIPE

1) Trace Wire Specifications
   a. Trace wire shall be a #12 AWG (American Wire Gage, 0.0808" Diameter) fully annealed, high carbon 1055 grade steel, high strength copper-clad steel conductor (HS-CCS) rated at 30 volts, insulated with 30 mil. high-density, high molecular weight polyethylene (HDPE) insulation rated for direct burial use at 30 volts.
   b. HS-CCS conductor shall be at 21% conductivity for locating purposes.
   c. Break load of 452 lbs. HDPE insulation shall be RoHS (Restriction of Hazardous Substances) compliant and utilize virgin grade material.
   d. Insulation color shall be green to meet the APWA (American Public Works Association) color code standard for identification of buried sewer piping.
   e. Trace wire shall be Copperhead© High Strength HS-CCS HDPE 30 mil. and made in the USA or equal as approved by Bluffton City Engineering.
2) Installation
   a. Tracer wire and test stations shall be installed along the entire section of any installed force main, simultaneously with the piping, as a continuous single wire.
   b. No looping or coiling of wire is allowed.
   c. Installation shall allow for proper access for connection of line tracing equipment and for locating of wire without loss or deterioration of low frequency (512Hz) signal for distances in excess of one thousand (1000) linear feet and with distortion of signal caused by multiple wires being installed in close proximity of one another.
   d. All service lateral trace wires shall be connected to the mainline with a single wire (no looping will be allowed) using a mainline to lateral lug connector, installed without cutting/splicing the mainline trace wire.
   e. Trace wire on all service laterals/stubs must terminate at an approved trace wire access box directly above the utility. See Subsection C-4, Trace Wire Termination/Access Points.
   f. All mainline dead-ends shall go to ground using a Rhino "Tri-view" end line locating post with a drive-in magnesium grounding anode rod, buried at the same depth as the trace wire. The anode will be buried on the opposite side of the utility box to the trace write utilizing the connection point in the access box.
   g. Trace wire must be properly grounded at all dead-ends/stubs.
   h. Grounding of trace wire shall be achieved by use of a drive-in magnesium grounding anode rod with a minimum of twenty (20) feet of #14 HDPE copper clad wire connected to anode (minimum 1.0 lb.) specifically manufactured for this purpose and buried at the same elevation as the force main.
   i. Where existing trace wire is encountered on an existing force main line that is being extended or tied into, the new and existing trace wire shall be connected using approved splice connectors and shall be properly grounded at the splice location as specified, and completely waterproof to prohibit corrosion and loss of conductivity.
   j. Any damage occurring during installation of the trace wire must be immediately repaired in an approved waterproof method. Taping and/or spray shall not be allowed.
3) Connectors
   a. Main line splice to service line connection shall be specifically manufactured for use in underground trace wire installation, shall be dielectric silicon filled to seal out moisture and corrosion, and installed in a manner so as to prevent any uninsulated wire exposure.
   b. Wire shall be properly spliced at each end connection and each service connection.
   c. Wire at all splice locations shall be adequately wrapped and protected.
   d. The cost for trace wire shall be included in the unit price cost of the force main and will not be paid for separately.
4) Trace Wire Termination/Access Points
   a. All trace wire termination points shall utilize an approved ground trace wire access box specifically manufactured for this purpose.
   b. A minimum of two (2) feet of excess wire is required in all grade level trace wire access boxes after setting at final grade.
   c. The terminal posts shall be installed at air relief valve pits, valves, blow-off structures, fence lines, lot lines, road right-of-way lines, or where directed by Bluffton City Engineering.
   d. Terminal posts shall be of thermoplastic construction provided with two (2) external terminals, grounded locating plate, copper ground lug at bottom of post, triangular shape for improved visibility, and lockable and removable cap.
   e. Terminal posts shall be Rhino "Tri-View" or equal approved by Bluffton Wastewater Department. All posts shall have a drive-in magnesium grounding anode rod.
   f. Color shall be green or as otherwise approved by Bluffton City Engineering.

SANITARY SEWER LEAKAGE TESTING

Bluffton City Engineering shall be given written notice twenty-four (24) hours prior to the required leakage testing. All testing, including supplies and equipment, is to be furnished by the contractor. The pipe to be tested shall be cleaned and isolated to perform the test.

A. INFILTRATION TEST

1. Gravity sewer pipe shall be subjected to an infiltration test. Using a sharp-edged weir or other approved measuring device, the flow within the pipe shall be measured and recorded to establish the rate of infiltration, but in no case shall the test duration be less than two (2) hours. If dewatering was implemented during construction, the test shall not be done until sufficient time has elapsed to allow the ground water table to return to its natural level.
2. Practically watertight work is required. The total amount of infiltration into the system shall not exceed one hundred (100) gallons per inch diameter of sewer, per mile, per twenty-four (24) hours: 0.00132 gallon/inch diameter/100 feet/minute. Therefore, the following amounts shown in **Table 11-1** shall be maximums.

Table 11-1

PIPE DIAMETER (Inches)	ALLOWABLE INFILTRATION (GAL./MIN./100 FEET)
4"	0.0053
6"	0.0079
8"	0.0110
10"	0.0130
12"	0.0160

B. LOW PRESSURE AIR TEST - GRAVITY SEWERS

1) The contractor, at his option, may use the low pressure air test, under the observation and subject to the approval of Bluffton City Engineering. Low pressure air shall be slowly introduced into the sealed line until the internal air pressure reaches 4 PSIG plus the groundwater head divided by 2.31. The test equipment shall include a pressure relief valve designed to prevent test pressure from exceeding 9.0 PSIG.
2) At a stable internal air pressure within 0.5 PSIG of the initial internal air pressure, timing shall commence with a stopwatch or similar device of 99.8 percent accuracy. Timing shall end with the internal air pressure drops 1 PSIG below the stable internal air pressure.
3) The line shall be accepted if the time shown in **Table 11-2** for the designated pipe size and length elapses before the air pressure drops 1 PSIG below the stable internal air pressure at which time the test can be discontinued for the accepted line.

Table 11-2

PIPE DIAMETER (Inches)	MINIMUM TIME (Min:Sec)	MAXIMUM PIPE LENGTH FOR MINIMUM TIME (Feet)	TIME FOR LONGER PIPE LENGTH (Sec)
4	3:46	597	0.380*L
6	5:40	398	0.854*L
8	7:34	298	1.520*L
10	9:26	239	2.374*L
12	11:20	199	3.418*L
15	14:10	159	5.342*L
18	17:00	133	7.692*L
21	19:50	114	10.470*L
24	22:40	99	13.674*L

C. PRESSURE AND LEAKAGE TESTS - PRESSURE PIPE

1) Bluffton City Engineering shall be given twenty-four (24) hour written notice of the required pressure and leakage testing to be performed by the contractor. The pressure and leakage test shall be performed in accordance with the basic provisions of AWWA C600. All force mains shall be given a hydrostatic test of at least 1.5 times the shutoff head of the connected pumps or 150 PSI, whichever is lesser. Test Pressure shall not exceed pipe restraint design pressure or rated pressure of the valves. Loss of water pressure during test shall not exceed 5 PSI in a two (2) hour test period.
2) Valves shall not be operated in either direction at differential pressures exceeding the rated valve working pressure.
3) The pressure and leakage test shall be performed following the general form of the following:
   a. Record time and line pressure prior to start of test.
   b. Pump water into new force main until pressure reaches at least 1.5 times the shutoff head of the connected pumps or 150 PSI, stop pumping and record time and line pressure.
   c. Contractor shall remain at site for one hour. The test shall be voided if any adjustments are made to the force main, test equipment, or appurtenances. Tightening of fittings on test equipment is allowed. Following the one hour period, record time and line pressure.
   d. Pump water into new force main from a calibrated container of water until pressure is back to the initial test pressure i.e., 1.5 times the shutoff head of the connected pumps or 150 PSI. Stop pumping when this pressure is achieved, record time, line pressure, and amount of water pumped to the nearest 1/100-gallon. The calibrated container shall have markings at 1/10-gallon increments.
   e. Repeat steps **c** and **d** one additional time.

4) For a test pressure of 150 PSI, a section of force main is considered satisfactory if it meets the following as shown in **Table 11-3**:

Table 11-3

FORCE MAIN DIAMETER (Inches)	ALLOWABLE LEAKAGE GAL./HR./1000 FEET
4"	0.3700
6"	0.5500
8"	0.7400
10"	0.9200
12"	1.1000

The maximum allowable leakage can be calculated from the following formula for additional test pressures:

$$L = \frac{S * D * \sqrt{P}}{133{,}200}$$

Where:
L = allowable leakage in gallons per hour
S = length of pipe tested, in feet
D = nominal diameter of pipe in inches
P = average test pressure during leakage test, in pounds per square inch (gauge)

5) If the leakage from a test section is greater than permitted under these specifications, the contractor shall locate and repair the defective joints, mains, and appurtenances. The pressure and leakage test shall then be repeated until satisfactory results are obtained. All labor and materials required to meet the requirements of the pressure and leakage test shall be at the expense of the contractor.

GENERAL NOTES

1. INSPECTION DURING CONSTRUCTION. Contractor shall allow Bluffton City Engineering personnel the opportunity to inspect the installation of sanitary appurtenances prior to proceeding with backfilling. Bluffton City Engineering shall be given twenty-four (24) hours notice of the contractor's intent to install sanitary piping and structures, unless agreed to otherwise in writing.
2. In general, all materials, labor, equipment, and miscellaneous accessories and their installation shall be guaranteed to be free from all defects for a period of one (1) year from the date of startup and continuous use by the Bluffton Wastewater Department. Any defects found during this one year period shall be repaired or replaced at no cost to the Bluffton Wastewater Utility and any such defect that has been repaired or replaced shall thenceforth be guaranteed for an additional twelve (12) months from the date of such repair or replacement.
3. Contractor shall engrave a three-inch (3") high by one-eighth inch (1/8") deep "X" on the curb directly above each service lateral. Where curbs are not available, contractor shall notch the sidewalk directly above each service lateral.

SANITARY SEWER DEFLECTION TESTING

A. Deflection testing is required for all mainline flexible pipe installed to flow into the City of Bluffton sanitary system. Bluffton City Engineering shall be given twenty-four (24) hour written notice of the required deflection testing to be performed by the contractor. An allowable deflection of 5% internal pipe diameter will be acceptable after all backfilling has been in place for thirty (30) days. A Nine-Point "Go-No-Go" Mandrel shall be used for the deflection test. A proving ring shall be provided for each mandrel.
B. All pipe exceeding the allowable deflection shall be televised to determine the extent of replacement or rerounding required. The reworked section shall be retested 30 days after completion. Contractor shall bear all testing costs. The "Go-No-Go" mandrel shall be manually pulled without the use of mechanical devices.
C. Following leakage and mandrel testing, televising is required. Bluffton City Engineering shall be given written notice twenty-four (24) hours prior to the televising. A camera equipped with remote control devices to adjust light intensity and one thousand (1,000) linear feet of sewer cable shall be provided. The camera shall transmit a continuous image to the television monitor as it is being pulled through the pipe. The image shall be clear enough to enable Bluffton City Engineering representative and others viewing the monitor to easily evaluate the interior condition of the pipe. The camera shall stamp the DVD with manhole number, lateral distance from manhole, linear footage, and project number. Contractor shall bear all televising costs.
D. The pipe shall be thoroughly cleaned before installing camera and commencing televising.
E. If any pipe and/or joint is found to be leaking, regardless of the results from the leakage testing, in the sole judgement of Bluffton City Engineering, the contractor shall repair that portion of the work to the satisfaction and approval of Bluffton City Engineering.

SANITARY SEWER LATERAL PIPE AND FITTINGS

A. Service laterals from the main gravity sewer line in the street, alley, or easement to the connection at the building shall be a minimum diameter of four (4) inches residential and six (6) inches non-residential.
B. When connecting to the gravity sanitary sewer system, the lateral pipe shall be SDR-35 or Schedule 40 pipe. All connections shall be made by means of an approved tee, or wye. All joints must be watertight with a gasket or solvent cement joint. Fernco's shall not be used for new construction. Saddle connections shall not be used for new construction or VCP connections. Backflow prevention shall be installed on all new laterals and lateral repairs that are subject to any of the following conditions:
   - Building where the elevation of any floor is at or below the invert of the City sanitary sewer main.
   - If a plug in the City sanitary sewer main will cause the hydraulic grade line to rise above the lowest floor level.
   - Areas where the lowest building level to be served by gravity sanitary sewer service is less than one (1') above the top of the manhole casting elevation of the first upstream or downstream manhole on the public sewer.
C. A minimum of one clean-out shall be installed for each lateral. Clean-outs shall be the same diameter as the lateral pipe. A backflow prevention device may be used as a clean-out.
D. Sanitary service connections for deep sewers (ten [10] feet or deeper) shall be installed per **Detail SS02, Service Connection For Deep Sewers**. Sanitary service connections for shallow sewers (less than ten [10] feet deep) shall be installed per **Detail SS03, Service Connection For Shallow Sewers.**

SANITARY SEWER MANHOLES

A. Precast concrete manholes shall conform to ASTM C478, with rubber type gaskets equal to ASTM C443. Monolithic cast-in-place manholes shall only be used with the prior written approval of Bluffton City Engineering. The base and first riser section of the precast concrete manhole shall be integrally cast as one unit. Precast concrete cones shall be of the eccentric cone type. No "See Through" lift holes shall be allowed on precast concrete manholes forty-eight (48) inches in diameter or less. In addition to the rubber type gaskets, all joints shall receive a 1/2-inch diameter non-asphaltic mastic (Kent-Seal or Bluffton City Engineering approved equal) conforming to ASTM C990. Pipe connection to manhole shall be watertight flexible connector (KOR-N-SEAL, A-LOK, Dura-Seal) or Bluffton City Engineering approved equal.
- Standard manholes shall be installed per **Detail SS04. Typical Manhole Type A**.
- Drop manholes shall be installed per **Detail SS05, Typical Manhole Type B,.**
- Bench walls shall be installed inside manholes per **Detail SS06, Bench Wall Details**.
- Pipe connections to existing manholes shall be installed per **Detail SS07, Existing Manhole Connection Detail**.

