LEBANON, INDIANA

LEBANON STANDARDS

DATE OF CURRENT ISSUANCE: 10/01/2012

DIRECTIONS FOR USE

1.) The Entire Set Of Full Size Standards Shall Be Attached To The Construction Drawings And Shall Be Considered Part Thereto. Partial Set May Be Used For Small Projects When Approved By The Lebanon Utility Service Board And The Water, Wastewater And Stormwater Operations Manager.

2.) Details Prepared By Outside Sources Shall Not Be Included In The Construction Drawings When Said Details Cover Work Which Is Covered By Lebanon Standards.

3.) Individual Lebanon Standards That Do Not Apply May Be Crossed–Out By Design Engineer Through The Placement Of A Single Large X Over 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.

4.) Details Prepared By Outside Sources Covering Work Which Is Not Covered By Lebanon Standards Are The Sole Responsibility Of The Design Engineer And Shall Be Placed On Sheets Other Than The Lebanon Standards Sheets.

GENERAL NOTES

1.) Contractor Shall Verify The Exact Location Of All Existing Utilities At Least 48 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 Lebanon And The Owner Of The Affected Utility.

2.) All Construction Drawings Shall Be Submitted To Lebanon Utilities In Electronic Format, Autocad Release 2007* And PDF. All Coordinate Data Shall Be U. S. Survey Feet. All Benchmarks And Elevations Shall Be From NAD 1983 (Conus) Datum.
*(Autocad Data Interchange, If Created From A Non–Autocad System.)

3.) Wherever Proprietary Equipment Is Specified, All Proposals For Substitution Shall Be Submitted In Writing To The Lebanon Utility Service Board And Shall Be Subject To The Findings Of The Lebanon Utility Service Board.

4.) Whenever A Non–Parallel Trench Opening Encroaches Within 5' Of An Existing Street Or Whenever Centerline Of Water Main Is Within 3' Of An Existing Street, Flowable Fill Shall Be Used For Trench Backfill.

5.) Installation Of Or Provisions For The Installation Of All Underground Utilities (Including Service Laterals) To Be Placed Under Pavement Areas Shall Be Established Prior To The Construction Of The Pavements.

6.) Contractor Shall Contact Lebanon Utilities For Electrical Standards, Terms, And Conditions During Project Planning And At Least 1 Month Prior To Construction Or Excavation.

7.) Contractor Is Required To Provide To The Lebanon Utilities, A Performance Bond For 125% Of The Construction Cost Of The Work To Be Dedicated To The Lebanon Utilities And A Three–Year Maintenance Bond In The Amount Of 10% Of The Performance Bond. In Addition, The Contractor Shall Make A Written Request For Permission To Start Construction 7 Calendar Days Prior To Intended Start Of Construction. Construction Shall Not Start Until Contractor Has Received Written Permission From Lebanon Utilities.

8.) Attention Is Drawn To The Plan Review Fees As Adopted By The Storm Water Management Board And Utility Service Board.

INDEX

CITY OF LEBANON

HAROLD "HUCK" LEWIS — MAYOR

ALLEN W. MILBURN — CHAIRMAN OF UTILITY SERVICE BOARD

MICHAEL MARTIN — UTILITIES MANAGER

ROBERT E. WAPLES — WATER/WASTEWATER OPERATIONS MANAGER

LARRY LEE — STREET COMMISSIONER

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REVISIONS		
Rev. No.	Description	Date

DAVID LAREY — REGISTERED — No. PE19700063 — STATE OF INDIANA — PROFESSIONAL ENGINEER

RECOMMENDED FOR APPROVAL — DESIGN ENGINEER — DATE 10/01/2012

CITY OF LEBANON

DIRECTIONS FOR USE, GENERAL NOTES & REVISION LOG

SHEET 01 OF 18

GENERAL NOTES

1.) The Right-Of-Way Widths, Pavement Widths, And Easements Widths Indicated On This Sheet Are Minimum Distances Required By The City Of Lebanon. Greater Widths May Be Provided. The Contractor Shall Review The Plat And The Plans To Confirm The Various Widths Indicated On This Sheet And Shall Report Any Discrepancy To Lebanon Building Inspector And Lebanon Utilities Prior To Proceeding With Construction.

2.) The Location Of Proposed Utilities As Indicated Hereon Are Based Upon The Experience Of The City Of Lebanon 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 The Utilities Manager. Utilities Not Meeting These Requirements Shall Be Removed And Replaced As Directed By The Utilities Manager.

3.) Primary Arterial Streets And Divided Arterial Streets Are To Be Coordinated With Lebanon Utilities And Lebanon Planning Department And Shall Be In Accordance With The Minimum Design Standards Outlined By The Subdivision Control Ordinance.

4.) A Written Request For Variance May Be Submitted To The Lebanon Planning Department To Allow For The Deletion Of The 4 Foot Wide Sidewalk From Commercial Collector Streets. The Sidewalks Shall Be Constructed Unless A Written Variance Is Issued By The Lebanon Planning Department.

5.) In Accordance With Sheet 3 Of The Lebanon Standards Notice Is Hereby Given That The 8 Foot Planting Strip Shall Be Maintained Around Cul-De-Sacs.

STREET LIGHTING

1.) Street Lighting Is Required On All Streets. For Newly Platted Streets, The Developer Shall Provide The Design For Street Lighting In Accordance With Those Requirements Outlined Hereon And Clarified Through The Approval Process. Provide Lighting At Intersections, Cul-De-Sacs, And Other Locations Requiring Added Safety. Plans Shall Be Submitted To The Utility Service Board.

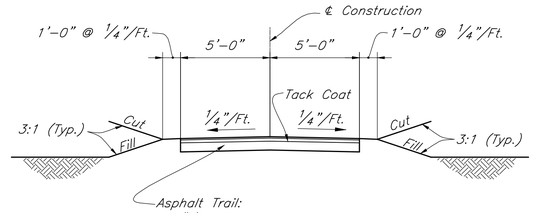
2.) The City Has No Requirement For Minimum Lighting Levels On Residential Streets. However, Comments Or Concerns Of The Utility Service Board Shall Be Incorporated Into Necessary Resubmittal Of The Lighting Plans.

3.) All Lighting Plans Submitted For Approval, Shall Include, But Are Not Limited To, Location Of Each Light Standard, Transformer, And Junction Box. Note That Light Standards Are Typically The Direct Burial Type And Impact An Approximate Area Of 18" In Diameter And 5' Deep.

4.) Light Standards, Luminaires, Transformers, Junction Boxes, And Wires Are Supplied By The Lebanon Utilities So As To Ensure Uniformity In System Operation And Maintenance. Deviations Are Not Permitted.

5.) Noting That Wire Size Shall Be #6AL And That A Typical Run Includes 3 Wires, The Developer Shall Furnish And Install, 2-Inch Diameter Rigid Conduit At All Street Crossings. Certain Crossings May Require Additional Conduits Or Upsizing In Accordance With The Lighting Plans.

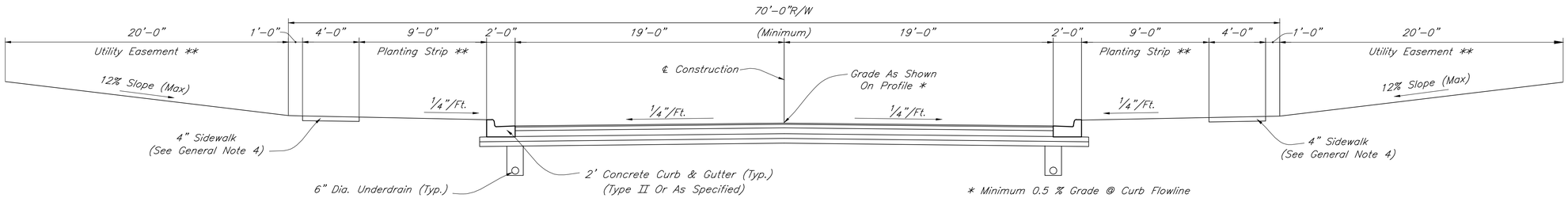
6.) Lighting Is To Be Installed By The Utility Service Board With Cost Paid By The Developer In Accordance With The Schedule Of Values In Effect At Time Of Installation. The Lighting Will Then Be Dedicated To The Lebanon Utilities For Ownership, Operation, And Maintenance.



1.) Cross Slope Shall Be 1/4"/Ft. Maximum For Crowns, Transitions, And Superelevations.

TYPICAL TRAIL CROSS SECTION

Scale: 1/4"=1'-0"

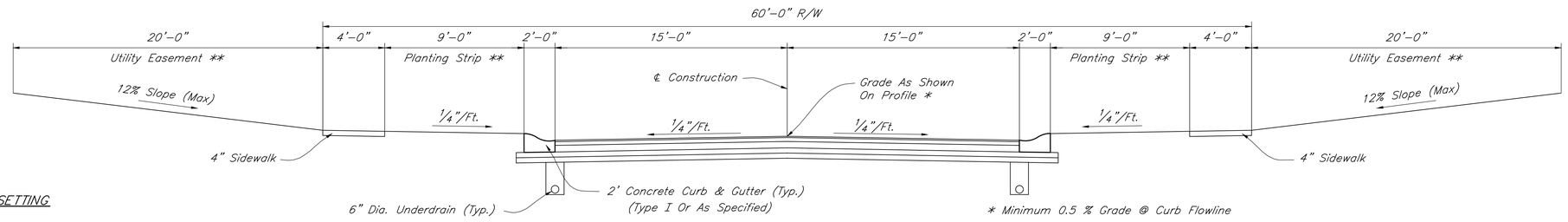


* Minimum 0.5 % Grade @ Curb Flowline

** Trees Are Not Permitted In Planting Strip Or Utility Easement (Area To Be Seeded Immediately)

SECONDARY ARTERIAL AND RESIDENTIAL/COMMERCIAL COLLECTOR STREETS

Scale: 1/4"=1'-0"



* Minimum 0.5 % Grade @ Curb Flowline

** Trees Are Not Permitted In Planting Strip Or Utility Easement (Area To Be Seeded Immediately)

COMMERCIAL TRANSFORMER SETTING

1.) The Developer Is Responsible For Placing Conduit From The Riser Pole To The Concrete Pad As Well As Pouring The Transformer Pad To The Lebanon Utilities Specifications.

2.) The Developer Is Responsible For All Secondary Installations.

3.) If Deemed Necessary By The Lebanon Utilities Electric Department, The Transformer Pad Shall Include A Termination Enclosure.

4.) The Lebanon Utilities Will Furnish And Install The Transformer.

5.) All Wiring Shall Be Located In Dedicated Utility Easements.

6.) All Primary Wiring Under Parking Lots, Streets, Or Similar Features Shall Be Placed In Rigid Conduit, Which Shall Be Furnished And Installed By The Developer.

LOCAL RESIDENTIAL STREETS

Scale: 1/4"=1'-0"

REVISIONS		
Rev. No.	Description	Date

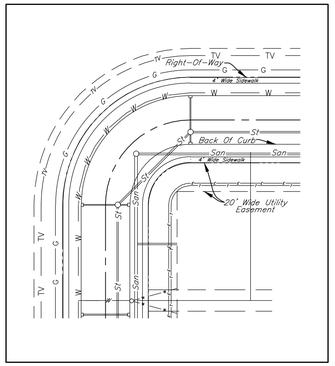
DAVID LAHEY — REGISTERED — No. PE19700063 — STATE OF INDIANA — PROFESSIONAL ENGINEER

RECOMMENDED FOR APPROVAL	DESIGN ENGINEER	10/01/2012 DATE
APPROVED	MAYOR	10/01/2012 DATE
APPROVED	STREET COMMISSIONER	10/01/2012 DATE

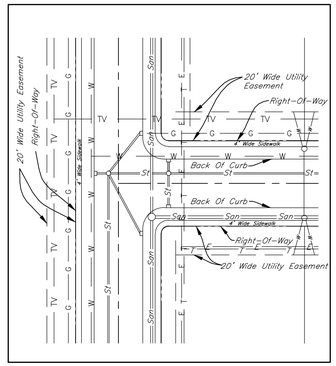
CITY OF LEBANON

RIGHT-OF-WAY, UTILITY EASEMENT, UTILITY LOCATION & STREET LIGHTING GUIDELINES

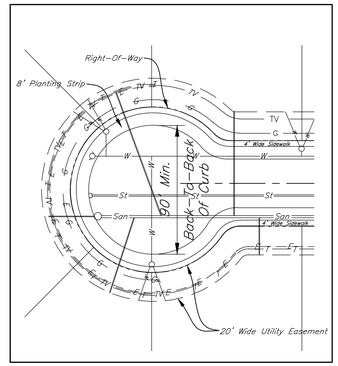
SHEET 02 OF 18



HORIZONTAL CURVE



"T"-INTERSECTION



CUL-DE-SAC

UTILITY ALIGNMENT

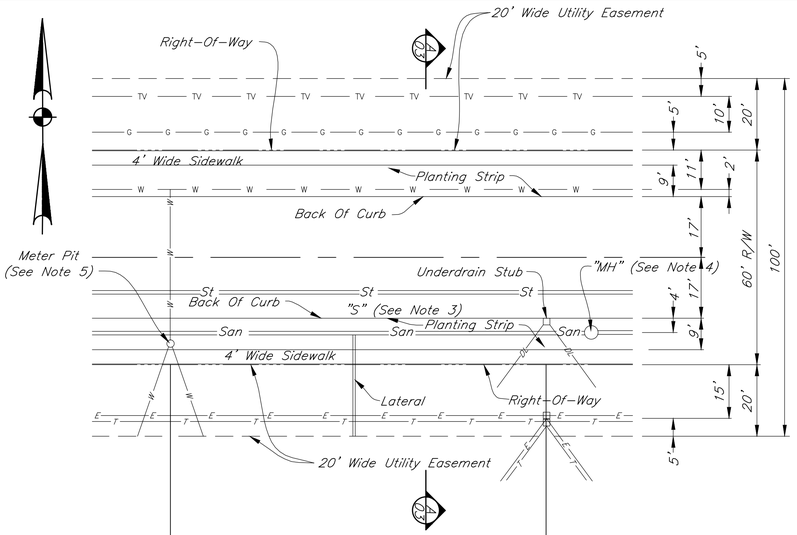
Scale: 1"=50'

GENERAL NOTES

1.) The Location Of Proposed Utilities As Indicated Hereon Are Based Upon The Experience Of The City Of Lebanon And Are So Indicated To Insure 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 The Utilities Manager. Utilities Not Meeting These Requirements Shall Be Removed And Replaced As Directed By The Utilities Manager.

2.) The 8 Foot Wide Planting Strip Must Be Continued Around The Cul-De-Sac, Which Is To Say That The Front Edge Of The Sidewalk Needs To Remain 8 Feet Behind The Back-Of-Curb At All Points Around The Cul-De-Sac.

3.) Provide Conduit Crossings As Directed By Lebanon Utilities Electrical Department Which Should Be Made Part Of The Lighting Plans As Required By Sheet 02.



NOTES:

1.) Right-Of-Way Width, Back-To-Back Of Curbs Dimension, And Planting Strip Width Shown Above Are Based Upon Local Residential Street.

2.) Provide Underdrain Stub As Detailed On Sheet 04. Private Drain Line From A Lot Is Optional For A Sump Pump Discharge.

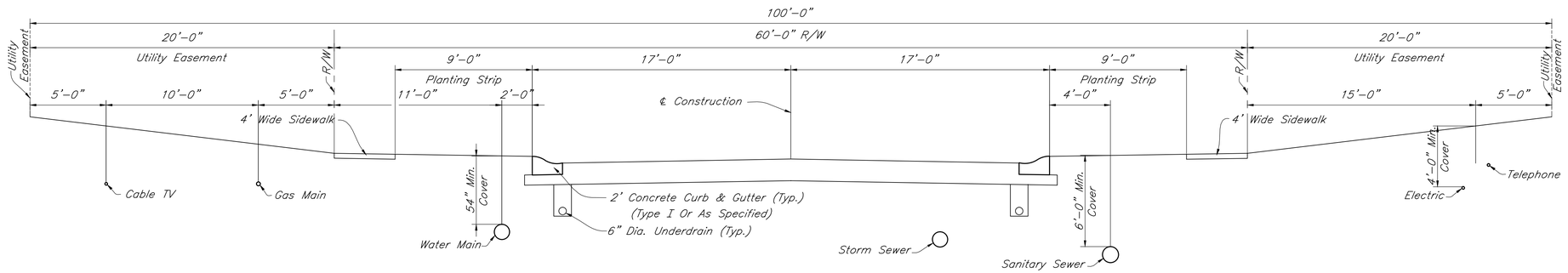
3.) Imprint "S" Into Curb At The Location Of The Sanitary Sewer Lateral.

4.) Imprint "MH" Into Curb On The Appropriate Side Of Street At The Location Of The Sanitary Sewer Manholes.

5.) Imprint "MH" Into Curb On The Appropriate Side Of Street At The Location Of The Sanitary Sewer Manholes.

TYPICAL LOT DETAIL

Scale: 1"=20'



UTILITY ROAD SECTION (A 03)

Scale: 1/4"=1'-0"

LEGEND

- W — Water Main
- St — Storm Sewer
- San — Sanitary Sewer
- G — Gas Main
- TV — Cable TV
- E — Electric
- T — Telephone
- DL — Private Drain Line

REVISIONS		
Rev. No.	Description	Date

DAVID LAHEY — REGISTERED — No. PE19700063 — STATE OF INDIANA — PROFESSIONAL ENGINEER

RECOMMENDED FOR APPROVAL	DESIGN ENGINEER	10/01/2012	DATE
APPROVED	MAYOR	10/01/2012	DATE
APPROVED	UTILITIES MANAGER	10/01/2012	DATE

CITY OF LEBANON

PLACEMENT OF UTILITIES

SHEET 03 OF 18

PAVEMENT CONSTRUCTION

1.) Subbase And Subgrade Shall Be 100 Percent 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 An Independent Laboratory. Tests Results Shall Be Submitted To The Street Commissioner 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 Residential Streets With Concrete Pavement Four Inch Compacted Aggregate Base #53 Is Optional If Adequate Subgrade Is Present. Adequacy Of Subgrade Shall Be Determined Solely By The City Based On A Contractor Performed Proofroll With A Fully Loaded Single Axle Dump Truck.

3.) Place 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.) Upon Approval Of The Mix Design By The City Engineering Representative, Chemical Modification Of Soils Per INDOT Standard Specifications Section 215, Shall Be Performed To A Minimum Depth Of 16 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 Procedure Shall Be Submitted To The City Engineering Representative. Unsatisfactory Soil Modifications As Determined By The City Engineering Representative May Require An Increase In Depth Of The Aggregate Base Or Binder. Tensar TriAx Geogrid May Be Used In Lieu Of Or In Conjunction With The Chemical Modification Of Soils, As Directed By The City Engineer. In Conjunction With The Usage Of Tensar TriAx Geogrid, A Modified Pavement Section May Be Provided By The City Engineer.

HANDICAP RAMP CONSTRUCTION

1.) All Handicap Ramps Shall Meet The Requirements Of The American With Disabilities Act, The Most Recent INDOT Standard Specifications, And These Lebanon Standards, Curb Swipes Required For Handicap Ramps Shall Be Provided At Time Of Initial Construction And Shall Be Per Lebanon Standards.

2.) Minimum Width Of Curb Ramp Shall Be 4 Feet Not Including Flares. Maximum Slope Of Ramps Shall Be 12:1.

3.) Handicap Ramps Are To Be Located As Shown On The Plans Or As Directed By The Street Commissioner.

CURB RAMP CONSTRUCTION

1.) Type D Ramps Shall Be Provided Adjacent To Each Point Of Tangency 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 Vicinity Of Hospitals, Medical Centers Or Athletic Stadiums. The Use Of Details Contrary To Those Shown Hereon Shall Require The Prior Written Approval Of The City Engineering Representative.

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

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

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

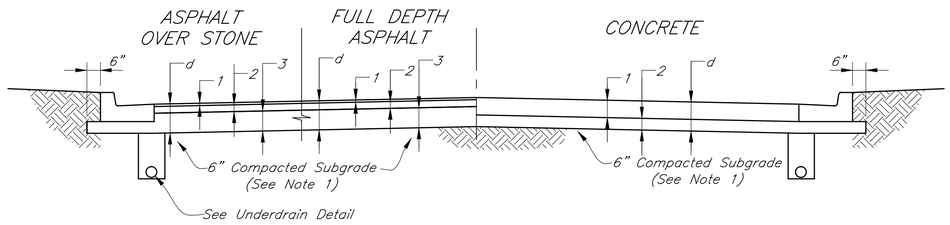
5.) Drainage Structures Shall Not Be Placed In Line With The Ramps Except Where Existing Drainage Structures Are Being Utilized In The New Construction. Location Of The Ramps Shall Take Precedence Over Location Of Drainage Structures.

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

7.) Expansion Joint For The Ramp Shall Be A Maximum ½" Wide. The Top Of The Joint Filler For All Ramp Types Shall Be Flush With Adjacent Concrete.

