

UPPER SAUCON TOWNSHIP

LEHIGH COUNTY, PENNSYLVANIA

STANDARD CONSTRUCTION DOCUMENTS

SEPTEMBER 2012

THE PIDCOCK COMPANY

CIVIL ENGINEERING AND LAND PLANNING ARCHITECTURE LAND SURVEYING

OXFORD DRIVE AT FISH HATCHERY ROAD
ALLENTOWN, PENNSYLVANIA

PREFACE

These Standard Construction Documents are comprised of the General Provisions, Technical Specifications, and Standard Construction Details. The user of any portion of these Documents shall consider the content of the full Documents in their entirety.

These Standard Construction Documents are intended to be used for construction and installation of improvements and common amenities (as those items are defined in the Township Subdivision and Land Development Ordinance) which are intended to be offered for dedication or otherwise conveyed or transferred to the Township, and to common amenities for which the Subdivision and Land Development Ordinance requires construction to Township Standards, all pursuant to an approved subdivision/land development plan. It is not intended that these Standard Construction Documents be a substitute for comprehensive project construction specifications as prepared by the Design Engineer for a Developer. These Standard Construction Documents do not address all issues typically addressed in the complete set of plans and specifications by the Design Engineer including but not limited to, safety, measurement of quantities for payment, waiver of liens, insurance, etc. Additionally, these Standard Construction Documents represent the minimum standards and requirements for construction and installation of improvements and common amenities. In cases where these minimum standards and requirements are not adequate for the specific design, it is incumbent upon and solely the responsibility of the Developer and Design Engineer to identify such inadequacies and provide for the necessary modifications in the design.

These Standard Construction Documents are intended to be used in conjunction with the current edition of the Commonwealth of Pennsylvania, Department of Transportation, Specifications Publication 408, and Bureau of Design, Standards for Roadway Construction. The Provisions of the Commonwealth of Pennsylvania, Department of Transportation, Specifications Publication 408, and Standards for Roadway Construction shall govern where applicable, except as specifically modified by the requirements of the Standard Construction Documents.

All work and installations as outlined in these Documents shall be required to comply with all applicable federal, state and local standards and regulations, including but not limited to, Occupational Safety and Health Administration (OSHA) regulations, Department of Labor & Industry regulations, state and local blasting permit requirements, regulations governing earth disturbance, stormwater management, environmental protection, etc.

The Standard Construction Documents prepared by The Pidcock Company are copyrighted. It shall be understood by all parties or persons that this notice of copyright is equivalent to affixing the notice of copyright on every component of the Standard Construction Documents prepared by The Pidcock Company. No other person, party, or organization of whatsoever kind other than The Pidcock

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CONTENTS

SECTION A GENERAL PROVISIONS	A-1
ART. 1 DEFINITIONS:.....	A-2
ART. 2 RESPONSIBILITY OF THE DEVELOPER:	A-3
ART. 3 RESPONSIBILITY OF THE CONTRACTOR:	A-4
ART. 4 PRECONSTRUCTION REQUIREMENTS:.....	A-4
ART. 5 SCOPE OF OBSERVATION BY THE ENGINEER:	A-5
ART. 6 APPROVALS AND STANDARDS:.....	A-5
ART. 7 DIFFERING SUBSURFACE AND PHYSICAL CONDITIONS:	A-6
ART. 8 REQUIRED SUBMITTALS:	A-6
ART. 9 SAFETY AND PROTECTION:	A-8
ART. 10 SURVEY:	A-12
ART. 11 MATERIAL TESTING:	A-13
ART. 12 RELEASE OF IMPROVEMENTS SECURITY/COMPLETION OF IMPROVEMENTS:	A-13
ART. 13 RECORD AS-BUILT PLANS:.....	A-13
ART. 14 WAIVERS:	A-14
ART. 15 CONFLICTS:.....	A-14
SECTION B TECHNICAL SPECIFICATIONS	B-1
STREETS, CURBS AND SIDEWALKS	B-2
STORM SEWERS AND APPURTENANCES	B-13
WATER MAINS AND APPURTENANCES.....	B-24
SECTION C STANDARD CONSTRUCTION DETAILS	C-1

Section A GENERAL PROVISIONS

GENERAL PROVISIONS

The following GENERAL PROVISIONS are to be used for Work within Upper Saucon Township.

Art. 1 DEFINITIONS:

COMMON AMENITIES – Certain additions, alterations or modifications constructed or made to, upon or in connection with realty as required by an approved subdivision or approved land development plan and which are not intended to be offered for dedication to the Township or its Authorities.

CONTRACTOR - The term "Contractor" shall in every case be held to mean the individual, co-partnership or corporation performing the Work of the project for the Developer, and as such represents the Developer. Although the use of the term Contractor below is used to identify typical duties, responsibilities and requirements of the Contractor, it shall not relieve the Developer from its responsibilities as outlined in the Documents.

DESIGN ENGINEER - The Engineer responsible for preparation of the plans for the Developer.

DEVELOPER - The Developer, where referred to in these Documents, shall be the individual, partnership, corporation, or other entity, undertaking the improvement of property within the Township pursuant to the Township ordinances and resolutions. The term Developer shall include all of its agents, servants, employees, contractors, and subcontractors.

DOCUMENTS - These General Provisions, Technical Specifications and Standard Construction Details for the Township, the Plan, and Subdivision and Land Development Improvements Agreement.

ENGINEER - The term "Engineer" shall be held to mean the Township Engineer, acting directly or through duly authorized representatives, such representatives acting within the scope of the particular duties and authority assigned to them by Upper Saucon Township.

The term "Engineer" may also be held to mean such other person, persons or authority as may hereafter be appointed to succeed to the functions, duties and employment herein specified to be performed by the said Engineer.

GEOTECHNICAL ENGINEER - The Geotechnical Engineer shall be the Geotechnical Consultant advising the Township on geotechnical issues.

HAZARDOUS ENVIRONMENTAL CONDITION - The presence at the site of Asbestos, PCB's, Petroleum, Hazardous Waste, Radioactive Material, Carbonate geological features, underground mines, and other materials as defined as Hazardous Material in the Township Zoning Ordinance.

IMPROVEMENTS – All additions, alterations or modifications constructed or made to, upon or in connection with realty as required by an approved application and which are intended to be offered for dedication to the Township or its Authorities.

OBSERVER - An authorized representative of the Engineer assigned to make observations of the Work performed or being performed. The Observer is not authorized, and the Contractor shall not rely upon the Observer, to assume any responsibility for the Contractor's means, methods, techniques, sequences, and safety of construction.

PLAN - The approved Preliminary and Final Plans, and all other documents and materials forming the grounds for approval of the Preliminary and Final plans including but not limited to all calculations, reports, studies, letters and other materials submitted by or on behalf of the Developer or prepared in connection with the development of the project.

SHOP DRAWINGS - All drawings, diagrams, illustrations, brochures, schedules, and other data which are prepared by the Contractor, a subcontractor, manufacturer, supplier or distributor, and which illustrates the equipment, material or some portion of the Work.

TOWNSHIP - Upper Saucon Township.

WORK - Any and all obligations, duties, and responsibilities necessary to the successful completion of the project including construction, installation, erection, and completion of the Improvements, undertaken by a Contractor which shall include such obligations, duties, and responsibilities not only of the Contractor, but also of each and every subcontractor, in accordance with the Subdivision and Land Development Improvements Agreement (if any) and the Plan.

Art. 2 RESPONSIBILITY OF THE DEVELOPER:

- A. The Developer shall be responsible for compliance with all applicable federal, state, and local laws, ordinances and resolutions including but not limited to, Department of Labor & Industry regulations, state and local blasting permit requirements, regulations governing earth disturbance, and other applicable safety codes, etc;
- B. The Developer shall provide a superintendent or other person responsible for overseeing the Work on a day-to-day basis. In cases where such superintendence is not provided, the Developer or his authorized representative shall meet with the Engineer's representative on a pre-arranged basis to discuss any problems and the general condition of the project;

- C. The Developer shall be responsible to procure all permits, licenses, agreements, easements, etc. and shall be responsible for any and all fees for completion of the Work;
- D. It shall be the responsibility of the Developer anticipating earth disturbance activities on the site of the proposed development to have plans and specifications prepared for soil erosion and sedimentation control. The plans and specifications shall be prepared by a Design Engineer familiar with the requirements of the Department of Environmental Protection (DEP). The plans and specifications shall be prepared pursuant to guidance and procedures provided by all applicable DEP documents. The Developer shall have a copy of the approved plans and specifications available at the site before proceeding with the work.

Art. 3 RESPONSIBILITY OF THE CONTRACTOR:

- A. The Contractor shall be responsible for compliance with all applicable federal, state, and local laws and Ordinances, including but not limited to, Department of Labor & Industry regulations, state and local blasting permit requirements, regulations governing earth disturbance, and other applicable safety codes, etc;
- B. The Contractor is responsible for notifying all owners of utilities located in the Township. It is the responsibility of the Contractor to arrange for the field identification, location and protection of all overhead and subsurface utilities--both public and private--which may be encountered during the course of this project;
- C. The Contractor shall provide a superintendent or other person responsible for overseeing the Work on a day-to-day basis. In cases where such superintendence is not provided, the Contractor or his authorized representative shall meet with the Engineer representative and Township representative on a pre-arranged basis to discuss any problems and the general condition of the project.

Art. 4 PRECONSTRUCTION REQUIREMENTS:

- A. Before any Work at the site can commence, the following must be completed:
 - 1. All Agreements with the Township shall be executed and any required improvements security and/or escrow shall be posted;
 - 2. Satisfactory proof of insurance as required by the Township must be secured by the Developer and approved by the Township Solicitor's office;

3. The Contractor shall submit to the Township and Engineer a preliminary progress schedule indicating the starting and completion dates of the various stages of the Work, and a schedule of shop drawing submissions. The Contractor shall provide a minimum of 48 hours notice to the Engineer for observation of work;
4. If, in the opinion of the Engineer, the Work is of such complexity to require a Preconstruction Conference, such a conference will be held to review the above schedules, to establish procedures for handling shop drawings and other submissions, processing improvements security release requests, and to establish a working understanding between the parties as to the project. The conference is to be attended by an authorized representative of the Developer, Contractor, his superintendent, and others as appropriate, and by the Engineer and Township as deemed necessary by the Township. Additionally as Work continues, if in the opinion of the Engineer or Township that job progress meetings are necessary, these meetings are to be attended by the Developer and its Contractor;
5. Copies of all permits and easements necessary to execute the Work must be provided to the Township and Engineer.