B. The minimum diameter of manholes shall be determined by the pipe diameter and the entering and exiting angles of the pipes as shown in **Table 11-4.**

Table 11-4: MINIMUM MANHOLE DIAMETER (Inches)

PIPE DIAMETER (Inches)	PIPE ENTERING / PIPE EXITING AT 0° TO 45° BEND	PIPE ENTERING / PIPE EXITING AT 45° TO 90° BEND
8-21	48	48
24	48	60
27-30	60	60
33-36	60*	72

* 72" With A-Lok Connector

C. Final adjustment in elevation of the frame and cover shall be accomplished by the use of a two-inch (2") minimum thickness adjustment ring up to a maximum combined thickness of twelve inches (12") as show in **Detail SS08, Precast Adjusting Ring**. Brick or block shall NOT be used in the construction of a manhole or to adjust the elevation of the frame and cover.
D. Manholes shall not have ladder rungs.
E. Manhole frame and cover shall be Neenah R-1772-2302 and R-1772-0123 with gasketed lid, EJ 1022Z1AGS with gasketed lid, or as approved by Bluffton City Engineering. When watertight frame and cover is required by Bluffton City Engineering or the developer, Neenah R-1916-F with locking lid, EJ 1022Z1PT manhole frame and cover, or as approved by Bluffton City Engineering shall be provided. The words "Sanitary Sewer" must be cast in recess letters two (2) inches in height onto the manhole covers. Castings shall be of uniform quality, free from blow holes, porosity, hard spots, shrinkage, distortion, or other defects. They shall be smooth and well-cleaned by shot blasting or other approved method. All castings shall be manufactured true to pattern; component parts shall fit together in a satisfactory manner. Round frames and covers shall be of non-rocking design or shall have machined horizontal bearing surfaces to prevent rocking and rattling under traffic. All castings shall be fully interchangeable.
F. The lowest elevation to receive gravity sanitary service must be one (1) foot above the top of manhole casting elevation or either the first upstream or downstream manhole on the public sewer to which the connection is to be made. The property owner shall provide and maintain a grinder pump system, or Bluffton City Engineering approved equal, discharging to the gravity building connection outside of the public right-of-way for those portions of the building not meeting the stated gravity service requirements.
G. Inside drop manholes are not allowed.
H. Manholes shall be installed at distances not greater than four hundred (400) feet.
I. Mortar all joints watertight using the exterior backplaster material and then wrap with geotextile fabric.

SANITARY SEWER MANHOLE TESTING REQUIREMENTS

A. As required in 327 IAC 3-6-16, manhole vacuum testing is required on all manholes placed on the project. After manhole assembly (including riser rings and casting) and backfilling, all manholes shall be vacuum tested in accordance with ASTM C1244. If the manhole shows leakage or signs thereof, the manhole shall be repaired until it passes the vacuum test.
B. All vacuum testing and equipment shall be provided by the contractor. Any repairs necessary shall be the responsibility of the contractor.

OIL / GREASE TRAP REQUIREMENTS

A. Any new commercial or industrial entities shall construct a one thousand-gallon (1,000-gal.) (minimum) grease trap if said entity generates and/or wastes oil, grease, or the by-products thereto. The design engineer shall submit detailed calculations for size justification of said trap. Calculation shall be accompanied with references, specifically denoting origin of sizing/calculation method.
B. Toilets, urinals and other similar fixtures shall not waste through the grease interceptor. All other waste shall enter through the grease interceptor, through the inlet pipe only.
C. The grease interceptor and the grease trap shall be designed such that it is easily accessible for inspection/sampling and cleaning at all times. The grease trap shall have a minimum of two (2) compartments with fittings designed for grease interception.
D. The oil/grease trap shall be located outside the building and at a distance far enough to allow soluble grease/oil to become insoluble.
E. A backwater prevention valve shall be located downstream of oil/grease trap.

REVISIONS		
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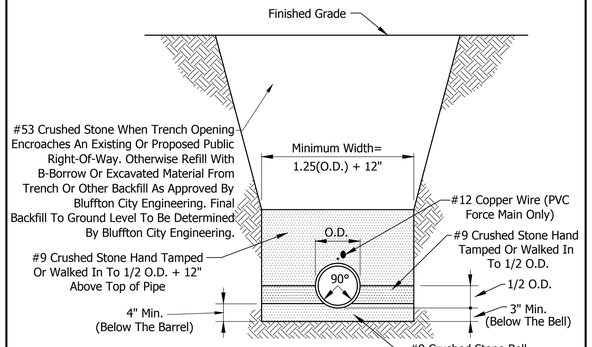
CITY OF BLUFFTON

SANITARY SEWER (SS) NOTES

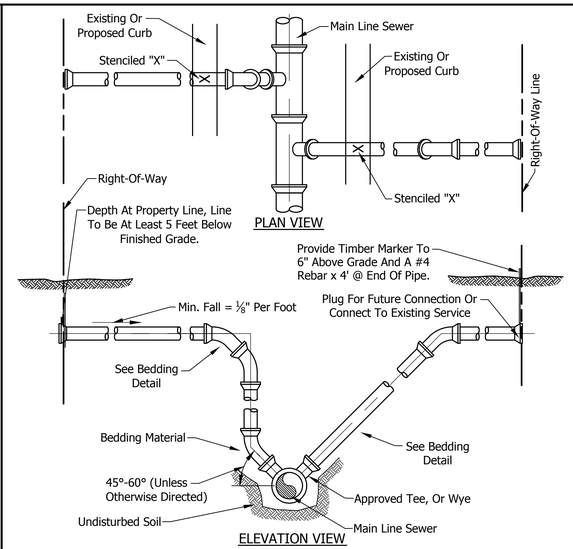
SHEET 10 OF 18



Pipe Size	8" TO 15"	18" And Over
Bedding Below The Pipe Barrel	O.D./4 Min.=4"	O.D./4 Max.=8"

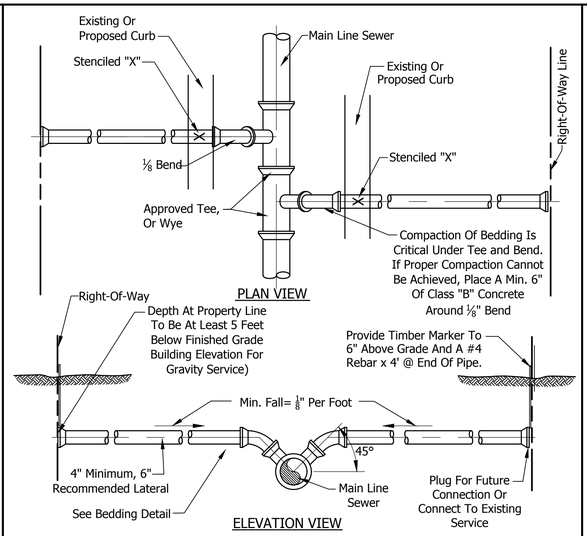
PVC PIPE BEDDING DETAIL

Scale: None



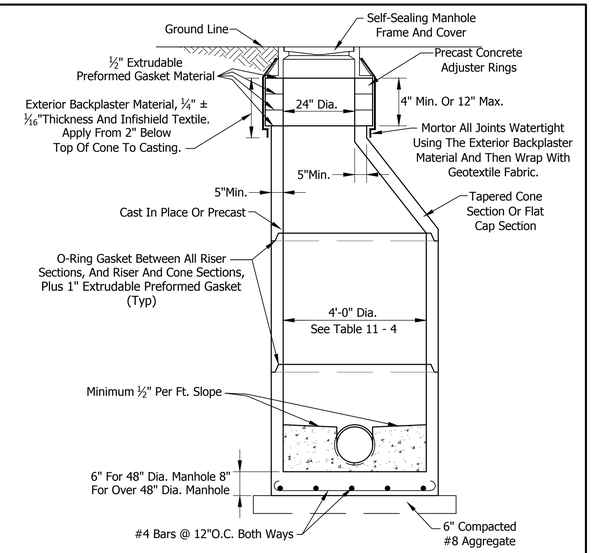
SERVICE CONNECTION FOR DEEP SEWERS (10' DEEP AND OVER)

Scale: None



SERVICE CONNECTION FOR SHALLOW SEWERS (LESS THAN 10' DEEP)

Scale: None



TYPICAL MANHOLE TYPE A

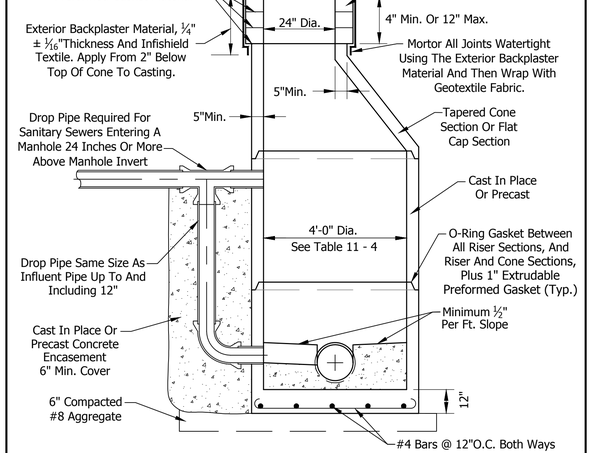
Scale: None

SANITARY SEWER DETAIL – SS01

SANITARY SEWER DETAIL – SS02

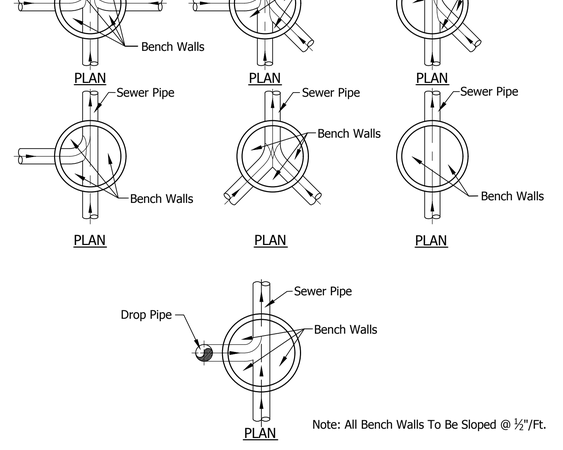
SANITARY SEWER DETAIL – SS03

SANITARY SEWER DETAIL – SS04



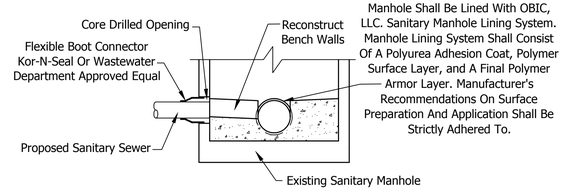
TYPICAL MANHOLE TYPE B

Scale: None



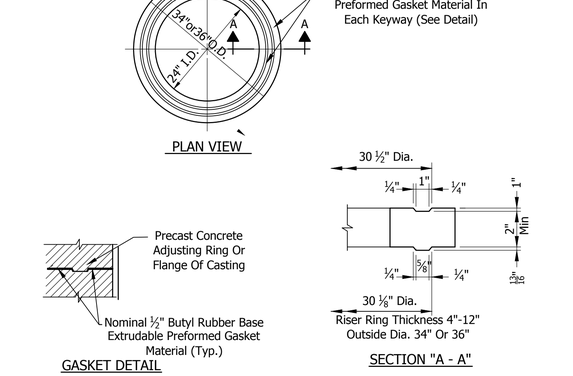
BENCH WALL DETAILS

Scale: None



EXISTING MANHOLE CONNECTION DETAIL

Scale: None



PRECAST ADJUSTING RING

Scale: None

SANITARY SEWER DETAIL – SS05

SANITARY SEWER DETAIL – SS06

SANITARY SEWER DETAIL – SS07

SANITARY SEWER DETAIL – SS08

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SANITARY SEWER (SS) DETAILS

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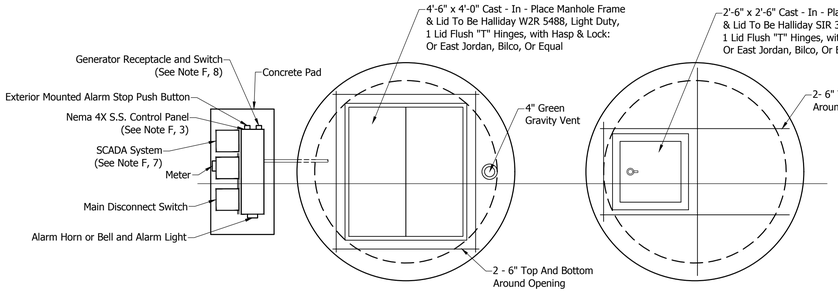


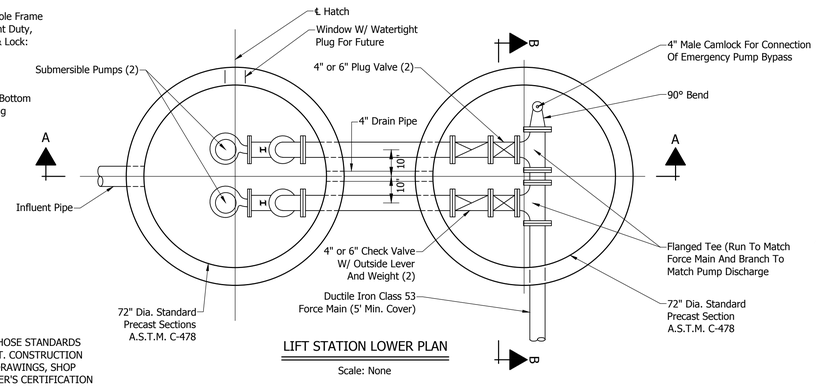
LIFT STATION TOP PLAN

Scale: None

NOTE:
Location Of Electrical Appurtenances Including Panel Orientation To Be Verified With Bluffton City Engineering.

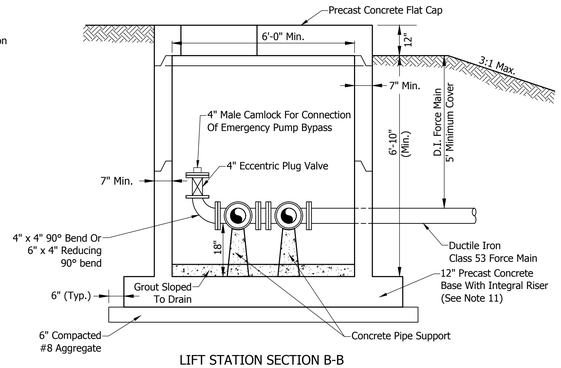
NOTICE:

CERTIFICATION IS LIMITED TO THOSE STANDARDS AND GUIDELINES PER THIS SHEET. CONSTRUCTION IS SUBJECT TO CONSTRUCTION DRAWINGS, SHOP DRAWINGS, AND DESIGN ENGINEER'S CERTIFICATION SHEET, WITH BLUFFTON CITY ENGINEERING APPROVAL.