8.) Crosswalk And Stop Line Marking, If Used, Shall Be So Located As To Stop Traffic Short Of Ramp Crossing.

9.) Slope Of Ramp May Be Warped When Field Conditions Warrant And When Approved By The Street Commissioner.



LOCAL RESIDENTIAL STREETS

d=13"	d=8"	d=10"
① 1½" Surface (165#/SYD HMA, Type A)	① 1½" Surface (165#/SYD HMA, Type A)	① 6" Concrete (PCCP)
② 2½" Intermediate (275#/SYD HMA, Type A)	② 2½" Intermediate (275#/SYD HMA, Type A)	② 4" Compacted Aggregate Base #53 (See Note 2)
③ 9" Compacted Aggregate, No. 53, Base	③ 4" Base (440/SYD HMA, Type A)	

LOCAL RESIDENTIAL COLLECTOR AND LOCAL COMMERCIAL STREETS

d=14"	d=10"	d=11"
① 1½" Surface (165#/SYD HMA, Type A)	① 1½" Surface (165#/SYD HMA, Type A)	① 7" Concrete (PCCP)
② 2½" Intermediate (275#/SYD HMA, Type A)	② 2½" Intermediate (275#/SYD HMA, Type A)	② 4" Compacted Aggregate Base #53
③ 4" Base (440/SYD HMA, Type A)	③ 6" Base (660/SYD HMA, Type A)	
④ 6" Compacted Aggregate, No. 53, Base		

RESIDENTIAL/COMMERCIAL COLLECTOR AND SECONDARY ARTERIAL STREETS

d=15"	d=12"	d=11½"
① 1½" Surface (165#/SYD HMA, Type A)	① 1½" Surface (165#/SYD HMA, Type A)	① 7½" Concrete (PCCP)
② 2½" Intermediate (275#/SYD HMA, Type A)	② 2½" Intermediate (275#/SYD HMA, Type A)	② 4" Compacted Aggregate Base #53
③ 4" Base (440/SYD HMA, Type A)	③ 8" Base (880/SYD HMA, Type A)	
④ 7" Compacted Aggregate, No. 53, Base		

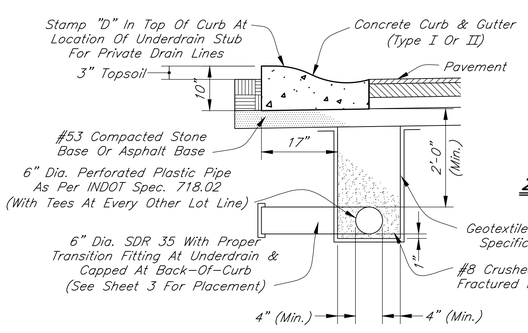
INDUSTRIAL STREETS AND ARTERIALS

The Asphalt Over Stone And Full Depth Asphalt Pavement Sections Shall Be Designed Based Upon California Bearing Ratio (CBR) Tests Performed On The Subgrade Soils. Pavement Thickness Designs Shall Be Submitted To The Street Commissioner For Approval.

d=13"
① 9" Concrete (PCCP)
② 4" Compacted Aggregate Base #53

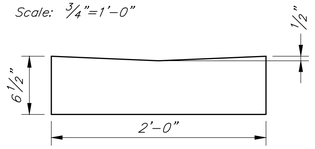
PAVEMENT CONSTRUCTION

Scale: None



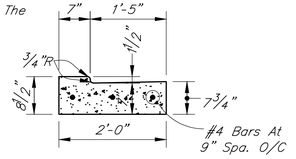
UNDERDRAIN DETAIL

Scale: ¾"=1'–0"



SPECIAL CURB DETAIL

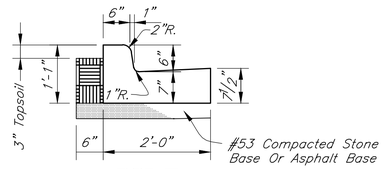
Scale: 1½"=1'–0"



NOTE:
Reinforced Concrete Gutter Is Required At All Private Drives That Intersect A Public Road With Type II 2' Combined Concrete Curb And Gutter Or Similar.

REINFORCED CONCRETE GUTTER

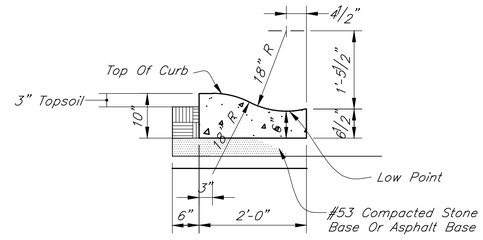
Scale: ¾"=1'–0"



TYPE II

2' COMBINED CONCRETE CURB & GUTTER

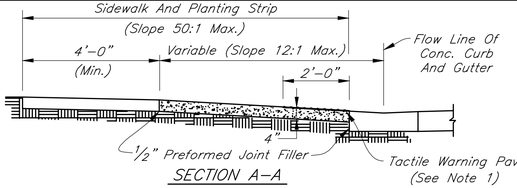
Scale: ¾"=1'–0"



TYPE I

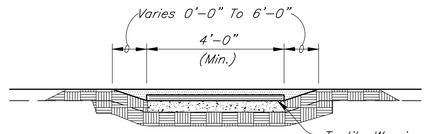
2' CONCRETE ROLL CURB & GUTTER

Scale: ¾"=1'–0"



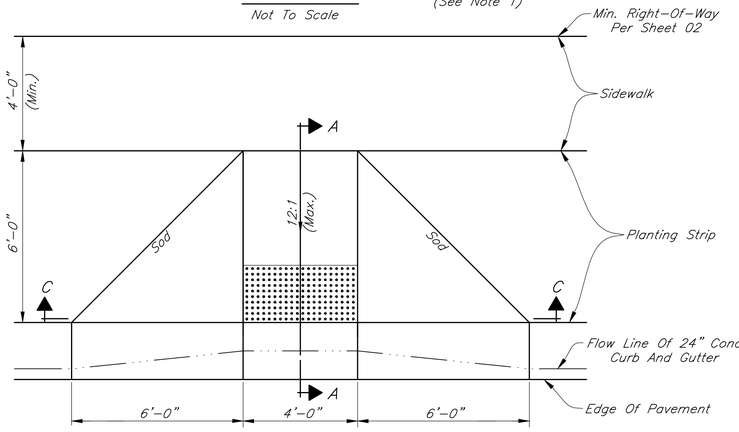
SECTION A–A

Scale: None



SECTION C–C

Not To Scale

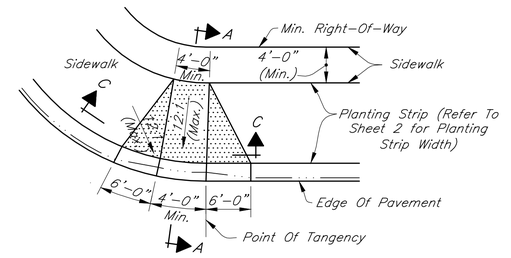


(See Curb Ramp Construction Notes On This Sheet)

CURB RAMP, TYPE C

Scale: None

NOTE:
1.) Tactile Warning Pavers As Manufactured By ADA Solutions, INC., Or As Approved By The City Of Lebenon.
2.) Transition Gutter Flowline To Midpoint Of Concrete Curb And Gutter At Curb Ramp.



CURB RAMP, TYPE D

Scale: ⅛" = 1'–0"

HANDICAP RAMP CONSTRUCTION

REVISIONS		
Rev. No.	Description	Date

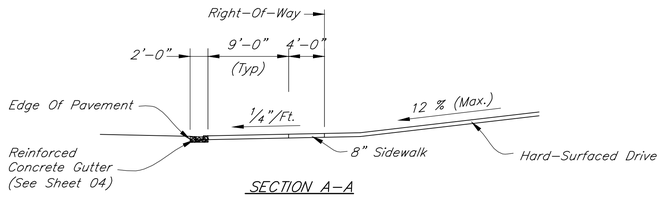
DAVID LAHEY REGISTERED No. PE19700063 STATE OF INDIANA PROFESSIONAL ENGINEER

RECOMMENDED FOR APPROVAL	DESIGN ENGINEER	10/01/2012 DATE
APPROVED	MAYOR	10/01/2012 DATE
APPROVED	STREET COMMISSIONER	10/01/2012 DATE

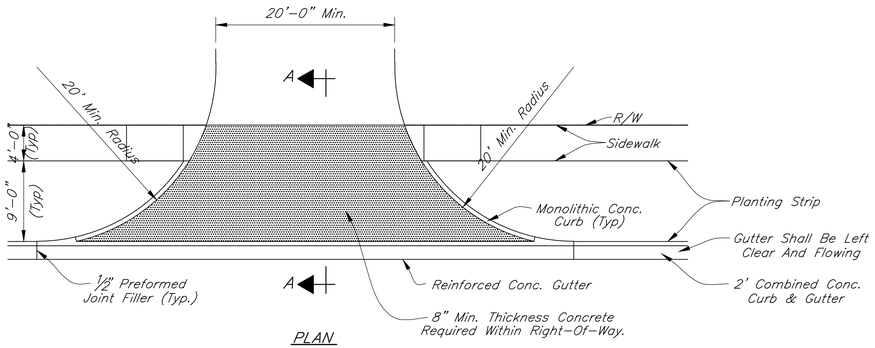
CITY OF LEBANON

PAVEMENT, CURB & SIDEWALK DETAILS & NOTES

SHEET 04 OF 18



SECTION A-A



PLAN

TYPICAL COMMERCIAL PRIVATE DRIVE

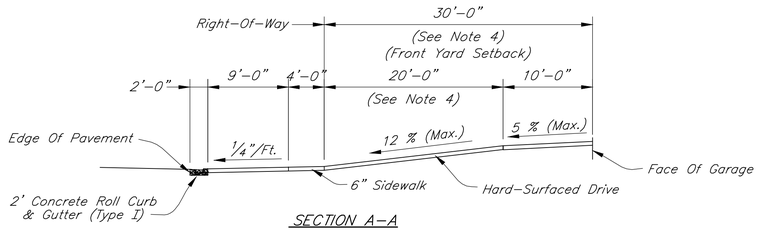
Scale: 1/8"=1'-0"

1.) The Maximum Algebraic Difference In Grades For Any 10 Foot Interval Shall Not Exceed 8 % For Crest Vertical Curves, Nor 10 % For Sag Vertical Curves.

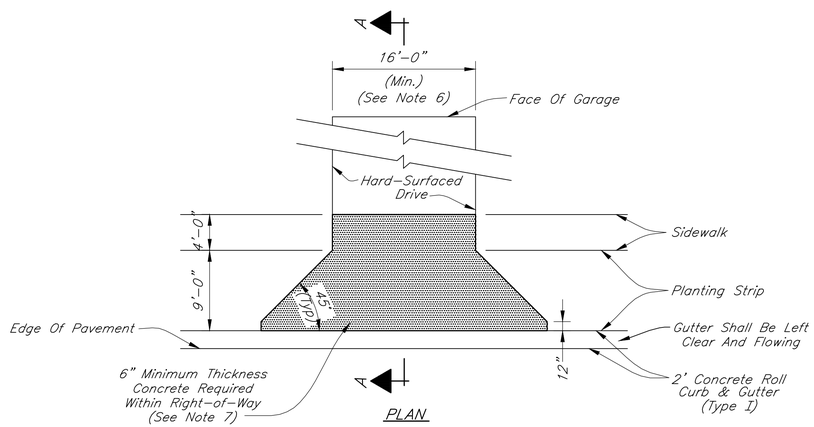
2.) Concrete Drives Require Control Joints At A Maximum Of Every 10 Feet Each Way.

3.) Use Actual Setback As Shown On Plat And As Provided By The City Of Lebanon Zoning Ordinance.

4.) Street Commissioner May Approve Alternate Paving Materials.



SECTION A-A



PLAN

TYPICAL RESIDENTIAL PRIVATE DRIVE

Scale: 1/8"=1'-0"

1.) The Maximum Algebraic Difference In Grades For Any 10 Foot Interval Shall Not Exceed 8% For Crest Vertical Curves, Nor 10% For Sag Vertical Curves.

2.) The Frontage Of All Lots Shall Drain To Adjacent Streets Except With The Prior Approval Of Lebanon Utilities.

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 Lebanon Zoning Ordinance.

5.) Street Commissioner May Approve Depressed Curb And Alternate Paving Materials.

6.) A Written Request For Variance May Be Submitted To The Lebanon Planning Department To Allow For A Reduction To The 16'-0" Minimum Private Drive Width. The Private Drive Shall Be Constructed As Shown Unless A Written Variance Is Issued By The Lebanon Planning Department.

7.) Where Residential Drive Construction Is Of Asphaltic Concrete, The Pavement Section Shall Consist Of 110#/Sys. H.A.C. Surface Over 330#/Sys. H.A.C. #8 Binder, Or Match Existing Roadway Pavement Section Thickness, Whichever Is Greater.

REVISIONS		
Rev. No.	Description	Date

DAVID LAHEY
REGISTERED
No. PE19700063
STATE OF INDIANA
PROFESSIONAL ENGINEER

RECOMMENDED FOR APPROVAL	DESIGN ENGINEER	10/01/2012 DATE
APPROVED	MAYOR	10/01/2012 DATE
APPROVED	STREET COMMISSIONER	10/01/2012 DATE

CITY OF LEBANON

PRIVATE DRIVE DETAILS AND NOTES

SHEET 05 OF 18

GENERAL NOTES

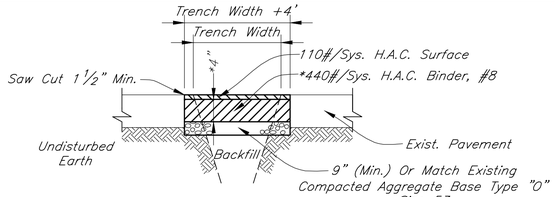
1.) Trench Backfill Within Streets, Alleys Or Sidewalks Shall Be Type I Or Type II As Shown.

2.) Type II Backfill May Be Used If The Trench Has Adequate Space To Allow Entrance Of Proper Equipment And Materials To Achieve The Required 95% Compaction.

3.) The Street Commissioner Shall Have The Authority To Require Type I Trench Backfill When, In His Opinion, Minimum Compaction Cannot Be Obtained.

4.) The Contractor Shall Notify The Street Commissioner At Least 24 Hours Prior To Beginning Backfill Of Excavation. If The Permanent Patch Placement Is To Be A Separate Operation, The Contractor Shall Also Notify The Street Commissioner 24 Hours Prior To Placement Of Patch.

5.) The Contractor Shall Be Responsible To Maintain And Repair Any And All Open Cuts Permitted Within The City Of Lebanon For A Period Of One Year Upon Final Acceptance By The City.



* If Existing Pavement Is Thicker Than 5", Additional Binder Is To Be Used To Match The Existing Pavement Thickness.

NOTES

1.) Saw Cuts Shall Provide A Vertical, Neat And Uniform Edge.

2.) All Materials Shall Comply With Specifications As Required By The City.

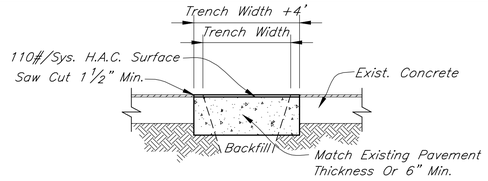
3.) The Existing Vertical Edge Of Pavement Is To Be Tack Coated Prior To The Laying Of New Asphalt. Tack Coat Is To Be Applied As Specified In The Latest Standard INDOT Specifications, Sections 409 And 902.

4.) The New Surface Pavement Grade Shall Match The Existing Surface Pavement Grade.

5.) A 2 (Two) 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.

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.) Concrete Surface Shall Be Broom Finish At Right Angles To Traffic Flow.

4.) All Concrete Shall Be Air Entrained–6 Bags Per Cubic Yard Minimum 4000 PSI Concrete.

5.) Contractor Shall Contact The Lebanon Street Commissioner To Determine If Anchors Are Required On Existing Concrete Pavement Repairs.

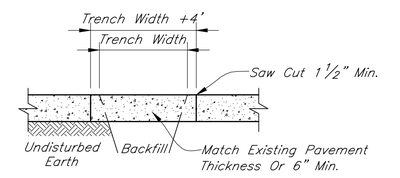
6.) The Concrete Pavement And The Existing Vertical Edge Of Pavement Are To Be Tack Coated Prior To The Laying Of New Asphalt. Tack Coat Is To Be Applied As Specified In The Latest Standard INDOT Specifications, Sections 409 And 902.

7.) The New Surface Pavement Grade Shall Match The Existing Surface Pavement Grade.

8.) A 2 (Two) 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.

CONCRETE W/ BITUMINOUS SURFACE 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.) Surface Of Repair Shall Be Broom Finish At Right Angles To Traffic Flow.

4.) All Concrete Shall Be Air Entrained–6 Bags Per Cubic Yard Minimum 4000 PSI Concrete.

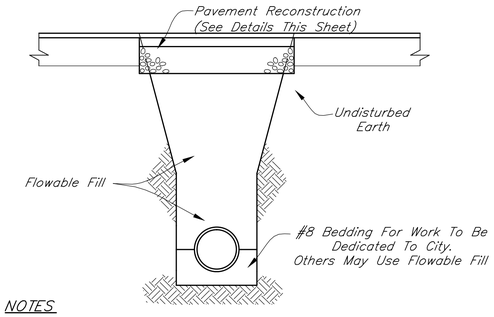
5.) Contractor Shall Contact The Lebanon Street Commissioner To Determine If Anchors Are Required On Existing Concrete Pavement Repairs.

CONCRETE PATCH

Scale: None

FOR CUTS WITHIN CONCRETE STREETS

FOR CUTS WITHIN BITUMINOUS STREETS



NOTES

1.) Trench Spoil Is To Be Removed From The Work Site And Disposed Of Out Of The Right–Of–Way.

2.) Flowable Fill Is To Be Poured Into The Trench To Serve As Backfill, To The Dimensions And Specifications Listed In This Detail.

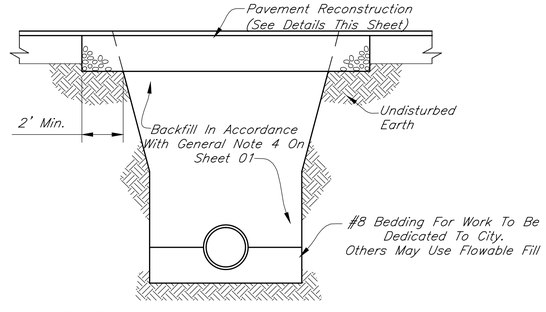
3.) The Flowable Fill Mix Shall Have Been Previously Reviewed And Approved By The Street Commissioner.

4.) The Compressive Strength Of The Flowable Fill Shall Not Be Less Than 50 PSI Nor Greater Than 100 PSI At 28 Days.

5.) When Type I Trench Backfill Is Used, The Existing Paved Surface Is Required To Be Over–Cut 2 Feet Minimum Each Side. Provide A Vertical, Neat Saw–Cut Edge.

TRENCH BACKFILL – TYPE I FLOWABLE FILL DETAIL

Scale: None



NOTES

1.) Saw Cut Existing Pavement Saw 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.

TRENCH BACKFILL – TYPE I GRANULAR FILL DETAIL

Scale: None

REVISIONS		
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DAVID LAHEY REGISTERED No. PE19700063 STATE OF INDIANA PROFESSIONAL ENGINEER

RECOMMENDED FOR APPROVAL	DESIGN ENGINEER	10/01/2012	DATE
APPROVED	MAYOR	10/01/2012	DATE
APPROVED	STREET COMMISSIONER	10/01/2012	DATE

CITY OF LEBANON

STREET CUT DETAILS

SHEET 06 OF 18

STORM SEWER REINFORCED CONCRETE PIPE

1.) Reinforced Concrete Pipe Shall Be Class III, IV, Or V As Specified In ASTM C-76.

2.) Reinforced Elliptical Concrete Pipe Shall Be Class HE-III Or HE-IV As Specified In ASTM C507.

3.) Lift Holes Are Not Allowed For Pipe Less Than 24 Inches In Diameter. A Maximum Of Two Lift Holes Are Allowed For Pipe 24 Inches In Diameter Or Larger. Lift Holes Shall Be Repaired According To Most Recent INDOT Standard Specifications.

4.) Fittings And Specialties Shall Be In Accordance With The Specifications For The Type Of Pipe Being Used.

5.) Each Pipe Section Shall Be Marked With Date Of Manufacturer, Size And Class Of pipe, Specification Designation, Manufacturer And Plant Identification.

6.) 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 A Shall Have Groove On The Spigot For Placement Of A Rubber "O"-Ring Or Profile Gasket In Accordance With ASTM C443. The Gasket Shall Be A Continuous Ring Which Fits Snugly Into The Annular Space Between The OverLapping Surfaces Of The Assembled Pipe Joint.

STORM SEWER GENERAL NOTES

1.) Storm Sewer Pipe Of Other Material Or Material Not Meeting These Specifications Shall Require The Prior Written Approval Of Lebanon Utilities.