Art. 5 SCOPE OF OBSERVATION BY THE ENGINEER:

- A. General observation of the Work, including but not limited to proposed water and storm sewerage systems, streets, overall grading, traffic signals, street trees, buffer strip landscaping, etc. shall be performed to the extent deemed necessary by the Engineer given the scope of the Work. Accessory to this observation is the review of all grade sheets, catalog and shop drawing submittals, processing of improvements security release requests, required surveying, etc. The Engineer shall not have the authority to stop the Work; that authority is reserved to the Township and Developer;

Any Work done or materials installed without proper notification of the Engineer for observation may be ordered removed or replaced;

- B. For Work along any State Routes, the Developer and its Contractor shall meet with PENNDOT representatives to identify the scope of PENNDOT construction observation and shall comply with PENNDOT standards for undertaking such work including safety procedures.

Art. 6 APPROVALS AND STANDARDS:

- A. Plan. Should revisions be proposed to the Plan, revised plans should be submitted promptly to the Township and to the Engineer. Although the Plan has been approved by the Township, changes may be required due to field conditions which were unknown, or incorrectly or insufficiently described on the drawings. In such instances, it will be the responsibility of the Developer,

through the Design Engineer, to propose any changes to the Plan for review by the Township prior to proceeding with the Work. Observers do not have the authority to approve, in the field, any changes from the approved Plan. Any and all requests for deviation from the Plan shall be submitted in writing by the Developer to the Engineer and the Township for review and must be accompanied by supporting engineering data. No oral agreements may be substituted for this process;

- B. PENNDOT Publication 408 and PENNDOT Standards for Roadway Construction (latest edition), the Township ordinances, resolutions and Subdivision and Land Development Improvements Agreement, these Documents, and the Plan are the documents which shall apply to Work in the subdivision/land development;
- C. Although relevant technical portions of these Documents may be relied upon in the specifications prepared by the Developer's engineer for his client, the Professional Engineer's Seal to be put on the specifications and on the Plans shall be that of the Developer's engineer who has the professional responsibility for the complete set of specifications, typically addressing matters of safety, blasting, measurement of quantities for payment, etc. Incorporation of portions or all of these Documents into the project construction documents by the Developer and/or the Developer's engineer constitutes an acceptance of and endorsement of these Documents by the Developer and the Developer's engineer.

Art. 7 DIFFERING SUBSURFACE AND PHYSICAL CONDITIONS:

If the Contractor believes that any subsurface or physical condition at or contiguous to the Site that is uncovered or revealed either differs materially from that shown or indicated in the Plan or is of a hazardous or unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in Work of the character provided for in the Plan, then the Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency) notify the appropriate regulatory agency as determined by the Contractor, and advise the Township and the Township Environmental Consultant and/or Geotechnical Engineer in writing about such condition. The Contractor shall not further disturb such condition or perform any Work in connection therewith (except as aforesaid) until receipt of approval to do so by the Township Environmental Consultant and/or Geotechnical Engineer.

Art. 8 REQUIRED SUBMITTALS:

- A. The Contractor shall review, stamp with its approval and submit, a minimum of six copies of all material lists, catalog submissions, shop drawings, pipe certifications, concrete and asphalt mix designs, and samples for improvements as proposed by the Plans. All submittals should be properly identified. At the time of submission, the Contractor shall inform the

Engineer in writing of any deviation in the submittals from the requirements of the Plan.

Mix design information for all materials used in constructing streets, curbs and sidewalks shall be submitted to and reviewed by the Engineer prior to the delivery of the materials on the project. PENNDOT pre-approval of these mix designs is required. A certification, by type and class, shall be provided to the Engineer to show that all pipe to be used on the project conforms to these Documents.

By approving and submitting shop drawings and samples, the Contractor thereby represents that it has determined and verified all field measurements, field construction criteria, materials, catalog numbers and similar data, or will do so, and that it has checked and coordinated each shop drawing and sample with the requirements of the Work and of the Plan.

No portion of the Work requiring a shop drawing or sample submission shall be commenced until the submission has been reviewed by the Engineer. All such portions of the Work shall be in accordance with reviewed shop drawings and samples, and no release of security for any improvement will be made until all required documentation has been supplied.

The Engineer's review is only for general conformance with the Township Standards and general compliance with the information given in the Plans. The Developer and its Contractor are responsible for dimensions to be confirmed and correlated at the job site; for information that pertains solely to the fabrication processes or to the means, methods, techniques, sequences, and procedures of construction; and for coordination of the Work of all trades. Review of catalog submissions or shop drawings by the Engineer in no way relieves the Developer and its Contractor from their responsibility to complete all work in accordance with these Documents. Any risk of error or omission or liability resulting therefrom is entirely assumed by the Developer and its Contractor;

- B. For improvements included in the Work where delegation of professional design services are required by the Plan (e.g., retaining walls, box culverts, etc.) or where the Developer is proposing an alternative to the Work shown on the Plan, the Calculations and Shop Drawings or plan revisions submitted must be signed and sealed by the design engineer responsible for their preparation. In addition, the Calculations and Shop Drawings or plan revisions submitted must be annotated by the Design Engineer to indicate that they have "Approved" the Calculations and Shop Drawings or plan revisions as being in compliance with the design as shown on the Plan.

Art. 9 SAFETY AND PROTECTION:

- A. Solely the Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work. The Contractor shall take all necessary precautions for the safety of, and shall provide necessary protection to prevent damage, injury or loss to:
 - 1. All persons on the Site or who may be affected by the Work;
 - 2. All the Work and materials and equipment to be incorporated therein, whether in storage on or off the site; and
 - 3. Other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities, and underground facilities not designated for removal, relocation, or replacement in the course of construction.

- B. The Contractor shall comply with all applicable laws and regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; including but not limited to, Occupational Safety and Health Administration (OSHA); Work Zone Traffic Control or 67 PA Code, Chapter 203; e.g., "all workers or persons at the project sites in or alongside the public streets shall wear hard hats and safety vests at all times", plus any other safety equipment as required by PENNDOT, and other applicable safety codes, etc. The Contractor shall erect and maintain all necessary safeguards for such safety and protection. The Contractor shall notify owners of adjacent property and of underground facilities and other utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property. The Observer does not have the authority to stop the Work because of a safety violation. Nothing in these Documents shall be construed to obligate the Township or the Engineer to enforce the regulations and Standards of the Occupational Safety and Health Administration (OSHA) or other laws and regulations relating to protection of persons or property;

- C. The Contractor's duties and responsibilities for safety and for protection of the Work shall continue until such time as all the Work is completed and commencement of the maintenance period;

- D. Maintenance and Pavement Marking and Traffic Signage - The scope of the Work may require the removal or temporary alteration of existing pavement marking and traffic signage. The Contractor shall maintain proper traffic control at all times (day and night) and provide temporary lighting of traffic signage in the event permanent lighting systems are removed or destroyed. The Contractor shall immediately re-establish all pavement markings and

traffic signage destroyed, temporarily removed or obscured as a result of the Work.

The Contractor shall maintain traffic and protect the public from all damage to persons and property within the limits of the Work and for the duration of the Contract Period and as a minimum in accordance with the Plans. The Contractor shall furnish and erect all necessary signs, barricades, and bridging, and provide for the adequate lighting of all signs, barricades, and points of special hazard. The Contractor shall be responsible for settling all claims arising from failure on its part to adequately protect vehicular and pedestrian traffic.

The Contractor shall provide temporary bridging and plating in the event the traffic lanes are damaged or altered. Permanent construction of the traffic lanes shall be completed as soon as possible by the Contractor. The Contractor shall provide necessary pavement marking at temporary bridging and plating.

In order to minimize hazard and inconvenience, excavation in driveway and sidewalk areas shall be commenced only after receipt and review by the Engineer of all materials required to complete the particular installation.

No trench shall be allowed to remain partially or totally open overnight without proper signs, barricades, and temporary lighting. Traffic lanes shall be identified, marked, and maintained at all times.

It shall be the duty of the Contractor during the progress of the Work to maintain crossings, walks, sidewalks, and roadways open to traffic in a satisfactory condition, and to keep all fire hydrants, water valves, and fire alarm boxes accessible for use. The Contractor shall continually patrol the project area throughout the construction of the Work to detect the existence of trench subsidence or other conditions resulting from its Work which constitute hazards to the public and it shall immediately remedy all such unsafe conditions. It shall not await notification from the Engineer or the Developer that hazardous conditions exist before acting to correct same.

In the event a road closure and detour is planned, a Detour Plan meeting all applicable requirements related to signs, sign locations, sign durations, etc. must be prepared by a Professional Engineer licensed in the Commonwealth of Pennsylvania, and certified as to compliance with PENNDOT Publication 213, and Federal Highway Manual for Uniform Traffic Control Devices. The Detour Plan shall be submitted to the Township for review prior to implementation;

- E. The Contractor shall employ the necessary care and safety provisions for trench excavation close to or below the elevation of existing foundations of buildings or other structures, trees, streets, etc. The Contractor alone will be

held responsible for any damage to such buildings or their foundation or other structures resulting from its Work.

The Contractor's attention is particularly directed to utility lines which may be in the vicinity of the Work whether or not shown on the Plans. It shall be the responsibility of the Contractor alone to communicate with the owners of such utility lines in advance of performing any Work in the vicinity of said lines and to take precautions adequate to protect said lines from the Contractor's Work which protection shall be the responsibility of the Contractor alone. The Contractor shall be familiar with all federal, state, and local laws and regulations governing excavation and construction, and shall carry out its construction operations in accordance with the provisions thereof;

- F. If the Developer has obtained temporary or permanent construction easements to facilitate the Work in areas outside the public right-of-way, the Contractor shall visibly mark the extents of the easements in the field, and is advised that it is to use care to stay within the limits of these easements as indicated on the Plan. It is further advised that all reasonable care shall be taken to protect existing features, such as fences, curbs, sidewalks, shrubs, trees, etc., within these easements, and that any damage thereto shall be repaired, or damaged features replaced, at the Developer's expense alone;
- G. Dust Control - The Contractor shall furnish and apply water and/or other materials, as appropriate and required, and acceptable to all applicable regulatory agencies, for the allaying of dust within the project limits. The dust palliative shall be applied using suitable sprinkler allaying or spreading equipment whenever necessary to prevent dust pollution of the atmosphere;
- H. Caution: When piping systems are pressure tested, it is extremely important and essential that all plugs including test plugs and all pipe joints are installed and restrained in such a way that blowouts are prevented. It must be realized that sudden expulsion of a poorly installed plug or section of pipe or of a test plug which is partially deflated before the pipe pressure is released can be very dangerous. For this reason it is recommended that every plug and pipe joint be positively braced or otherwise restrained during pressure testing and that no one be allowed in a manhole adjoining a line being tested or in the vicinity of an exposed plug or pipe so long as pressure is maintained in the line;
- I. Tree Protection - The Contractor shall preserve mature trees within the construction site to protect the trunk, limbs and root system of the tree from damage by implementing protective measures such as tree protection barriers, use of preventive measures, or storage of Hazardous Materials as defined by the Zoning Ordinance within 150-feet of protected trees. Any damage or injury to protected trees shall be reported;
- J. The following notice shall be posted at the project site at a location accessible to all workers.