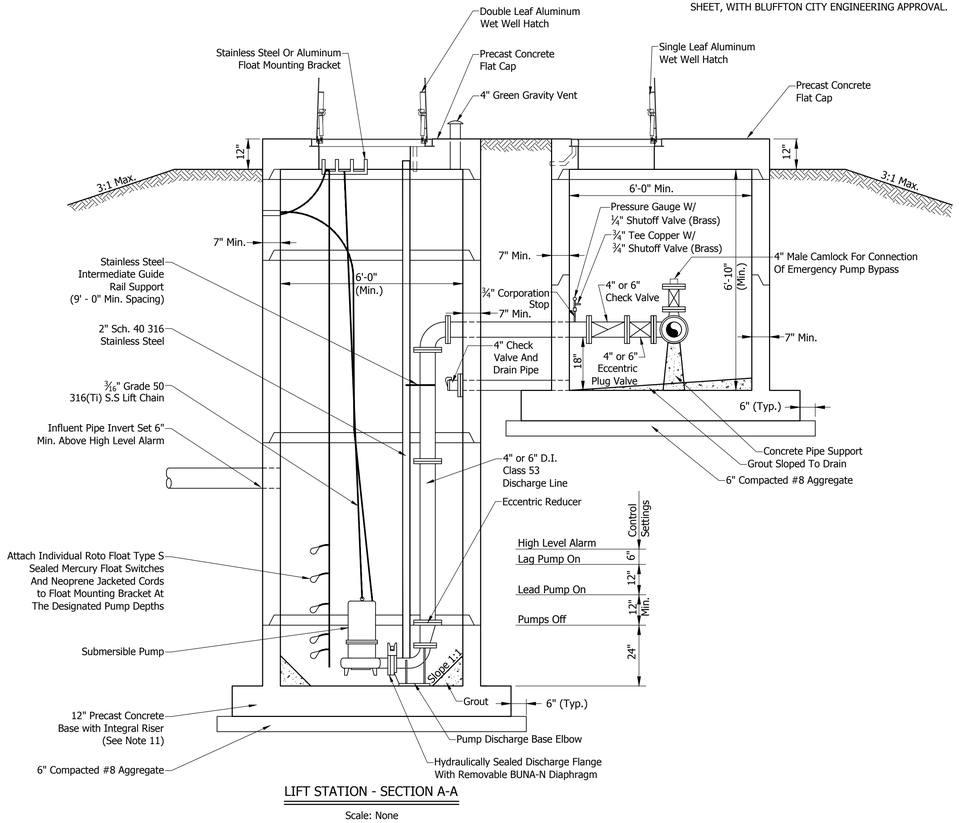
LIFT STATION LOWER PLAN

Scale: None



LIFT STATION SECTION B-B

Scale: None



LIFT STATION - SECTION A-A

Scale: None

SANITARY LIFT STATION STANDARDS AND GUIDELINES

A. All accessories and equipment in these Standards shall be provided by the contractor or developer, subject to the approval of Bluffton City Engineering.
B. Any sanitary sewage pump station required for a development project shall be constructed at the location as shown on the drawings for said project, complete with all concrete, mechanical, electrical, site, and miscellaneous items of work required for a complete installation. Actual lift station dimensions, control settings, and pump selection to be as indicated by the design engineer's certification sheet. Certification shall be limited to these Standards. Construction of a lift station for a project is subject to the construction and shop drawings for said project and the design engineer's certification sheet as approved by Bluffton City Engineering. Personal lift stations that discharge to the Bluffton sanitary sewer shall consist of a pre-manufactured system made for pumping sewage. Personal lift station tanks made from septic tanks or concrete structures are not acceptable for this application.
C. PUMPS
1) Pumps "A" and "B" shall be identical, centrifugal, submersible, solids handling, non-clog design capable of handling three-inch (3") sphere solids, fibrous material, sludge, and material found in typical raw sewage.
2) Replaceable brass wear ring shall be fitted to volute.
3) Manufacturer shall warrant the pumps for five (5) years after installation.
4) Manufacturer of pumps shall be approved by Bluffton City Engineering.
D. All mating surfaces intended to be watertight shall be machined and fitted with nitrile rubber O-rings with sealing complete when metal-to-metal contact is made, resulting in controlled compression of O-rings without specific torque limit. Fasteners shall be 316 S.S.
E. Pump operation shall be of the direct acting mercury switch float type for completely automatic operation as follows:
1) Start and stop one pump on rise or fall of water level.
2) Start both pumps in the event the water continues to rise with one pump running.
3) Automatically alternate the pumps in the lead position.
4) Automatically start the second pump if the lead pump should fail for any reason.
5) Alarm and alarm light in case of overload or pump failure.
F. PUMP STATION CONTROL PANEL
1) Pump station control panel shall be a complete package with circuit breakers and magnetic starters for each pump, automatic control system, alarm system components, hand-off-auto selector switches, indicating lights, three running time meters (one to record the time both pumps are operating), and all other miscellaneous accessories as may be shown on the drawings and/or required for a complete installation.
2) Two (2) 20 Amp, One-Phase Circuit Breakers shall be installed in the panel for 115 Volts to supply power for the alarm system, automatic control system, and duplex receptacle.
3) Control panel shall be enclosed in a NEMA 4X ground mounted stainless-steel enclosure with minimum dimensions of 36" x 36" x 12" and hinged front cover equipped with a lock. Panel enclosure shall be anchored to a concrete pad and include vented bottom panels to create an air gap between the concrete pad and the conduit entries into the bottom of the enclosure. Conduit entries into the enclosure shall be made with watertight fittings. Materials and installation of the required equipment grounding shall be in accordance with NEC Section 250-83(c). All wiring shall have not less than 600 Volt insulation. Wiring and Buss shall be in accordance with NEC, State, Local, and NEMA standards. All wiring shall be color coded. Conduit shall be sized to allow the power, float, and control cables to be easily pulled from the wet well to the control panel. Conduits shall be sealed at control panel to prevent sewer gasses from entering. All conduits, fittings, or connections shall enter from the bottom of enclosures.
4) Pump indicating lights shall consist of a green light for pump running, a red light for pump off, and a blue light for pump seal failure. Mount pump indicating lights on a Dead Front Panel inside of the enclosure with the hand-off-auto selector switches and pump runtime meters.
5) All pilot lights shall be of the transformer type with low voltage lamps for extended life service.
6) Mount 115 Volt duplex receptacle inside the panel cover, the alarm light on the side and extending above the panel, and the alarm horn on the side of the panel. Nothing should be installed on the front or protrude from the top of the outer panel enclosure.
7) The Bluffton Wastewater Department wireless SCADA (Supervisory Control and Data Acquisition) system shall be installed. System shall include 3 run-time meters with hour display, dual phase monitors, independent breakers for each pump, independent breakers for controls and convenience outlet, and battery backup. Please contact Bluffton City Engineering for current SCADA protocol.
8) Generator receptacle and switch shall be included with the lift station system so the station can be energized from Bluffton's portable generator. Generator receptacle shall be Appleton AR20044-RS.

SANITARY LIFT STATION STANDARDS AND GUIDELINES (CONTINUED)

G. CHECK VALVES
1) Check valves shall be iron body, full bronze mounted, non-slamming type, to operate without excessive loss of head.
2) The check valves shall be designed for not less than 175 PSI cold water working pressure and shall have bronze hinges, stainless steel hinge pins, and full bronze mounted discs with raised bead seat tings.
3) The check valves shall be of the swing check type, flanged, faced, and drilled 125# ASA with outside weigh and lever.
H. PLUG VALVES
1) Plug valves shall be of the eccentric type, of semi-steel construction ASTM A 126-911, Class B with resilient BUNA-N faced plugs.
2) These valves shall be designed for 150 PSI working pressure with flanges faced and drilled 125# ASA.
3) Four-inch (4") and six-inch (6") valves shall be lever actuated with a permanent lever attached unless otherwise specified and approved.
I. Each pump station shall have the supervision of a factory trained engineer of the pump manufacturer's company during installation and start-up. Said supervision shall include the instruction in the operation and maintenance of the equipment of the personnel of the lift station's owner.
J. Piping in and within two (2) feet of the wet well and valve pit shall be flanged thickness class 53 ductile iron pipe.
K. Lift station and valve pit manholes shall be pre-cast concrete in accordance with ASTM C478 with rubber gaskets equal to ASTM C443 with ½" Hamilton Dent-Seal extrudable preformed gasket material or equal approved by Bluffton City Engineering. Lift station and valve pit manholes shall be lined with OBIC, LLC. sanitary manhole lining system. Manhole lining system shall consist of a polyurea adhesion coat, polymer surface layer, and a final polymer armor layer. The receiving manhole from the lift station force main and the next downstream manhole shall also be lined with the OBIC, LLC. sanitary manhole lining system. Manufacturer's recommendations on surface preparation and application shall be strictly adhered to. Additional manhole lining specifications can be requested from Bluffton City Engineering.
L. Horizontal projections from precast integral base and riser may be required to enable the weight of the vertical soil ring above the projection to resist buoyancy forces. Consult design engineer's certification sheet as approved by Bluffton City Engineering.
M. Sewer and force main penetrations or wet well and valve pit shall be core drilled and made watertight through the use of KOR-N-SEAL, A-LOK, Dura-Seal, or equal as approved by Bluffton City Engineering.

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CITY OF BLUFFTON

SANITARY SEWER LIFT STATION STANDARDS AND GUIDELINES

SHEET 12 OF 18

WATER DISTRIBUTION GENERAL NOTES

A. MINIMUM WATER MAIN SIZES
1) All water mains to be dedicated to the City of Bluffton shall be a minimum of six inches (6").
2) Permanent dead-ends of greater than eight hundred feet (800') shall be eight inches (8").
3) Looped mains greater than sixteen hundred feet (1600') shall be a minimum of eight inches (8").
4) The City Engineer may determine that upsizing certain sections of water mains to ten inches (10") or larger may be required for a development or for the needs of the community.

B. STEEL CASING REQUIREMENTS FOR WATERMAIN. All water mains larger than two inches (2") and to be installed under a railroad or state highway shall be placed inside a continuous steel casing pipe. The casing pipe must be sized appropriately and installed in a way that is acceptable to Bluffton City Engineering. The installation shall be in accordance with the affected right-of-way authority permit requirements. If a special permit is obtained from the affected right-of-way authority to install the water main via open trench cutting, the water main shall still be installed in a casing.

C. Water main shall be installed with a minimum depth of cover of sixty (60) inches and meet storm and sanitary sewer separation requirements as listed in 327 IAC 8-3.2-9. If the proposed water main conflicts with storm sewer and eighteen (18) inches of vertical separation cannot be achieved then the water main shall be installed per **Detail WM06, Special Storm Sewer Conflict Treatment**. Installation of this type must be approved by Bluffton City Engineering on a case-by-case basis.

D. Proposed water main that branches from an existing main shall be installed per **Detail WM02, Cutting-In Sleeve And Tee Connection** or **Detail WM03, Tapping Sleeve And Valve Connection**.

E. Maximum distance between gate valves shall be six hundred (600) feet.

F. INSPECTION DURING CONSTRUCTION. Contractor shall coordinate with Bluffton City Engineering to have personnel present for visible inspection during construction of any water main and before water main is backfilled.

G. The operation of Bluffton's fire hydrants and valves shall be limited to Bluffton Water Department personnel, unless approval is granted from Bluffton's Water Department Supervisor.

H. Once testing standards have been satisfied and As-Builts have been accepted by the City Engineer for a Project's water infrastructure, City Council can be petitioned in writing to accept Project's water infrastructure. No water infrastructure or portion thereof shall be accepted by the City Council as part of the City of Bluffton's public water system except by resolution of the City Council upon recommendation of the City Engineer or their designee.

I. Contractor is responsible for all leaks, faulty hydrants, broken mains, etc., for one (1) year after the date of acceptance by the City.

J. Service Line Separation - The fire service and water service lines shall be separate water service lines with independent valves located outside of the facility served. When two (2) or more piping systems are used for water in a building or industrial plant, extreme care should be taken not to interconnect the systems. There may be a potable water system and systems carrying lesser quality water such as fire protection. To help prevent the possibility of the separate systems being interconnected, pipes should be adequately identified by legends and color coding.

PVC WATER MAIN PIPING AND APPURTENANCES

A. PVC PIPE (C900)
1) Pipe shall be made from unplasticized PVC compounds having a minimum cell classification of 12454 as defined in ASTM D1784. The compound shall qualify for Hydrostatic Design Basis (HDB) of 4000 psi for water at 73.4°F, in accordance with the requirements of ASTM D2837.
2) Nominal outside diameters and wall thicknesses of push-on or restrained joint pipe shall conform to the requirements of AWWA C900. Pipe shall be Pressure Class 235 psi (DR-18) at a minimum. Pipe shall be in standard lengths of twenty (20) feet and having integral bell and spigot with elastomeric gasket and ductile iron pipe size (DIPS) equivalent outside diameter. Straight pipe sections with plain ends for use with high deflection couplings shall not be used. Random or non-uniform lengths shall not be permitted. Pipe shall bear identification markings in accordance with AWWA C900, including the National Sanitation Foundation (NSF) seal of approval, size, O.D. Base, DR ratio, AWWA Pressure Class, manufacturing name, and production code.
3) The pipe joint shall be of elastomeric gasket joint type. Joints shall conform to ASTM D3139 and the gasket shall conform to ASTM F477.

B. MECHANICAL JOINT FITTINGS
1. Fittings for buried ductile iron pipe and AWWA C900 PVC pipe shall be mechanical joint gray cast iron in accordance with AWWA C110 (ANSI A21.10) or AWWA C153 (ANSI 21.53) with the joint meeting the requirements of AWWA C111 (ANSI A21.11).
2. Mechanical joints fittings shall have a standard asphaltic coating on the exterior. Fittings shall have a cement mortar lining on the interior in accordance with AWWA C104 (ANSI A21.4), latest revision.
3. The radius of the curvature of all bends, tees, and crosses shall be in accordance with AWWA C110 (ANSI A21.10) for standard weight ductile iron fittings or AWWA C153 (ANSI 21.53) for compact weight ductile iron fittings. Mechanical joint fittings shall be as manufactured by American Pipe, U.S. Pipe, or equal approved by Bluffton Water Department.
4. All mechanical joint fittings, valves, and hydrant inlets shall be provided with a joint restraining system. Restraining glands shall be manufactured of high strength ductile iron conforming to the requirements of ASTM A356. Dimensions of the glands shall be such that they can be used with the standardized mechanical joint bell and tee head bolts conforming to the requirements of AWWA C111 (ANSI A21.11) and AWWA C153 (ANSI 21.53). The mechanical joint retraining device shall have a minimum water working pressure rating of 250 psi with a safety factor of at least 2:1 against separation when tested in a dead-end situation. The minimum restrained joint length on either side of a fitting for D.I. pipe not Poly Wrapped is included in **Detail WM07, Joint Restraint.** If project conditions vary from the conditions listed in **Note 2** of **Detail WM07**, then consult Bluffton City Engineering.
5. The joint restraint system shall be specific for the pipe material being installed (D.I. or PVC C900) and as manufactured by EBAA Iron (Megalug) or Romac Industries Inc., unless a universal mechanical joint restraint is used as manufactured by Tyler Union (Tufgrip Dual Wedge Series 1500), or equal approved by Bluffton City Engineering.

C. HANDLING
1) Equipment and facilities for unloading, hauling, distributing, and storing materials shall be furnished by the contractor installing the pipe.
2) Pipe, fittings, and other material shall be handled to prevent breaking and/or damage. Pipe shall not be unloaded by rolling or dropping off delivery vehicle. Pipe may be unloaded;
   a. individually by hand,
   b. individually with use of spreader bar on top and nylon straps looped under the pipe,
   c. in units using mechanical equipment, such forklifts, cherry pickers, or front-end loaders with forks.
3) Materials shall be distributed and placed to minimize interference with traffic. No street or roadway may be closed without first obtaining permission from the proper authorities. The contractor installing the pipeline shall furnish and maintain proper warning signs and obstruction lights for protection of traffic along highways, streets, and roadways upon which material is distributed. No distributed material shall be placed in drainage ditches.
4) All pipe, fittings, and other materials which cannot be distributed along the route of the work shall be stored and protected from environmental degradation before subsequent use when needed. Storage arrangements shall be the responsibility of the contractor installing the pipe.