2.) The Contractor Shall Submit Information To The Utilities Operations Manager Showing Conformance With These Specifications Upon Request.

3.) As-Built Drawings Shall Be Submitted To Lebanon Utilities Within 30 Days Of Successful Completion Of Project.

4.) Contractor Shall Allow Lebanon Utilities The Opportunity To Inspect The Installation Of The Pipe And Bedding Material Prior To Proceeding With Backfilling An Open Trench. Lebanon Utilities Shall Be Given 48 Hours Notice Of The Contractor's Intent To Install Storm Sewer Piping And Structures.

5.) The Smallest Permissible Storm Sewer Pipe Diameter Is 12 Inches.

6.) Drawings And Calculations For Runoff, Retention And Discharge Rates Shall Be Provided To The Lebanon Storm Water Board, Operations Manager And The Engineering Representative Of The Storm Water Board For Drainage Review. Drawings And Calculations Shall Be Certified By A Registered Professional Engineer.

7.) All Projects With Storm Sewer Systems Must Be Approved By The Lebanon Storm Water Board, As Indicated By Signature, Prior To Submittal To Lebanon Utilities.

8.) As-Built Drawings Shall Be Submitted To Lebanon Utilities For Their Records. Contractor Shall Submit As-Built Drawings Within 30 Days of Successful Completion Of All Testing Requirements.

9.) All Storm Inlet To Mainline Connections Shall Be Made With SDR 26 PVC Or Concrete Pipe.

10.) All Joints Concrete On 18" And Larger Storm Pipe Shall Be Wrapped With Non Woven Geotextile Fabric.

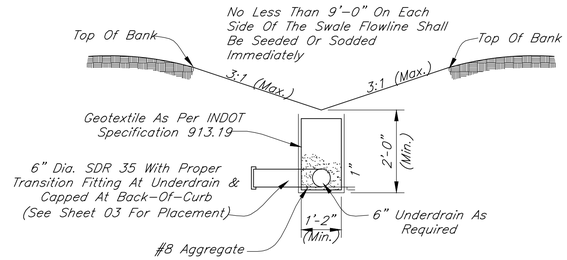
STORM SEWER DEFLECTION TESTING AND TELEVISING

1.) Deflection Testing Is Required For All Mainline Flexible Pipe And The City Of Lebanon Shall Be Given 24 Hour Written Notice Of Deflection Testing. An Allowable Deflection Of 5 Percent Inside Pipe Diameter Will Be Acceptable After All Backfilling Has Been In Place For 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 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.

2.) Televising Is Required For All Pipe City Of Lebanon Shall Be Given 24 Hour Written Notice Of Televising. A Camera Equipped With Remote Control Devices To Adjust Light Intensity And 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 Pipe. The Image Shall Be Clear Enough To Enable The City Of Lebanon 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.

3.) The Pipe Shall Be Thoroughly Cleaned Before Installing Camera And Commencing Televising.

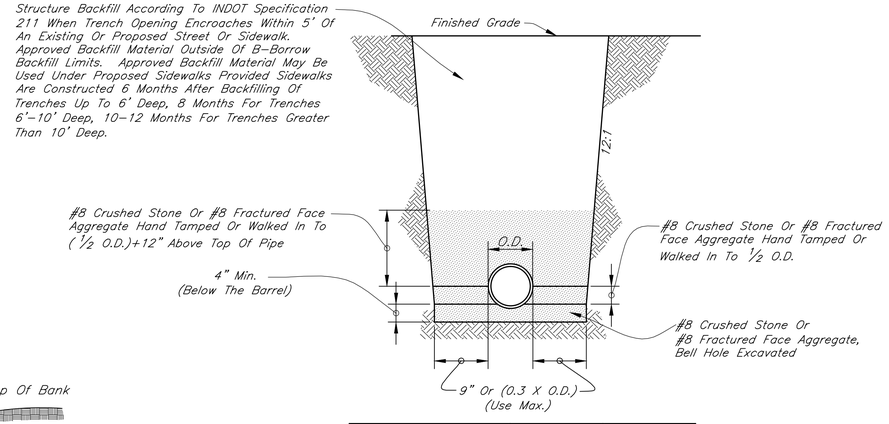
4.) If Any Pipe And/Or Joint Is Found To Be Leaking In Such A Way As Soil Migration Is Likely In The Sole Judgment Of The City, The Contractor Shall Repair That Portion Of The Work To The Satisfaction And Approval Of The City Of Lebanon.



SWALE UNDERDRAIN DETAIL

Scale: 1/2"=1'-0"

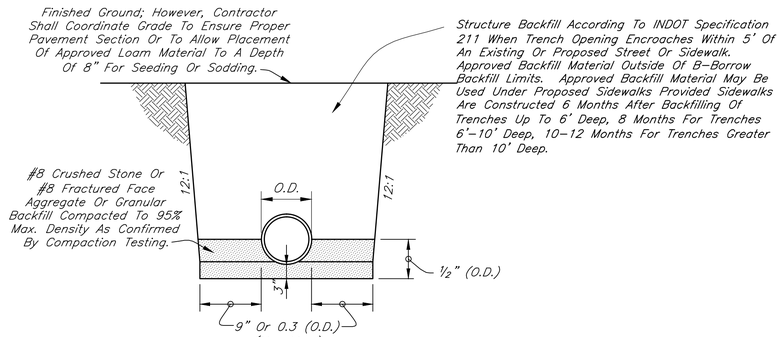
Swales Shall Be Constructed With A Minimum 0.3 Percent Profile Grade Provided That A 6 Inch Diameter Underdrain Is Provided For All Residential Swales And Commercial/ Industrial Swales With Less Than A 0.5 Percent Profile Grade.



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 PIPE BEDDING DETAIL

Scale: None



RCP PIPE BEDDING DETAIL

Scale: None

REVISIONS		
Rev. No.	Description	Date

DAVID LAHEY REGISTERED No. PE19700063 STATE OF INDIANA PROFESSIONAL ENGINEER

RECOMMENDED FOR APPROVAL — DESIGN ENGINEER — DATE 10/01/2012

APPROVED — STREET COMMISSIONER — DATE 10/01/2012

CITY OF LEBANON

STORM SEWER BEDDING DETAILS AND NOTES

SHEET 07 OF 18

GENERAL NOTES

1.) Swales Shall Be Constructed With A Minimum 0.3 Percent Profile Grade Provided That A 6 Inch Diameter Underdrain Is Provided For Residential Swales With Less Than A 1.0 Percent Profile Grade And Commercial/ Industrial Swales With Less Than A 0.5 Percent Profile Grade.

2.) Type J, K, L, M And N Manholes As Detailed Herein 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 The Detail, "F" Diameter Manhole Section May Be Used Throughout The Depth Of The Manhole.

3.) 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 Lebanon Utilities. Regardless Of The Type Of Casting Used, The Casting Shall Be Centered Over The Manhole Steps.

4.) Manholes Shall Be Installed At Distances Not Greater Than 400 Feet For Mainline Pipe Less Than 48" Diameter Or 500 Feet For Mainline Pipe Greater Than Or Equal To 48" Diameter.

5.) Manhole Steps Shall Be Neenah R-1981-J, East Jordan No. 8512, M.A. Industries PS 1-PF, Or As Approved By Lebanon Utilities.

6.) Castings Which Drain Roll Curb And Gutter, Type I Curbing Shall Be Neenah R-3501-TR Or R-3501-TL, East Jordan No. 7495M1 Or 7495M2 Or As Approved By Lebanon Utilities. Catch Basin Type A Required. Manholes Shall Not Be Used To Drain Type I Curbing.

7.) Castings Which Drain Combined Curb And Gutter, Type II Curbing Shall Be Neenah R-3287-15V, East Jordan No. 7565 T1 Or As Approved By Lebanon Utilities. Catch Basin Type C Required. Manholes Shall Not Be Used To Drain Type II Curbing.

8.) Castings Which Drain Combined Curb And Gutter, Type II Curbing Shall Be Neenah R-3287-10V, East Jordan No. 7505 M1, T2 Or As Approved By Lebanon Utilities. Catch Basin Type B Required. Manholes Shall Not Be Used To Drain Type II Curbing.

9.) Castings For Inlets Which Drain Open Pavement Areas Without Curbing Shall Be Neenah R-3405, East Jordan No. 5250 Or As Approved By Lebanon Utilities.

10.) Castings For Manholes Which Drain Open Pavement Areas Without Curbing Shall Be Neenah R-1772-G, East Jordan No. 1022-M2 Or As Approved By Lebanon Utilities.

11.) Castings For Use On Inlets Or Manholes Which Drain Swales Or Dry Bottom Detention Basins Shall Be Neenah R-4342, East Jordan No. 6489 Or As Approved By Lebanon Utilities.

12.) Castings For Manholes Which Do Not Drain Surface Water Shall Be Neenah R-1772-C, East Jordan No. 1022-2 Or As Approved By Lebanon Utilities. All Covers Shall Be Stamped "STORM SEWER" With 2" Raised Letters.

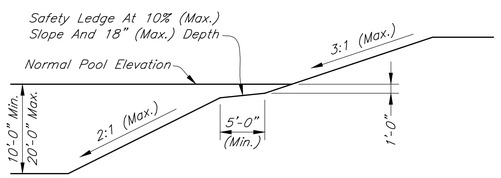
13.) A 2' Sump Below Downstream Pipe Is Required On Any Catch Basin, Type A, B, Or C Which Drains Directly To A Mainline Pipe. Catch Basin Connections Shall Occur At A Manhole. Manholes Which Connect Catch Basins And Mainline Pipe Shall, As A Minimum, Be Located At Each Street Intersection.

14.) The Contractor Shall Remove Soils Under A Precast Bottom, Which In Its Natural State, Have Good Bearing Strength And Which Have Had Its Characteristics Adversely Changed By The Contractor's Operations And Replace With 6 Inches Of #2 Stone.

15.) For Type C Manholes, The Base And First Riser Section Of The Precast Concrete Manhole Shall Be Integrally Cast As One Complete Unit.

16.) Non-Shrink Grout Required In Annular Space And Place 6" Collar On Exterior Of Manhole.

17.) Contractor Shall Install An External Rubber Sleeve Sealing System Wrapped Over The Flange Of The Manhole Frame To 2-Inches Below The Bottom Of The Lowest Adjusting Ring. The External Rubber Sealing Sleeve Shall Have A Minimum Thickness Of 60 Mils And Meet The Requirements Of ASTM C923, ASTM C443 And ASTM F477. The Rubber Sleeve Shall Be Infi-Shield External Manhole Seal, Or As Approved By The Lebanon Utilities.



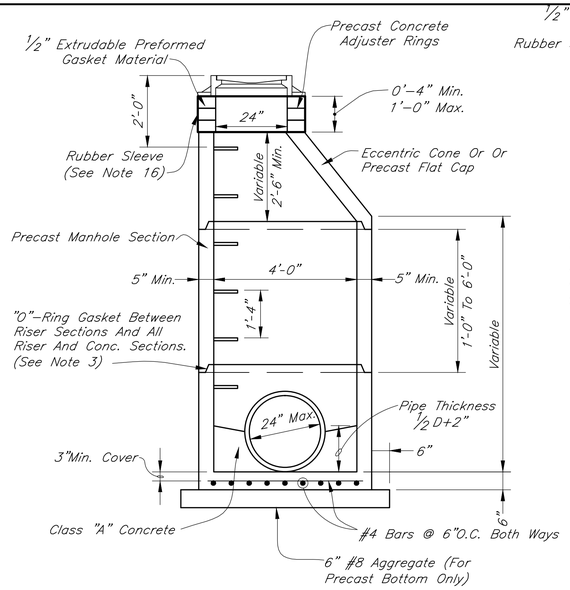
TYPICAL DETENTION POND SECTION

Scale: 1/8" = 1'-0"

1.) Detention Ponds And Detention Basins Shall Be Designed So That Inlet Pipe(s) Are No Closer To The Facility Outlet Than 1/5 The Perimeter Of The Pond Normal Pool Or Dry Basin Bottom, Respectively. A Suitable Sediment Trap Is Required At The Inlet.

2.) Dry Bottom Basins Shall Be Subject To The Maximum Of 3:1 Slope Above The Basin Floor. The Longitudinal Grade Shall Be Subject To The Ditch Requirements As Set Out On This Sheet. The Transverse Grade Shall Be 2% Minimum.

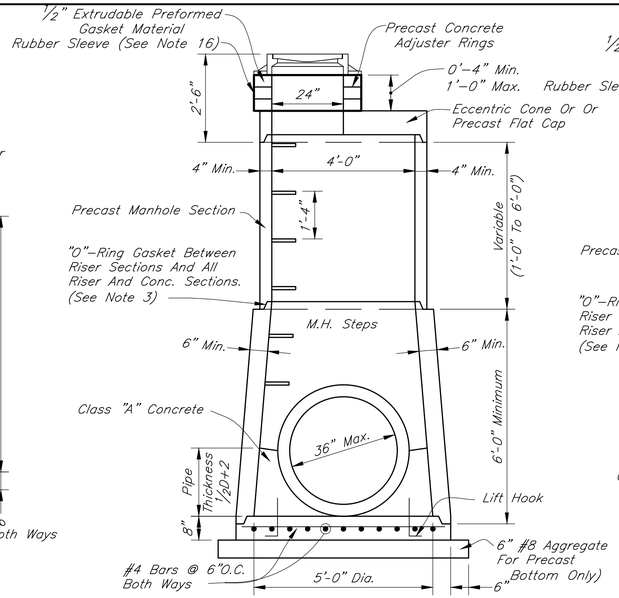
3.) If A Swale Underdrain Is Needed Per The Swale Underdrain Detail And General Note 1, The Outlet From The Dry Basin Shall Be Such As To Ensure Positive Outlet For Underdrain.



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

MANHOLE, TYPE C

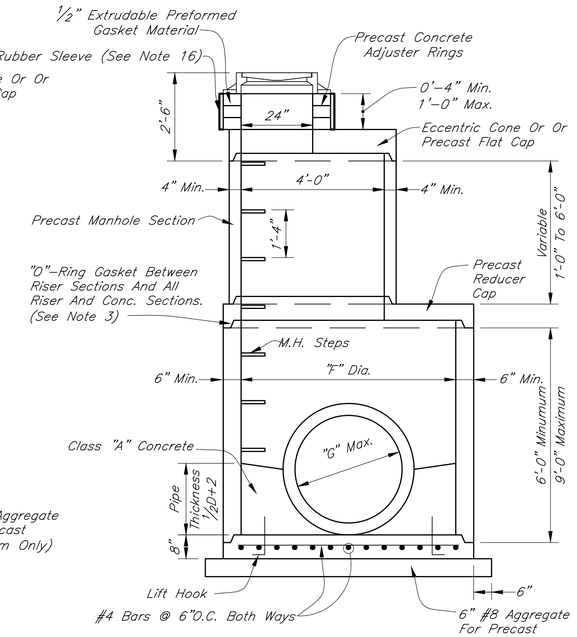
Scale: 1/2"=1'-0"



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

MANHOLE, TYPE H

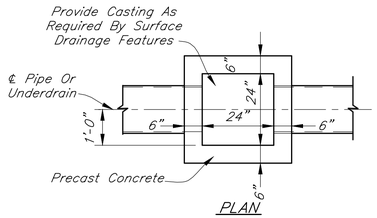
Scale: 1/2"=1'-0"



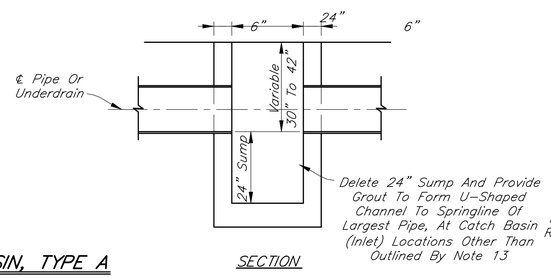
Manhole Type	Manhole Diameter "F"	MAXIMUM PIPE SIZE "G"	
		Pipe Entering / Pipe Exiting At 0°-45° Bend	Pipe Entering / Pipe Exiting At 45°-90° Bend
J	60"	36"	33"
K	72"	48"	36"
L	96"	54"	48"
M	102"	72"	66"
N	108"	84"	72"

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

Scale: 1/2"=1'-0"



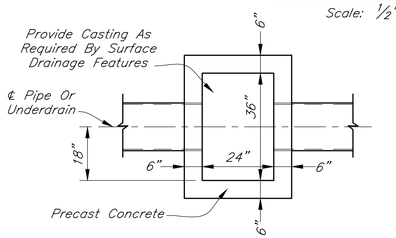
PLAN



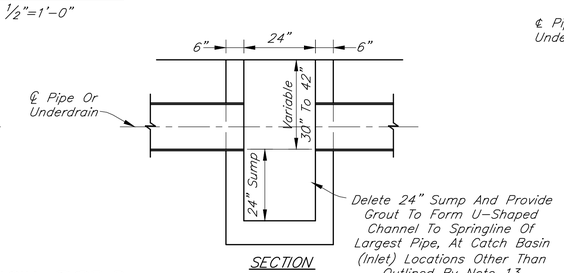
SECTION

CATCH BASIN, TYPE A

Scale: 1/2"=1'-0"



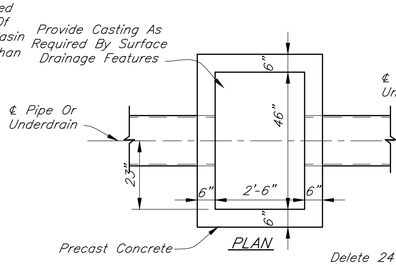
PLAN



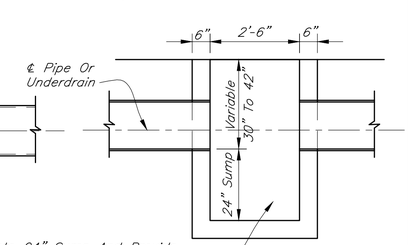
SECTION

CATCH BASIN, TYPE B

Scale: 1/2"=1'-0"



PLAN



SECTION

CATCH BASIN, TYPE C

Scale: 1/2"=1'-0"

REVISIONS		
Rev. No.	Description	Date

DAVID LAHEY — REGISTERED — No. PE19700063 — STATE OF INDIANA — PROFESSIONAL ENGINEER

RECOMMENDED FOR APPROVAL — DESIGN ENGINEER — 10/01/2012 DATE

APPROVED — STREET COMMISSIONER — 10/01/2012 DATE

CITY OF LEBANON

STORM SEWER DETAILS AND NOTES

SHEET 08 OF 18

WATER MAIN MATERIALS

1.) All Pipe Provided For Use In The City Of Lebanon Water System Shall Be Manufactured By Griffith, U.S. Pipe, Or City Approved Equal. All Fittings Provided For Use In The City Of Lebanon Water System Shall Be Manufactured By Clow, Tyler, Union Foundry, Mueller, Or As Approved By Lebanon Utilities Water Department. No SIGMA Or Foreign Materials Shall Be Allowed.

2.) Ductile Iron Pipe For Water Mains Shall Be Centrifugally Cast And Shall Conform To The Latest Revision Of ANSI Specification A21.5 And AWWA C151. Ductile Iron Pipe, 10 Inches In Diameter Or Less, With Push-On Or Mechanical Joints Shall Be Special Thickness Class 50. Ductile Iron Pipe, 12 Inches In Diameter Or Larger, With Push-On Or Mechanical Joints Shall Be Pressure Class 350. The Pipe Shall Be Provided With A Minimum Laying Length Of 18 Feet.

3.) Ductile Iron Fittings, 3 Inches Through 48 Inches, Shall Conform To The Latest Revision Of ANSI Specification A21.10 And AWWA C110. Ductile Iron Compact Fittings, 3 Inches Through 16 Inches Shall Conform To The Latest Revision Of ANSI Specification A21.53 And AWWA C153. Fittings In And Within 2 Feet Of Structures Shall Be Flanged. All Other Fittings Shall Be Mechanical Joint Type.

4.) Ductile Iron Pipe Coatings Shall Conform To The Latest Revision Of ANSI A21.51, AWWA C151, And ANSI A21.4, AWWA C104. Interior Pipe Lining Shall Be Cement-Mortar With Asphaltic Seal Coat. Exterior Pipe Coating Shall Be Standard Asphaltic Coating, Except Exposed Piping Within Structures Shall Receive Shop Priming Compatible With Finish Painting.

5.) Mechanical Joints And Accessories Shall Conform To The Latest Revision Of ANSI Specification A21.10 And AWWA C110. Rubber Gaskets Shall Be Vulcanized Synthetic Rubber And Shall Conform To The Latest Revision Of ANSI Specifications A21.11 And AWWA C111.

6.) Flanged Ductile Iron Pipe Shall Conform To The Latest Revision Of ANSI Specification A21.15 And AWWA C115. Rubber Gaskets Shall Be Either Ring Or Full Face And Shall Be 1/8" Thick. Bolts And Nuts Shall Conform To ANSI B18.2.1 And ANSI B18.2.2.