NOTICE TO WORKERS

The Pidcock Company (TPC), acting on behalf of Upper Saucon Township, and Upper Saucon Township assume no responsibility for or control over the Contractor's safety programs, nor any responsibility for the Contractor's work procedures, methods, sequences, techniques of construction, equipment, etc. Representatives of TPC are at the site only on behalf of Upper Saucon Township to determine general compliance with applicable Township documents and to determine the acceptability of the final product. Should any worker feel that the work is proceeding in an unsafe manner, it is recommended that the foreman, the project superintendent, the Pennsylvania Department of Labor and Industry, the Occupational Safety and Health Administration, and/or any other regulatory agency having jurisdiction be notified by the worker.

Art. 10 SURVEY:

- A. The Developer shall provide engineering surveys to establish reference points for construction as necessary to enable the Contractor to proceed with the Work and to enable the Engineer to confirm its installation in accordance with the Plans. The Contractor shall be responsible for laying out the Work, shall protect and preserve the established reference points and property monuments, and shall make no changes or relocations without the prior approval of the Engineer;
- B. All survey and grade control will be the responsibility of the Developer through its engineer and/or Contractor;
- C. Easements for storm drainage facilities and utilities, and property lines adjacent to proposed improvements, or other locations as may be required by the Township or Engineer, shall be visibly staked prior to construction;
- D. Grade sheets for curbs, waterline, storm sewers, swales, etc. shall be submitted for review a minimum of three days before construction. The Developer is responsible for the accuracy thereof;
- E. The Observer will "spot-check" survey control points during construction, as may be necessary. If necessary, the Observer may request the Engineer Survey Department to verify locations. Municipality costs of surveying checks will be treated as an observation charge to the Developer;
- F. The Developer shall have the basin construction baseline and the controlling site features staked, and shall set grade stakes for the bottom of the basin and the top of berm. Following the Developer's grading operations for the detention basin and prior to placement of the basin liner and topsoil, the Engineer will complete a preliminary basin as-built survey and volume calculations to verify that the basin location and volume generally conform to the approved plans. If applicable, prior to placement of topsoil and seeding, permeability/density test results of the liner material should be furnished to both the Township and Geotechnical Engineer by the Developer to confirm the limiting permeability is achieved, or a Certification as to the acceptable installation of the geotextile basin liner shall be provided by the liner manufacturer for Geotechnical Engineer review and approval.

Upon completion of topsoiling and seeding, a final basin survey will also be completed by the Engineer. Basin surveys will be treated as an observation charge.

Art. 11 MATERIAL TESTING:

All testing shall be as required to satisfy the requirements of the Township Specifications and industry-standard protocols (as appropriate) and shall be in accordance with the applicable specifications.

Art. 12 RELEASE OF IMPROVEMENTS SECURITY/COMPLETION OF IMPROVEMENTS:

Procedures for release of improvements security and the Final and Maintenance Inspections shall be in accordance with the Subdivision and Land Development Improvements Agreement with the Township and with Township Ordinances and policies as applicable.

Art. 13 RECORD AS-BUILT PLANS:

Record As-built Plans shall be prepared by the Design Engineer from information recorded during construction. Information obtained by an Observer is not available for and is not to be used for preparation of the Record As-built Plans. Such plans shall be submitted to the Township and Engineer upon the completion of construction. Following are the record as-built plans submission and drawing requirements:

- A. Submission Requirements: The Developer shall have its Design Engineer prepare and provide three prints (signed and sealed by a registered professional engineer or land surveyor in Pennsylvania) and one copy in electronic format (i.e., .pdf format) for inclusion in the Township Master Plans of the final record as-built plan, drawn in a neat and legible manner, and identified as "Record As-built Plans". The plan preparer and date should be identified. Prior to submitting these plans, one print of the plan(s) shall be submitted to the Township and Engineer for review;
- B. Drawing Requirements: All construction changes shall be noted by drawing a line through the design data and adding the record data adjacent thereto, or in cases where the plan would be unclear, redrawing the plan to reflect the actual installation. The following specific information shall also be noted:
 - 1. Roads: "Record" curb and/or pavement grades for intersections. Any significant deviations in the centerline profile shall be noted on the plan;
 - 2. Storm Sewerage System: Invert and top elevations at all manholes, basin outlet control structures, inlets, endwalls, and sewer lengths, slopes, pipe diameters, and types of pipe;

3. Water Distribution System: Stationing of each gate valve, bend, tee, cross, plug, and lateral. Each curb stop and valve box shall be stationed and defined with reference ties when necessary. The location and depth of the water main with respect to the street centerline or utility easement line shall be shown and dimensioned;
4. Traffic Improvements: Signal equipment, signs, striping, depressed curbs, etc. shall be noted on the plan;
5. Site lighting: Location of site lighting standards and building mounted lights.
6. Landscaping: Location and species of landscape plantings.
7. Other Underground Utilities: Location and depth of sanitary sewerage system, electric, telephone, cable TV, and gas lines within the rights-of-way. Any encasement of the above utilities should be identified and the utility location and depth should be shown;
8. Abandoned utilities should be identified by a note and by drawing a line through the original location data.

Additionally, signed and sealed documentation from the Design Engineer (or other appropriate professional) certifying that the as-built lighting fixtures and landscaping species, location, and sizes are in accordance with the approved Plan.

Art. 14 WAIVERS:

The Developer or Contractor, as the case may be, may submit a request for a waiver of the requirements of these documents. Such request shall be in writing and shall include evidence that the requirement is unnecessary given the nature of the work or the operation thereof or that the proposed alternative is equal to or greater than the requirements of these documents. The waiver shall be subject to the review and approval of the Board of Supervisors which may place reasonable conditions on any such approval.

Art. 15 CONFLICTS:

Unless a specific detail or specification is approved by the Board of Supervisors as part of the plan review process, these documents shall apply to the construction and installation of all improvement. In the event of such conflict, the specific detail or specification approved by the Board of Supervisors shall control over the specific requirements of these documents.

Section B TECHNICAL SPECIFICATIONS

UPPER SAUCON TOWNSHIP

TECHNICAL SPECIFICATIONS

STREETS, CURBS AND SIDEWALKS

Materials and Construction

All materials and construction methods used in the construction of streets, curbs, and sidewalks shall meet the requirements as set forth in Pennsylvania Department of Transportation (PENNDOT) Specifications, Publication 408 except as specifically modified by the requirements herein and except that the use of any type of slag or light weight aggregate material is prohibited.

EXCAVATION:

It is required that the Developer maintain all areas in a well drained condition during the construction period so as to avoid pooling or ponding of water. If a sinkhole should develop during construction, the Developer shall immediately repair the sinkhole at its expense alone and in accordance with the following:

Upon detection of a sinkhole, the Developer or its Contractor shall notify the Township, contact its own geotechnical engineer who shall propose a repair solution and have that procedure reviewed by the Geotechnical Engineer. The Developer's geotechnical engineer and the Geotechnical Engineer shall monitor the repair in accordance with the reviewed procedure and upon completion of the repair and before any construction activity resumes in the area, the Developer's geotechnical engineer shall send a written report to the Township and to the Geotechnical Engineer that the sinkhole has been repaired in accordance with the reviewed procedure and that construction activities may continue.

Undercutting. Rock, shale, hardpan, loose rock, boulders, or other material unsatisfactory for lawns, fields, subgrades, roads, shoulders, or any areas intended for turfing shall be excavated to a minimum depth of 12 inches, or to the depth below subgrade as specified by the Developer and its geotechnical engineer and acceptable to the Geotechnical Engineer. Muck, peat, matted roots, or other yielding material, unsatisfactory for subgrade foundation, shall be removed to the depth designated by the Geotechnical Engineer. The excavated area shall be refilled with suitable material, obtained from the grading operations or borrow areas and thoroughly compacted by rolling. The necessary refilling will constitute a part of the embankment. Where rock cuts are made and refilled with select material, any pockets created in the rock surface shall be provided with proper drainage.

Compaction Requirements. In cut areas, the upper six inches of the subgrade material under areas to be paved shall be compacted to a density of not less than 98 percent of maximum density for cohesive soils or 100 percent of maximum density for non-cohesive soils as determined by the Standard Proctor Density Test (AASHTO T 99 - Method C).

In cut areas, the upper six inches of the subgrade material under areas to be turfed shall be compacted to a density of not less than 90 percent of maximum density for cohesive soils or 95 percent of the maximum density for non-cohesive soils as determined by the Standard Proctor Density Test (AASHTO T 99 - Method C).

The in-place field density shall be determined in accordance with AASHTO T 191, Sand Cone Method, or AASHTO T 310, Nuclear Method.

Blasting. Blasting may be permitted only when proper precautions are taken for the safety of all persons, the work, and the property. All damage done to the work or property shall be repaired at the Developer's expense. All operations of the Contractor in connection with the transportation, storage, and use of explosives shall conform to all federal, state and local regulations, explosive manufacturers' instructions, with applicable approved permits to be submitted to the authority having jurisdiction for review. Any review given, however, will not relieve the Contractor of its responsibility in blasting operations.

Blasting shall be performed only after obtaining all necessary permits from state and local agencies and the Township, as applicable, and notifying the Township prior to each day of blasting.

PREPARATION OF EMBANKMENT AREA. Where an embankment is to be constructed, all sod, vegetative and deleterious matter shall be removed from the surface upon which the embankment is to be placed, and the cleared surface shall be broken up by plowing or scarifying to a minimum depth of six inches. This area shall then be compacted as indicated in Formation of Embankments. Where embankments are to be placed on natural slopes steeper than 3 to 1, horizontal benches shall be constructed.

FORMATION OF EMBANKMENTS. Embankments shall be formed in successive horizontal layers of not more than eight inches in loose depth for the full width of the cross section, unless otherwise specified by the Developer and its geotechnical engineer and acceptable to the Geotechnical Engineer. The grading operations shall be conducted, and the various soil strata shall be placed, to produce a soil structure as shown on the typical cross section or as directed. Materials such as brush, hedge, roots, stumps, grass or other organic matter shall not be incorporated or buried in the embankment.

Operations on earthwork shall be suspended at any time when satisfactory results cannot be obtained because of rain, freezing, or other unsatisfactory conditions in the field. The Contractor shall drag, blade, or slope the embankment to provide proper surface drainage.

Embankment material under areas to be paved shall be compacted to a density of 100 percent of the maximum dry density per Standard Proctor Density Test (AASHTO T 99 - Method C) for the top 3 feet, and 98 percent of the maximum dry density per Standard Proctor Density Test (AASHTO T 99 - Method C) for the remainder for cohesive soils. Embankment material

shall be compacted to a density of 100 percent of the maximum dry density per Standard Proctor Density Test (AASHTO T 99 - Method C) for the entire depth for non-cohesive soils.

The in-place field density shall be determined in accordance with AASHTO T 191, Sand Cone Method, or AASHTO T 310, Nuclear Method.

No layer in an embankment area shall be covered by another until the proper density is obtained.