PVC WATER MAIN PIPING AND APPURTENANCES (CONTINUED)

D. PIPE BEDDING AND BACKFILL
1) Pipe shall be installed in accordance with AWWA C605 and ASTM D2774 Standard Practice for Underground Installation of Thermoplastic Pipe and manufacturer's recommendations as interpreted and directed by Bluffton City Engineering and with a minimum cover of sixty (60) inches.
2) Pipe shall not be installed in water or wet mucky soils, on rock, or stony soil. When these conditions exist, the objectionable material shall be removed to a depth of six (6) inches below the pipe's final grade and install coarse sand, uniformly graded crushed stone, or other bedding material approved by Bluffton City Engineering.
3) Structure backfill extending four (4) inches minimum under the barrel of the pipe and extending to the first twelve (12) inches over the top of the pipe shall be sand or crushed stone aggregate (95% passing a ½" screen but not more than 10% passing a #200 sieve).
4) On completion of the specified structure backfill, the balance of a trench through any existing or proposed improved area, such as streets, sidewalks, trails, or improved driveways shall be one (1) inch to one-and-a-half (1½) inch clean, uniformly graded crushed stone or gravel and shall be finished to the standards as prescribed for streets, sidewalks, trails, or driveway approaches as prescribed in the **Bluffton Standards.**
5) On completion of the specified structure backfill, the balance of a trench outside of those areas previously listed shall be mechanically filled to at least three (3) inches above the proposed finished grade of the surrounding terrain. Backfill material shall be free of debris, brush, roots, stones and rubble more than three (3) inches in greatest dimension. The top six (6) inches of backfill shall be topsoil corresponding to that underlying original sod.
6) Water main shall be installed with trace wire as detailed in **Section WM04, Trace Wire and Test Stations**.
7) Please reference **Detail WM01, Water Main Bedding.**

DUCTILE IRON WATER MAIN PIPING AND APPURTENANCES

A. DUCTILE IRON (D.I.) PIPE
1) D.I. pipe for water mains shall be centrifugally cast and shall conform to the latest revision of AWWA C151 (ANSI A21.5). D.I. pipe six (6) inches through sixteen (16) inches diameter, with push-on or mechanical joints, shall have a minimum wall thickness corresponding to Special Thickness Class 50. D.I. pipe sixteen (16) inches or larger in diameter, with push-on or mechanical joints, shall be Pressure Class 350. The pipe shall be provided with a minimum laying length of eighteen (18) feet.
2) Coatings for D.I. pipe and fittings shall conform to the latest revision of AWWA C151 (ANSI A21.51) and AWWA C104 (ANSI A21.4). Interior pipe lining shall be cementitious mortar with asphaltic seal coat. Exterior coating shall be standard asphaltic coating, except exposed piping within structures shall receive shop priming compatible with finish coat.

B. PIPE BEDDING AND BACKFILL
1) All water main material shall be installed in accordance with AWWA C600 and with a minimum cover of sixty inches (60").
2) The structure backfill of trenches through any existing or proposed improved area, such as streets, sidewalks, trails, or improved driveways, shall be of one-inch (1") to one-and-a-half-inch (1 ½") clean, uniformly graded crushed stone or gravel and shall be finished to the standards as prescribed for streets, sidewalks, trails, or driveway approaches as prescribed in the **Bluffton Standards.**
3) Experience of the City of Bluffton has been that structure backfill has not been required for all D.I. water mains installations outside those areas previously listed. However, Bluffton City Engineering may direct that structure backfill shall be required as trench conditions dictate.
4) Bedding for D.I. pipe outside of those areas requiring structure backfill.
   - Pipe barrels shall be solidly supported by the trench bottom by using a pair of wooden support wedges or appropriately sized concrete blocks every four feet (4'-0") along the pipe barrel between the pipe barrel and the trench bottom. Any over excavation or void under pipe or fittings shall be filled with blocking to solidly support the pipe and fittings.
   - Backfill shall be mechanically filled to at least three inches (3") above the proposed finished grade of the surrounding terrain. Backfill material shall be free of debris, brush, roots, stones, and rubble more than three inches (3") in greatest dimension. The top six inches (6") of backfill shall be topsoil corresponding to that underlying original sod.
5) Water main shall be installed with trace wire as detailed in **Section, Trace Wire and Test Stations.**
6) Please reference **Detail WM01, Water Main Bedding.**

C. FITTINGS
1) Mechanical joints and accessories shall conform to the latest revision of AWWA C110 (ANSI A21.10). Rubber gaskets shall be vulcanized synthetic rubber and shall conform to the latest revision of AWWA C111 (ANSI A21.11), including "Cor-Ten" steel tee bolts and nuts.
2) Flanged D.I. pipe shall conform to the latest revision of AWWA C115 (ANSI A21.15). Rubber gaskets shall be either ring or full face and shall be one-eighth (1/8) inches thick. Bolts and nuts shall conform to ANSI B18.21 and ANSI B18.2.2 and shall be stainless steel.
3) Push-on joints shall conform to the latest revision of AWWA C111 (ANSI A21.11). Rubber gaskets shall be vulcanized synthetic rubber and shall conform to the latest revision of AWWA C111 (ANSI A21.11).
4) Any pipe less than ten (10) feet in length from centerline of fitting and connecting to a fitting must be restrained. Restrain shall be accomplished with EBAA Iron "Megalug" Series 1100 for all mechanical joints and restraint coupling for push-on joints or as approved by Bluffton City Engineering.
5) Thrust block and wedges shall be furnished by the Bluffton Water Department.

HYDRANTS AND GATE VALVES

1) Gate valves shall be in accordance with AWWA C515 having fused epoxy coating inside and outside assembled with stainless steel bolts and shall be American Flow Control Series 2500. Gate valves shall be installed per **Detail WM04, Typical Valve Installation.**
2) Consult Bluffton City Engineering for valves larger than sixteen inches (16").
3) Valves shall pass a 250 PSI factory test. Valves boxes shall be furnished with posi-caps to align box over stem.
4) All valves provided for use in the City of Bluffton Water System shall open to left (counterclockwise) and close to the right (clockwise).
5) LOCATION OF GATE VALVES. Gate valves on water mains shall be installed adjacent or near tee-joints for hydrants, location downstream or upstream to be determined by Bluffton City Engineering may waive need for gate valve on main at hydrant tee-joint. Any water main that is expected to be extended in the future shall end in a gate valve with a cap, and have the appropriate joint restraint for a dead-end main. Other locations of gate valves on a water main shall be determined by Bluffton City Engineering.
6) Fire Hydrants shall be in accordance with AWWA C502 with stainless steel shoe and bolts and complete with all necessary fittings and accessories. A Storz Nozzle shall be provided on all hydrants. This is for a universal connection for fire hose equipment. Fire hydrants shall be American-Darling B-62-B or American Flow Control Waterous Pacer with Storz nozzle or Bluffton approved equal. Fire Hydrant shall be installed per **Detail WM05, Typical Hydrant Installation.**
7) SPACING OF FIRE HYDRANTS.
   - six-hundred feet (600') on a residential street;
   - four-hundred feet (400') on a street servicing commercial or industrial buildings.

TRACE WIRE AND TEST STATIONS

A. TRACE WIRE SPECS
1) Trace wire shall be a #12 AWG (American Wire Gage, 0.0808" Diameter) fully annealed, high carbon 1055 grade steel, high strength copper-clad steel conductor (HS-CCS) rated at 30 volts, insulated with 30 mil. high-density, high molecular weight polyethylene (HDPE) insulation rated for direct burial use at 30 volts.
2) HS-CCS conductor shall be at 21% conductivity for locating purposes.
3) Break load of 452 lbs. HDPE insulation shall be RoHS (Restriction of Hazardous Substances) compliant and utilize virgin grade material.
4) Insulation color shall be blue to meet the APWA (American Public Works Association) color code standard for identification of buried water main piping.
5) Trace wire shall be Copperhead© High Strength HS-CCS HDPE 30 mil. and made in the USA or equal as approved by Bluffton City Engineering.

B. INSTALLATION
1) Trace wire and test stations shall be installed
   - along the entire section of any installed pipeline,
   - simultaneously with the piping,
   - as a continuous single wire.
2) No looping or coiling of wire is allowed.
3) Installation shall allow for proper access for connection of line tracing equipment and for locating of wire without loss or deterioration of low frequency (512Hz) signal for distances in excess of one thousand (1000) linear feet and with distortion of signal caused by multiple wires being installed in close proximity of one another.
4) All service lateral trace wires shall be connected to the mainline with a single wire (no looping will be allowed) using a mainline to lateral lug connector, installed without cutting/splicing the mainline trace wire.

TRACE WIRE AND TEST STATIONS (CONTINUED)

B. INSTALLATION (CONTINUED)
5) Looping of wire shall be allowed at fire hydrants with trace wire connecting to an aboveground two-terminal blue access box with one-inch (1") conduit. Copperhead part #T3-75 ground wire shall be connected to the bottom terminal or equal as approved by Bluffton City Engineering.
6) Trace wire on all service laterals/stubs must terminate at an approved trace wire access box directly above the utility. See Trace Wire Termination/Access Points.
7) All mainline dead-ends shall go to ground using a Rhino "Tri-view" end line locating post with a drive-in magnesium grounding anode rod, buried at the same depth as the trace wire. The anode will be buried on the opposite side of the utility box to the trace write utilizing the connection point in the access box.
8) GROUNDING
   - Mainline trace wire shall not be connected to existing conductive pipes but shall be treated as a mainline dead-end.
   - Trace wire must be properly grounded at all dead-ends/stubs.
   - Grounding of trace wire shall be achieved by use of a drive-in magnesium grounding anode rod with a minimum of twenty (20) feet of #14 HDPE copper clad wire connected to anode (minimum 1.0 lb.) specifically manufactured for this purpose and buried at the same elevation as the water main.
9) Where existing trace wire is encountered on an existing water main line that is being extended or tied into, the new and existing trace wire shall be connected using approved splice connectors, shall be
   - connected using approved splice connectors,
   - properly grounded at the splice location as specified, and
   - completely waterproof to prohibit corrosion and loss of conductivity.
10) Any damage occurring during installation of the trace wire must be immediately repaired in an approved waterproof method. Taping and/or spray shall not be allowed.

C. CONNECTORS
1) Main line splice to service line connection shall be
   - specifically manufactured for use in underground trace wire installation,
   - dielectric silicon filled to seal out moisture and corrosion, and
   - installed in a manner so as to prevent any uninsulated wire exposure.
2) Wire shall be properly spliced at each end connection and each service connection.
3) Wire at all splice locations shall be adequately wrapped and protected.
4) All mainline trace wires shall be interconnected at intersections, crosses, and tees.
   - At tees, the three (3) wires shall be joined using a single 3-way lockable connector.
   - At crosses, the four (4) wires shall be joined using a 4-way connector.
   - Using two (3) 3-way connector with a short jumper wire between them is an acceptable alternative.
5) The cost for tracer wire shall be included in the Unit Price for installing the water main piping.

D. TRACE WIRE TERMINATION/ACCESS POINTS
1) All trace wire termination points shall utilize an approved ground trace wire access box specifically manufactured for this purpose.
2) A minimum of two (2) feet of excess wire is required in all grade level trace wire access boxes after setting at final grade.
3) The terminal posts shall be installed at fence lines, lot lines, road right-of-way lines, or where directed by Bluffton City Engineering.
4) Terminal posts shall be of thermoplastic construction provided with two (2) external terminals, grounded locating plate, copper ground lug at bottom of post, triangular shape for improved visibility, and lockable and removable cap.
5) Terminal posts shall be Rhino "TriView" or equal approved by Bluffton City Engineering. All posts shall have a drive-in magnesium grounding anode rod.
6) Color shall be blue or as otherwise approved by Bluffton City Engineering.

WATER SERVICE INSTALLATION PROCEDURE

A. Except for four inches (4") or larger pressure taps, the Bluffton Water Department shall make all individual customer water service installations: the Water Department taps the water main, constructs the outside water meter installation, sets the meter, and runs the water service from the tap to the customer side of the meter pit with Type K copper in accordance with the City of Bluffton Water Service Tap Fee Schedule. Contractor is responsible for making the connection from just outside the water meter installation to the customer's water service line.

B. Pressure taps of four inches (4") or larger shall be paid for by the customer, and Bluffton City Engineering must approve the contractor who shall perform any such pressure tap prior to said tap being made. Once the tap and service line have been constructed, the Bluffton Water Department shall construct the outside water meter installation in accordance with the City of Bluffton Water Service Tap Fee Schedule.

C. Service tubing for underground service from main to customer shall be copper water tube, Type K, soft temper for three-quarters inch (3/4") and one inch (1") service lines and hard temper for service lines greater than one inch (1"), conforming to ASTM B88, ASTM B251, and AWWA C800. The pipe shall be marked with the manufacturer's name or trademark and mark indicative of the type of pipe. The outside diameter of the pipe and minimum weight per foot of pipe shall not be less than that listed in ASTM B251, Table II.

D. Bluffton City Engineering shall determine the location of water taps, water service, and outside meter. The customer constructs, at customer's expense, the private service line from the building to the outside meter installation.

WATER MAIN TESTING

A. WATER MAIN PRESSURE AND LEAKAGE TESTING
1) The completed construction of the water main, fittings, hydrants, valves, and appurtenances shall pass pressure and leakage testing prior to acceptance by the City of Bluffton.
2) The contractor shall give Bluffton City Engineering written notice twenty-four (24) hours before the new water main facilities are complete and ready for filling and flushing by the Bluffton Water Department.
3) Following completion of filling and flushing, Bluffton City Engineering will have the pressure and leakage test performed by an independent professional pressure and leakage testing contractor using methods based upon AWWA C600. Required result is no leakage.
4) If the pressure and leakage testing results fail to pass Bluffton's requirement for no leakage, the contractor shall locate and fix the leaks until the new construction, in its entirety, passes Bluffton's pressure and leakage requirements.
5) The operation of the Bluffton Water Department valves and hydrants shall only be conducted by Bluffton Water Department personnel.

B. WATER MAIN DISINFECTION AND BACTERIOLOGICAL TESTING
1) After the new water main facilities have passed Bluffton's pressure and leakage requirements, the Bluffton Water Department shall conduct disinfection procedures in accordance with AWWA C651.
2) If there is construction abnormality, solely as determined by Bluffton City Engineering that prevents the proper disinfection or acceptable bacteriological test results for the new water main facilities, the contractor shall locate and correct the abnormalities until proper disinfection and bacteriological results are obtained.