7.) Push-On Joints Shall Conform To The Latest Revision Of ANSI Specification A21.11 And AWWA C111. Rubber Gaskets Shall Be Vulcanized Synthetic Rubber And Shall Conform To The Latest Revision Of ANSI Specifications A21.11 And AWWA C111.

8.) Service Tubing To Customer Shall Be Polyethylene Tubing For Service Lines And Shall Be Manufactured In Accordance With ASTM F876 And AWWA C904. Tubing Shall Have Copper Tubing O.D. (CTS) And Shall Be DR9 And Be Marked With Size, Manufacturer's Name, Pressure Class, NSF Approval, ASTM And AWWA Specification And Production Code. Stainless Steel Inserts Are Required At All Compression Connections. All Service Tubing To Have Blue Tracer Wire, 12 Gage Minimum.

9.) All Water Main Material Shall Be Installed In Accordance With AWWA C600, And With A Minimum Depth Of Cover Of 54 Inches.

WATER MAIN PRESSURE AND LEAKAGE TESTING

1.) Lebanon Utilities Water Department (765-482-8824) Shall Be Given 48 Hours Written Notice Of The Required Pressure And Leakage Test To Be Performed By The Contractor. The Pressure And Leakage Test Shall Be Performed In Accordance With The Basic Provisions Of AWWA C600. The Testing Procedure Shall Assume A 100 PSIG Working Pressure. The Test Pressure Shall Not Be Less Than 1.25 Times The Working Pressure At The Highest Point Along The Test Section But Not Less Than 150 PSIG At The Point Of Testing. Test Pressure Shall Not Exceed Pipe Or Thrust-Restraint Design Pressures Or Rated Pressure Of The Valves. The Test Pressure Shall Not Vary By More Than ±5 PSI For The 2 Hour Test Duration.

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 Main Until Pressure Reaches 150 PSIG, Stop Pumping When Pressure Reaches 150 PSIG, 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 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 Main From A Calibrated Container Of Water Until Pressure Reaches 150 PSIG, Stop Pumping When Pressure Reaches 150 PSIG, 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.) A Test Section Of Water Main Is Considered Satisfactory If It Meets The Following:

Main Size (Inches)	Allowable Leakage (Gal./Hr./1000 Ft.)
6	0.55
8	0.74
10	0.92
12	1.10

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.

6.) The Operation Of The City Of Lebanon Water System Valves And Hydrants Shall Only Be Conducted By Authorized Lebanon Utilities Water Department Personnel.

WATER MAIN DISINFECTION AND BACTERIOLGICAL TESTING

1.) Lebanon Utilities Water Department (765-482-8824) Shall Be Given 48 Hours Written Notice Of The Required Disinfection, Flushing And Testing Procedures To Be Performed By The Contractor. All Newly Installed Water Mains Shall Be Disinfected In Accordance With ANSI/AWWA C651. Liquid Chlorine, High-Test Calcium Hypochlorite (70 Percent Chlorine), Or High-Test Sodium Hypochlorite (14.7 Percent Chlorine) May Be Used To Provide An Initial Minimum Concentration Of 25 MG/L Of Free Chlorine In All Newly Installed Mains.

2.) A Minimum Concentration Of 10 MG/L Of Free Chlorine Shall Be Maintained In All Parts Of The Newly Installed Mains For 24 Hours Of Contact Time.

3.) Following The Initial 24 Hour Contact Time But Prior To 48 Hours Of Contact Time, All Treated Water Shall Be Thoroughly Flushed From The Newly Laid Pipe At Its Extremity Until The Replacement Water Has A Chlorine Residual Equal To Distribution System Residual.

4.) After Flushing, Two Consecutive Water Samples Shall Be Collected On Successive Days From The Treated Piping System As Directed By Lebanon Utilities Water Department. Each Sample Shall Show Satisfactory Bacteriological Results.

5.) The Taking Of Samples And The Testing Of Chlorine Residual Shall Be Carried Out By The Contractor At The Direction Of Lebanon Utilities Water Department. A Copy Of The Test Results Shall Be Provided To Lebanon Utilities Water Department.

WATER MAIN GENERAL NOTES

1.) Provide A Valve On All Runs And Branches Per The Connection Details On Sheet 10 Of The Lebanon Standards Even When Such Runs Or Branches Are Stubs For Future Extensions.

2.) Water Mains Shall Follow The Alignment Of The Road And Remain 2 Feet Behind The The Back Of Curb On One Side Of The Street W/Out Alternating From Such Side.

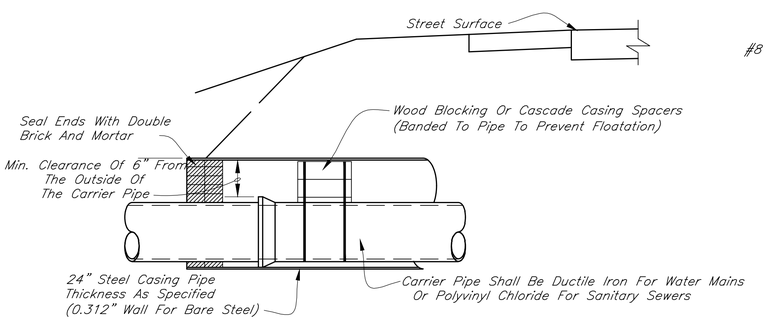
3.) All Water Pipe Shall Be Installed In Accordance With AWWA C600 And With A Minimum Depth Of Cover Of 54 Inches.

4.) For Cul-De-Sacs Run Main Straight-Thru To Back Of Cul-De-Sac, Set Reducer As Required And Provide 6" Valve And Fire Hydrant Per Typical Hydrant Installation Detail On Sheet 10. For Intended Temporary Ends Of Projects, (i.e. Phases Of Development), Terminate With Main Valve Followed By 60' To 80' Of Main With PE-PE Reducer As Required, And Provide Fire Hydrant With Hydrant Shoe Connected To Pipe/Reducer Directly.

5.) Use Polyethylene Cross-Linked Wrap Around All Water Main

STEEL CASING REQUIREMENTS FOR WATER MAINS

1.) All Water Mains That Are At Least Two Inches In Diameter And That Are To Be Placed Under An Existing Or Proposed Street Other Than Local Residential Street Must Be Placed Inside A Casing Pipe. The Casing Pipe Must Be Sized Appropriately And Installed In A Way That Is Acceptable To The Lebanon Utilities Water Department.



TYPICAL STREET CASING DETAIL FOR UP TO 12" CARRIERS

Scale: None

1.) Bored Or Jacked Crossings Require Intimate Knowledge Of Site Conditions; Therefore, Construction Is Subject To Certified Special Provisions Prepared By The Design Engineer.

2.) Casings Depicted Hereon Do Not Necessarily Comply With INDOT Permit Requirements, But Are Intended To Be Used For Crossings Of Public Roads Under The Jurisdiction Of The City Of Lebanon When Open Cut Of Such Roads Is Not Permitted.

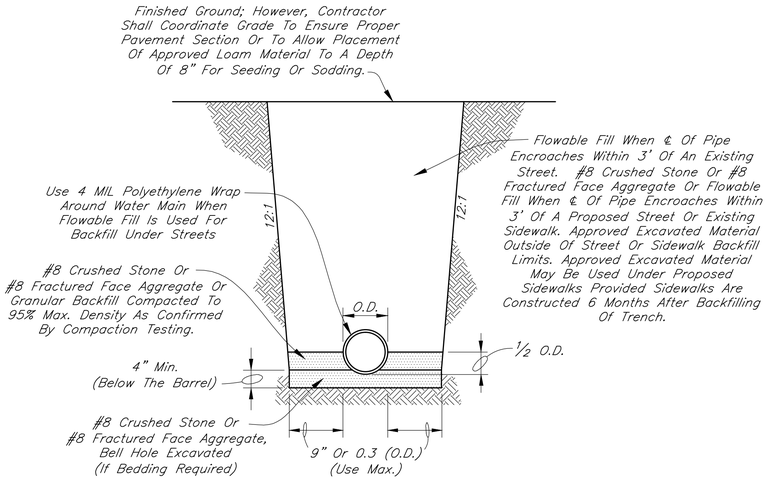
3.) Refer To Appropriate Lebanon Standards For Carrier Pipe Requirements.

AS-BUILT DRAWINGS AND WARRANTIES

1.) As-Built Drawings Shall Be Submitted To Lebanon Utilities Water Department. As-Built Drawings Shall As A Minimum Provide Two Perpendicular Horizontal Measurements And A Vertical Measurement To All Fittings, Valves, And Deflections In Pipe. Where Applicable, Contractor Shall Dimension The Location Of The Water Main From Back-Of-Curb. Contractor Shall Submit As-Built Drawings Within 30 Days Of Successful Completion Of All Testing Requirements.

2.) Contractor Is Responsible For All Leaks, Faulty Hydrants, Broken Mains, Etc., For One Year After The Date Of Acceptance By The City.

3.) It Is The Contractor's Responsibility To Make Sure The Discharge Of Concentrated Chlorine Does Not Have A Negative Impact On Any Aquatic Life



Pipe Size	6" TO 14"	16" And Over
Bedding Below The Pipe Barrel	O.D./4 Min.=4"	O.D./4 Max.=8"

DI PIPE BEDDING DETAIL

Scale: None

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DAVID LAHEY REGISTERED No. PE19700063 STATE OF INDIANA PROFESSIONAL ENGINEER

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APPROVED	UTILITIES MANAGER	10/01/2012 DATE
APPROVED	WATER/WASTEWATER OPERATIONS MANAGER	10/01/2012 DATE

CITY OF LEBANON

WATER MAIN BEDDING DETAILS AND NOTES

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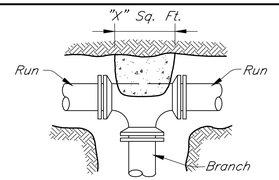


TEE OR DEAD-END CROSS

MINIMUM LENGTH OF RESTRAINED JOINT D.I. PIPE (WITH POLY WRAP) EACH SIDE OF FITTING (FEET)				
PIPE SIZE	6"	8"	12"	16"
Tee Including Thrust Block (See Note 5)	68	96	146	194
Horizontal 90° OR Vertical 45° Down	24	31	43	55
Horizontal 45° OR Vertical 22 1/2° Down	10	13	18	23
Horizontal 22 1/2° OR Vertical 11 1/4° Down	5	7	9	11
Horizontal 11 1/4°	3	3	5	6
Dead End	91	120	169	218

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 54" Cover, 150 PSI Pressure, And ASTM D2487 Soil Types CL, ML, SC, SM, SP, SW, GC, GM, GP, & GW. For Less Cover, Higher Pressure, Or ASTM D2487 Soil Types PT, OH, CH, MH, & OL, Consult Lebanon Utilities Water Department.

3.) Restraint To Be Accomplished With Romac Series 600 Or Ford/Uni-Flange Series 1300 Friction Clamps For Push-On Joints, Anchoring Coupling For Valves And Adjacent Tees, Romac Gripring Or Megalug Series 1100 For All Mechanical Joints, Or As Approved By Lebanon Utilities Water Department.

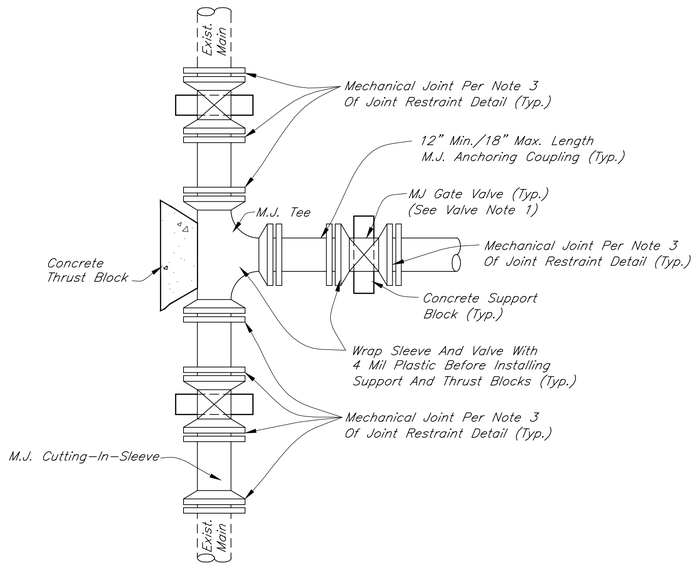
4.) Concrete Thrust Blocks In Lieu Of Mechanical Restraint May Be Used Only With The Written Approval Of Lebanon Utilities Water Department.

5.) 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, & 10 Square Feet For 6, 8, 12, & 16 Inch Pipe, Respectively. Other Than Restraint Of MJ Fittings Adjacent To Tee, No Run Restraint Length Is Required.

6.) Concrete Shall Not Be Allowed To Come In Contact With Any Joint, Flanges, Gaskets, Bolts Or Nuts. Four Mil High Density Polyethylene Plastic Shall Be Used To Cover All Fittings, Piping And Valves Prior To Pouring The Thrust Block.

JOINT RESTRAINT DETAIL

Scale: None

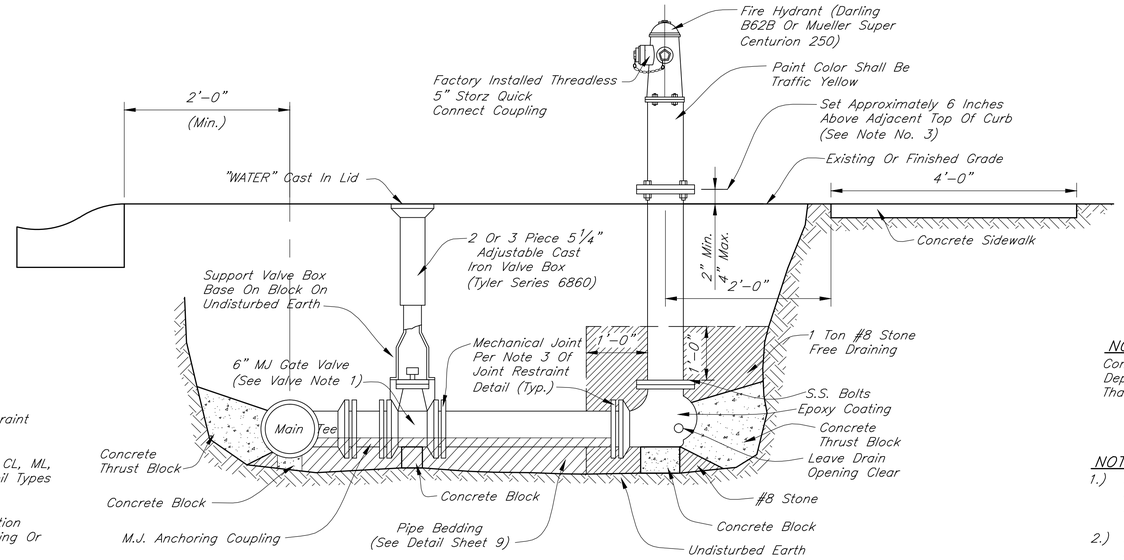


CUTTING-IN-SLEEVE AND TEE CONNECTION

Scale: None

NOTES:

1.) Contractor Must Obtain Written Approval From Lebanon Utilities Water Department In Order To Use Either The Tapping Sleeve And Valve Connection Or The Cutting-In-Sleeve And Tee Connection.



TYPICAL HYDRANT INSTALLATION DETAIL

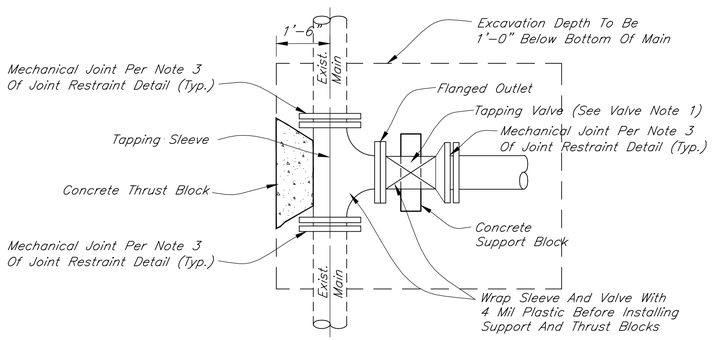
Scale: None

NOTES:

1.) Hydrants Shall Be Provided At Each Street Intersection And At Intermediate Points Between Intersections Or As Directed By The Lebanon Utilities Water Department Or The Lebanon Fire Department.

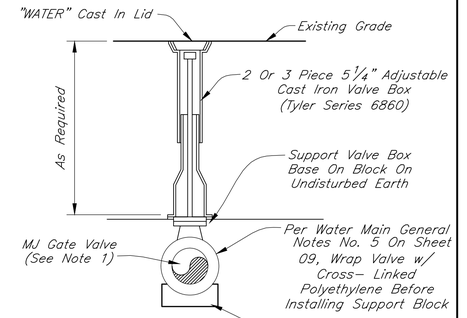
2.) Generally, Hydrants Shall Be Spaced Per The Requirements Of Appendix III-B Of The Uniform Fire Code. In Addition, When Any Portion Of A Building Is In Excess Of 150 Feet From A Water Supply On A Public Street, On-Site Fire Hydrants And On-Site Mains Shall Be Provided As Outlined By Section 903.2 Of The Uniform Fire Code.

3.) Extensions Are The Responsibility Of The Developer



TAPPING SLEEVE AND VALVE CONNECTION

Scale: None



NOTES:

Consult Lebanon Utilities Water Department For Valves With Bury Depth In Excess Of 10 Feet. Use Longer Model For Depth Greater Than Minimum.

TYPICAL VALVE INSTALLATION DETAIL

Scale: None

NOTES:

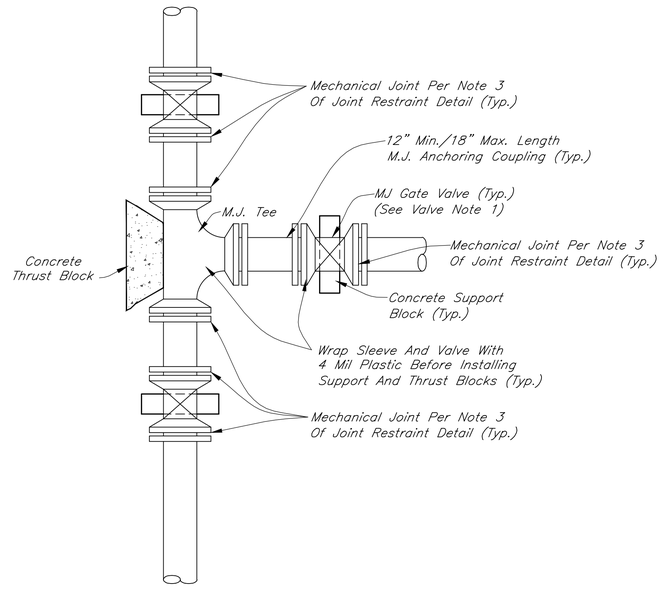
1.) All Gate Valves Shall Be Either American Flow Control 2500, U.S. Pipe Metroseal 250, Waterous Company Series 500 Or Mueller A-2360.

2.) All Gate Valves Shall Be Assembled With Factory Installed Stainless Steel Bolts.

3.) All Valves Shall Open Counterclockwise.

4.) Lebanon Utilities Water Department Prefers The Use Of A 2 Piece Valve Box. When Needed Due To Increased Depth, A 3 Piece Valve Box May Be Used.

5.) Lebanon Utilities Customers Must Purchase Meters Through The Utilities To Be Valid. No Meter Will Be Acknowledged For Credit Purposes Other Than Approved In Writing Or Purchased By The Utilities.



STANDARD NEW WORK BRANCH CONNECTION

Scale: None

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CITY OF LEBANON

WATER MAIN DETAILS & NOTES

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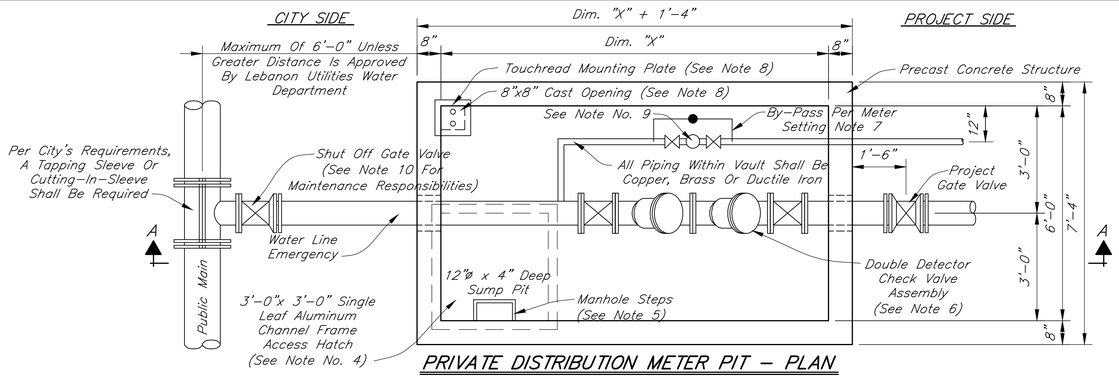
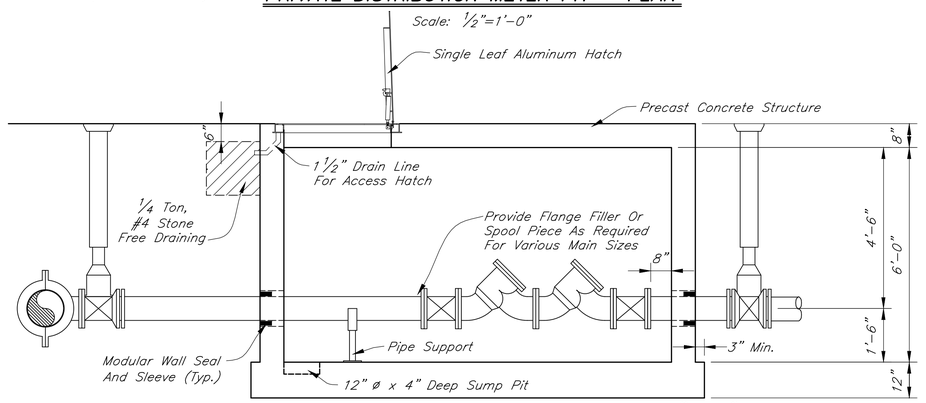


PRIVATE DISTRIBUTION METER PIT – PLAN

Scale: ½"=1'-0"



PRIVATE DISTRIBUTION METER PIT – SECTION "A-A"

Scale: ½"=1'-0"

	4" TURBINE	6" TURBINE	8" TURBINE
Dim. "X"	8'-4"	8'-4"	9'-8"

PRIVATE DISTRIBUTION METER PIT NOTES:

1.) Provide #4 Rebars At 12" O.C. In Top, Bottom And All Sides.