During construction of the embankment, the Contractor shall route its equipment whenever practical, both when loaded and when empty, over the layers as they are placed and shall distribute the travel evenly over the entire width of the embankment. The equipment shall be operated in such a manner that hardpan, cemented gravel, clay, or other chunky soil material will be broken up into small particles and become incorporated with the other material in the layer.

When the excavated material to be used in the embankment consists predominantly of rock fragments of such size that the material cannot be placed in layers of the prescribed thickness without crushing, pulverizing or further breaking down the pieces, such material may be placed in the embankment in layers not exceeding two feet in thickness. Each layer shall be leveled and smoothed with suitable leveling equipment and by distribution of spalls and finer fragments of rock. This type of lift shall not be constructed above an elevation four feet below the finished subgrade. Density requirements will not apply to portions of embankments constructed of materials which cannot be tested in accordance with specified methods. Methods based on performance criteria established from test sections shall be used where the fill gradation does not accommodate traditional in-place density measurements. These procedures establish a performance criteria with test strips consisting of lifts of fill placed in various thickness and number of passes with the compaction equipment. The Developer's engineer shall establish acceptable placement and compaction criteria based on the test strips, as reviewed by the Geotechnical Engineer.

FINISHING AND PROTECTION OF SUBGRADE. After the subgrade has been substantially completed, the full width shall be conditioned by removing any soft or other unstable material which will not compact properly. The resulting areas and all other low areas, holes or depressions shall be brought to grade with suitable select materials. Scarifying, blading, rolling and other operations shall be performed to provide a thoroughly compacted subgrade shaped to the lines and grades shown on the Plans.

Grading of the subgrade shall be performed so that it will drain readily. The Contractor shall take all precautions necessary to protect the subgrade from damage. Hauling over the finished subgrade is prohibited. All ruts or rough places that develop in a completed subgrade shall be smoothed and recompacted.

No subbase, base, or surface course shall be placed on the subgrade until the subgrade has been proof rolled with a fully loaded tri-axle dump truck and reviewed by the Engineer and/or the Geotechnical Engineer, as applicable.

BITUMINOUS CONCRETE PAVEMENT

The following sections of PENNDOT Specifications, Publication 408 shall apply:

Section 409, Superpave Asphalt Mixture Design, Hot Mixed Asphalt (HMA), including the following:

<u>Material</u>	<u>Section</u>
Excavation	203, 204, and 205
Embankment	206
Subgrade	210
Subbase	350
Superpave Asphalt Mixture Design, HMA Base Course (Standard)	309
Superpave Asphalt Mixture Design, HMA Wearing Course (Standard)	409
Plain Cement Concrete Curb	630
Cement Concrete Sidewalk	676

The following procedure will govern the placement of bituminous concrete pavement on streets and/or roads within the Township:

1. Backfilling of utility trenches (such as for sanitary and storm sewers, water mains, gas mains, electrical facilities, etc.) shall be accomplished in accordance with these specifications, unless otherwise specified by the owner of the utility and reviewed by the Township. All trenches and excavations shall be backfilled promptly after the utilities are installed. Method of backfilling shall be as follows:
 - a. Within State Highway Right-of-Way: Backfilling shall be done in accordance with requirements of the State Highway Occupancy Permit;
 - b. Within existing streets the backfill shall consist of:
 - (1) A proper bedding of granular material properly formed to fully support the entire length of pipe;
 - (2) PENNDOT No. 2A stone for initial backfill of sides and top of the pipe to eight inches below the existing subgrade;
 - (3) Where required by the Engineer/Township, eight inches of clay placed and tamped to seal the trench at the subgrade elevation;
 - (4) In lieu of 2. and 3. above and with written approval from the Township, "flowable fill"; i.e., "Controlled Low Strength Material" (CLSM), with late-age strength of 80 to 100 psi may be placed to existing subgrade elevation. The 180-day settlement period (as referenced below) is replaced by the time required to reach late-age strength;

- (5) New base and surface courses in accordance with the current pavement section for the roadway classification or equivalent to the material of the existing roadway (whichever is greater), as determined by the Engineer;
- (6) When excavation of an existing Township street is necessary, it shall be done in accordance with requirements of the Township.

c. Within proposed streets the backfill shall consist of:

- (1) A proper bedding of granular material properly formed to fully support the entire length of pipe;
- (2) Clean clay-like material or PENNDOT No. 2A stone for initial backfill of the sides and for 12 inches above the pipe. For HDPE pipe, only PENNDOT No. 2A shall be used to 12 inches above the pipe, which envelope shall be maintained throughout the construction period and shall not extend into subbase materials for roadways;
- (3) Approved material free from organic matter, large or frozen lumps or stones over ten inches in their largest dimensions. Stones which are used in backfilling shall be so distributed through the mass that all interstices are filled with fine material.

The material shall be moistened or dried, if necessary, to obtain the required compaction. Backfill material shall be reviewed by the Engineer. The use of slag or lightweight aggregate in any form for bedding or backfill is prohibited. Special care shall be taken in placing the backfill. Particular care shall be used to obtain thorough compaction under the haunches and along the sides to the top of the pipe.

All backfill shall be placed in loose layers not exceeding six inches in depth under and around the pipe, and not exceeding eight inch lifts over the pipe. Successive layers shall be added and thoroughly compacted by mechanical or pneumatic tampers until the trench is completely filled to the elevation as directed. Backfilling shall be done in such a manner as to avoid injurious top or side pressures on the pipe.

Underground warning tape shall be installed a minimum of two feet above any pipe in the backfill of any mainline or lateral trench. Tape shall be alkali resistant, 4 mils polyethylene, 4 inches minimum width, continuously printed with name or symbol of utility buried below, color coded as follows:

Red: Electric.

Yellow: Gas, oil, and dangerous materials.

Orange: Telephone, cable TV, and other communications.

Blue: Water systems.

Green: Sewerage systems.

Where plastic water or sewer pipe is used the tape shall be appropriately colored and able to conduct a signal generated by a locating device.

Backfill shall be compacted to a density of not less than 98 percent of maximum density. The maximum density is the maximum dry weight density in pounds per cubic foot as determined by the Standard Proctor Density Test (AASHTO T 99 - Method C).

All backfilled trenches shall be allowed to settle for at least 180 days before the permanent base course or pavement may be constructed. Where less than 180 days of settlement time is anticipated and permitted by the Engineer, all trench backfill shall be PENNDOT No. 2A stone, tamped and when required by the Engineer/Township, capped with eight inches of clay at subgrade elevation, wherever permanent base course pavement is to be constructed. In such cases, the delay time until paving the permanent base course may be reduced as determined by the Engineer/Township.

Installation of utilities in areas underlain by carbonate geology as described in Zoning Ordinance Section 5.15 shall require placement of a clay or bentonite clay dikes at 20 foot intervals along the length of the trench. These dikes shall be constructed in such a manner that there will be six inches of clay/bentonite beneath the pipe and a minimum of two feet above the top of the pipe for the width of the trench. The thickness of these dikes shall be a minimum of two feet along the length of the main.

All installation of pipe in areas underlain by carbonate geology as described in Zoning Ordinance Section 5.15 shall adhere to the following conditions pertaining to backfill requirements. During periods when there is no prediction of precipitation, all open trenches shall be protected properly. During periods when precipitation is anticipated all trenches shall be completely backfilled at the completion of each workday and reopened the following workday. Under no circumstances shall trenches be left open during periods of precipitation.

The Township/Geotechnical Engineer reserves the right to impose more stringent requirements for installations which will occur in areas underlain by carbonate geology as described in Zoning Ordinance Section 5.15. These requirements include but are not limited to the placement of an approved liner to encase the proposed system or other methods and/or materials determined to secure the integrity of this zone.

2. Weather Limitations.

- a. Bituminous Base Course -- Superpave HMA. Bituminous base course shall not be placed on surfaces that are wet or at a temperature of 35 degrees F or lower, or when the air temperature is 35 degrees F or lower.
- b. Bituminous Wearing Course -- Superpave HMA. Placement shall be permitted during the period 1 April to 15 October annually, provided temperature conditions as listed in (c) below are met and provided further that no paving will be permitted during inclement weather.

Prior to the placement of the wearing course, if the base course is dirty or has set longer than two weeks, the base course shall be satisfactorily cleaned and tacked. The Engineer/Township shall make the above determination when the wearing course is not immediately placed on the base course.

When the bituminous wearing course is placed adjacent to curbs, it shall be sealed with Koch 9005 rubberized asphalt. Excess bituminous material shall be removed to the satisfaction of the Engineer/Township.

- c. Bituminous Wearing Course -- Superpave HMA. Placement may be permitted during the period 16 October to 15 November under the following conditions:
- (1) Bituminous wearing course shall be hauled in properly covered and insulated trucks;
 - (2) Bituminous wearing course shall not be placed on damp or wet surfaces;
 - (3) Bituminous wearing course shall not be placed when the air temperature is 40 degrees F or lower, nor when the temperature of the base or binder on which it is to be placed is 40 degrees F or lower;
 - (4) Extra precautions shall be taken in drying the aggregate to be used in the mix, controlling the temperature of the delivered material, and compacting the mixture;
 - (5) Bituminous wearing course shall not be placed if, on the date preceding placement, it rained or snowed and the temperature fell below freezing during the previous evening;
 - (6) Bituminous wearing course shall not be placed after November 15 without a written request from the Developer and the subsequent express written consent of the Township Manager and Engineer.

CONCRETE CURB, SIDEWALK AND DRIVEWAY APRONS: Construction of plain cement concrete curb shall meet the requirements of Section 630 - Plain Cement Concrete Curb, PENNDOT Specifications, Publication 408. This shall include the placement of concrete curb with an acceptable, self-propelled machine (slip-form machine).

Construction of cement concrete sidewalks and driveway aprons shall meet the requirements of Section 676 - Cement Concrete Sidewalks, PENNDOT Specifications, Publication 408. Refer to Standard Construction Details - RESIDENTIAL SIDEWALK AND DRIVEWAY APRON - UST-R-3; NON-RESIDENTIAL SIDEWALK AND DRIVEWAY APRON - UST-R-4; CONCRETE CURB - UST-R-5; SIDEWALK AND CURB RAMP - UST-R-6.

The concrete curb shall be cast to a regular vertical and horizontal alignment. Transition in the vertical and horizontal alignment shall be smooth and continuous. The finish on the visible portion of the curb shall be dense and consistent in appearance. Visible differences in the finish alone shall be grounds for rejection of the curb construction.

Concrete curb, sidewalk, and driveway aprons shall not be placed or cured when the air temperature is or is anticipated to be 40 degrees F or lower without a written request from the Developer and the subsequent express written consent of the Township Manager and Engineer. Concrete curb, sidewalk and driveway aprons shall not be placed on frozen base, subbase or subgrade. Concrete to be used shall be PENNDOT Class AA minimum (minimum mix design 28 day compressive strength of 3,750 psi).