REVISIONS		
Rev. No.	Description	Date

KAMERYN I. WRIGHT REGISTERED No. PE11900310 STATE OF INDIANA PROFESSIONAL ENGINEER

RECOMMENDED FOR APPROVAL — DESIGN ENGINEER — 6/6/2023 DATE

CITY OF BLUFFTON

WATER MAIN (WM) NOTES

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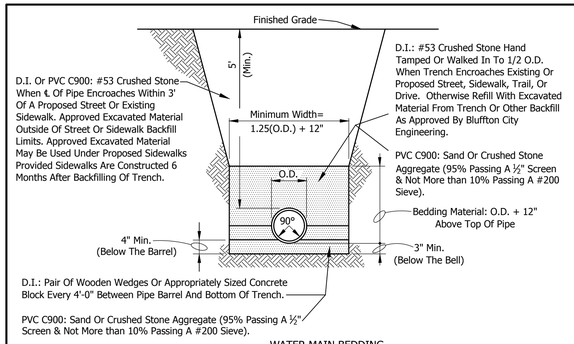


WATER MAIN BEDDING

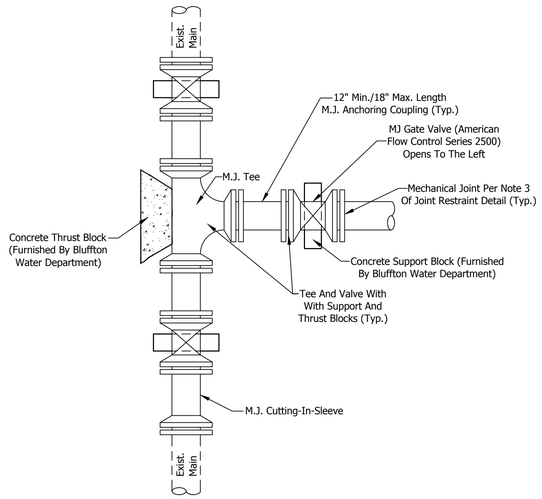
Scale: None

PIPE BEDDING TABLE		
Pipe Size (in.)	Bedding Depth Below Barrel (in.)	Cubic Yards Of Bedding Per Foot Of Pipe (cys/ft)
4	4	0.039
6	4	0.053
8	4	0.070
10	4	0.088
12	4	0.108
14	4	0.131
16	5	0.164
18	5	0.191
20	6	0.230
24	7	0.306
30	8	0.432

NOTES:

1. Experience of Bluffton Water Department with local soil conditions has been that bedding has not been required for most D.I. water main installations outside of those requiring structure backfill. However, Bluffton City Engineering may direct that bedding is required as trench conditions dictate. Therefore, it is recommended that the project owner and project contractor come to an agreement on payment methods in the event that bedding is required for D.I. water main outside of areas that require structure backfill. The PIPE BEDDING TABLE is a useful tool for such purpose.

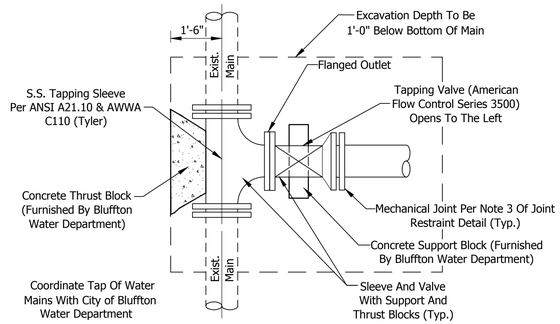
WATER MAIN DETAIL – WM01



CUTTING-IN-SLEEVE AND TEE CONNECTION

Scale: None

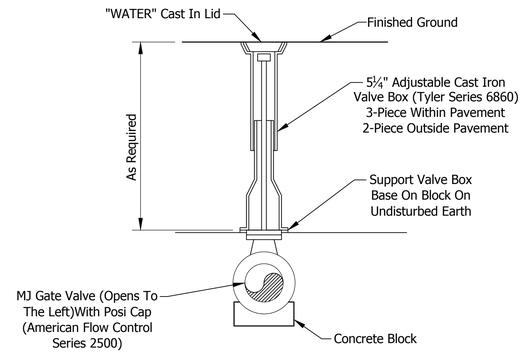
WATER MAIN DETAIL – WM02



TAPPING SLEEVE AND VALVE CONNECTION

Scale: None

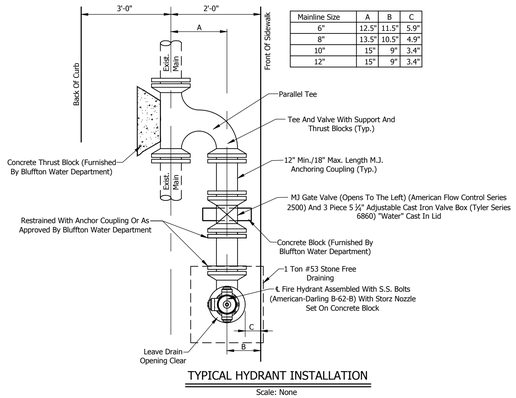
WATER MAIN DETAIL – WM03



TYPICAL VALVE INSTALLATION

Scale: None

WATER MAIN DETAIL – WM04

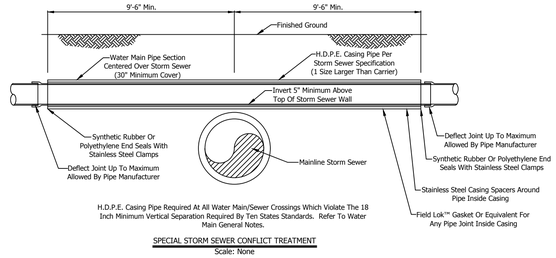


Mainline Size	A	B	C
6"	12.5"	11.5"	5.9"
8"	13.5"	10.5"	4.9"
10"	15"	9"	3.4"
12"	15"	9"	3.4"

TYPICAL HYDRANT INSTALLATION

Scale: None

WATER MAIN DETAIL – WM05

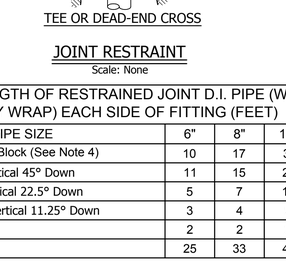


H.D.P.E. Casing Pipe Required At All Water Main/Sewer Crossings Which Violate The 18 Inch Minimum Vertical Separation Required By Ten States Standards. Refer To Water Main General Notes.

SPECIAL STORM SEWER CONFLICT TREATMENT

Scale: None

WATER MAIN DETAIL – WM06



TEE OR DEAD-END CROSS

JOINT RESTRAINT

Scale: None

MINIMUM LENGTH OF RESTRAINED JOINT D.I. PIPE (WITHOUT POLY WRAP) EACH SIDE OF FITTING (FEET)				
PIPE SIZE	6"	8"	12"	16"
Tee Including Thrust Block (See Note 4)	10	17	31	45
Horizontal 90° Or Vertical 45° Down	11	15	20	26
Horizontal 45° or Vertical 22.5° Down	5	7	10	12
Horizontal 22.5° or Vertical 11.25° Down	3	4	5	6
Horizontal 11.25°	2	2	2	3
Dead End	25	33	47	61

NOTES:

1. Length of restraint measured from centerline of fitting requiring restraint. Length of restraint for vertical bends up are equal to that for horizontal bends.
2. Length of restraint based upon 5' cover, Ductile Iron Pipe NOT Poly Wrapped, 150 PSI pressure, and ASTM D2487 soil types CL, ML, SC, SM, SP, SW, GC, GM, GP, & GW. For less cover, different pipe types, higher pressure, or ASTM D2487 soil types PT, OH, CH, MH, & OL, consult Bluffton City Engineering.
3. Restraint to be accomplished with Romac series 600 or Ford/uni-flange series 1390 friction clamps for push-on joints, anchoring coupling for valves and adjacent tees, EBBA iron "Megalug" series 1100 for all mechanical joints, or as approved by Bluffton City Engineering.
4. Tees and Dead-End Crosses require concrete thrust blocks in addition to branch restraint length, "X" area for concrete thrust blocks per detail shall be as follows; 2, 4, 6, and 10 square feet for 6, 8, 12, and 16 inch pipe, respectively.

WATER MAIN DETAIL – WM07

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CITY OF BLUFFTON

WATER MAIN (WM) DETAILS

SHEET 14 OF 18

EROSION CONTROL NOTES

GENERAL:
Take Measures To Control Erosion And Sedimentation By Storm/Wind Events To Assure That Sediment Is Not Transported From The Site By Storm Events. Practices Such As Silt Traps Or Filters Shall Be Installed Prior To Land Disturbing Activities. New Drainage Swales Shall Be Seeded And/Or Sodded, Or Other Protective Practices Applied, Immediately Following Construction. All Practices Shall Be Maintained To Remove Sediment From Runoff Leaving The Site As Long As Unstabilized Soil Conditions Exist.

After Land Disturbing Activities Cease And The Soil Is Stabilized, Temporary Erosion Control Measures May Be Eliminated If Their Purpose Has Been Fulfilled. Any Disturbed Soil Resulting From Removal Of Such Practices Shall Be Stabilized By Approved Methods.

Dispose Properly All Waste And Unused Building Materials Including, But Not Limited To, Garbage, Debris, Cleaning Wastes, Water, Toxic Materials, And Hazardous Substances. Do Not Allow Substances To Be Carried By Runoff Into A Receiving Channel Or Storm Sewer System.

Clean Public Or Private Roadways Daily And After Major Storms Using Acceptable Methods Such as Sweeping To Remove Any Accumulated Sediment. The Developer's Contractors Are Responsible For Supervision Of The Construction Activity Within The Development And Shall Take All Necessary Actions To Remove Sediment From The Streets.

For Construction Sequence, Maintenance, And Other Soil Erosion Requirements, See Specifications For Site Clearing, Slope Protection, Erosion Control, Landscaping, And Seeding.

Erosion And Sediment Control Practices Must Adhere To, Or Exceed Those Shown On The Erosion Control Plan, And Shall Be In Accordance With The Construction Stormwater General Permit, And Indiana Storm Water Quality Manual, Indiana Department Of Environmental Management.

SURFACE STABILIZATION:
Cut Slopes Which Are To Be Topsoiled Should Be Scarified To A Minimum Depth Of 4 Inches Prior To Placement Of Topsoil. Install Erosion Control Blankets On All Slopes Of 3 (Horizontal) To 1 (Vertical).

Stabilize All Disturbed Ground Within Fifteen Days Of Being Left Inactive By Seeding, Sodding, Mulching, Or By Other Equivalent Erosion Control Practices. Immediate Stabilization Shall Be Planned To Aid In Surface Runoff And Stabilization Shall Follow A Linear Progression As The Site Is Developed.

Un-Vegetated Areas That Are Left Idle Or Scheduled To Be Left Inactive Must Be Temporarily Or Permanently Stabilized With Measures Appropriate For The Season To Minimize Erosion Potential. To Meet This Requirement, The Following Apply:

1. Stabilization Must Be Initiated By The End Of The Seventh Day The Area Is Left Idle. The Stabilization Activity Must Be Completed With Fourteen Days After Initiation. Initiation Of Stabilization Includes, But Is Not Limited To, The Seeding And/Or Planting Of The Exposed Area And Applying Mulch Or Other Temporary Surface Stabilization Methods Where Appropriate. Areas That Are Not Accessible Due To An Unexpected And Disruptive Event That Prevents Construction Activities Are Not Considered Idle.

2. Areas That Have Been Compacted May Be Excluded From The Stabilization Requirement When The Areas Are Intended To Be Impervious Surfaces Associated With The Final Land Use, Provided Run-off From The Area Is Directed To Appropriate Sediment Control Measures.

TEMPORARY GRAVEL CONSTRUCTION ENTRANCE/EXIT PAD:
Construct The Temporary Gravel Drive Using 6 Inches INDOT No. 2 Stone Over A Stable Foundation. Geotextile Fabric Shall Be Used Under All Drives Including Individual Lots. Grade For Positive Drainage.

Inspect The Entrance Pad Area Weekly And After Storm Events Or Heavy Use. Reshape The Pad As Needed For Drainage And Runoff Control. Top Dress Pad With Clean Stone.

SODDING:
Do Not Install Sod On Hot, Dry Soil, Frozen Soil, Compacted Clay, Loose Sand Or Gravel, Or Pesticide Treated Soil. Ideal Sodding Time Is May 1-June 1, Or September 1-October 20, Although It Can Be Installed As Early As March 15, If Available And Temperatures Are Above 32°F, Or June 1-September 1 If Irrigated.

Install Sod After Other Erosion Control Practices Have Been Completed. Break Up Compacted Soils Sufficiently To Create A Favorable Rooting Depth Of 6-8 Inches, Using A Chisel Plow, Disk, Harrow, Or Rake.

Soil Compaction Is To Be Minimized, Especially In Areas Where Permanent Vegetation Will Be Established. Topsoil Must Be Preserved, Unless Infeasible.

Apply Topsoil If The Site Is Otherwise Unsuitable For Establishing Vegetation. Shape, Smooth, And Firm The Soil Surface.

Have The Soil In The Sod Bed Tested To Determine Its pH And Nutrient Level. If The pH Is Too Acidic For The Grass Sod To Be Installed, Apply Lime According To Test Results Or At The Rate Recommended By The Sod Supplier.

Fertilize As Recommended By The Soil Test. If Testing Was Not Done, Consider Applying 400-600 Lbs./Acre Of 12-12-12 Analysis Fertilizer, Or Equivalent Fertilizer, As Recommended By The Soil Test. Work The Fertilizer Into The Soil To 2-4 Inches Deep.

Apply Fertilizer At An Appropriate Time Of year For The Project Location, Taking Into Consideration Proximity To A Waterbody, And Preferably Timed To Coincide With The Period Of Maximum Vegetative Uptake And Growth.

Avoid Applying Fertilizer Immediately Prior To Precipitation Events That Are Anticipated To Result In Stormwater Run-Off From The Application Area.

TREE CONSERVATION/PROTECTION:
Protect Trees From Construction Equipment By Fencing Off An Area Equivalent To The Tree's Crown With Temporary Construction Safety Fence. If A Fence Cannot Be Erected, Cushion The Rooting Area With 6 Inches Of Wood Chips, Or Wood Or Brick Paths.

Create Traffic Patterns Such As To Keep Soil Compaction To A Minimum. Store Supplies And Equipment Away From Protected Tree Areas. Aerate Soil Where Compaction Has Been Excessive.

When Clearing Areas Adjacent To Protected Trees, Use Equipment Such As A Brush Cutter Or Rotary Ax, Or Cut By Hand. Where Root Areas Must Be Graded, Cut Large Roots Instead Of Tearing Them With Equipment.

Minimize Changes In The Drainage Pattern. Avoid Putting Fill Over The Root System.

Prune Low Hanging Limbs That Could Otherwise Be Broken Off By Equipment.

EROSION CONTROL NOTES CONT'D

EROSION CONTROL BLANKETS:
Erosion Control Blankets Shall Be Selected Based Upon Application And Shear Strength.

Use Machine Produced Mat Of Straw Fiber Matrix Or Curled Wood Excelsior Of 80 Percent, 6 Inch Or Longer Fiber Length.

Evenly Distribute Fibers Over Entire Area Of Blanket To Provide Consistent Thickness.

Provide Blanket With Top Side Covered With Biodegradable Extruded Plastic Mesh.

Treat Blankets To Impart Smolder Resistance Without Use Of Chemical Additives.

Provide "Curlex Blankets" By American Excelsior Company, Or "S150" By North American Green, Or Accepted Substitute.

EROSION CONTROL BLANKET STAPLES:
Use Minimum 0.091 Inch Diameter Steel Wire "U" Shape With Legs 6 Inches In Length With 1 Inch Crown.

CONCRETE AND CEMENTITIOUS WASHWATER:
Cementitious Washwater Results From The Cleaning Of Tools And Equipment Used In The Delivery, Mixing, Handling, And Working Of Cementitious Materials Often Associated With Concrete, Mortar, Plaster, Stucco, Grout And Flowable Fill.

Concrete Washouts Shall Be Of Sufficient Volume And Quantity To Contain All Liquid And Concrete Waste Generated By Washout Operations. The System Shall Be Designed To Eliminate Run-off And Minimize Precipitation From Entering The Washwater Containment System. Covering Of Containment When Not In Use Is Recommended.

Locate Washwater Containments At Least 50 Feet From Any Creeks, Wetlands, Ditches, Karst Features, Or Storm Drains/manmade Conveyance Systems. Locate When Practical In Relatively Flat Areas With Established Vegetative Cover In Areas That Provide Easy Access For Equipment That Will Require The Use Of Washwater Containment Facilities.