2.) All Labor And Materials To Be Provided By The Developer, Except City Will Furnish Meter And Developer Shall Install Meter, And Developer Shall Provide Mounting Plate And City Will Install Touchread.

3.) Piping, Valves, Double Detector Check Valve Assembly And Meter Shall Be Same Size Throughout. Other Than Dim. "X", Meter Pit Dimensions Shall Be Maintained For 4", 6" And 8" Mains.

4.) Access Hatch Shall Be On Meter Side Of Pit And Shall Be Bilco Model J-4AL With Drain Coupling Or As Approved By Lebanon Utilities Water Department.

5.) Manhole Steps Shall Be Neenah R-1981-J, East Jordan No. 8512, M.A. Industries PS-1-PF, Or As Approved By Lebanon Utilities Water Department.

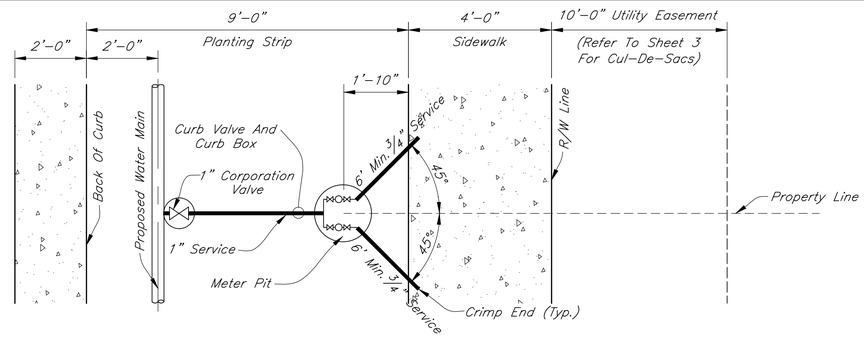
6.) Double Detector Check Valve Assembly Shall Be Watts Series 709, Wilkins Model 950, Febco Model 806, Or As Approved By Lebanon Utilities Water Department.

7.) Piping In And Within 2 Feet Of Meter Pit Shall Be Class 53 Flanged Ductile Iron Pipe. Transition To Class 50 At A Mechanical Joint.

8.) Provide 1/4"x12"x12" Cast Iron Plate With Two 1-5/8" Diameter Holes At 4" On Center For Touchread Mounting. After SSPC-SP-6 Preparation, Paint Plate With 5 Mils DFT Tnemec 74-ANSI No. 61 Gray Over 3 Mils DFT Tnemec 90-97 Primer. Center Plate Over 8"x8" Opening. Secure Plate With Four 1/4"ø 304 S.S. Anchor Bolts, Nuts & Washers.

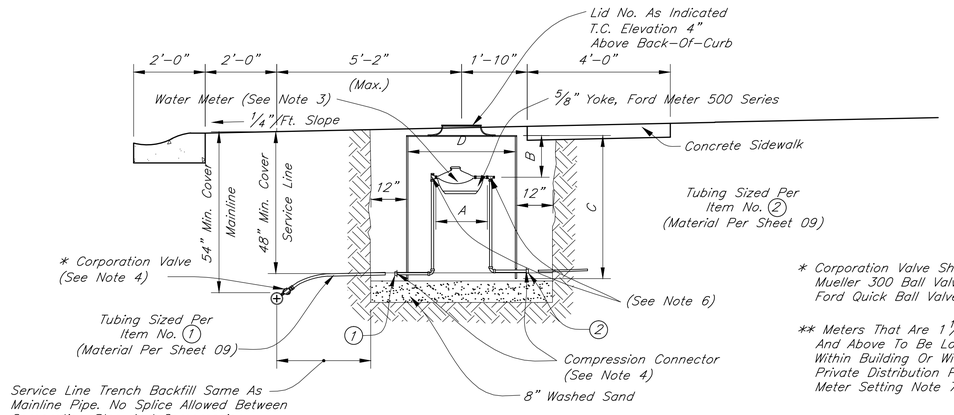
9.) Refer To Typical Meter Setting Detail And Meter Setting Notes Regarding Domestic Water Service Lines.

10.) The Lebanon Utilities Water Department Does Not Maintain Past The City Side Shut Off Gate Valve As The Downstream Side Of The Valve Begins The Private System.



TYPICAL DUAL METER SETTING PLAN

Scale: None



* Corporation Valve Shall Be Mueller 300 Ball Valve Or Ford Quick Ball Valve.

** Meters That Are 1 ½", 2" And Above To Be Located Within Building Or Within Private Distribution Pit Per Meter Setting Note 7

TYPICAL METER SETTING PLAN

Scale: None

	DUAL 5/8"x3/4"	SINGLE 5/8"x3/4"	SINGLE 1"x1"	SINGLE 2"x2"
Mueller Part No.	203RD2148RBBN	203RS1848RBBN	330RS2148RBBN	550VB3648FBB
Ford Part No.	PDSBHH24420-48	PSBHH14418-48	PSBHH44420-48	PSBHH-788-36HB-48
Dim A	7.88"	7.88"	11.125"	17.25"
Dim B	7"	7"	7"	16.5"
Dim C	48"	48"	48"	48"
Dim D	21" I.D.	18" I.D.	21" I.D.	36" I.D.
Lid No.	Ford C34-TT Lid	Ford C32-TT Lid	Ford C34-TT Lid	Ford C34-TT Lid W/Ring
①	¾" Compression	¾" Compression	1" Compression	2" Compression
②	¾" Compression	¾" Compression	1" Compression	2" Compression

METER SETTING NOTES:

1.) Other Than Meter Itself, All Items Within Meter Setting Included Under Referenced Part Number.

2.) Residential Construction Requires The Use Of Dual Meter Installations Whenever Possible.

3.) Water Meters For New Meter Settings Are Furnished By The Lebanon Utilities Water Department And Installed By The Developer.

4.) Contractor Shall Make All Tubing Connections Utilizing Mueller Or Ford Compression Connectors. Curb Valve And Box Required On City Side Of Meter.

5.) Contractor To Install Angle Inverted Key Service Valves As Manufactured By Ford Meter Box Company.

6.) 1 ½" And 2" By-Pass Around Meter With Locking Valve.

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CITY OF LEBANON

WATER MAIN METER SETTING & PITS

SHEET 11 OF 18

SANITARY SEWER POLYVINYL CHLORIDE (PVC) PIPE

1.) PVC Pipe Diameters Of 4 Inches Through 15 Inches Shall Meet Or Exceed All The Requirements Of ASTM D3034, And Shall Have A Cell Classification Of 12454-B, 12364 Or 13364. Reference Should Be Made To ASTM D1784 For A Summarization Of Cell Class Properties. PVC Pipe Diameters Greater Than 15 Inches Shall Meet Or Exceed All Requirements Of ASTM F679, And Shall Have A Minimum Cell Classification Of 12454 Or 12364.

2.) The Minimum Wall Thickness Of PVC Pipe, 4 Inches Through 15 Inches In Diameter, Shall Conform To SDR-26, Type PSM, As Specified In ASTM D3034 (See Note 5 For Fittings). The Minimum Wall Thickness For PVC Pipe Greater Than 15 Inches Shall Conform To TPVC PS115, As Specified In ASTM F679. PVC PS115 Pipe Shall Have A Minimum Pipe Stiffness Of 115 Pounds Per Square Inch For Each Diameter When Measured At Five Percent Deflection And Tested In Accordance With ASTM D-2412.

3.) PVC Open Profile Or Closed Profile Sewer Pipe Shall Meet Or Exceed All Requirements Of ASTM F794 Or ASTM F949, And Shall Have A Minimum Cell Classification Of 12454 And A Minimum Uniform Pipe Stiffness Of 50 Pounds Per Square Inch For Each Diameter When Measured At Five Percent Deflection And Tested In Accordance With ASTM D2412 (See Note 5 For Fittings). Contractor May Only Use PVC Open Profile Or Closed Profile Pipe Where Sewer Pipe Diameter Is Between 18 Inches And 30 Inches. Pipe Joints Shall Have A Bell Wall, Gasket Groove And Spigot Which Is Integral With The Pipe.

4.) 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.

5.) Pipe Fittings Shall Be SDR-26 Manufactured Fittings Made Of PVC Plastic Having A Cell Classification Of 12454, Or 13343, As Defined In ASTM D1784. Saddle Connections Shall Not Be Allowed For New Construction. Lateral Connections Shall Occur At SDR-26 Tee-Wyes.

6.) 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.

7.) Installation Shall Be In Accordance With ASTM Recommended Practice D2321.

TABLE 1

SPECIFICATION TIME REQUIRED FOR A 1.0 PSIG PRESSURE DROP
FOR SIZE AND LENGTH OF PIPE INDICATED FOR Q=0.0015

1 Pipe Diameter (In.)	2 Minimum Time (Min:Sec.)	3 Length For Minimum Time (Ft.)	4 Time For Longer Length (Sec.)	Specification Time For Length (L) Shown (Min.:Sec.)							
				100 Ft.	150 Ft.	200 Ft.	250 Ft.	300 Ft.	350 Ft.	400 Ft.	450 Ft.
4	3:46	597	.380L	3:46	3:46	3:46	3:46	3:46	3:46	3:46	3:46
6	5:40	398	.854L	5:40	5:40	5:40	5:40	5:40	5:40	5:42	6:24
8	7:34	298	1.520L	7:34	7:34	7:34	7:34	7:36	8:52	10:08	11:24
10	9:26	239	2.374L	9:26	9:26	9:26	9:53	11:52	13:51	15:49	17:48
12	11:20	199	3.418L	11:20	11:20	11:24	14:15	17:05	19:56	22:47	25:38
15	14:10	159	5.342L	14:10	14:10	17:48	22:15	26:42	31:09	35:36	40:04
18	17:00	133	7.692L	17:00	19:13	25:38	32:03	38:27	44:52	51:16	57:41
21	19:50	114	10.470L	19:50	26:10	34:54	43:37	52:21	61:00	69:48	78:31
24	22:40	99	13.674L	22:47	34:11	45:34	56:58	68:22	79:46	91:10	102:33
27	25:30	88	17.306L	28:51	43:16	57:41	72:07	86:32	100:57	115:22	129:48
30	28:20	80	21.366L	35:37	53:25	71:13	89:02	106:50	124:38	142:26	160:15
33	31:10	72	25.852L	43:05	64:38	86:10	107:43	129:16	150:43	172:21	193:53
36	34:00	66	30.768L	51:17	76:55	102:34	128:12	153:50	179:29	205:07	230:46

NOTE:

For More Efficient Testing Of Long Test Sections And/Or Sections Of Larger Diameter Pipes, A Timed Pressure Drop Of 0.5 PSIG May Be Used In Lieu Of The 1.0 PSIG Timed Pressure Drop. If A 0.5 PSIG Pressure Drop Is Used, The Required Test Time Shall Be Exactly Half As Long As Those Shown Above.

TABLE 2: Manhole Vacuum Test Times Table

Depth Of Manhole (Feet)	Diameter Of Manhole						
	48"	60"	72"	84"	96"	108"	120"
	Minimum Time (Seconds)						
8	20	26	33	39	45	51	57
10	25	33	41	48	56	64	72
12	30	39	49	58	67	77	86
14	35	46	57	68	79	89	100
16	40	52	67	77	90	102	114
18	45	59	73	87	101	115	129
20	50	65	81	96	112	127	143
22	55	72	89	106	123	140	157
24	59	78	97	116	134	153	171
26	64	85	105	125	145	166	186
28	69	91	113	135	157	178	200
30	74	98	121	144	168	191	214

SANITARY SEWER LATERAL PIPE AND FITTINGS

1.) Service Laterals Shall Be Either SDR-26 Or Schedule 40 PVC Pipe From The Sewer Main To The Property Line. Service Laterals Shall Be Either SDR-26, SDR-35 Or Schedule 40 PVC Pipe Outside Of The Right-Of-Way.

2.) Joints Shall Be Flexible Gasket Push-On-Compression Type Conforming To ASTM D3212 And ASTM F477. Solvent Cement Joints Are Allowed For Service Laterals.

3.) Lateral Size Shall Be A Minimum Of 6 Inches In Diameter Between Mainline Sewer And Right-Of-Way. 90 Degree Bends Are Prohibited.

4.) All Laterals Shall Be Inspected By Lebanon Utilities Sewer Department Prior To Backfilling. Prior To Receiving Approval Of The Lateral, Contractor Shall Provide The Following Information On A Legible Diagram: Depth And Position Of Lateral Between Mainline Sewer To The Building, Lot Number, Address, Date And Time Of Installation, Pipe Material, Bedding Type, Pipe Installer And City Inspector.

5.) A Minimum Of One Cleanout Shall Be Installed For Each Lateral. Where The Length Of A Lateral Exceeds 100 Feet, Then One Cleanout Shall Be Installed For Every 100 Feet Of Lateral Length. Cleanouts Are Required Adjacent To Buildings At 18" Or 24" As Per Plumbing Code.

6.) Contractor Shall, When Curbs Are Available, Engrave A 3-Inch High By 1/8-Inch Deep "S" On The Curb Directly Above Each Service Lateral. Where Curbs Are Not Available, Contractor Shall Notch The Sidewalk Directly Above Each Service Lateral.

7.) A Separate Lateral Sewer Is To Be Constructed From Each Side Of The Common Wall(s) Separating Units Of Multi-Unit Housing (Sometimes Referred To As Doubles, Triples And Quads), Up To And Including 4-Units, With Each Lateral Sewer Connecting To The Public Mainline Sewer

SANITARY SEWER LEAKAGE TESTING

1.) Lebanon Utilities Sewer Department (765-482-8843) Shall Be Given 48 Hour Written Notice Of The Required Leakage Testing Procedure To Be Performed By The Contractor. 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 (Maximum Test Pressure Is 9 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 When 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 1 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.

SANITARY SEWER DEFLECTION TESTING

1.) Lebanon Utilities Sewer Department (765-482-8843) Shall Be Given 48 Hour Written Notice Of The Required Deflection Testing Procedure To Be Performed By The Contractor. An In-Place Deflection Test Shall Be Performed On All Flexible Pipe Installed Within The City Of Lebanon For The Purposes Of Conveying Sanitary Sewage. An Allowable Deflection Of 5 Percent Internal Pipe Diameter Will Be Acceptable After All Backfilling Has Been In Place For 30 Days. A Nine-Point, "Go-No-Go" Mandrel Shall Be Used For The Defection Test. A Proving Ring Shall Be Provided For Each Mandrel.

2.) All Pipe Exceeding The Allowable Deflection Shall Be Replaced Or Rerounded. The Replaced Or Rerounded Section Shall Be Retested 30 Days After Replacement Or Rerounding. The Contractor Shall Bear All Costs For Testing And Testing Equipment. The "Go-No-Go" Mandrel Shall Be Manually Pulled Without The Use Of Any Winching Or Other Mechanical Device.

SANITARY SEWER TELEVISING AND AS-BUILT DRAWINGS

1.) The Lebanon Utilities Sewer Department (765-482-8843) Shall Be Given 48 Hour Written Notice Of The Required Televising Procedure To Be Performed By The Contractor. A Camera Equipped With Remote Control Devices To Adjust The Light Intensity And 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 The Lebanon Utilities Sewer Department 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. An Audio Voice-Over Shall Be Made During The Inspection Identifying Any Problems.

2.) The Pipe Shall Be Thoroughly Cleaned Before The Camera Is Installed And Televising Is Commenced.

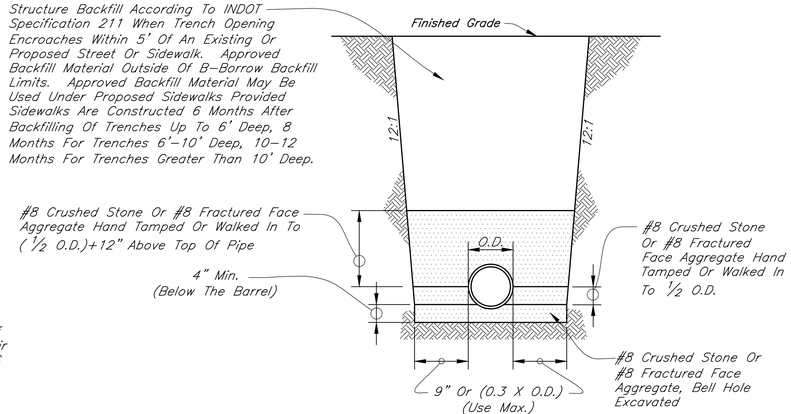
3.) If Any Pipe And/Or Joint Is Found To Be Leaking, The Contractor Shall Repair That Portion Of The Work To The Satisfaction And Approval Of The Lebanon Utilities Sewer Department.

4.) The DVD Disc Of The Entire Sewer Line, Reproduction Map Indicating The Pipe Segment Numbers Of All The Pipe That Has Been Televised, And As-Built Drawings Shall Be Submitted To Lebanon Utilities Sewer Department For Their Records. Contractor Shall Submit DVD's And As-Built Drawings Within 30 Days Of Successful Completion Of All Testing Requirements.

SANITARY SEWER GENERAL NOTES

1.) Contractor Shall Allow Lebanon Utilities Sewer Department The Opportunity To Inspect The Installation Of The Pipe And Bedding Material Prior To Proceeding With Backfilling An Open Trench. Lebanon Utilities Sewer Department (765-482-8843) Shall Be Given 48 Hours Notice Of The Contractor's Intent To Install Sanitary Sewer Piping And Structures.

2.) For PVC Force Mains, Contractor Shall Place Both 10 Gauge Insulated, Solid Copper Wire And Polyethylene Identification Tape. Both Items Shall Be Highly Resistant To Alkalis, Acids And Other Destructive Agents Found In Soil. The 10 Gauge Tracer Wire Shall Be Attached Directly To The Outside Of The Force Main Every 10 Feet. Tracer Wire Termination Shall Be Internal To A Water Tight Manhole Or Valve Pit. The Polyethylene Identification Tape Shall Have A Minimum Thickness Of 4 Mils And Shall Clearly Identify The Type Of Utility Underground. Polyethylene Tape Shall Be Placed Directly Over Pipe 1'-6" Below Final Grade.