The Contractor shall be particularly diligent in its craftsmanship at expansion and contraction joints and stormwater inlets or any other structure that interrupts the continuity of the concrete curb. Failure to integrate joints and inlets into a consistent and continuous vertical and horizontal alignment and smooth finish shall be grounds for rejection of the curb construction.

BELGIAN BLOCK GRANITE CURB: When permitted by the Township, Belgian Block granite curb shall be installed in accordance the Standard Construction Details – BELGIAN BLOCK GRANITE CURB – UST-R-7.

SHOULDERS: Where applicable, the shoulder shall consist of the same pavement structure as the cartway.

UNDERDRAIN: Pipe underdrain shall meet the requirements of PENNDOT Specifications, Publication 408, Section 610 and be reviewed by the Engineer. Inside diameter of pipe shall be six inches, unless otherwise shown on the approved plans.

NOTIFICATION: No connections shall be made to existing Township streets without prior approval and without three working days advance notice to the Township to allow for scheduling of Township observation personnel.

TRAFFIC SIGNAL EQUIPMENT: The Developer and its Contractor shall follow all applicable signalization system design and installation standards and codes including but not limited to standards and codes of IEE, ASTM, ANSI, International Municipal Signal Association (IMSA), Institute of Traffic Engineers (ITE), and PENNDOT, and shall bear the label of approval of the National Board of Fire Underwriters and Laboratory where applicable. New, first-quality, PENNDOT approved materials, made by a manufacturer of established recognized reputation, shall be furnished and used unless otherwise specified. The Contractor shall follow PENNDOT Publication 408, Sections 930-936, 950-957, 960-966, 1101, 1103, and 1104, as well as Title 67 Chapter 221, Publication 148 (TC-7800), Publication 149, Publication 236, and Publication 111 (TC-8700).

A signal corridor analysis shall be provided for any proposed traffic signal within the limits of an existing coordinated corridor or if timing changes are proposed to a traffic signal within the limits of an existing coordinated corridor.

Unless otherwise directed by the Township, all existing equipment to be removed (signs, signal heads, mastarms, controller cabinets, and all hardware within the cabinet) shall remain the property of the Township and shall be inventoried and stored at the location designated by the Township. The Township reserves the right to require the Contractor to legally dispose of any equipment not desired by the Township.

Prior to final acceptance, as-built drawings shall be provided to the Township for review. A copy of the as-built drawing shall be provided for storage in the controller cabinet.

Controllers. All Traffic Signal Controllers shall be the 980 Series NEMA TS-2 Type 2, as manufactured by Naztec, Inc. and shall be capable of integration into a Closed Loop System. The Controller shall include a hand-held cord in the police compartment, a NEMA 12-channel conflict monitor, a Solid State Flasher, and Solid State Load Switches in a Cabinet for NEMA 3R application with a front door compartment and sufficient shelving for the necessary equipment.

A copy of closed loop software (Street Wise) shall be supplied to the Township, if applicable.

All Controller Cabinets shall be sized for future Fiber-Optic Telemetry equipment.

Interconnect, if any is required, shall be Fiber Optic cable, 6 fiber 62.5/125 micron multimode, terminated in patch panels with ST connectors. In situations where attachment to utility poles is not available or where conduit and trenching is not feasible, interconnect shall be accomplished with radio, provided a site survey has been performed and the testing substantiates reliability. The approval to proceed with a radio interconnect option shall be at the sole discretion of the Township.

All controllers shall be equipped with a battery back-up unit that will automatically switch to battery power unit when the incoming power is interrupted. The controller cabinet must have a 1" red LED indicator which must illuminate when utility power is lost. The controller cabinet shall be equipped with a generator hook-up connection in a separate cabinet with a cord for connection to the generator.

Signal Support. All Traffic Signals shall be supported with Valmont SMA42X Series of Traffic Signal Mastarms or equal, capable of having an extension to the shaft, and having a luminaire mounting arm added at a future date. Certification by a Pennsylvania Registered Professional Engineer shall be provided indicating that all components at the vertical poles and mastarms are designed by the manufacturer to adequately support the loads shown on the plans or the maximum load requirements established by AASHTO specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, latest edition, whichever is greater. Copies of the PENNDOT Certifications for the signal supports shall be supplied to the Engineer. Design calculations shall be provided to the Engineer for review before fabrication of all non-PENNDOT standard poles. Traffic signal supports shall be installed in accordance with PENNDOT Publication 408 and PENNDOT Supplemental Installation Procedures for Traffic Signal Supports. Wire mesh shall be provided between the top of the foundation and the bottom of the base plate to prevent rodent access but permit adequate drainage in place of mortar. For foundations in fill, the required foundation depth shall be measured from the point of minimum grade at the foundation. For foundations in cut, slope protection walls, connected to the top of the foundation, shall be provided. Slope protection wall designs prepared by a Pennsylvania Registered Professional Engineer shall be submitted to the Engineer for review prior to construction. Abandoned Signal Foundations shall be removed to a depth of 1' below final grade, and the existing ground shall be restored in the area of the foundation to provide a

uniform level surface. The area disturbed by removal shall be restored to match the adjoining undisturbed area.

Signal Heads. All Vehicular and Pedestrian Signal Head indications must have the look of an incandescent lamp. LEDs that appear pixilated will not be acceptable. The pedestrian signal heads shall have Portland Orange and Lunar White LED indications representing the 'Hand' and 'Walking Person', respectively. All vehicular and pedestrian signal improvements shall be contained in a polycarbonate housing. Back plates, visors, louvers, and optically programmed signal heads shall be provided as indicated on the permit plans. Signal heads shall be securely mounted, using signal mounting brackets where indicated, and in accordance with the regulations. Signal heads shall be installed over roadways with the top of the housings at the same elevation. Where vehicular and pedestrian signals are to be installed on the same support, the assemblies should be separated. Vehicular signal heads shall be aimed, as directed, toward a point approximately 150 feet in advance of the stop line and in the center of the traveled traffic approach. Pedestrian signals shall be aimed to the far side of the crosswalk they are to control. Signals shall be hooded securely with burlap material until the signal is put into operation.

Electrical Distribution. The Contractor shall coordinate with the local power company to obtain metered power for each traffic signal controller cabinet. All meter equipment shall be housed in the Small Single Door Enclosure.

Conduit runs shall be sized for future use. All conduit street crossings will be 3" conduit. Controllers should be located at the intersection of conduit runs, and not at the end of a conduit loop. Each controller foundation or pole foundation (if the controller is pole mounted), will have the equivalent of two 3" conduits entering it from an adjacent junction box. Multiple conduit runs between common terminals shall be installed in a common trench. All effort shall be made to install conduits prior to construction of final grade (i.e., sidewalk, driveways, road widening, et al.). All loops will terminate in junction boxes, and there will be at least one junction box on each corner.

Detection. Detector Lead-In cable shall be IMSA Spec No. 50-2, 14 AWG. Detector Loop wires shall be IMSA Spec. No. 51-5, 14 AWG. Loop Amplifiers shall be rack mounted. All intersections will be equipped with Optical Preemption for all approaches to the intersection. Detectors will be positioned to achieve the proper distance for activation and control of the intersection. Optical preemption equipment will be Strobecom II as manufactured by Tomar.

SIGNS: All signalized intersections shall be signed with Street Name signs of the size and designation as required by PENNDOT. All overhead street name signs (Series D3-4 and D3-5) shall include stiffeners. All stand alone traffic signs shall be mounted on PENNDOT Breakaway Type 'B' posts.

The street signs to be installed at unsignalized intersections for Township roadways shall conform to PENNDOT Specifications, Publication 236, Detail D3-1 with white reflectorized Type II or Type VII sheeting letters on green reflectorized Type III or Type VII sheeting background. All street signs shall be installed prior to installation of roadway base course paving.

For sign removal, the identified sign shall be removed from the current location. All sub-surface equipment shall be removed to a depth of 1' below grade and the existing ground in the area of the sign shall be restored to provide a uniform level surface. The area disturbed by removal shall be returned to match the adjoining undisturbed area. All existing aluminum and steel removed shall be inventoried and stored at the location designated by the Township. The Contractor shall exercise care during removal, storage, bundling, and delivery to prevent additional damage or deterioration of the sign materials, particularly aluminum sign blanks.

For sign relocations, signs shall be removed per sign removal above. The sign shall be installed in the new location, as identified on the plans, or as directed by the Engineer. The Contractor shall provide any anchoring equipment necessary to provide anchoring as originally installed. The Contractor shall be responsible for replacing in kind all signs or posts damaged during removal or reinstallation.

PAVEMENT MARKINGS: Long lane line pavement markings are to be paint and shall conform to Sherwin Williams Highway Products, Hotline Traffic Paints Premium Waterborne TM 2152 White or TM 2153 Lead Free Yellow. Gore transverse stripping is to be epoxy. All other pavement markings are to be cold inlaid plastic or hot surface applied thermoplastic. Pavement markings shall be repainted at the close of the 18-month maintenance period.

UPPER SAUCON TOWNSHIP

TECHNICAL SPECIFICATIONS

STORM SEWERS AND APPURTENANCES

GENERAL: All materials and construction methods used in the construction of storm sewers and appurtenances shall meet the requirements as set forth in Pennsylvania Department of Transportation (PENNDOT) Specifications, Publication 408 except as specifically modified by the requirements herein, and except that the use of any type of slag or lightweight aggregate material is prohibited.

Materials

PIPE AND STRUCTURES: Reinforced concrete pipe (RCP) shall be used for all storm sewers to be constructed within street rights-of-way to be dedicated to the Township and may be used for storm sewers located within drainage easements. High density polyethylene (HDPE) pipe may be permitted by the Township in drainage easements outside the street rights-of-way. Manholes shall be constructed of precast concrete manhole sections. Inlets and endwalls shall be precast reinforced concrete structures. Manholes and inlets shall not be constructed of precast concrete blocks or sewer brick. Sewer brick shall be used only at the top of the concrete structure to allow for adjustment of the casting. See Construction, LEVELING COURSE.

All materials shall be by a manufacturer listed in PENNDOT, Publication 35, Bulletin 15 (Approved Construction Materials).

CONCRETE STORM SEWER PIPE, REINFORCED: Concrete culvert and sewer pipe, reinforced, shall conform to the requirements of AASHTO M170 (current edition) for Class III pipe.

HIGH DENSITY POLYETHYLENE PIPE (HDPE): HDPE pipe shall meet the requirements of AASHTO M252 or AASHTO M294, Standard Specification for polyethylene corrugated drainage pipe.

MORTAR: Mortar for brick masonry, pipe joints, and connections to other structures shall conform to the requirements of Pennsylvania Department of Transportation (PENNDOT) Specifications, Publication 408, Section 705.7.

RUBBER GASKET JOINTS: Joints using rubber gaskets shall conform to the requirements of AASHTO M198. Rubber gaskets for concrete pipe shall be continuous rubber rings which fit snugly in the annular spaces between the overlapping surfaces of the ends of the pipes to form a flexible watertight seal under all conditions of service. The gasket shall have smooth surfaces free from all imperfections.