Prefabricated Washout Containers Or Roll-off Dumpsters Are Preferred. Structure Must Be Watertight And Have The Strength To Resist Failure Or Collapse For The Duration Of Use. Below Grade Systems Are To Be Used Only When There Is No Other Feasible Way To Implement Containment. Waterproof Lining Is Required To Have A Minimum Thickness Of 10 Mil, Be A Single Continuous Sheet Sufficient To Adequately Line The Entire Containment And Be Free Of Defects, Holes, Rips, Or Tears. Signage Is Required To Identify Washout Areas.

Washouts Shall Not Be Used For Trash Or Construction Debris. Containers Should Not Be Filled Beyond 75 Percent Of Containment Capacity. When A Containment Is At Capacity And Can No Longer Accept Washwater, Identify With "closed"Sign. No Spillage Of Washwater Shall Occur From The Transport Of The Unit. Closure Of Washwater Shall Be Accomplished When All Fluids Are Removed Or Evaporated. The Remaining Solid Cementitious Material May Be Used As Clean Fill.

FLOATING OUTLET "SKIMMER":
Sediment Basins Where Feasible, Must Withdraw Water From The Surface Of The Water Column Unless Equivalent Sediment Reduction Can Be Achieved By Use Of Alternative Measures. Alternative Measures Include But Are Not Limited To Increasing The Basin Length To Width Ratio To 4:1 Or Greater, Implementation Of Porous Baffles, Use Of Flocculants/polymers, And Or Phasing Of Project Land Disturbance And Rapid Stabilization.

Floating Outlets Can Be Implemented With The Permanent Basin Outlet Structure. The Discharge Capacity:

Dewatering Zone Volume/Dewatering Time = Required Flow Rate Of Skimmer. Locate Floating Devices Where They Can Be Easily Accessed To Facilitate Maintenance Activities And To Be Appropriately Tethered Or Restrained To Prevent Flexible Boom Damage. If Ice Formation Is A Concern, Install Boom And Inlet At An Incline To Maintain Positive Drainage Through The Device. Install Following The Manufacturer's Recommendation.

The Floating Inlet Is Designed To Drain The Dewatering Zone In No Less Than 48 Hours And No Longer Than 72 Hours For The Minimum Required Storage Volume. Inspect Weekly And Prior To Anticipated Rain Events. The Floating Outlet Practice Shall Only Be Removed When The Contributing Drainage Area Has Been Properly Stabilized And No Longer Contributing Sediment-laden Run-off Or When Freezing Conditions Are Anticipated.

NATURAL BUFFERS:
Preserve Existing Natural Buffers That Are Adjacent To Waters Of The State To Promote Infiltration And Provide Protection Of The Water Resource. Natural Buffers Must Be Preserved, Including The Entire Buffer Bordering And/or Surrounding The Water Resource.

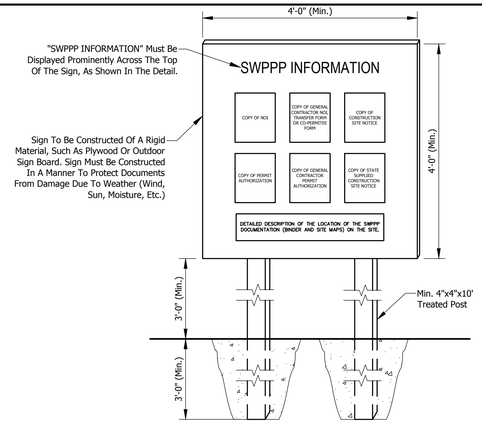
Buffers:
1. 50 Feet Or More In Width Must Be Preserved To A Minimum Of 50 Feet
2. Less Than 50 Feet In Width Must Be Preserved In Their Entirety.
3. May Be Enhanced With Vegetation That Is Native And Promotes Ecological Improvements And Sustainability.

Run-off Directed To The Natural Buffer Must Be Treated With Appropriate Erosion And Sediment Control Measures Prior To Discharging To The Buffer And Managed To Prevent Erosion From Occurring Within The Buffer Area.

Stormwater Conveyances And Outfalls Are Allowed To Impact The Buffer And Must Be Designed To Minimize The Width Of Disturbance And Impact To The Buffer.

WASTE CONTAINERS (TRASH RECEPTACLES):
Must Be Managed To Reduce The Discharge Of Pollutants And Blowing Of Debris. If Stormwater Has The Potential To Come Into Contact With Waste, A Cover Is Required. Waste That Is Not Disposed Of In A Trash Receptacle Must Be Protected From Exposure To The Weather And/or Removed At The End Of The Day From The Site And Disposed Of Properly.

ANIONIC POLYMERS (FLOCCULANTS):
Are Authorized For Sediment Control Provided Their Use Is In Conformance With Current State Of Indiana Standards And Specifications, And The Use Is Identified In The Stormwater Pollution Prevention Plan (SWP3). The Manufacture Representative Or Properly Trained Individual Is Required To Oversee The Use Of All Polymers. Prior To The Use Of The Polymer, An Email Notification Must Be Made To Bluffton City Engineering.



SWPPP INFORMATION SIGN
Not To Scale

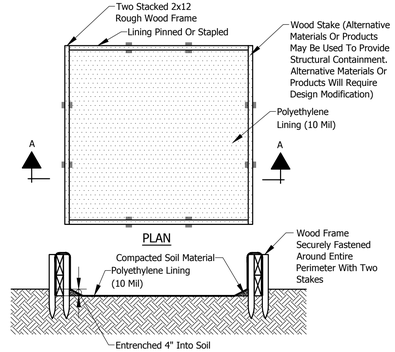
NOTES:
1.) The SWPPP Information Sign Must Be Located Near The Construction Entrance Of This Site, Such That It Is Accessible And Viewable By The General Public, But Not Obstructing Views As To Cause A Safety Hazard.

2.) All Posted Documents Must Be Maintained In A Clearly Readable Condition At All Times Throughout Construction And Until The Notice-Of-Termination (NOT) Is Filed For The Permit.

3.) Contractor Shall Post Other Storm Water And/Or Erosion And Sediment Control Related Permits On The Sign As Required.

4.) Sign Shall Be Located Outside Of Public Right-Of-Way And Easements Unless Approved By Bluffton City Engineering.

EROSION CONTROL DETAIL – E01



SECTION A-A

NOTES:
Prefabricated Washout Containers Or Roll-Off Dumpsters Are Preferred. Self-Installed Concrete Washouts With A Concrete Block Or Wood Frame Are Acceptable. Signage Should Be Installed Identifying Washout Areas.

Washouts Shall Not Be Used For Trash. Concrete Washouts Shall Be Located Away From Inlets, Open Drainage Facilities, Watercourses And Construction Traffic.

Concrete Washouts Shall Be Of Sufficient Volume And Quantity To Contain All Liquid And Concrete Waste Generated By Washout Operations.

Once Concrete Wastes Are Washed Into The Designated Area And Allowed To Harden, The Concrete Should Be Broken Up, Removed, And Disposed Of Offsite. Washouts Shall Be Monitored Daily. Arrange For Clean-out When 1/2 Full, Potential For Heavy Rainfall, Or Prior To A Large Pour.

Plastic Lining Material Should Be A Minimum Of 10 Mil. Polyethylene Sheeting And Should Be Free Of Holes, Tears, Or Other Defects That Compromise The Impermeability Of The Material.

CONCRETE WASHOUT
Not To Scale

EROSION CONTROL DETAIL – E02

REVISIONS		
Rev. No.	Description	Date

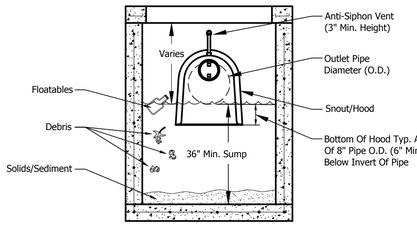
KAMERYN L. WRIGHT REGISTERED No. PE11900310 STATE OF INDIANA PROFESSIONAL ENGINEER

RECOMMENDED FOR APPROVAL — DESIGN ENGINEER — 6/6/2023 DATE

CITY OF BLUFFTON

EROSION CONTROL (E) NOTES

SHEET 15 OF 18



NOTES:

Installation:

Snout/Hood Is Installed Over The Outlet Pipe Of A Catch Basin Or Stormwater Structure To Reduce Floatable Trash And Debris, Free Oils, And Other Solids From Stormwater Discharges.

Snout/Hood Shall Be Centered And Anchored Over The Outlet Pipe And Must Cover The Pipe O.D. To Ensure Proper Installation.

Structure Shall Be Sumped To Manufacture's Recommended Depth. Minimum Sump Depth Is Typically 2.5 To 3 Times The I.D. Of The Outlet Pipe Size (Minimum Of 36").

Snout/Hood Shall Be Equipped With An Anti-Siphon Vent.

Maximum Flow And Velocity Shall NOT Exceed Manufacture's Recommendation.

Maintenance:

Sediment Depth And Surface Pollutants In The Sump Shall Be Measured Monthly And After Each Rain Event Of 8" or More.

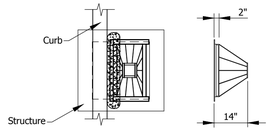
The Sump Shall Be Emptied At Least Yearly And When The Sump Is Half Full, Or Six Inches Of Floatable Pollutants Accumulate On The Surface.

The Snout/Hood Shall Be Inspected Yearly And The Anti-Siphon Vent Shall Be Flushed To Ensure It Is Clear.

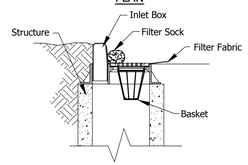
SNOUT/HOOD OIL WATER DEBRIS SEPARATOR

Not To Scale

EROSION CONTROL DETAIL – E03



PLAN



SECTION

NOTES:

Installation:
Install Basket Curb Inlet Protection As Soon As Inlet Boxes Are Installed (New Development) Or Prior To Land Disturbing Activities (Existing Development).

If Necessary, Adapt Basket Dimensions To Fit Inlet Box Dimensions.

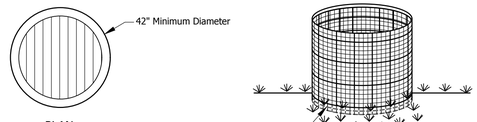
Remove The Grate And Install The Frame Into The Grate Opening. Cut And Install Geotextile Fabric According To The Manufacturer's Recommendations. Replace The Grate. Install Filter Sock Across Inlet Box Opening.

Maintenance:
Inspect Daily And After Each Storm And Remove Sediment. Replace Or Clean Geotextile Fabric And Filter Sock As Needed. Remove Tracked On Sediment From The Street (But Not By Flushing With Water) To Reduce The Sediment Load On This Curb Inlet Practice.

BASKET CURB INLET PROTECTION

Not To Scale

EROSION CONTROL DETAIL – E04



PLAN

SECTION

NOTES:

Installation:
6" x 6" Welded Wire Mesh Shall Be Formed Of 10Ga. Steel Conforming To ASTM A-185.

Geotextile Shall Be Wrapped Three Inches Over The Top Member Of The 6" x 6" Welded Wire Mesh And Shall Be Secured With Fastening Rings Through Both Geotextile Layers And Close Around A Steel Member At Six Inches On Center. Fastening Rings Shall Be Constructed Of Wire Conforming To ASTM A-641, A-809, A-370, And A-938.

Geotextile Shall Be Secured To The Sides Of Welded Wire Mesh With Fastening Rings At A Spacing Of One Per Square Foot Except For The Bottom 2-Inches Which Shall Extend Past The Welded Wire And Be Left Unsecured For Entrenchment.

Welded Wire Assembly Shall Be Formed Into A Minimum 42" Diameter Circle With a 3" Minimum Overlap On The Ends Secured By Wire Or Zip Ties.

Welded Wire Assembly Shall Then Be Placed In A 6" Deep Trench And Backfilled And Compacted Over The Geotextile Flap.

Maintenance:
Inspect The Welded Wire Inlet Protector Weekly And After Each Rainfall Event.

If Geotextile Tears, Start To Decompose, Or In Any Way Becomes Ineffective, Replace The Affected Portion Immediately.

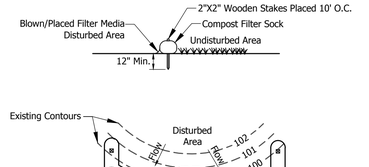
Remove The Deposited Sediment When It Reaches Half The Height Of The Structure At Its Lowest Point Or Is Causing The Structure To Shift. Take Care To Avoid Undermining The Structure During Clean Out.

After The Contributing Drainage Area Has Been Stabilized, Remove The Structure And Sediment Deposits, Bring The Disturbed Area To Grade, And Stabilize.

WELDED WIRE INLET PROTECTION

Not To Scale

EROSION CONTROL DETAIL – E05



NOTES:

Installation:
Filter Sock Should Maintain Solid Contact With The Soil And Be Installed In A Manner That Minimizes Gaps Between The Bottom Of The Sock And The Underlying Substrate.

Filter Socks Should Be Installed Parallel To The Contour With Both Ends Of The Sock Extended Upslope At A 45 Degree Angle To The Rest Of The Sock.

Socks Placed On Earthen Slopes Should Be Staked In The Center Of The Sock Or Immediately Downslope Of The Sock At The Interval Recommended By The Manufacturer. Socks Installed On Paved Surfaces Shall Have Concrete Blocks Placed Immediately Downslope Of The Sock At An Interval Recommended By The Manufacturer.

Maintenance:
Traffic Shall Not Be Permitted To Cross Filter Socks.

Inspect The Structure Weekly And After Each Rainfall Event. Damaged Socks Shall Be Repaired According To The Manufacturer's Specifications Or Replaced Within 24 Hours Of Inspection.

Remove Deposited Sediment When It Reaches Half The Height Of The Filter Sock At Its Lowest Point.

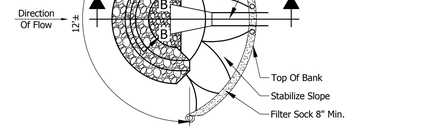
Take Care To Avoid Undermining The Filter Sock During Clean Out.

After The Contributing Drainage Area Has Been Stabilized, Remove And Properly Dispose Of Any Unstable Sediment And Construction Material, And Stabilize.

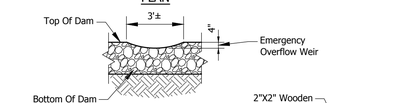
FILTER SOCK

Not To Scale

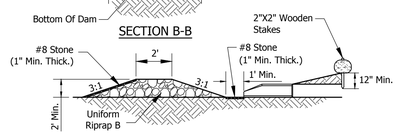
EROSION CONTROL DETAIL – E06



PLAN



SECTION B-B



SECTION A-A

NOTES:

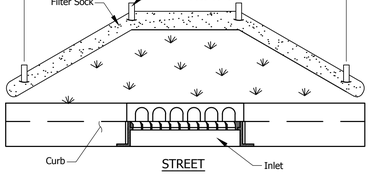
Installation:
Around the Outer Perimeter Of The Excavated Area, Lay A Ring of INDOT Uniform B Riprap To A Height Of 12 to 24 Inches Above The Top Of The Storm Drain. Foundation Shall Be Laid On Geotextile Fabric.