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

See Development Standards For Lateral Pipe Bedding

PVC PIPE BEDDING DETAIL

Scale: None

REVISIONS		
Rev. No.	Description	Date

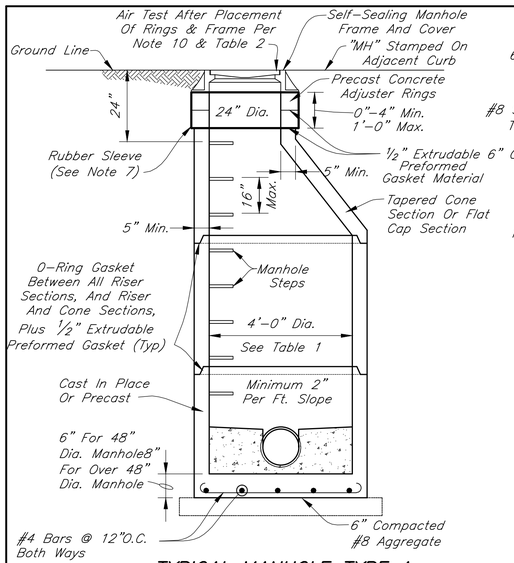
DAVID LAHEY REGISTERED No. PE19700063 STATE OF INDIANA PROFESSIONAL ENGINEER

RECOMMENDED FOR APPROVAL	DESIGN ENGINEER	10/01/2012 DATE
APPROVED	UTILITIES MANAGER	10/01/2012 DATE
APPROVED	WATER/WASTEWATER OPERATIONS MANAGER	10/01/2012 DATE

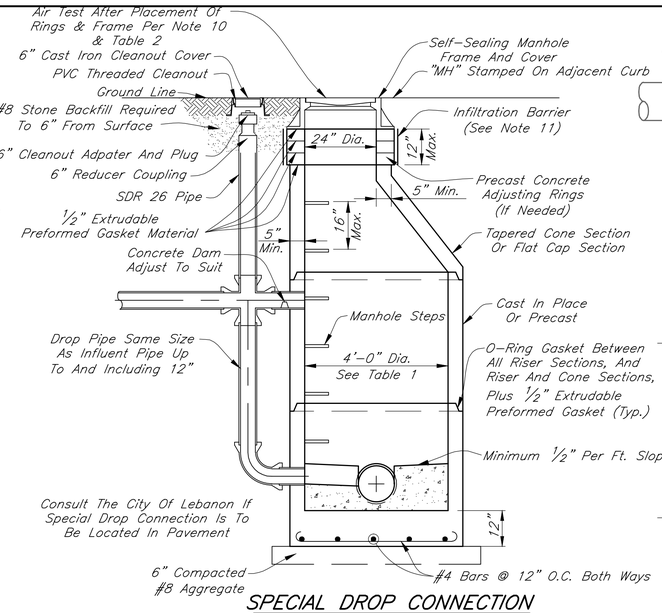
CITY OF LEBANON

SANITARY SEWER BEDDING DETAILS AND NOTES

SHEET 12 OF 18

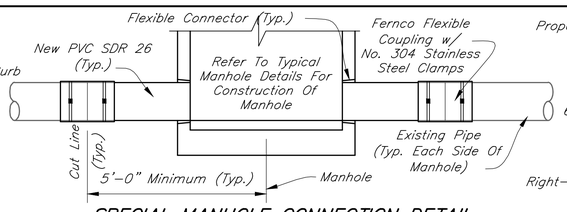


TYPICAL MANHOLE TYPE A



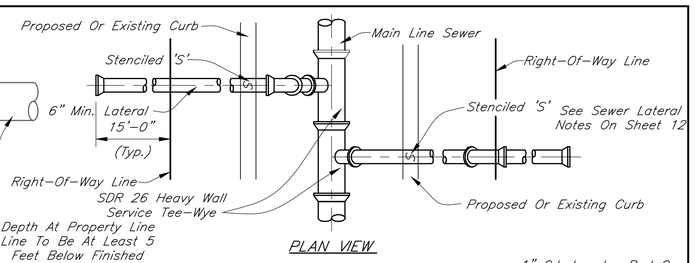
SPECIAL DROP CONNECTION

Scale: ½" = 1'-0"
(For Use Outside Of Pavement Only)

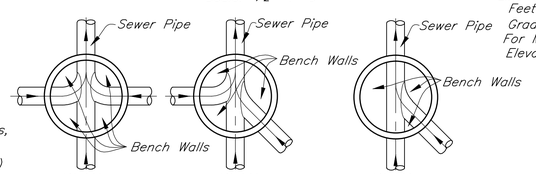


SPECIAL MANHOLE CONNECTION DETAIL

Scale: ½"=1'-0"



PLAN VIEW

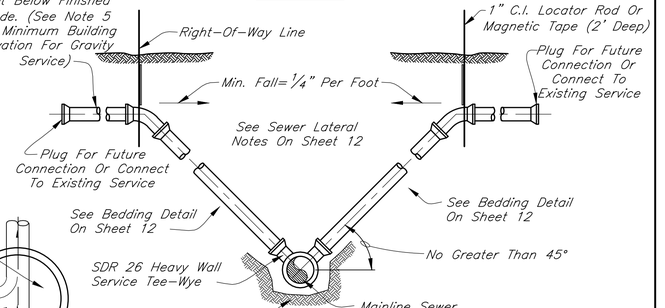


Note: All Bench Walls To Be Sloped @ 2"/Ft.

BENCH WALL DETAILS

Scale: None

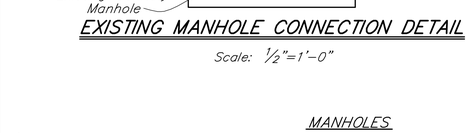
BENCH WALL DETAIL WITH DROP



ELEVATION VIEW

SERVICE CONNECTION FOR DEEP SEWERS (15' DEEP AND OVER)

Scale: None



EXISTING MANHOLE CONNECTION DETAIL

Scale: ½"=1'-0"

TABLE 1: Manhole Diameter Table		
Pipe Size	Minimum Manhole Diameter	
	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-Lock Connector

MANHOLES

1.) Precast Concrete Manholes Shall Conform To ASTM C478, With Rubber Type Gaskets Equal To ASTM C-443. Monolithic Cast-In-Place Manholes Shall Only Be Used With The Prior Written Approval Of Lebanon Utilities Sewer Department. The Base And First Riser Section Of The Precast Concrete Manhole Shall Be Integrally Cast As One Complete Unit. Precast Concrete Cones Shall Be Of The Eccentric Cone Type. No "See Through" Lift Holes Shall Be Allowed On Precast Concrete Manholes 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 City Approved Equal) Conforming To AASHTO M-198 And Federal Specifications Specifications SS-S-210A. Manhole/Sewer Connection Shall Be Made With A Flexible Watertight Connection.

2.) Final Adjustment In Elevation Of The Frame And Cover Shall Be Accomplished By The Use Of A 4 Inch Minimum Thickness Adjusting Ring As Detailed Herein To A Maximum Combined Thickness Of 12 Inches. Brick Or Block Shall Not Be Used In The Construction Of A Manhole Or To Adjust The Elevation Of The Frame And Cover.

3.) Manhole Ladder Rungs Shall Be Neenah No. R-1981-J, East Jordan Iron Works No. 8512, M. A. Industries No. PS 1-PF Or As Approved By Lebanon Utilities Sewer Department.

4.) Manhole Frame And Cover Shall Be Neenah R-1772-C With Lightweight Gasketed Lid, East Jordan 1022-Z1 With Gasketed Lid, Or As Approved By Lebanon Utilities Sewer Department. When Watertight Frame And Cover Are Required By Lebanon Utilities Sewer Department Or Developer, Neenah R-1772-C With Locking Lid, East Jordan 1022-3WT With Locking Lid, Or As Approved By Lebanon Utilities Sewer Department Shall Be Provided. All Covers Shall Be Stamped "SANITARY SEWER" With 2" Raised Letters.

5.) The Lowest Elevation To Receive Gravity Sanitary Service Must Be One (1) Foot Above The Top Of Manhole Casting Elevation Of Either The First Upstream Or Downstream Manhole On The Public Sewer To Which Connection Is To Be Made. Those Portions Of The Building Not Meeting The Stated Gravity Sanitary Service Requirement Shall Be Provided And Maintained By The Property Owner With A Grinder Pump System Or Lebanon Utilities Sewer Department Approved Equal Discharging To The Gravity Building Connection Outside Of The Public Right-Of-Way.

6.) Manholes Shall Be Installed At Distances Not Greater Than 400 Feet.

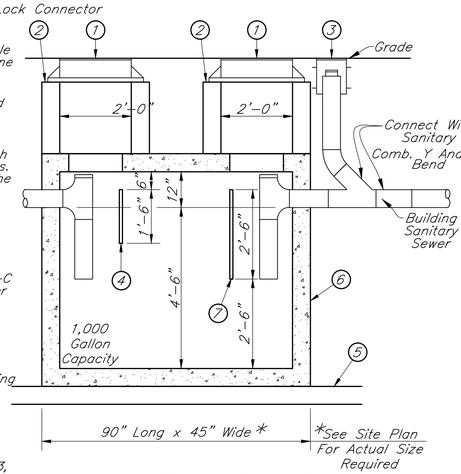
7.) Contractor Shall Install An External Rubber Sleeve Sealing System Wrapped Over The Flange Of The Manhole Frame To 2-Inches Below The Bottom Of The Lowest Adjusting Ring. The External Rubber Sealing Sleeve Shall Have A Minimum Thickness Of 60 Mils And Meet The Requirements Of ASTM C923, ASTM C443 And ASTM F477. The Rubber Sleeve Shall Be Infi-Shield External Manhole Seal, Or As Approved By Lebanon Utilities Sewer Department.

8.) Apply Bituminuous Coating, Hydrocide 700 Mastic, On The External Face At All Manhole Section Joints. Hydrocide Mastic Shall Be Applied To 6" Above And Below Each Joint. Apply Non-Shrink Mortar Or Epoxy Grout On The Internal Face At All Manhole Section Joints.

9.) Commercial Taps As Determined By The Lebanon Utilities Sewer Department Shall Have Lateral Connections Made Directly To An Existing Or Proposed Manhole Using Details Per This Sheet.

10.) All Sanitary Manholes Shall Be Vacuum Tested With Castings Per ASTM C124 Following Full Installation. All Sanitary Manhole Sections Shall Be Vacuum Tested In the Shop Prior To Shipping.

11.) Infiltration Barrier Shall Be 60 Mils Minimum EPDM Sealed With A 2 Inch Mastic Strip To Cone (Manhole) And To Top Of Casting Lip And Shall Be Infi-Shield Or City Approved Equal.



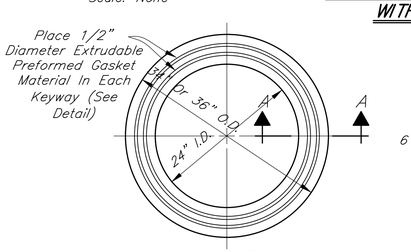
Grease Interceptor Subject To Sanitary Sewer Manhole Construction Requirements Including Vacuum Testing

GREASE INTERCEPTOR DETAIL

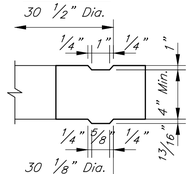
Not To Scale

NOTES:

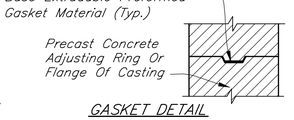
1. Cast Iron Manhole Frame And Cover R-6462-FH Or Approved Equal
2. 24" Diameter Concrete Pipe Riser
3. Cast Iron Cleanout And Cover
4. Precast Concrete Inlet Baffle
5. 6" Leveled Sand Bed
6. Precast Concrete Structure Designed For Vehicle Traffic. (Must Be Approved By The Authority Having Jurisdiction)
7. Precast Concrete Outlet Baffle



PLAN VIEW



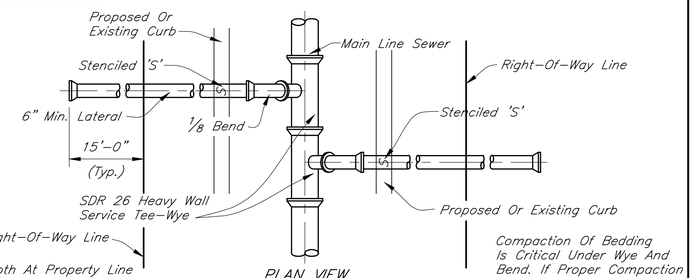
SECTION "A-A"



GASKET DETAIL

PRECAST ADJUSTING RING

Scale: None



PLAN VIEW

ELEVATION VIEW

SERVICE CONNECTION FOR SHALLOW SEWERS (LESS THAN 15' DEPTH)

Scale: None

REVISIONS		
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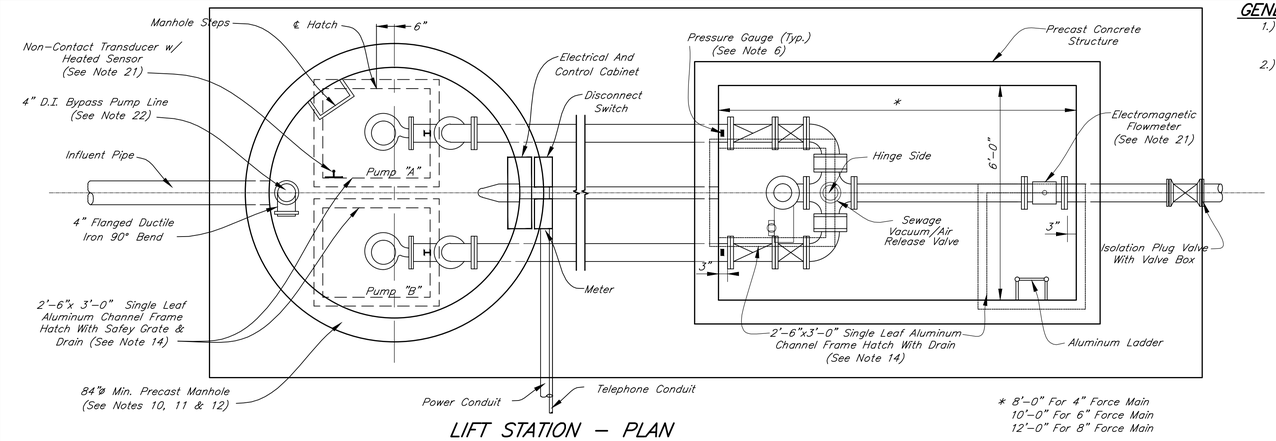
DAVID LAHEY REGISTERED No. PE19700063 STATE OF INDIANA PROFESSIONAL ENGINEER

RECOMMENDED FOR APPROVAL	DESIGN ENGINEER	10/01/2012 DATE
APPROVED	UTILITIES MANAGER	10/01/2012 DATE
APPROVED	WATER/WASTEWATER OPERATIONS MANAGER	10/01/2012 DATE

CITY OF LEBANON

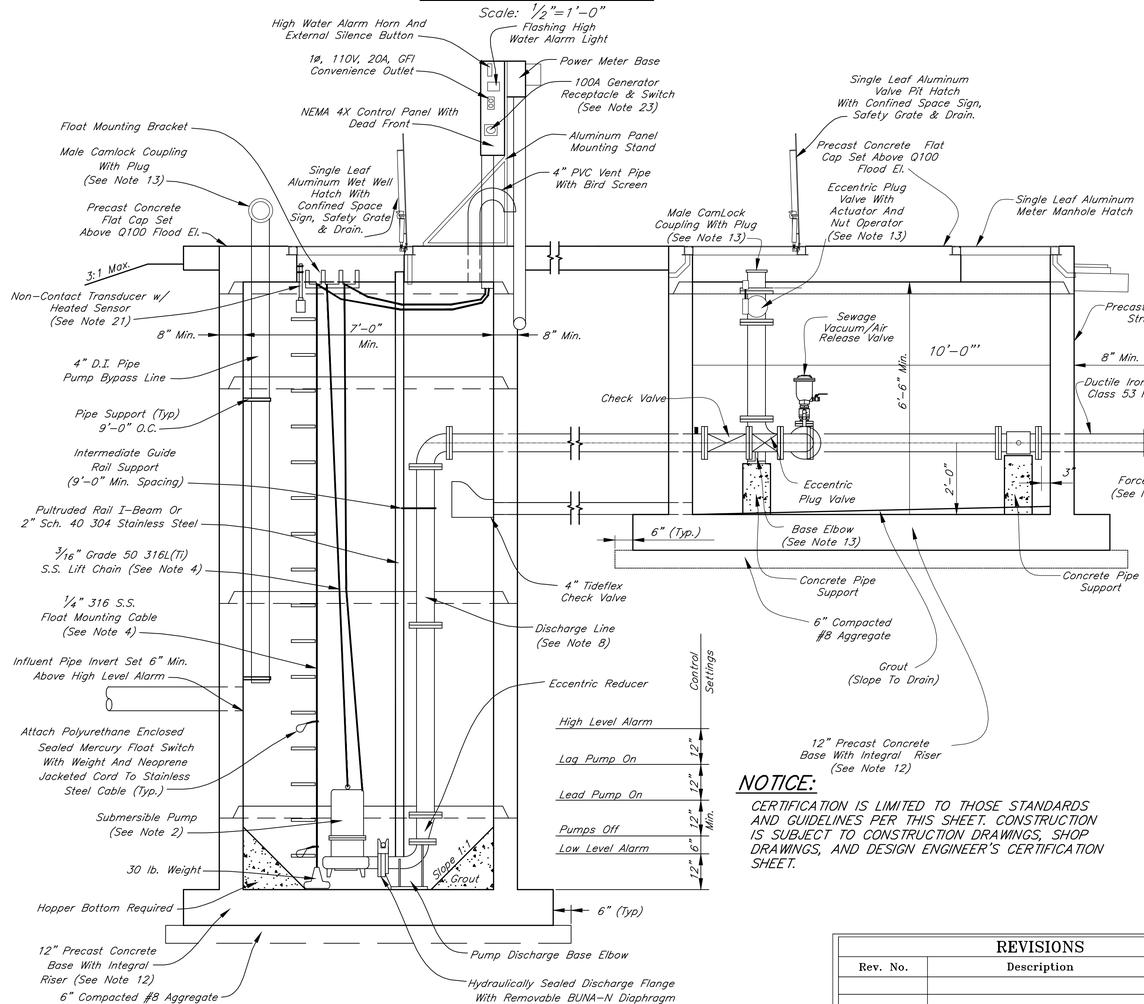
SANITARY SEWER DETAILS AND NOTES

SHEET 13 OF 18



LIFT STATION – PLAN

Scale: 1/2"=1'-0"



LIFT STATION – SECTION

Scale: 1/2"=1'-0"

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.

GENERAL NOTES:

1.) Actual Lift Station Dimensions, Control Settings, Grinder & Pump Selection To Be As Indicated By The Design Engineer's Certification Sheet.

2.) Pumps "A" And "B" Shall Be Identical, Centrifugal, Submersible, Solids Handling, Non-Clog Design Capable Of Handling 3" Sphere Solids, Fibrous Material, Sludge, And Material Found In Typical Raw Sewage. Fit Replaceable Bronze Wear Ring To Volute. Pumps Shall Be Hydromatic, Flygt, Or Lebanon Utilities Sewer Department Approved Equal. Manufacturer Shall Warrant The Pumps For One Year After Installation. Developer Shall Pay All Operation And Maintenance Costs Until Acceptance. Developer Shall Warrant Pumps And Controls For One Year After Acceptance.

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.

Mechanical Shaft Seal System Running In An Oil Reservoir Shall Have Separate, Constantly Lubricated Lapped Seal Faces. The Lower Seal Unit Between Media And Oil Reservoir Shall Consist Of One Stationary Seat And One Rotating Ring Held In Place By Its Own Spring. The Rotating Seat Ring And The Stationary Seat Ring Shall Be Made Of Tungsten-Carbide. The Lower Seal Shall Be Removable Without Disassembling The Seal Chamber. The Upper Seal Between Seal Chamber And Motor Shall Be Of The Same Design With Its Own Spring. Seals Shall Be Maintenance Free, But Shall Be Easily Inspectable.

Lift Station Control Panel Shall Be A Minimum 36"x60" NEMA 4X Stainless Steel With Padlockable 3-Point Handle With Stainless Steel Floor Stands. The Control Cabinet Shall House The Following Controls And Indications: Telemetry System Per Note 21 Of This Sheet, Warning Lights For Each Pump, Indicator Lights, Common Alarm, H-O-A Switches, Silence Button, Pump Alternator, Warning Reset Buttons, Relays, Heater, Surge Protection, Phase Monitoring, Hour Meters, Amp Meters And A GFI 110 Volt, Single Volt, Single Phase Convenience Outlet. Enclosure Shall Be Suitable For The Specified Horsepower And Voltage Of The Pumps. The Outer Door Of The Panel Shall Be A Hinged Dead Front With Provisions For Padlocking. Inside Shall Be A Separate Hinged Panel To Protect All Electrical Components, H-O-A Switches, Run Lights, Circuit Breakers, Etc., Mounted Such That Only The Faces Protrude Through Said Panel With No Wiring Fixed To Said Panel. The Manufacturer Shall Warrant The Control Center For One Year After Installation Covering 100% Parts And Labor.

Provide A Disconnect Switch Housed In A Separate NEMA 4X S.S. Enclosure With External Operation Handle Capable Of Being Locked In The "ON" Position.

Lower Seal Failure Alarm Shall Be Engaged By Seal Failure Sensor Provided In The Seal Chamber Which Senses Water Intrusion Through Through Lower Seal. A Mini-Float In The Motor Chamber Which Signals Pump Shut-Down And Alarm Upon Water Intrusion Through Upper Seal May Be Acceptable When Approved By Lebanon Utilities.

Overtemperature Alarm And Pump Shut-Down Shall Be Engaged By Heat Sensor Attached To The Motor Windings. Motor Winding And Stator Lead Insulation Shall Be Class F With Maximum Temperature Capability Of 155°C. Housing Shall Be Filled With High-Dielectric Oil. Air Filled Housing May Be Acceptable When Approved By Lebanon Utilities Sewer Department. Pump And Motor Shall Be Designed To Operate Partially Or Fully Submerged In Pumped Media Without The Use Of Cooling Jackets.