CONCRETE: Plain and reinforced concrete used in structures, pipe cradles, connections of pipes with structures and support of structures or frames shall conform to the requirements of Pennsylvania Department of Transportation (PENNDOT) Specifications, Publication 408, Section 704, Class A concrete minimum.

BRICK: Brick shall conform to the requirements of AASHTO M91, Grade MM.

PRECAST CONCRETE PIPE MANHOLE SECTIONS: Precast reinforced concrete pipe manhole sections shall conform to the requirements of AASHTO M199. Unless otherwise approved by the Engineer, the sections shall have a minimum inside diameter of 48 inches.

FRAMES, COVERS, AND GRATE CASTINGS: The castings shall conform to one of the following requirements:

1. Gray iron castings shall meet the requirements of AASHTO M105 (current edition);
2. Steel castings shall meet the requirements of AASHTO M103 (current edition).

All castings shall be true to form and dimensions, and shall be free from inclusions of foreign material, casting faults, injurious blow holes, cracks, sponginess, and other defects rendering them unsuitable. The finished frame and cover or grate shall have the bearing surfaces machined or ground so that there will be no variations that will permit rocking or rattling, and the diameter of the cover or grate shall be such as to fit the frame without wedging. All castings shall be thoroughly cleaned by the manufacturer.

Grates for inlets shall be bicycle safe as detailed in PENNDOT Standard for Roadway Construction Steel Grate -- Bicycle Safe.

STEPS: All manholes and inlets shall be provided with steps. Steps shall conform to PENNDOT Specifications, Publication 408, Section 605.

Construction

EQUIPMENT: The Contractor shall provide equipment to handle the pipe in unloading and placing in its final position, without damage to the pipe.

The Contractor shall provide mechanical and pneumatic tampers sufficient to obtain the compaction of the pipe bedding and backfill as specified.

Use of the Hydra-Hammer or impact type equipment similar to the Hydra-Hammer will not be permitted for compacting backfilled trenches.

EXCAVATION:

1. The Contractor shall perform all common excavation to the depth necessary for pipe installation as shown on the grade cut sheets reviewed by the Engineer;

2. The Contractor shall perform all rock excavation to the depth required for common excavation plus at least eight inches below the bottom of the pipe bedding.

When rock or noncushioning material is encountered in trench excavation, a cushion at least eight inches thick shall be placed between the rock and the bottom of the pipe bedding. The cushion shall consist of clean sand, granular material meeting the requirements of AASHTO No. 10 aggregate, or PENNDOT No. 2A stone. The bottom of the trench shall be excavated to a horizontal section as far as practicable.

Blasting may be considered only when proper precautions are taken for the safety of all persons, the work, and the property. All damage done to the work or property shall be repaired at the Developer's expense. All operations of the Developer in connection with the transportation, storage, and use of explosives shall conform to all federal, state and local regulations, explosive manufacturers' instructions, with applicable approved permits to be submitted to the authority having jurisdiction for review. Any review given, however, will not relieve the Developer of its responsibility in blasting operations.

Blasting shall be performed only after obtaining all necessary permits from state and local agencies and the Township, as applicable;

3. Should unstable soil be encountered or should the Engineer deem it necessary to excavate to a depth below the grade shown on the Plans to secure a good foundation, the Contractor shall remove the unstable soil for the full width of the trench and replace it with PENNDOT No. 2A stone or larger, as reviewed by the Engineer. The pipe bedding shall be constructed on top of the PENNDOT No. 2A stone. The Engineer shall determine the depth of removal of unstable soil and the amount of backfill necessary. The backfill shall be thoroughly compacted and shaped to form the bed for the pipe;
4. Excavated material not required or acceptable for backfill shall be legally disposed of by the Contractor. Common excavation shall not be carried below the required depth. When this occurs, the trench shall be backfilled with material reviewed by the Engineer and thoroughly compacted to the density of the surrounding earth material, as determined in accordance with the Standard Proctor Density Test (AASHTO T 99 - Method C);
5. Where the bottom of the trench is found to be an inadequate foundation for the pipe and cannot be stabilized by the above methods, a concrete pad or cradle of sufficient size shall be constructed as determined by the Geotechnical Engineer;
6. The minimum width of the trench at the top of the pipe when placed shall be at least equal to the outside diameter of the pipe plus 12 inches on each side of the pipe. The trench shall be excavated accurately to the established line so that at least a 12-inch space will exist between the side of the trench and the side of the pipe. The maximum allowable width of trench shall not exceed 24 inches on each side of the pipe when placed;

7. The sides of trenches shall be vertical for a minimum distance of four feet above the top of the pipe. These requirements are for the stability of the trench and not to be confused with the safety issues of the trench. The Contractor shall perform such veeing, trench bracing, sheathing, or shoring necessary to perform and protect the excavation and as required for safety and to conform to governing laws. Unless otherwise provided, bracing, sheathing, or shoring shall be removed by the Contractor as backfill progresses in strict accordance with all safety procedures and to conform to all governing laws;
8. In the absence of more stringent limitations specifically defined herein or imposed by the Engineer or any other regulatory agency, the length of open trench shall be limited to 50 feet in advance of where pipe has been laid and 100 feet in total at any single location. Within areas underlain by carbonate geology, the combined length of open trench shall be limited to 50 feet in total. Any open trenches shall be completely backfilled or may covered with steel plates only as reviewed by the Township on a case-by-case basis. All construction equipment shall be removed from within rights-of-way of existing public roadways at the end of each work day and immediately upon the temporary or permanent discontinuance of work.

BEDDING: Unless otherwise directed by the Engineer/Township, all pipe, including that which is laid on an eight inch cushion in areas of rock excavation, shall bear the full length on a firm, flat trench bottom of a minimum of four inches of PENNDOT No. 2A stone, properly shaped to receive the pipe configuration at the joints. Wherever the Geotechnical Engineer may deem it necessary, the pipe shall be laid on a concrete pad or cradle of sufficient size to span areas of unsatisfactory bearing.

LAYING AND INSTALLING PIPE: Pipe shall be laid to true alignment and regular grade. Before pipe is laid, all dirt shall be removed from inside the pipe and all lumps, blisters, dirt, oil, grease and moisture shall be removed from inside and outside the ends. After pipe is laid, care shall be taken to prevent the entrance of dirt or water from the trench. Every open end of a pipe or fitting shall be plugged before leaving the work for the day or before backfilling the trench. Plugs shall be on the site before the Contractor commences construction of the pipe line.

Cutting of pipe for closure pieces, or other reasons, shall be done in a neat and workmanlike manner by a method which will not damage the pipe. All such cutting of pipe shall be done in conformance with the manufacturer's recommendations.

The Engineer/Township may inspect all pipe before it is laid, and reject any section that is damaged by handling or is found to be defective to a degree which will materially affect the function and service of the pipe.

Pipe shall not be laid on frozen ground. Pipe which is not true in alignment, or which shows any settlement after laying, shall be taken up and relaid.

The Contractor shall provide, as may be necessary, for the temporary diversion of stream flow in order to permit the installation of the pipe under dry conditions.

DEWATERING: Any water which collects in any excavation shall be removed by the Contractor before proceeding with the construction of the pipeline or structures.

LINE AND GRADE: The location (line) and/or grade of all sewers and pipe lines to be constructed shall be established by means of offset stakes, pins or other survey marks. When the Contractor uses a laser to obtain line and grade for laying the pipe, periodic checks shall be made by the Contractor from grade stakes. The first grade stake shall be furnished at 25 feet and at intervals not greater than 100 feet thereafter. When the Observer checks for vertical and/or horizontal alignment of the pipe, the Contractor shall assist him. Grade sheets shall be prepared by the Developer's engineer and submitted to the Engineer for review a minimum of three working days prior to construction.

A minimum horizontal separation of ten feet and a minimum vertical separation of 18 inches shall be maintained between waterlines and sanitary or storm sewers in accordance with Pennsylvania Department of Environmental Protection Public Water Supply Manual, Part II, Community System Design Standards, Chapter 8, Section 8.7 inclusive, or latest version of the governing regulations. When conflicts occur with existing facilities and the separations are less than mentioned above, the corrective methods shall be reviewed by the Engineer/Township.

HIGH DENSITY POLYETHYLENE PIPE: HDPE pipe shall be installed in accordance with the requirements of the PENNDOT Specifications, Publication 408, Section 601. However, in all installations, during construction the minimum depth from surface grades to top of pipe shall be 3 feet, and upon final grading the minimum depth from finished grade to top of pipe shall be 2 feet, unless greater depths are recommended by the pipe manufacturer. All pipe shall have watertight joints unless otherwise reviewed by the Engineer upon receipt of documentation to indicate that an alternative joint would be appropriate.

Repair of damaged HDPE shall be according to the pipe manufacturer's recommendations. This shall include but is not limited to removal and replacement or a repair procedure acceptable to the Engineer/Township.

CONCRETE PIPE JOINTS: Joints for concrete storm sewer pipe shall be of the bell and spigot type.

One of the following methods of jointing pipe shall be used: portland cement mortar or rubber gasket.

When mortar is used, on the inside of the pipe the lower half of the joint shall be filled flush with mortar for pipes up to 27 inches in diameter. For these pipes where only the lower half of the joint is filled on the inside, then the upper half of the joint shall be filled on the outside of the joint. For pipes over 27 inches in diameter, the inside joint shall be filled flush with mortar for the entire inside periphery.

When a rubber gasket is used to make the joint, it shall be installed in accordance with the manufacturer's instructions.

BACKFILLING: Backfilling of trenches for pipes shall be accomplished in accordance with these specifications. All trenches and excavations shall be backfilled promptly after the pipes are installed. Method of backfilling shall be as follows:

1. Within State Highway Right-of-Way: Backfilling shall be done in accordance with requirements of the State Highway Occupancy Permit;
2. Within existing streets, the backfill shall consist of:
 - a. A proper bedding of granular material properly formed to fully support the entire length of pipe;
 - b. PENNDOT No. 2A stone for initial backfill of sides and top of the pipe to eight inches below the existing subgrade;
 - c. Where required by the Engineer/Township, eight inches of clay placed and tamped to seal the trench at the subgrade elevation;
 - d. In lieu of b. and c. above and with written approval from the Township, "flowable fill"; i.e., "Controlled Low Strength Material" (CLSM), with late-age strength of 80 psi to 100 psi may be placed to existing subgrade elevation. The 180-day settlement period (as referenced below) is replaced by the time required to reach late-age strength;
 - e. New base and surface courses in accordance with the current pavement section for the roadway classification or equivalent to the material of the existing roadway (whichever is greater), as determined by the Engineer;
 - f. When excavation of an existing Township street is necessary, it shall be done in accordance with requirements of the Township.
3. In all other areas (including but not limited to proposed streets) the backfill shall consist of:
 - a. A proper bedding of granular material properly formed to fully support the entire length of pipe;
 - b. Clean clay like material or PENNDOT No. 2A stone for initial backfill of the sides and for 12 inches above the pipe. For HDPE pipe, only PENNDOT No. 2A shall be used to 12 inches above the pipe, which envelope shall be maintained throughout the construction period and shall not extend into subbase materials for roadways;
 - c. Approved material free from organic matter, large or frozen lumps or stones over ten inches in their largest dimensions. Stones which are used in backfilling shall be so distributed through the mass that all interstices are filled with fine material.