Maintenance:
Inspect The Structure Weekly And After Each Rainfall Event. After The Contributing Drainage Area Has Been Stabilized, Remove And Properly Dispose Of Any Unstable Sediment And Construction Material, And Stabilize.

ROCK DONUT

Not To Scale

EROSION CONTROL DETAIL – E07



STREET

NOTES:

Installation:
Filter Sock Is Not Recommended For Use As A Diversion And Should Not Be Used Across A Stream, Channel, Ditch, Swale, Or Anywhere That Concentrated Flow Is Anticipated.

Filter Sock Should Maintain Solid Contact With The Soil And Be Installed In A Manner That Minimizes Gaps Between The Bottom Of The Sock And The Underlying Substrate.

Maintenance:
Inspect The Silt Fence Weekly And After Each ½" Rainfall Event.

If Fence Fabric Tears, Starts To Decompose, Or In Any Way Becomes Ineffective, Replace The Affected Portion Immediately.

Inspect The Structure Weekly And After Each Rainfall Event. Damaged Socks Shall Be Repaired According To The Manufacturer's Specifications Or Replaced Within 24 Hours Of Inspection.

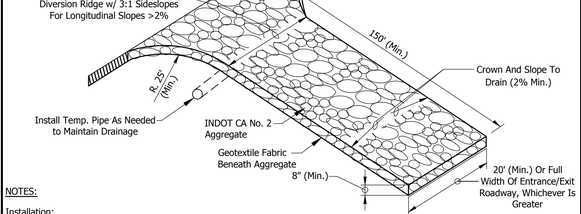
Remove Deposited Sediment When It Reaches Half The Height Of The Filter Sock At Its Lowest Point. Take Care To Avoid Undermining The Filter Sock During Clean Out.

After The Contributing Drainage Area Has Been Stabilized, Remove And Properly Dispose Of Any Unstable Sediment And Construction Material, And Stabilize.

FILTER SOCK BEHIND CURB

Not To Scale

EROSION CONTROL DETAIL – E08



NOTES:

Installation:
A Stable Construction Entrance Must Be Provided At All Points Of Construction Traffic Ingress And Egress To The Project Site. Avoid Locating On Steep Slopes Or At Curves In Public Roads.

Remove All Vegetation And Other Objectionable Material From The Foundation Area, And Grade The Foundation And Crown For Positive Drainage.

If Longitudinal Slope Is In Excess Of 2%, Construct A Water Bar (Ridge) About 15 Feet From The Entrance To Divert Runoff Away Form The Road (See Detail Above).

Install Pipe Under The Pad (If Needed) To Maintain Proper Public Road Drainage.

Place Geotextile Fabric On The Graded Foundation To Improve Stability.

Place Aggregate To Dimensions And Grade Shown On The Erosion Control Plan, Leaving The Surface Smooth And Sloped For Drainage.

Divert All Surface Runoff And Drainage From The Stone Pad To A Sediment Trap Or Basin.

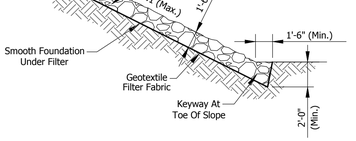
Maintenance:
Inspect Daily And After Each Storm Event Or Heavy Use.

Reshape Pad And Topdress As Needed For Drainage And Runoff Control.
Immediately Remove Mud And Sediment Tracked Or Washed Onto Public Roads By Brushing Or Sweeping. Flushing Should Only Be Used If The Water Is Conveyed Into A Sediment Trap Or Basin.

TEMPORARY GRAVEL CONSTRUCTION ENTRANCE

Not To Scale

EROSION CONTROL DETAIL – E09



NOTES:

Installation:
Excavate Only Deep Enough For Both Filter And Riprap. Compact Any Fill Material To The Density Of The Surrounding Undisturbed Soil.

Cut A Keyway In Stable Material At The Base Of The Slope To Reinforce The Toe. Keyway Depth Should Be 1 ½ Times The Design Thickness Of The Riprap, And Should Extend A Horizontal Distance Equal To The Design Thickness.

Place Geotextile Fabric On The Smoothed Foundation, Overlapping The Edges 12 Inches Minimum. Secure With Anchor Pins Spaced Every 3 Feet Along The Overlap.

Immediately After Installing The Filter, Add The Riprap To Full Thickness In One Operation. Do Not Dump Through Chutes Or Use Any Method That Causes Segregation Of Rock Sizes, Or That Will Dislodge Or Damage The Underlying Filter Material.

If Fabric Is Damaged, Remove The Riprap And Repair By Adding Another Layer Of Fabric, Overlapping The Damaged Area By 12 Inches.

Place Smaller Aggregate In Voids To Form A Dense, Uniform, Well Graded Mass. Blend The Riprap Surface Smoothly With The Surrounding Area To Eliminate Protrusions Or Over Falls.

Maintenance:
Inspect Periodically For Displaced Aggregate Material, Slumping And Erosion At Edges, Especially Downstream Or Downslope.

RIPRAP

Not To Scale

EROSION CONTROL DETAIL – E10

REVISIONS		
Rev. No.	Description	Date

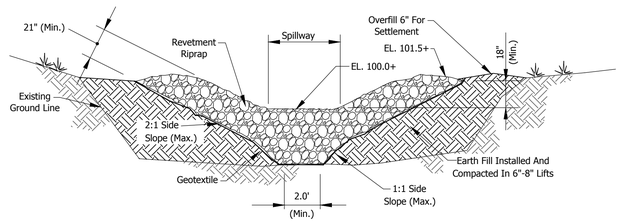
KAMERYN I. WRIGHT
REGISTERED
No. PE11900310
STATE OF INDIANA
PROFESSIONAL ENGINEER

RECOMMENDED FOR APPROVAL — DESIGN ENGINEER — 6/6/2023 DATE

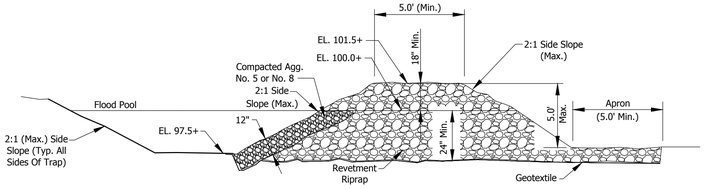
CITY OF BLUFFTON

EROSION CONTROL (E) DETAILS

SHEET 16 OF 18



EARTH EMBANKMENT AND STONE OUTLET SECTION



CROSS SECTION VIEW OF THE STONE OUTLET SECTION

TEMPORARY SEDIMENT TRAP
Not To Scale

Notes:

The Spillway Width Varies With The Drainage Area Contributing To The Temporary Sediment Trap:

Drainage Area (acres)	Width (ft.)
1	4
2	6
3	8
4	10
5	12

The Length And Width Of The Basin Are As Shown On The Erosion Control Plan (Maximum Drainage Area Is 5 Acres).

See The Indiana Storm Water Quality Manual For Additional Information.

Installation:
Clear, Grub, And Strip All Vegetation And Root Mat From The Embankment Area.

Create Embankment Using Material Free Of Roots, Rocks, Brush, And Debris. Overfill The Embankment 6 Inches To Allow For Settling.

Excavate A Trapezoidal Stone Outlet Section From The Compacted Embankment (Section A-A).

Install Geotextile And Place Specified Stone To The Lines And Grades Shown.

Stabilize The Embankment And Other Disturbed Areas With Seed And Mulch Or Another Suitable Erosion Resistant Cover

Maintenance:
Inspect Traps Weekly And Following Each Storm Event And Immediately Repair. Check Embankment For Any Erosion And Piping Holes And Repair.

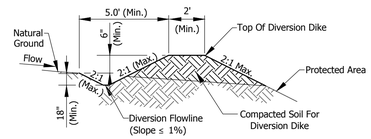
Remove Sediment When It Has Accumulated To One Half The Design Depth. Check Pool Area Side Slopes For Erosion And Repair.

Replace Spillway Gravel Facing If Clogged.

Inspect Vegetation And Reseed Again, If Necessary.

Check The Spillway Depth Periodically To Ensure A Minimum 18 Inch Depth From The Lowest Point Of The Settled Embankment To Highest Point Of The Spillway Crest. Fill Any Low Areas To Maintain The Design Elevation.

EROSION CONTROL DETAIL – E11



Notes:

Installation:
Lay Out The Diversion By Setting Grade And Alignment To Fit Site Needs And Topography, Maintaining A Stable, Positive Channel Grade Towards The Outlet.

Remove And Properly Dispose Of Brush, Trees, And Other Debris From The Foundation Area.

Construct The Diversion To Dimensions And Grades Shown In The Construction Plans.

Construct The Diversion Ridge In Six To Eight-Inch Lifts. Compact Each Lift By Driving Wheels Of Construction Equipment Along The Ridge. Overfill And Compact The Ridge To Design Height Plus 10 Percent To Allow For Settlement.

Stabilize Outlets Prior To Or During Construction Of The Diversion, Diverting Sediment-Laden Storm Water Flow To A Temporary Sediment Trap Or A Temporary Dry Sediment Basin.

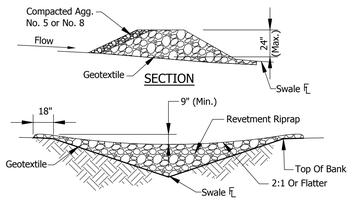
Maintenance:
Inspect Within 24 Hours Of Each Rain Event And At Least Once Every Seven Calendar Days.

Remove Sediment From Channel To Maintain Positive Grade.

Check Outlets And Make Necessary Repairs Immediately.

Adjust Ridge Height To Prevent Overtopping.

TEMPORARY DIVERSION
Not To Scale



ELEVATION

NOTES:

Installation:
Excavate A Cutoff Trench Into The Swale Banks And Extend It A Minimum Of 18 Inches Beyond The Top Of Bank. Place The Rock In The Cutoff Trench And Channel to The Limits And Dimensions Shown.

Extend The Rock At Least 18 Inches Beyond The Top Of Bank To Keep Overflow Water From Undercutting The Dam As It Re-Enters The Channel.

Space Dams So That The Upstream Dam Toe Elevation And The Overflow Weir Of The Downstream Dam Top Elevation Are The Same.
(A 1% Swale Slope Would Equal 200' Spacing)

Stabilize The Channel Above The Uppermost Dam. Erosion Resistant Lining Shall Extend At Least 6" Below Lowest Dam.

Maintenance:
Inspect Check Dams And The Channel After Each Storm Event, And Repair Any Damage Immediately. If Significant Erosion Occurs Between Dams, Install A Riprap Liner In That Portion Of The Channel.

Remove Sediment Accumulated Behind Each Dam As Needed To Maintain Channel Capacity, To Allow Drainage Through The Dam, And To Prevent Large Flows From Displacing Sediment.

Add Aggregate To The Dams As Needed To Maintain Design Height And Cross Section.

When The Dams Are No Longer Needed, Remove The Aggregate And Stabilize Channel Using An Erosion Resistant Lining, If Necessary.

ROCK CHECK DAM
Not To Scale

EROSION CONTROL DETAIL – E12

EROSION CONTROL DETAIL – E13

NOTES:
Installation:
Place Temporary Slope Drains On Undisturbed Soil Or Well Compacted Fill. Set The Slope Drain Inlet At The Bottom Of The Diversion Channels. Connect The Pipe To The Inlet Section.

Construct The Diversion Ridge By Placing Fill Over The Pipe In 6 Inch Lifts. Compact Each Lift By Hand Tamping Under And Around The Inlet, And Along The Pipe.

Make The Top Of The Fill 6 Inches Higher Than The Adjoining Diversion.

Make All Pipe Connections Watertight And Secure So That Joints Will Not Separate In Use.

Anchor The Pipe To The Face Of The Slope With Stakes Spaced No More Than 10 Feet Apart. Extend The Pipe Beyond The Toe Of Slope To A Stable Grade. Protect The Outlet From Erosion.

Grade The Diversion Channel At The Top Of The Slope Toward The Temporary Slope Drain (Slope <2%).

Stabilize All Disturbed Areas Following Installation.

Maintenance:
Inspect Weekly And Following Each Storm Event. (Remove Sediment From The Channel And Reinforce The Ridge As Needed.)

Check The Inlet For Sediment Or Trash Accumulation.

Check The Fill Over The Pipe For Settlement, Cracking, Or Piping Holes; Repair Immediately.

Check For Holes Where The Pipe Emerges Form The Dike; Repair Immediately.

Check The Conduit For Evidence Of Leaks Or Inadequate Anchoring; Repair Immediately.

Check The Outlet For Erosion Or Sedimentation; Clean & Repair Or Extend If Necessary.

SECTION C-C

PIPE SIZE SELECTION TABLE	
Maximum Drainage Area Per Pipe	Minimum Pipe Diameter
0.50 acre	8 In.
0.75 acre	10 In.
1.00 acre	12 In.
>1.00 acre	Individually Designed

TEMPORARY SLOPE DRAIN
Not To Scale

NOTES:

Installation:
Excavate Only Deep Enough For Both Filter And Riprap. Compact Any Fill Material to The Density Of The Surrounding Undisturbed Soil.

Cut A Keyway In Stable Material At The Base Of The Slope to Reinforce The Toe; Keyway Depth Should Be 1 ½ Times The Design Thickness Of The Riprap And Should Extend A Horizontal Distance Equal To The Design Thickness.

Place Geotextile Fabric On The Smoothed Foundation, Overlapping The Edges 12 Inches Min. Secure With Anchor Pins Spaced Every 3 Feet Along The Overlap.

Immediately After Installing The Filter, Add The Riprap To Full Thickness In One Operation. Do Not Dump Through Chutes Or Use Any Method That Causes Segregation Of Rock Sizes Or That Will Dislodge Or Damage The Underlying Filter Material.

If Fabric Is Damaged, Remove The Riprap And Repair By Adding Another Layer Of Fabric, Overlapping The Damaged Area By 12 Inches.

Place Smaller Rock In Voids To Form A Dense, Uniform, Well Graded Mass. Blend The Rock Surface Smoothly With The Surrounding Area To Eliminate Protrusions Or Over-Falls.

Inspect Periodically For Displaced Rock Material, Slumping, And Erosion At Edges, Especially Downstream Or Downslope.

Maintenance:
Inspect Periodically For Displaced rock Material, Slumping And Erosion At Edges, Especially Downstream Or Downslope.

PRECAST CONCRETE END SECTION W/ RIP RAP
Not To Scale

EROSION CONTROL DETAIL – E14

EROSION CONTROL DETAIL – E15

REVISIONS		
Rev. No.	Description	Date

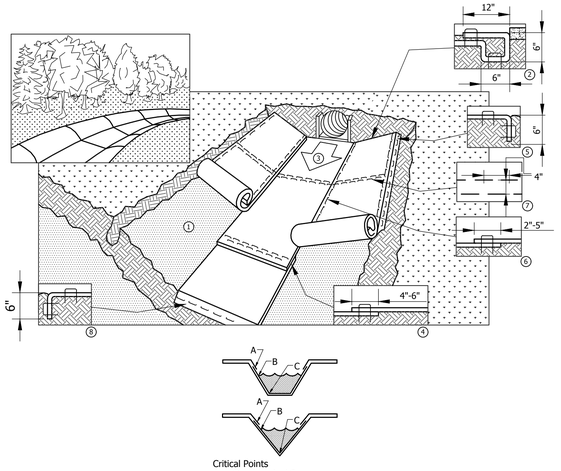
KAMERYN I. WRIGHT REGISTERED No. PE11900310 STATE OF INDIANA PROFESSIONAL ENGINEER

RECOMMENDED FOR APPROVAL — DESIGN ENGINEER — 6/6/2023 DATE

CITY OF BLUFFTON

EROSION CONTROL (E) DETAILS

SHEET 17 OF 18



Critical Points
A. Overlaps And Seams
B. Projected Water Line
C. Channel Bottom/Side Slope Vertices

① Prepare Soil Before Installing Blankets, Including Any Necessary Application Of Lime, Fertilizer, Or Seed.