Alarm Conditions To Be Transmitted To The Utility's SCADATA SCADA System Shall Be Pump Run, Pump Seal Failure, Phase Fail, Pump Overtemperature, Door Open, Wet Well Low Level, Wet Well High Level. All Alarms Shall Be Wired Such That They Will Remain On Until Manually Reset.

Rail System Shall Enable The Easy Removal Of The Pump Without The Need For A Person To Enter The Wet Well. A Non-Corrosive FRP I-Beam Shall Be Provided For Each Pump. The Guide Rail Shall Be Supported At The Bottom By The Discharge Elbow, Aligned Perfectly Plumb And Securely Affixed To Access Frame. One Intermediate Guide Rail Support Is Required For Each 9' Of Guide Rail Length. Schedule 40 S.S. Guide Rails May Be Acceptable When Approved By Lebanon Utilities Sewer Department.

3.) Check Valve Shall Use Packing Material To Seal The Integral Shaft Or Hinge Pin. O-Ring Side Plug And O-Ring Shall Not Be Used To Seal Integral Shaft Or Hinge Pin. Check Valve Shall Be Provided With Bolted Covers For Easy Access To The Discs And Shall Be Outside Adjustable Weight & Lever And Shall Be CCNE Series 8000 Swing Check Valve Or Approved By Lebanon Utilities Sewer Department.

4.) Provide Sufficient Lift Chain, Float Mounting Cable, And Pump Power & Sensor Cable To Enable Non-Spliced Field Adjustment. Lift Chain Shall Have A Minimum Work Load Limit Of 1100 Pounds. Float Mounting Cable Shall Be Held In Place By Weight, Floats Shall Be Fastened To Cable With S.S. Clamps Near Each Float Location. Pump Power & Sensor Cable Shall Be Suitable For Submersible Pump Applications And This Shall Be Indicated By A Code/Legend Permanently Embossed On The Cable.

5.) Plug Valve Shall Be Hand Lever Operated And Shall Be Dezurik Fig.118, Val-Matic Cam-Centric 500 Series, Or Lebanon Utilities Sewer Department Approved Equal.

6.) Pressure Gauge Shall Be Trerice Model 450 LFB Or Lebanon Utilities Sewer Department Approved Equal. Drill & Tap Run Of Pipe To Install Pressure Gauge.

7.) Piping Beyond 2 Feet Of Valve Pit Shall Be DI AWWA C151, PVC ASTM D2241, PVC AWWA C900, Or Lebanon Utilities Sewer Department Approved Equal. Piping Shall Be Bedded In Accordance With The PVC Bedding Detail On Sheet 12, Except Stone Backfill Above Springline Of Pipe Is Not Required For DI Force Main Pipe. Piping Shall Be Pressure Tested In Accordance With Water Main Pressure And Leakage Testing Requirements Outlined On Sheet 9, Except Test Pressure Shall Be 1.25 Times Pump Cut-Off Head Converted To PSI. See Design Engineer's Certification Sheet For Class.

8.) Piping In And Within 2 Feet Of Wet Well And Valve Pit Shall Be Class 53 Flanged Ductile Iron Pipe.

9.) Piping, Valves, And Fittings In Wet Well And Valve Pit Shall Be Factory Primed Tnemec Series 140-1211 To A Dry Film Thickness Of 5.0 To 11.0 Mils And Shall Be Field Painted With Tnemec Series 69-Color To A Dry Film Thickness Of 5.0 To 6.0 Mils.

10.) Dampproof All Exterior Vertical Surfaces Which Are Backfilled Against With A Shop Applied Bituminous Coating, Hydrocide 700 Mastic.

11.) Lift Station And Valve Pit Manholes Shall Be Pre-Cast Concrete In Accordance With ASTM C-478, With Rubber Gaskets Equal To ASTM-443 With 1/2" Gasket Material Or Lebanon Utilities Sewer Department Approved Equal. See Sanitary Sewer Details And Notes Sheet For Manhole Steps.

12.) 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. See Design Engineer's Certification Sheet.

13.) Camlock Model 633-LAS Flanged Adaptor And 634-B Dust Cap Shall Be Used At Wet Well. Camlock Model 633-LBS Flanged Coupler And 634-A Dust Ring Shall Be Used Within Valve Vault. Camlock Coupling And Eccentric Plug Valve On By-Pass Line Shall Be 4 Inch Diameter With Transition To Force Main Size Occurring With Concentric Reducer Placed On Top Of Base Elbow. Fix Operating Nut For Eccentric Plug In Vertical Position To Enable Wrench Operation From Surface. Layout Of All Valve Vault Fittings And Equipment To Be Based Upon By-Pass Line Being Up Close To Hatch Opening As Shown.

14.) Aluminum Hatches Shall Be Bilco Type "J-3AL" w/ Optional Protective Grating Panel Or Lebanon Utilities Sewer Department Approved Equal. Leaf Shall Be 1/4" Aluminum Diamond Plate Live Load Rated To 300 PSF. Channel Frame Shall Be 1/4" Extruded Aluminum With A Mill Finish And Bituminous Coating On Exterior Surfaces. Hatch Shall Be Provided With Type 316 S.S. Hardware Throughout, Compression Spring Operators, Automatic Hold-Open Arm With Release Handle, Recessed Lock Hasp With Flush Cover, And 1-1/2" Drain Coupling.

15.) Sewer Connection To Wet Well Shall Be KOR-N-SEAL, A-LOK, Dura-Seal, Or Lebanon Utilities Sewer Department Approved Equal.

16.) Force Main Penetrations Of Wet Well And Valve Pit Shall Be Core Drilled And Made Watertight Through The Use Of KOR-N-SEAL, A-LOK, Dura-A-Seal, Or Lebanon Utilities Sewer Department Approved Equal.

17.) Automatic Pump Control System Shall Include All Necessary Items And Appurtenances Which Might Normally Be Considered A Part Of A Complete System. System Shall Be Supplied By One Manufacturer, Shall Be Factory Assembled, Wired, And Tested, And Shall Be Per Complete Electrical Drawings And Instructions. Major Components And Sub-Assemblies Shall Be Identified As Function With Laminated, Engraved, Bakelite Nameplates.

Provide The Services Of A Factory-Trained, Qualified Representative To Inspect, To Adjust, And To Place The System In Trouble-Free Operation And To Instruct The Operating Personnel In The Proper Operation And Care Of The System.

All Major Components Of Control Center Shall Be American-Made And Available From Local Sources. Pump Manufacturer Shall Accept The Control Center In Writing To Ensure Unit Responsibility And Warranty.

An Incoming Power Terminal Block Shall Be Located At The Bottom Of The Control Enclosure. A Lightning Arrestor Shall Be Provided At The Terminal Block And Connected To Each Line Of The Incoming Side Of The Power Input Terminals. A Single Main Fusible/Breaker Disconnect Switch Of Adequate Size To Provide Power For Control, Operation, And Appurtenant Components Shall Be Provided. Provide A Circuit Breaker And Magnetic Starter With Each Leg Manual Reset Overload Protected For Each Pump. Starters Shall Have Auxiliary Contacts On 3ø Applications To Operate Both Pumps Simultaneously. Provide A Circuit Breaker And Transformer To Power The Control Panel With 1ø, 115 Volt Service For All Control Functions. Provide A Green "Run" Light And H-O-A Switch To Enable Field Connections.

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.

Minimum 4" Diameter, Schedule 40 Conduit Shall Be Provided From Wet Well To Control Panel Enabling Pump Power & Sensor Cables And Float Switch Cables To Be Easily Pulled. Seal Conduit At Control Panel To Prevent Sewer Gases From Entering. All Conduits, Fittings, Or Connections Shall Enter From The Bottom Of Enclosures.

Sump Level Rise To Lead Pump Run Pre-Set Level Causes Lead Pump To Operate. Lead Pump Operating And Sump Level Falling To Pumps Off Pre-Set Level Causes Lead Pump To Shut Off. Lead Pump Operating And Sump Level Rising To Lag Pump Run Pre-Set Level Causes Lag Pump To Operate. Lag Pump Operating And Sump Level Falling To Pumps Off Pre-Set Level Causes Both Pumps To Shut Off. Sump Level Rise To High Level Alarm Causes High Level Alarm To Operate. Sump Level Fall To Low Level Alarm Causes Low Level Alarm To Operate. An Alternating Relay Shall Be Provided To Cause Pumps To Alternate Whenever Pumps Off Pre-Set Level Is De-Energized. If One Pump Fails For Any Reason, The Remaining Pump Shall Operate Upon Sump Level Rise To Lag Pump Run Pre-Set Level. An Hour Meter Shall Be Provided For Each Pump To Record The Elapsed Operating Time Of Each Pump. Provide A Low Level And High Level Float for Redundant Operation If The Transducer Control Is Inoperative.

18.) Four Manuals Shall Be Presented To The Owner Which Shall Include The Following Minimum Information: 1) Operation Instructions, 2) Maintenance Instructions, 3) Recommended Spare Parts List, 4) Lubrication Schedule, 5) Structural Diagrams, 6) As-Built Wiring Diagrams, & 7) Bill Of Materials.

19.) Provide Telephone Conduit Without Conductors So That The Telephone Conductors May Be Pulled At A Future Date.

20.) Contractor Shall Construct A 12 Foot Wide Asphaltic Concrete Access Drive From Existing Edge Of Pavement To Proposed Edge Of Stone Lot. The Asphaltic Concrete Pavement Section Shall Comply With The Asphalt Pavement Reconstruction Detail Shown On Sheet 6. A 20' Radius Is Required On Both Sides Of 12' Lane At Intersection Of 12' Lane And Adjacent Street.

21.) The Telemetry System Shall Be Installed Complete To Communicate With The Utilities Existing SCADA System Including The Programming Of The Master Station As Required. The System Must Utilize A SCADATA Remote Terminal Unit. The System Shall Be Housed Within The Lift Station Control Panel. Telemetry System Shall Operate From A 120 Volt, 60 Hertz Power Source And Be Provided Complete With A Battery Backup, Low Temperature Strip Heater. Provide Pump Run Time Meters, Amp Meter, And Voltage Meter. Pump Run, Pump Seal Failure, Phase Fail, Pump Overtemperature, Door Open, Wet Well Low Level, Wet Well High Level, Amp Meter Shall Be Monitored. All Control Cables Shall Be Teminated At Labelled Terminal Strips. Transducer Shall Be Endress+Hauser FDU81 With A Heated Sensor. Transducer Transmitter Shall Be Endress+Hauser FMU86 Housed Within The Lift Station Control Panel.

22.) Contractor To Fasten Pump Bypass Line To Interior Wet Well Wall With Stainless Steel Clamps Spaced Every 9'-0".

23.) The Lift Station Shall Be Provided With A Generator Receptacle And Transfer Switch For Emergency Operation. The Receptacle Shall Be A Hubbell HBL4100RS2W Or Utilities Approved Equal. The Transfer Switch Shall Be Submitted To Lebanon Utilities Sewer Department For Approval Prior To Installation.

REVISIONS		
Rev. No.	Description	Date

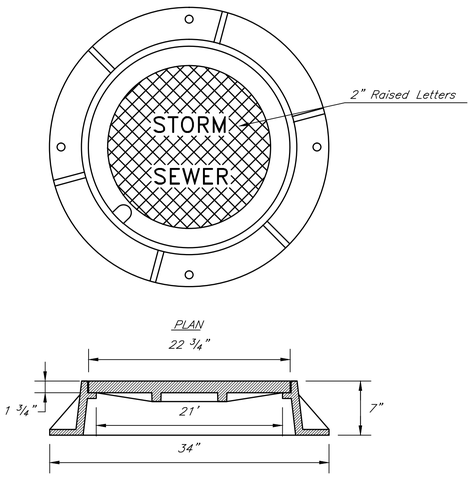
DAVID LAHEY REGISTERED No. PE19700063 STATE OF INDIANA PROFESSIONAL ENGINEER

RECOMMENDED FOR APPROVAL	DESIGN ENGINEER	10/01/2012	DATE
APPROVED	UTILITIES MANAGER	10/01/2012	DATE
APPROVED	WATER/WASTEWATER OPERATIONS MANAGER	10/01/2012	DATE

CITY OF LEBANON

SANITARY SEWER
LIFT STATION STANDARDS
& GUIDELINES

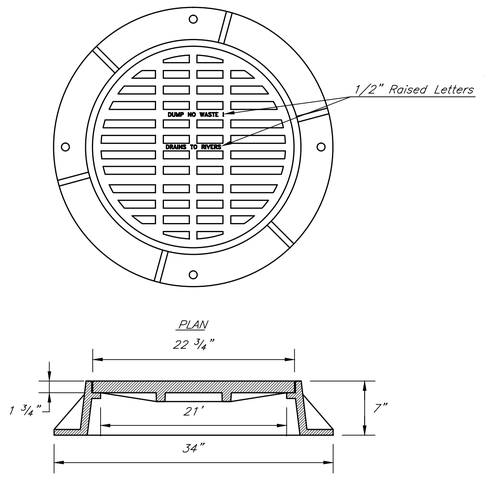
SHEET 14 OF 18



Weight = 335 Lbs.

NEENAH R-1772-C
OR EAST JORDAN 1022-Z1

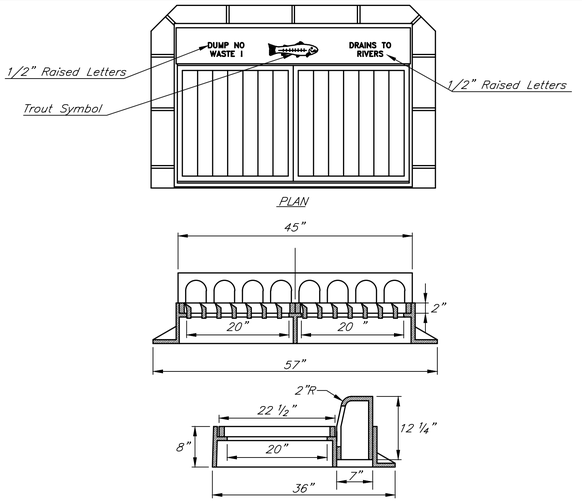
Scale: None



Weight = 300 Lbs.

NEENAH R-1772-G
OR EAST JORDAN 1022-M2

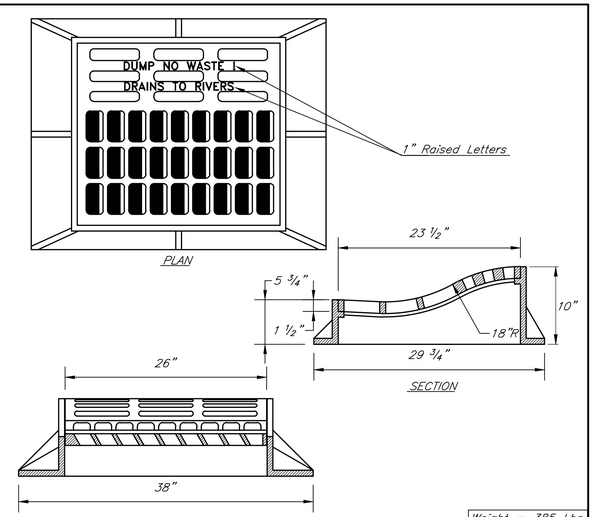
Scale: None



Weight = 1105 Lbs.

NEENAH R-3287-15V
OR EAST JORDAN 7565 T1

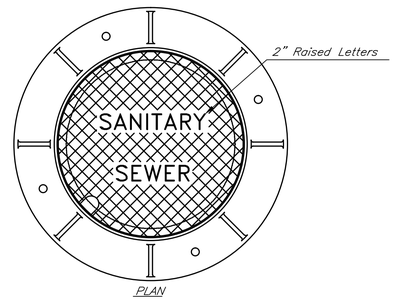
Scale: None



Weight = 385 Lbs.

NEENAH R-3501-T (R or L)
OR EAST JORDAN 7495M4, M2 & M1

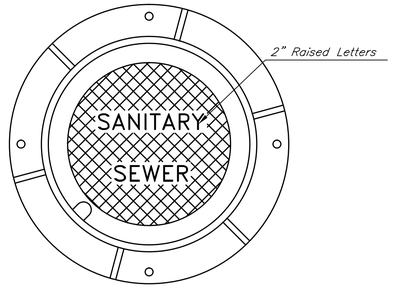
Scale: None



Weight = 146 Lbs.

EAST JORDAN 1022Z1

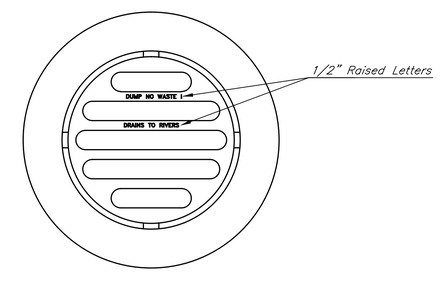
Scale: None



Weight = 335 Lbs.

NEENAH R-1772-C
OR EAST JORDAN 1022-Z1

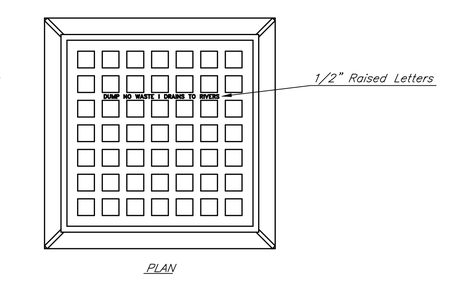
Scale: None



Weight = 180 Lbs.

NEENAH R-4342
OR EAST JORDAN 6489

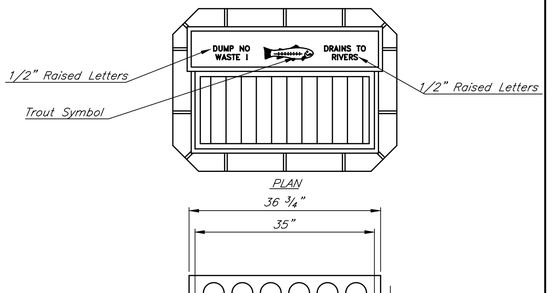
Scale: None



Weight = 305 Lbs.

NEENAH R-3405
OR EAST JORDAN 5250

Scale: None



Weight = 665 Lbs.

NEENAH R-3287-10V
OR EAST JORDAN 7505, M1 & T2

Scale: None

REVISIONS		
Rev. No.	Description	Date

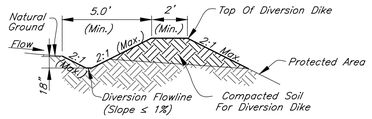
DAVID LAHEY REGISTERED No. PE19700063 STATE OF INDIANA PROFESSIONAL ENGINEER

RECOMMENDED FOR APPROVAL	DESIGN ENGINEER	10/01/2012 DATE
APPROVED	MAYOR	10/01/2012 DATE
APPROVED	STREET COMMISSIONER	10/01/2012 DATE

CITY OF LEBANON

CASTING STANDARDS

SHEET 15 OF 18



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.

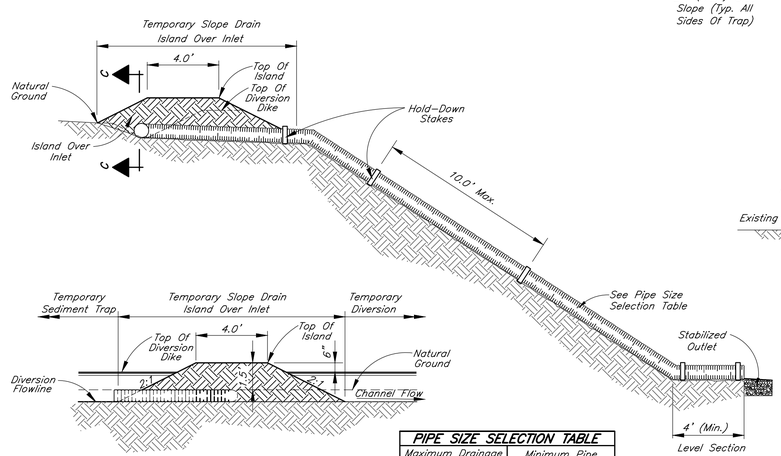
Remove Sediment From Channel To Maintain Positive Grade.

Check Outlets And Make Necessary Repairs Immediately.

Adjust Ridge Height To Prevent Overtopping.

TEMPORARY DIVERSION

Not To Scale



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

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.

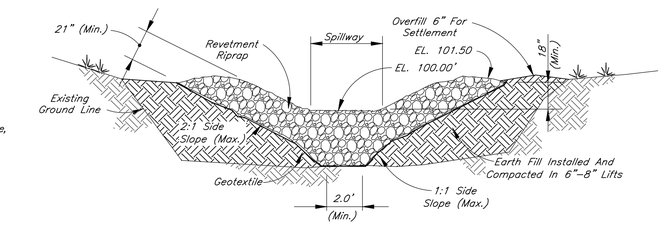
Check For Holes Where The Pipe Emerges Form The Dike; Repair Immediately.