The material shall be moistened or dried, if necessary, to obtain the required compaction. Backfill material shall be reviewed by the Engineer. The use of slag in any form for bedding or backfill is prohibited. Special care shall be taken in placing the backfill. Particular care shall be used to obtain thorough compaction under the haunches and along the sides to the top of the pipe.

All backfill shall be placed in loose layers not exceeding six inches in depth under and around the pipe, and not exceeding eight inch lifts over the pipe. Successive layers shall be added and thoroughly compacted by mechanical and pneumatic tampers until the trench is completely filled to the elevation as directed. Backfilling shall be done in such a manner as to avoid injurious top or side pressures on the pipe.

Underground warning tape shall be installed a minimum of two feet above any pipe in the backfill of any mainline or lateral trench. Tape shall be alkali resistant, 4 mils polyethylene, 4 inches minimum width, continuously printed with name or symbol of utility buried below, color coded as follows:

Red: Electric.

Yellow: Gas, oil, and dangerous materials.

Orange: Telephone, cable TV, and other communications.

Blue: Water systems.

Green: Sewerage systems.

Where plastic water or sewer pipe is used the tape shall be appropriately colored and able to conduct a signal generated by a locating device.

Backfill shall be compacted to a density of not less than 98 percent of maximum density. The maximum density is the maximum dry weight density in pounds per cubic foot as determined by the Standard Proctor Density Test (AASHTO T 99 - Method C).

All backfilled trenches shall be allowed to settle for at least 180 days before the permanent base course or pavement may be constructed. Where less than 180 days of settlement time is anticipated and permitted by the Engineer, all trench backfill shall be PENNDOT No. 2A stone, tamped and when required by the Engineer/Township, capped with eight inches of clay at subgrade elevation, wherever permanent base course and pavement is to be constructed. In such cases, the delay time until paving the permanent base course may be reduced as determined by the Engineer/Township.

AREAS UNDERLAIN BY CARBONATE GEOLOGY: Installation of storm sewers in these areas shall require placement of a clay or bentonite clay dikes at 20 foot intervals along the length of the pipe. These dikes shall be constructed in such a manner that there will be six inches of clay/bentonite beneath the pipe and a minimum of two feet above the top of the pipe for the width of the trench. The thickness of these dikes shall be a minimum of two feet along the length of the pipe.

All installation of storm sewers within these areas shall adhere to the following conditions pertaining to backfill requirements. During periods when there is no prediction of precipitation,

all open trenches shall be protected properly. During periods when precipitation is anticipated all trenches shall be completely backfilled at the completion of each workday and reopened the following workday. Under no circumstances shall trenches be left open during periods of precipitation.

The Township/Engineer reserves the right to impose more stringent requirements for installations which will occur in these areas. These requirements include but are not limited to the placement of an approved liner to encase the proposed system or other methods and/or materials determined to secure the integrity of these areas.

APPURTENANCES: Manholes, inlets, and endwalls shall be constructed to the requirements of PENNDOT Specifications, Publication 408, Section 605 and Section 714; the latest details of the PENNDOT Standards for Roadway Construction; these Specifications and the Township Standard Construction Details.

LEVELING COURSE: A leveling course of precast concrete adjustment units shall be provided at all manholes and inlets to set each casting at final grade. Brick is to be used for slope adjustment only, and the inside and outside surfaces of the masonry leveling course shall be neatly plastered with mortar to a minimum thickness of one-half inch.

PLACEMENT AND TREATMENT OF CASTINGS, FRAMES AND FITTINGS: All castings, frames, and fittings shall be placed in the positions indicated on the Plans or as directed by the Engineer, and shall be set true to line and to correct elevation. If frames or fittings are to be set in concrete or cement mortar, all anchors or bolts shall be in place and positioned before the concrete or mortar is placed. The unit shall not be disturbed until the mortar or concrete has set.

There shall be three weepholes placed in each inlet, as directed by the Engineer/Township. The minimum size of each weephole shall be two inches by four inches. The weepholes shall be placed in the top of the base unit (called "Inlet Box" by the PENNDOT -- Standards for Roadway Construction) or in the leveling course between the "Inlet Box" and the Concrete Top Units. The weepholes shall be spaced evenly unless otherwise directed by the Engineer. The backfill around the weepholes shall not be screened; i.e., place clean stone without screening the voids to allow water to enter the weepholes.

INSTALLATION OF STEPS: The steps shall be installed as indicated on the Plans, or as directed by the Engineer. When the steps are to be set in concrete they shall be placed and secured in position before the concrete is poured. The steps shall not be disturbed or used until the concrete or mortar has hardened for at least seven days. After this period has elapsed, the steps shall be cleaned and painted, unless they have been galvanized, or coated satisfactorily.

When steps are required with precast concrete pipe structures, they shall be cast into the sides of the pipe at the time the pipe sections are manufactured, or set in place after the structure is erected by drilling holes in the concrete and cementing the steps in place.

Typical step configuration shall be in accordance with PENNDOT Standards for Roadway Construction, detail for STANDARD MANHOLES, PRECAST MANHOLES & MANHOLE STEPS, RC-39.

BACKFILLING OF STRUCTURES:

1. After a structure has been completed, the area around it shall be filled with approved material, in horizontal layers not to exceed eight inches in loose depth, and compacted to the density specified. The fill shall be made to the elevation shown on the Plans, or as directed by the Engineer/Township;
2. Backfill shall not be placed against any structure until concrete is given the necessary time to cure;
3. Fill shall be deposited uniformly around the structure while backfilling to prevent unequal lateral pressure. Special care shall be taken to prevent any wedging action against the structure.

UNDERDRAIN: Pipe underdrain shall meet the requirements of PENNDOT Specifications, Publication 408, Section 610 and be reviewed by the Engineer. Inside diameter of pipe shall be six inches, unless otherwise shown on the approved plans.

SECURITY GRATES: Security grates shall be installed on all headwalls, endwalls, end sections, and culverts with openings 15 inches or greater. It shall be the responsibility of the Developer or its Contractor to submit to the Engineer for review a detailed drawing of the proposed security grate prior to fabrication. The number of bars shall be determined by the culvert size with bar spacing not to exceed six inches each way. Structural steel shall conform to ASTM A36 and bars shall conform to ASTM A615, Grade 60, epoxy coated or hot-dipped galvanized after fabrication. Grates shall be attached to the structures in a manner permitting ready removal for future cleaning of debris.

DETENTION BASINS: The construction of detention basins shall meet the requirements of PENNDOT Specifications, Publication 408, Sections 200 and 800 and be reviewed by the Engineer/Geotechnical Engineer.

In cut areas or in embankment areas, the upper six inches of the subgrade material beneath the clay blanket, within detention basin construction limits shall be compacted to a density of not less than 98 percent of maximum density. Maximum density is the maximum dry weight density in pounds per cubic foot as determined by the Standard Proctor Density Test (AASHTO T 99 - Method C).

Any required impervious liner shall be as recommended by the Geotechnical Engineer.

All detention basins shall be constructed with concrete low flow channels that meet the details on the Standard Construction Details – REINFORCED CONCRETE LOW FLOW CHANNEL - UST-D-7, unless otherwise permitted by the Township.

For detention basin fencing, the fence material shall meet the requirements of the Standard Construction Details –DETENTION BASIN FENCE - UST-D-8 or UST-D-9. All proposals shall be reviewed by the Township on a case-by-case basis and shall conform aesthetically to the surrounding community. Either the permanent or a temporary fence must be installed prior to the detention basin accepting runoff.

UNDERGROUND DETENTION FACILITIES: Underground detention facilities may be constructed of either: reinforced concrete vaults or tanks, large diameter plastic, metal or concrete pipe or commercially-available proprietary underground systems. The underground detention facilities shall be designed by the Developer's design engineer and/or geotechnical engineer and reviewed by the Engineer/Geotechnical Engineer. All materials used in the construction of underground detention facilities shall be watertight, and any required impervious liner shall be as recommended by the Geotechnical Engineer.

Underground detention facilities must be located a minimum of 10 feet horizontally from other public utilities, 50 feet horizontally from a private well or septic system tank/drain field, and 15 feet down gradient or 100 feet up gradient from building foundations. Percolation tests and test pits or borings must be performed in the location of the proposed underground detention facility as determined to be necessary by the Geotechnical Engineer.

All reinforced concrete vaults or tanks and pipes, bedding and backfill shall be designed to withstand HS-25 loading. All vaults, tanks and pipes shall be continuously sloped at a minimum of 0.25 percent to the outlet. The minimum pipe diameter shall be 36 inches, and pipes may not be closer to one another than ½ the inside pipe diameter or 3 feet, whichever is greater. A minimum 6" pipe bedding shall be provided, and the minimum backfill and cover must be per the manufacturer's specifications, based on the design load and considering flotation, where required. An emergency spillway shall be provided to safely pass the 100 year storm event.

A water quality treatment BMP shall be provided upstream of the underground detention facility. A minimum of one 30" access port shall be provided for each vault or tank. A minimum of one 48" manhole shall be provided for every 150 feet of pipe with a minimum of two 48" manholes for each underground piping facility. Access shall also be provided at the outflow structure. All access ports/manholes shall be bolted.

CLEANING AND RESTORATION OF SITE: After the backfill is completed, the Contractor shall dispose of all surplus material, dirt, and rubbish from the site.

After the work is completed, the Contractor shall remove all tools and other equipment used, leaving the entire site in good condition.

FINAL OBSERVATION: Prior to final approval of the storm sewerage system, the Township, the Engineer, and the Developer accompanied by the Contractor's representative, shall thoroughly observe the entire installation. Any indication of defects in material or workmanship or obstruction to flow in the pipe system shall be further investigated and corrected by the Contractor.

TESTING: Infiltration/exfiltration testing of the storm sewers shall be in accordance with ASTM C969-02 as may be updated or modified and shall be conducted by, and at the expense of, the Developer/Contractor.

NOTIFICATION: No connections shall be made to existing Municipal systems without prior approval and without three working days advance notice to the Township to allow for scheduling of Township observation personnel.