② Begin At The Top Of The Channel By Anchoring The Blanket In A 6 Inch Deep By 6 Inch Wide Trench With Approximately 12 Inches Of Blanket Extended Beyond The Upslope Portion Of The Trench. Anchor The Blanket With A Row Of Staples/Stakes Approximately 12 Inches Apart In The Bottom Of The Trench. Backfill And Compact The Trench After Stapling. Apply Seed To Compacted Soil And Fold Remaining 12 Inch Portion Of Blanket Back Over Seed And Compacted Soil. Secure Blanket Over Compacted Soil With A Row Of Staples/Stakes Spaced Approximately 12 Inches Apart Across The Width Of The Blanket.

③ Roll Center Blanket In Direction Of Water Flow In Bottom Of Channel. Blankets Will Unroll With Appropriate Side Against The Soil Surface. All Blankets Must Be Securely Fastened To Soil Surface By Placing Staples/Stakes In Appropriate Locations As Shown In The Staple Pattern Guide. When Using Optional Dot System, Staples/Stakes Should Be Placed Through Each Of The Colored Dots Corresponding To The Appropriate Staple Pattern.

④ Place Consecutive Blankets End Over End (Shingle Style) With A 4-6 Inch Overlap. Use A Double Row Of Staples Staggered 4 Inches Apart And 4 Inches On Center To Secure Blankets.

⑤ Full Length Edge Of Blankets At Top Of Side Slopes Must Be Anchored With A Row Of Staples/Stakes Approximately 12 Inches Apart In A 6 Inch Deep By 6 Inch Wide Trench. Backfill And Compact The Trench After Stapling.

⑥ Adjacent Blankets Must Be Overlapped Approximately 2-5 Inches, (Depending On Blanket Type) And Stapled. To Ensure Proper Seam Alignment, Place The Edge Of The Overlapping Blanket (Blanket Being Installed On Top) Even With The Colored Seam Stitch On The Blanket Being Overlapped.

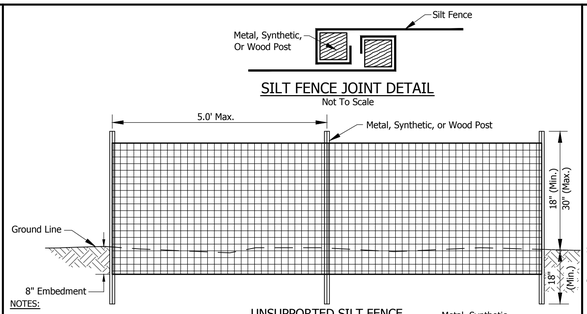
⑦ In High Flow Channel Applications, A Staple Check Slot Is Recommended At 30-40 Foot Intervals. Use A Double Row Of Staples Staggered 4 Inches Apart And 4 Inches On Center Over Entire Width Of The Channel.

⑧ The Terminal End Of The Blankets Must Be Anchored With A Row Of Staples/Stakes Approximately 12 Inches Apart In A 6 Inch Deep By 6 Inch Wide Trench. Backfill And Compact The Trench After Stapling.

NOTE:
* Horizontal Staple Spacing Should Be Altered If Necessary To Allow Staples To Secure The Critical Points Along The Channel Surface.

** In Loose Soil Conditions, The Use Of Staple Or Stake Lengths Greater Than 6 Inches May Be Necessary To Properly Anchor The Blankets.

EROSION CONTROL BLANKET - FLOWLINE APPLICATION
Not To Scale



SILT FENCE JOINT DETAIL
Not To Scale

NOTES:

Installation:
Silt Fence Is Not Recommended For Use As A Diversion And Should Not Be Used Across A Stream, Channel, Ditch, Swale, Or Anywhere That Concentrated Flow Is Anticipated.

Lay Out The Location Of The Fence So That It Is Parallel To The Contour Of The Slope And At Least 10 Feet Beyond The Toe Of The Slope To Provide A Sediment Storage Area. Turn The Ends Of The Fence Up Slope Such That The Point Of Contact Between The Ground And The Bottom Of The Fence End Terminates At A Higher Elevation Than The Top Of The Fence At Its Lowest Point

Along The Entire Fence Line, Dig An 8 Inch Deep Flat Bottomed Or V-Shaped Trench. Place Fence According To Manufacturer's Recommendations.

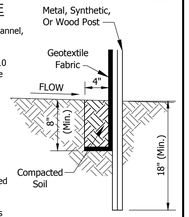
Maintenance:
Inspect The Silt Fence Weekly And After Each Storm Event.

If Fence Fabric Tears, Starts To Decompose, Or In Any Way Becomes Ineffective, Replace The Affected Portion Immediately.

Remove Deposited Sediment When It Reaches Half The Height Of The Fence At Its Lowest Point Or Is Causing The Fabric To Bulge. Take Care To Avoid Undermining The Fence During Clean Out.

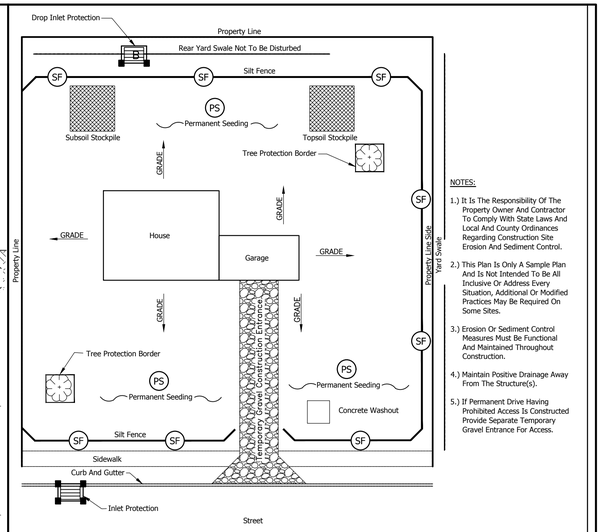
After The Contributing Drainage Area Has Been Stabilized, Remove The Fence And Sediment Deposits, Bring The Disturbed Area To Grade, And Stabilize.

UNSUPPORTED SILT FENCE



TRENCH DETAIL

SILT FENCE (SEDIMENT FENCE)
Not To Scale



NOTES:

1.) It Is The Responsibility Of The Property Owner And Contractor To Comply With State Laws And Local And County Ordinances Regarding Construction Site Erosion And Sediment Control.

2.) This Plan Is Only A Sample Plan And Is Not Intended To Be All Inclusive Or Address Every Situation, Additional Or Modified Practices May Be Required On Some Sites.

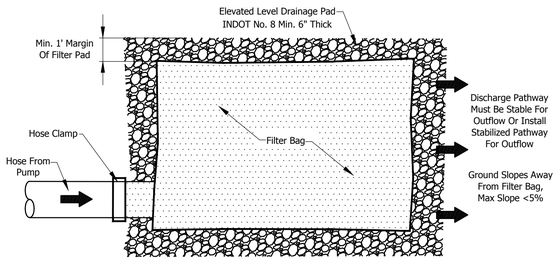
3.) Erosion Or Sediment Control Measures Must Be Functional And Maintained Throughout Construction.

4.) Maintain Positive Drainage Away From The Structure(s).

5.) If Permanent Drive Having Prohibited Access Is Constructed Provide Separate Temporary Gravel Entrance For Access.

SAMPLE EROSION CONTROL SITE PLAN
Not To Scale
(For Construction Of Typical Single Family Dwellings.)

EROSION CONTROL DETAIL – E16



NOTES:
Dewatering Bags Are Used To Minimize The Discharge Of Sediment For Pump Induced Dewatering Activities.

Bag Size Is Dependent On The Pumping Rate And Soil Conditions.

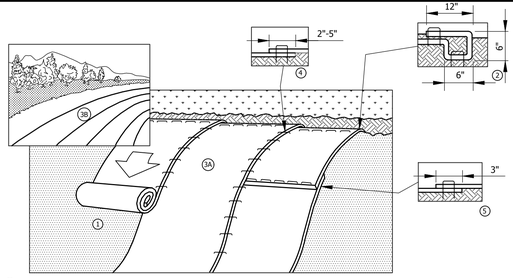
Clamp Pump Hose With Steel Hose Clamp Over The Rigid Hose Connector Area To A Tight Secure Connection To Filter Bag.

Locate Filter Bags Where Outflows Can Easily Drain. Preferred Locations Are Areas Of Undisturbed Densely Vegetated Areas. Locate For Ease Of Access, Monitoring, Maintenance, And Removal.

MATERIALS:
Nonwoven Polyethylene Geotextile Or Geotextile Bag.
Steel Hose Clamps Or Equivalent To tightly Attach Pump Hose To The Filter Bag.
Elevated Drainage Pad (No. 8 Stone, Wood Mulch, Straw Bales, Wood Pallet).
Secondary Containment Berm (Optional)

FILTER BAGS (PUMP DISCHARGE FILTER BAGS)
Not To Scale

EROSION CONTROL DETAIL – E17



① Prepare Soil Before Installing Blankets, Including Any Necessary Application Of Lime, Fertilizer, And Seed.

② Begin At The Top Of The Slope By Anchoring The Blanket In A 6 Inch Deep By 6 Inch Wide Trench With Approximately 12 Inches Of Blanket Extended Beyond The Upslope Portion Of The Trench. Anchor The Blanket With A Row Of Staples/Stakes Approximately 12 Inches Apart In The Bottom Of The Trench. Backfill And Compact The Trench After Stapling. Apply Seed To Compacted Soil And Fold Remaining 12 Inch Portion Of Blanket Back Over Seed And Compacted Soil. Secure Blanket Over Compacted Soil With A Row Of Staples/Stakes Spaced Approximately 12 Inches Apart Across The Width Of The Blanket.

③ Roll The Blankets (A.) Down Or (B.) Horizontally Across The Slope. Blankets Will Unroll With Appropriate Side Against The Soil Surface. All Blankets Must Be Securely Fastened To Soil Surface By Placing Staples/Stakes In Appropriate Locations As Shown In The Staple Pattern Guide. When Using Optional Dot System, Staples/Stakes Should Be Placed Through Each Of The Colored Dots Corresponding To The Appropriate Staple Pattern.

④ The Edges Of Parallel Blankets Must Be Stapled With Approximately 2-5 Inches Overlap Depending On Blanket Type. To Ensure Proper Seam Alignment, Place The Edge Of The Overlapping Blanket (Blanket Being Installed On Top) Even With The Colored Seam Stitch On The Previously Installed Blanket.

⑤ Consecutive Blankets Spliced Down The Slope Must Be Placed End Over End (Shingle Style) With An Approximate 3 Inch Overlap. Staple Through Overlapped Area, Approximately 12 Inches Apart Across Entire Blanket Width.

Overlap The Blankets With The Direction Of The Flow Of The Water.

NOTE:
* In Loose Soil Conditions, The Use Of Staple Or Stake Lengths Greater Than 6 Inches May Be Necessary To Properly Secure The Blankets.

EROSION CONTROL BLANKET - SLOPE APPLICATION
Not To Scale

SEEDING:
The Following Table Is For General Seeding Information Only. Consult The Indiana Storm Water Quality Manual For Recommendations Relating To Steep Banks And Cuts, High Maintenance Areas, And Channels And Areas Of Concentrated Flow.

SEEDS:
40 Percent Kentucky Bluegrass
40 Percent Creeping Red Fescue
20 Percent Annual Rye Grass

FERTILIZER:
Commercial Fertilizer (12-12-12)

STRAW:
Clean And Free Of Weed Seeds

Spread Fertilizer Uniformly Over Finish Graded Surfaces At A Rate Of 20 Pounds Per 1,000 Square Feet. Thoroughly Disk, Harrow, Or Rake Fertilizer Into Soil To Depth Not Less Than 2 Inches.

Distribute Seed Mix Same Day As Fertilizer Is Applied. Spread Evenly At A Rate Of 3 Pounds Per 1,000 Square Feet. Rake Lightly And Compact Areas With 100 Pound Roller.

Cover Areas With Straw Evenly Spread At A Rate Of 2 Tons Per Acre Immediately After Seeding. Water Areas With Fine Spray. Do Not Flood Or Create Washes. Protect Seeded Areas From Erosion.

Continue Watering Of These Areas On A Daily Basis For The Remainder Of The Construction Period.

Hold Sloped Areas Steeper Than 2 (Horizontal) To 1 (Vertical) With Wire Mesh Or Stakes And Wire.

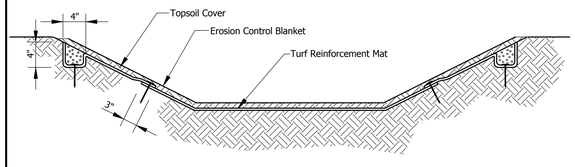
NOTES:
If Construction Activities Take Place During The Months Of November Through February, Use Dormant Seeding Practices In Place Of Temporary And Permanent Seeding Practices.

See Chapter 7 Of The Indiana Storm Water Quality Manual, For Additional Seeding Recommendations.

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
	Temporary Seeding Dates											
Wheat Or Rye												
Oats												
Annual Rye Grass												
	Permanent Seeding Dates											
Non-Irrigated*												
Irrigated												
Dormant Seeding**												

Irrigation Required
* Seeding Dates May Be Extended 5 Days If Mulch Applied And Planted Late Summer
** Increase Seeding Rate By 50%

EROSION CONTROL DETAIL – E18



Extend Turf Reinforcement Mat To Accommodate Maximum Designed Flow Depth.

NOTES:

Installation:
Select The Type Of Mat Recommended For The Site Conditions (Slope, Channel, Flow Velocity) And Problem To Be Addressed.

Install Any Practices Needed To Control Erosion And Runoff, Such As Temporary Or Permanent Diversions, Slope Drains, Sediment Basins/Traps, Silt Fence Or Straw Bale Dams.

Grade The Site As Specified.

Install The Mat According To Manufacturer's Specifications.

Backfill Topsoil To A Depth Equal To The Thickness Of The Mat.

Seed The Area After The Mat Has Been Installed And Backfilled With Soil.

Mulch The Area, Or Use Erosion Control Blankets To Stabilize The Surface.

Maintenance:
Until The Surface Is Stabilized, Inspect Weekly And After Each Storm Event For Erosion Exposing The Mat.

If A Specific Area Shows Erosion, Add Soil And Restabilize.

TURF REINFORCEMENT MAT
Not To Scale

EROSION CONTROL DETAIL – E19

EROSION CONTROL DETAIL – E20

EROSION CONTROL DETAIL – E21

EROSION CONTROL DETAIL – E22

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RECOMMENDED FOR APPROVAL — DESIGN ENGINEER — 6/6/2023 DATE

CITY OF BLUFFTON

EROSION CONTROL (E) DETAILS

SHEET 18 OF 18