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

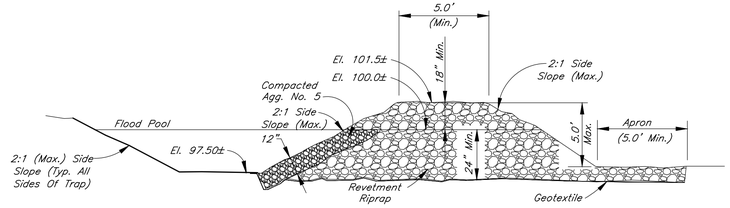
Check The Outlet For Erosion Or Sedimentation; Clean & Repair Or Extend If Necessary.

TEMPORARY SLOPE DRAIN

Not To Scale



EARTH EMBANKMENT AND STONE OUTLET SECTION



CROSS SECTION VIEW OF THE STONE OUTLET SECTION

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.

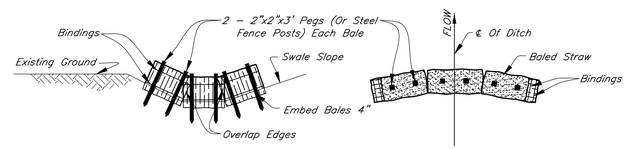
Replace Spillway Gravel Facing If Clogged.

Inspect Vegetation And Seed 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.

TEMPORARY SEDIMENT TRAP

Not To Scale



SECTION PLAN

Notes:

Installation:
Lay Out The Location Of The Straw Bale Barrier 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.

Excavate A Trench At Least 4 Inches Deep, A Bale's Width, And Long Enough That The End Bales Are Somewhat Upslope Of The Sediment Pool (So No Flow Can Cut Around The Bales).

Place Each Bale In The Trench So The Bindings Are Oriented Around The Sides Rather Than Top And Bottom (To Minimize Binding Deterioration), And Abut The Bales Tightly Against Each Other.

Anchor The Dam By Driving Two 36 Inch Long Steel Rebars Or 2"x2" Hardwood Stakes Through Each Bale Unit Nearly Flush With The Top. Drive The First Stake Towards The Previously Laid Bale To Force The Bales Together.

Tightly Wedge Straw Into Any Gaps Between The Bales To Prevent Sediment Laden Water From Running Through.

Backfill And Compact The Excavated Soil Against The Bales To Ground Level On The Down-slope Side And To 4 Inches Above Ground Level On The Up-slope Side.

Maintenance:
Inspect Straw Bale Dams After Each Storm Event, And Remove Any Sediment Deposits Promptly To Ensure Adequate Storage Volume For The Next Rain. Take Care Not To Undermine The Entrenched Bales.

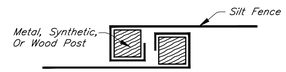
Inspect Daily For Deterioration Or Damage From Construction Activities, And Repair Immediately.

After The Contributing Drainage Area Has Been Stabilized, Remove All Straw Bales And Sediment, Bring The Disturbed Area To Grade, And Stabilize.

SLOPE STEEPNESS RESTRICTIONS		
Percent Slope		Maximum Distance Among Straw Bale Barrier
<2%	<50:1	100 Ft.
2%-5%	50:1 to 20:1	75 Ft.
5%-10%	20:1 to 10:1	50 Ft.
10%-20%	10:1 to 5:1	25 Ft.
>20%	>5:1	15 Ft.

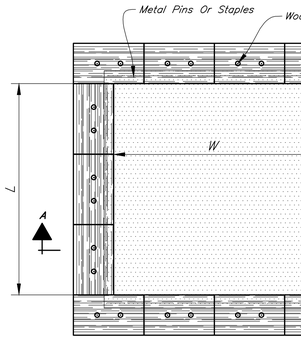
STRAW BALE DAM (STRAW BALE FILTER)

Not To Scale

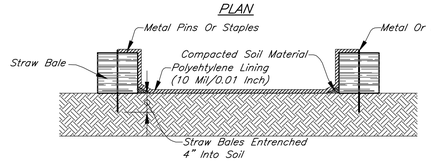


FENCE JOINT DETAIL

Not To Scale



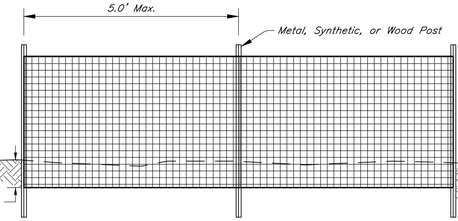
PLAN



SECTION A-A

CONCRETE WASHOUT

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.

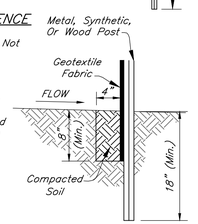
If Fence Fabric Tears, Starts To Decompose, Or In Any Way Becomes Ineffective, Replace The Affected Portion Immediately.

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.

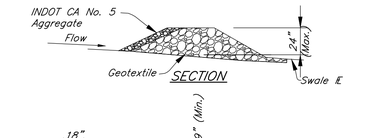
UNSUPPORTED SILT FENCE



TRENCH DETAIL

SILT FENCE (SEDIMENT FENCE)

Not To Scale



SECTION

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

REVISIONS		
Rev. No.	Description	Date

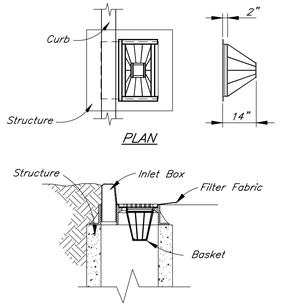
DAVID LAHEY REGISTERED No. PE19700063 STATE OF INDIANA PROFESSIONAL ENGINEER

RECOMMENDED FOR APPROVAL	DESIGN ENGINEER	10/01/2012 DATE
APPROVED	UTILITIES MANAGER	10/01/2012 DATE
APPROVED	WATER/WASTEWATER OPERATIONS MANAGER	10/01/2012 DATE

CITY OF LEBANON

EROSION CONTROL MEASURES

SHEET 16 OF 18



NOTES:

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

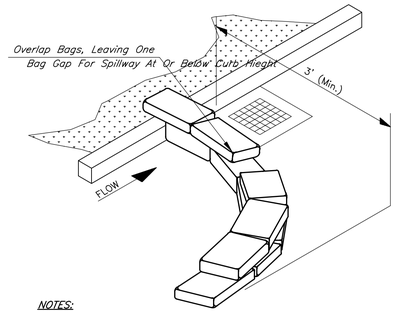
If Necessary, Adapt Basket Dimensions To Fit Inlet Box Dimensions.

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.

Maintenance:
Inspect Daily And After Each Storm And Remove Sediment. Replace Or Clean Geotextile Fabric 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



NOTES:

Installation:
Fill Bags Approximately Half Full With Washed Aggregate.

Place Bags In A Row Curving From The Curb, And Away From The Inlet Up-Slope From The Inlet.

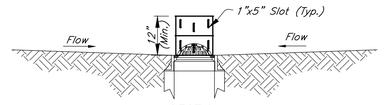
Overlap The Barrier Onto The Curb, Extending It A Minimum Of 3 Feet Into The Street.

Maintenance:
Inspect Daily And After Each Storm Event For Damage And Make Needed Repairs Immediately.

Remove Sediment (But Not By Flushing) When It Reaches Half The Height Of The Barrier.

SAND BAG INLET SEDIMENT BARRIER

Not To Scale



NOTES:

Installation:
Set Barrel Riser Height At Least 6 Inches Below Ground Elevation On The Downslope Side Of The Inlet To Prevent Runoff From Bypassing The Inlet.

If Necessary, On The Low Side Of The Inlet, Build A Temporary Dike Compacted To 6 Inches Higher Than The Riser And Stabilize Appropriately.

Cut Slots At Least 1 Inch Wide And 5 Inches Long In The Barrel, And Cut Out The Barrel Ends.

Place The Barrel Riser Over The Casting Grate.

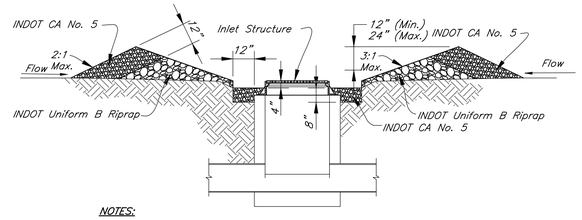
Wrap Geotextile Fabric Around The Riser Before Placement, And Tuck It Under The Bottom Of The Barrel. Attach The Fabric Top To The Barrel With Cord Or Wire.

Maintenance:
Inspect The Structure Weekly And Each Storm Event, And Remove Accumulated Sediment And Make Needed Repairs Immediately.

When The Contributing Drainage Area Has Been Stabilized, Remove, And Properly Dispose Of All Construction Material And Sediment, And Dispose Of Properly. Grade The Disturbed Area To The Elevation Of The Top Of The Inlet And Stabilize.

SLOTTED BARREL DROP INLET PROTECTION

Not To Scale



NOTES:

Installation:
Excavate An 8 Inch Deep And Minimum 12 Inch Wide Area Immediately Out From The Storm Drain.

Around That Excavated Area, Lay A Ring Of INDOT CA No. 1 Gravel To A Height 1-2 Feet Above The Top Of The Inlet, Per The Detail As Shown.

Cover The Outside Face Of The Ring With At Least 12 Inches Of INDOT CA No. 5 Gravel, Maintaining Slopes As Shown.

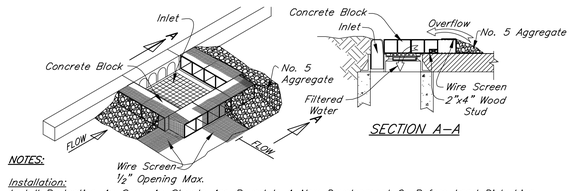
Place INDOT CA No. 5 In The 12 Inch Wide Excavation, From The Toe Of The Inside Slope To The Inlet Structure.

Maintenance:
Inspect The Structure Daily And After Each Storm Event, Removing Sediment And Making Needed Repairs Immediately.

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

GRAVEL DONUT DROP INLET PROTECTION

Not To Scale



NOTES:

Installation:
Install Protection As Soon As Streets Are Paved In A New Development Or Before Land Disturbing Activities In A Stabilized Area.

At Each Side Of The Inlet, Place A Concrete Block Lengthwise Out From The Curb With Its Openings Facing Outward To Serve As A Spacer Block.

Place A Row Of Blocks (Openings Facing Out) Across The Front Of The Inlet And Abutting The Spacer Blocks.

Insert A 2"x4" Wood Stud The Length Of The Inlet Plus Spacer Blocks Through The Front Most Openings Of The Spacer Blocks To Keep The Row Of Blocks Ahead Of It From Being Pushed Back Toward The Inlet.

Run Wire Mesh From The Top Of The Blocks, Down Their Outside Vertical Face, To About 12 Inches Into The Street.

Install Geotextile Fabric Over The Wire Mesh For Additional Filtration (Optional).

Pile No. 5 Aggregate In Front Of The Barrier To The Top Of The Blocks.

Place A Traffic Barricade At Each Installed Measure For Safety And To Protect Measure Integrity.

Maintenance:
Inspect Daily After Each Storm Event, Remove The Sediment And Replace The Aggregate. Replace The Geotextile Fabric, If Used.

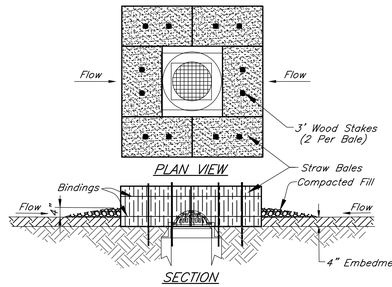
Periodically Remove Sediment And Tracked On Soil From The Street (But Not By Flushing With Water) To Reduce The Sediment Load On The Curb Inlet Protection.

Inspect Periodically For Damage And Repair. Keep Grates Free Of Debris.

When The Contributing Drainage Area Has Been Stabilized, Remove The Aggregate, Wire Mesh, Geotextile Fabric, Any Sediment, And Dispose Of Them Properly.

BLOCK AND GRAVEL CURB INLET PROTECTION

Not To Scale



NOTES:

Installation:
Excavate A Trench At Least 4 Inches Deep And A Bale's Width Around The Inlet.

Place The Bales Lengthwise In the Trench So The Bindings Are Oriented Around The Sides, Rather Than Top And Bottom.

Allow The Bales To Overlap At The Corners And Abut Them Tightly Against Each Other.

Anchor The Bales With (2) 36 Inch Long 2"x2" Hardwood Stakes Or Rebar.

Tightly Wedge Straw Into Any Gaps Between Bales To Prevent Sediment Laden Water From Flowing Directly Into The Inlet.

Backfill Excavated Soil Material, Four Inches High, Against The Outside Perimeter Of The Straw Bale Barrier And Compact In Place.

Maintenance:
Inspect The Straw Bale Drop Inlet Protection Daily And After Each Storm Event And Make Needed Repairs Immediately.

Remove Sediment And Debris From The Pool Area To Ensure Adequate Runoff Storage For The Next Rain, Taking Care To Not Damage Or Undercut The Bales.

When The Contributing Drainage Area Has Been Stabilized, Remove All Bales, Construction Material And Sediment And Dispose Of Properly. Grade The Disturbed Area To The Elevation Of The Top Of The Inlet And Stabilize.

STRAW BALE DROP INLET PROTECTION

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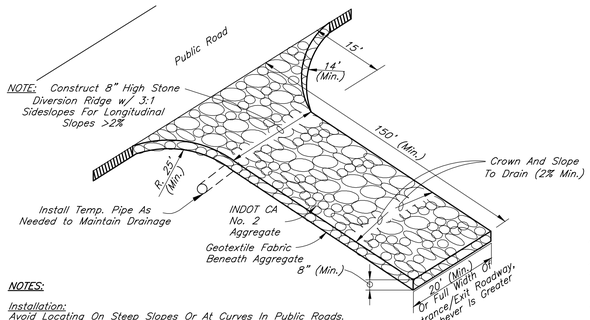


NOTES:

Installation:
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.

If Wet Conditions Are Anticipated, 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.

Top-dress The Drive With Washed Aggregate (INDOT CA No.53).

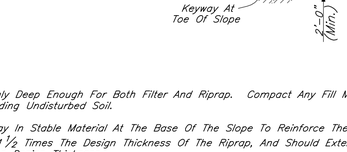
Divert All Surface Runoff And Drainage From The Stone Pad To A Sediment Trap Or Basin.

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



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 1½ 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 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.

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

RIPRAP

Not To Scale

REVISIONS		
Rev. No.	Description	Date

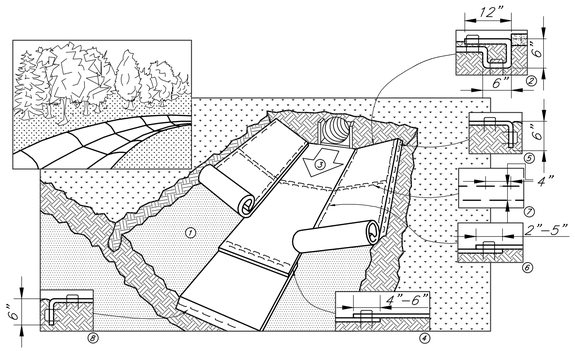
DAVID LAHEY REGISTERED No. PE19700063 STATE OF INDIANA PROFESSIONAL ENGINEER

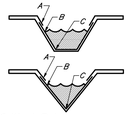
RECOMMENDED FOR APPROVAL	DESIGN ENGINEER	10/01/2012 DATE
APPROVED	UTILITIES MANAGER	10/01/2012 DATE
APPROVED	WATER/WASTEWATER OPERATIONS MANAGER	10/01/2012 DATE

CITY OF LEBANON

EROSION CONTROL MEASURES

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

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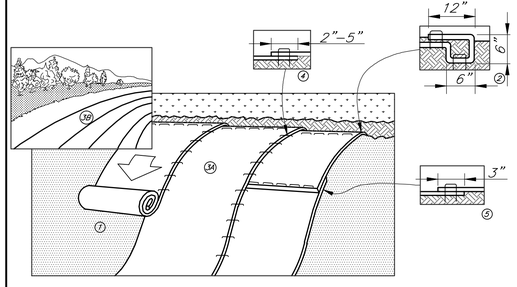


1. Prepare Soil Before Installing Blankets, Including Any Necessary Application Of Lime, Fertilizer, And Seed.
2. Begin At The Top Of The Slope By Anchoring The Blanket In A 6 Inch Deep By 6 Inch Wide Trench With Approximately 12 Inches Of Blanket Extended Beyond The Upslope Portion Of The Trench. Anchor 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.

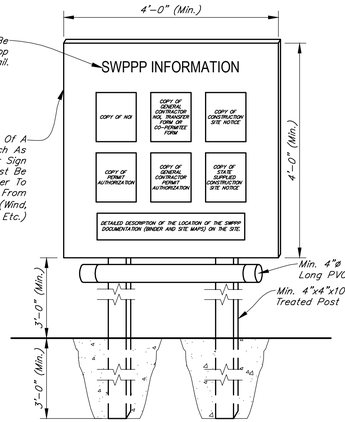
NOTE:
* In Loose Soil Conditions, The Use Of Staple Or Stake Lengths Greater Than 6 Inches May Be Necessary To Properly Secure The Blankets.

EROSION CONTROL BLANKET – SLOPE APPLICATION

Not To Scale

"SWPPP INFORMATION" Must Be Displayed Prominently Across The Top Of The Sign, As Shown In The Detail.

Sign To Be Constructed Of A Rigid Material, Such As Plywood Or Outdoor Sign Board. Sign Must Be Constructed In A Manner To Protect Documents From Damage Due To Weather (Wind, Sun, Moisture, Etc.)



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 The Plainfield MS4 Operator.

EROSION CONTROL NOTES

GENERAL:
Take Measures To Control Erosion And Sedimentation 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 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 Rule 5 327 IAC 15–5) And Shall Be In Accordance With The 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 Left Inactive For Seven Or More Days By Seeding, Sodding, Mulching, Or By Other Equivalent Erosion Control Practices. See The Landscape Plan For Permanent Ground Cover Requirements Adjacent To The Building And Parking Areas.

TEMPORARY GRAVEL CONSTRUCTION ENTRANCE/EXIT PAD:
Construct The Temporary Gravel Drive Using 2–3 Inches INDOT CA No. 53 Washed Stone Over A Stable Foundation, 6 Inches Minimum Thickness. Geotextile Fabric May Be Used Under Wet Conditions Or For Soils Within A High Seasonal Water Table To Provide Greater Bearing Strength. 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, 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, Disk, Harrow, Or Rake.

Apply Topsoil If The Site Is Otherwise Unsuited 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, Or Equivalent Fertilizer, As Recommended By The Soil Test. Work The Fertilizer Into The Soil To 2–4 Inches Deep.

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 Long Hanging Limbs That Could Otherwise Be Broken Off By Equipment.

Repair Wounds Simply By Removing Damaged Bark And Wood Tissue (Do Not Use Tree Paint).

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

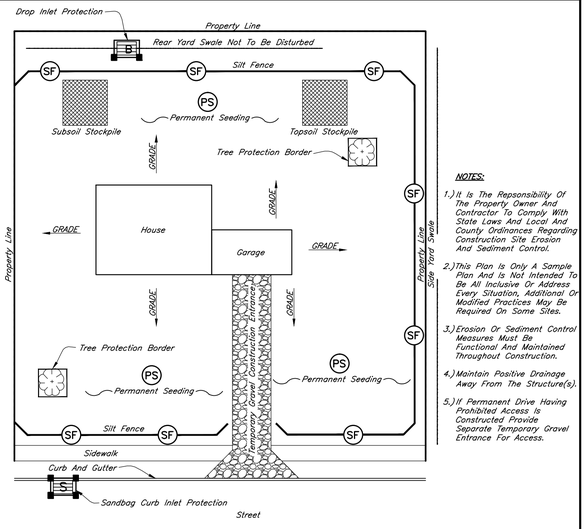
Evenly Distribute Fibers Over Entire Area Of Blanket To Provide Consistent Thickness.

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.

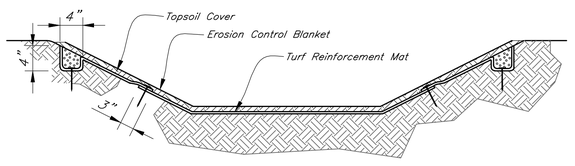
EROSION CONTROL BLANKET STAPLES:
Use Minimum 0.091 Inch Diameter Steel Wire "U" Shape With Legs 6 Inches In Length With 1 Inch Crown.



NOTES:
1.) It Is The Reponsibility 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.)



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

	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%

SEEDING:
The Following Table Is For General Seeding Information Only. Consult Section 3.12 Of The Indiana Handbook For Erosion Control In Developing Areas 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.

REVISIONS		
Rev. No.	Description	Date

DAVID LAHEY REGISTERED No. PE19700063 STATE OF INDIANA PROFESSIONAL ENGINEER

RECOMMENDED FOR APPROVAL	DESIGN ENGINEER	10/01/2012 DATE
APPROVED	UTILITIES MANAGER	10/01/2012 DATE
APPROVED	WATER/WASTEWATER OPERATIONS MANAGER	10/01/2012 DATE

CITY OF LEBANON

EROSION CONTROL MEASURES

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