SINKHOLES: It is required that the Developer maintain all areas in a well drained condition during the construction period so as to avoid pooling or ponding of water. If a sinkhole should develop during construction, the Developer shall immediately repair the sinkhole at its expense alone and in accordance with the following:

Upon detection of a sinkhole, the Developer or its Contractor shall notify the Township, contact its own geotechnical engineer who shall propose a repair solution and have that procedure reviewed by the Geotechnical Engineer. The Developer's geotechnical engineer and the Geotechnical Engineer shall monitor the repair in accordance with the reviewed procedure and upon completion of the repair and before any construction activity resumes in the area, the Developer's geotechnical engineer shall send a written report to the Township and to the Geotechnical Engineer that the sinkhole has been repaired in accordance with the reviewed procedure and that construction activities may continue.

UPPER SAUCON TOWNSHIP

TECHNICAL SPECIFICATIONS

WATER MAINS AND APPURTENANCES

GENERAL: All materials and construction methods used in the construction of water mains and appurtenances shall meet the requirements as set forth in Pennsylvania Department of Transportation (PENNDOT) Specifications, Publication 408 except as specifically modified by the requirements herein, and except that the use of any type of slag or light weight aggregate material is prohibited.

Materials and construction methods identified in these Documents are intended for applications where pressures are 100 psi or lower. Any applications where pressures are in excess of 100 psi may require modification subject to separate review.

Materials

ANSI/NSF STANDARDS. All materials to be used in construction or modification of a public water system including waterline extensions which may come in contact with or affect the quality of the water shall be certified for conformance with ANSI/NSF Standard 61 (Drinking Water System Components - Health Effects - National Sanitation Foundation). An acceptable certification shall be provided by the NSF or other certification organization acceptable to the Pennsylvania Department of Environmental Protection.

DUCTILE IRON PIPE: All pipe shall be Ductile Iron centrifugally cast in accordance with ANSI Specification A21.51 and shall have a Class 52 metal thickness.

PIPE JOINTS: All joints shall be of the push-on type except as noted and shall conform to ANSI Specification A21.11. Pipe shall be furnished complete with all joint accessories including the continuous, molded, rubber ring gasket and the gasket lubricant.

FITTINGS: All fittings shall conform to ANSI Specification A21.10 for ductile iron and gray iron fittings for 3-inch through 48-inch diameters for water and other liquids or to ANSI Specification A21.53 for ductile iron compact fittings for 3-inch to 12-inch diameters for water and other liquids.

CEMENT LINING: All pipe shall be double cement lined and asphaltic seal coated inside, and bituminous seal coated outside in accordance with ANSI/AWWA C104/A21.4. Minimum thickness of double cement lining shall be 1/8 inch.

EPOXY COATING: All fittings shall be epoxy coated inside and bituminous seal coated outside in accordance with ANSI/AWWA C116/A21.16.

VALVE, VALVE BOX, AND TAPPING SLEEVE AND VALVE: Refer to Township Standard Construction Detail - VALVE AND VALVE BOX - UST-W-6.

FIRE HYDRANTS: Fire hydrants shall conform to AWWA Specification C502 and shall be as shown on the Township Standard Construction Detail - FIRE HYDRANT - UST-W-1.

SERVICE CONNECTIONS: Refer to Township Standard Construction Detail - SERVICE CONNECTION DETAIL - UST-W-5.

BLOW-OFF ASSEMBLY: Refer to Township Standard Construction Detail - WATERLINE BLOW-OFF DETAIL - UWT-S-4.

COPPER SERVICE LINES: Service connections from the main to the curb stop of sizes 1-inch (minimum) through 2-inch diameter shall be Type K copper tubing, conforming to ASTM B88 (current issue), designed for a working pressure of not less than 150 psi. The copper service line shall be one continuous section of copper tubing from the corporation to the curb stop and shall not include any couplings.

DUCTILE IRON SERVICE LINES: Service connections from the main to the curb stop of sizes larger than 2-inch diameter shall be ductile iron conforming to the AWWA C151 and C153.

CONCRETE: All concrete required for thrust blocks, concrete mats, etc. shall conform to the requirements of Pennsylvania Department of Transportation (PENNDOT) Specifications, Publication 408, Section 704, Class A concrete minimum.

METERS AND METER PITS: Refer to Township Standard Construction Details – WATER METER / FIRE METER ASSEMBLY AND PIT - UST-W-7, and CAMPUS WATER METER AND PIT – UST-W-8. Water meters shall be supplied by the Township and sold to the Developer at the Township’s cost. Installation of meters not supplied by the Township is expressly prohibited. Water meters and meter pits shall be provided for all non-residential uses. The meter pit shall remain private but be located in a sufficiently sized easement to allow Township access from the public right-of-way.

AIR RELEASE VALVE ASSEMBLIES: Refer to Township Standard Construction Detail - AIR RELEASE VALVE AND MANHOLE - UST-W-9.

SPECIAL INSTALLATIONS: Detailed plans, design calculations, and specifications for all water booster pumping stations, well stations or other special installations shall be submitted for review by the Engineer/Township. The Developer shall arrange with the manufacturer to provide the services of a factory-trained representative to perform the initial start-up of the station and to instruct the operating personnel in the operation and maintenance of the station. In addition, three copies of a complete operating and maintenance manual shall be provided to the Engineer before the station will be accepted by the Township. The station shall be designed and constructed so as to be controlled and monitored by the Township's telemetering system. All programming and connection costs shall be borne by the Developer.

Construction

EQUIPMENT: The Contractor shall provide equipment to handle the pipe in unloading and placing in its final position, without damage to the pipe.

The Contractor shall provide mechanical and pneumatic tampers sufficient to obtain the compaction of the pipe bedding and backfill as specified. Use of the Hydra-Hammer or impact type equipment similar to the Hydra-Hammer will not be permitted for compacting backfilled trenches.

EXCAVATION:

1. The Contractor shall perform all common excavation to the depth necessary for pipe installation as shown on the grade cut sheets reviewed by the Engineer to provide between 4 and 5 feet of cover from final grade, unless otherwise permitted by the Engineer;
2. The Contractor shall perform all rock excavation to the depth required for common excavation plus at least 8 inches below the bottom of the pipe bedding.

When rock or noncushioning material is encountered in trench excavation, a cushion at least 8 inches thick shall be placed between the rock and the bottom of the pipe bedding. The cushion shall consist of clean sand, granular material meeting the requirements of AASHTO No. 10 aggregate, or PENNDOT 2A stone. The bottom of the trench shall be excavated to a horizontal section as far as practicable.

Blasting may be considered only when proper precautions are taken for the safety of all persons, the work, and the property. All damage done to the work or property shall be repaired at the Developer's expense. All operations of the Developer in connection with the transportation, storage, and use of explosives shall conform to all federal, state and local regulations, explosive manufacturers' instructions, with applicable approved permits to be submitted to the authority having jurisdiction for review. Any review given, however, will not relieve the Developer of its responsibility in blasting operations.

Blasting shall be performed only after obtaining all necessary permits from state and local agencies and the Township, as applicable, and notifying the Township prior to each day of blasting.

3. Should unstable soil be encountered or should the Engineer deem it necessary to excavate to a depth below the grade shown on the Plans to secure a good foundation, the Contractor shall remove the unstable soil for the full width of the trench and replace it with PENNDOT 2A stone or larger, as reviewed by the Engineer. The pipe bedding shall be constructed on top of the PENNDOT 2A stone. The Engineer shall determine the depth of removal of unstable soil and the amount of backfill necessary. The backfill shall be thoroughly compacted and shaped to form the bed for the pipe;

4. Excavated material not required or acceptable for backfill shall be legally disposed of by the Contractor. Common excavation shall not be carried below the required depth. When this occurs, the trench shall be backfilled with material reviewed by the Engineer and thoroughly compacted to the density of the surrounding earth material, as determined in accordance with the Standard Proctor Density Test (AASHTO T 99 - Method C);
5. Where the bottom of the trench is found to be an inadequate foundation for the pipe and cannot be stabilized by the above methods, a concrete pad or cradle of sufficient size shall be constructed as determined by the Geotechnical Engineer;
6. The minimum width of the trench at the top of the pipe when placed shall be at least equal to the outside diameter of the pipe plus 12 inches on each side of the pipe. The trench shall be excavated accurately to the established line so that at least a 12-inch space will exist between the side of the trench and the side of the pipe. The maximum allowable width of trench shall not exceed 24 inches on each side of the pipe when placed;
7. The sides of the trenches shall be vertical for a minimum distance of 4 feet or a maximum distance of 5 feet above the top of the pipe. These requirements are for the stability of the trench and not to be confused with the safety issues of the trench. The Contractor shall perform such veeing, trench bracing, sheathing, or shoring necessary to perform and protect the excavation and as required for safety and to conform to governing laws. Unless otherwise provided, bracing, sheathing, or shoring shall be removed by the Contractor as backfill progresses in strict accordance with all safety procedures and to conform to all governing laws;
8. In the absence of more stringent limitations specifically defined herein or imposed by the Engineer, Township or any other regulatory agency, the length of open trench shall be limited to 50 feet in advance of where pipe has been laid and 100 feet in total at any single location. Within areas underlain by carbonate geology, the combined length of open trench shall be limited to 50 feet in total. Any open trenches shall be completely backfilled or may be covered with steel plates only as reviewed by the Township on a case-by-case basis. All construction equipment shall be removed from within rights-of-way of existing public roadways at the end of each work day and immediately upon the temporary or permanent discontinuance of work.

BEDDING: Unless otherwise directed by the Engineer, all pipe, including that which is laid on an 8-inch cushion in areas of rock excavation, shall bear the full length on a firm, flat trench bottom of a minimum of 4 inches of PENNDOT No. 2A stone, properly shaped to receive the pipe configuration at the joints. Wherever the Geotechnical Engineer may deem it necessary, the pipe shall be laid on a concrete pad or cradle of sufficient size to span areas of unsatisfactory bearing.

PIPE ENVELOPE: PENNDOT No. 2A stone shall be placed in eight inch maximum lifts adjacent to the lower haunches to a height of 12 inches (minimum) above top of pipe, and shall be

compacted to 95 percent of maximum density. The maximum density is the maximum dry weight density in pounds per cubic foot as determined by the Standard Proctor Density Test (AASHTO T 99 - Method C). Care must be exercised to ensure placement and compaction of the embedment material in the pipe envelope.

LAYING AND INSTALLING PIPE: Pipe shall be laid to true alignment and regular grade. Any change in horizontal direction which exceeds the deflection tolerance recommended by the pipe manufacturer shall be made by restrained fittings.

Cutting of pipe for closure pieces, or other reasons, shall be done in a neat and workmanlike manner by a method which will not damage the pipe. Cut ends of the pipe shall be ground smooth and beveled as recommended by the manufacturer.

The Engineer/Township may inspect all pipe before it is laid, and reject any section that is damaged by handling or is found to be defective to a degree which will materially affect the function and service of the pipe.

Pipe shall not be laid on frozen ground. Pipe which is not true in alignment, or which shows any settlement after laying, shall be taken up and relaid.

The Contractor shall provide, as may be necessary, for the temporary diversion of stream flow in order to permit the installation of the pipe under dry conditions.

Push-on joints shall be applied in accordance with the manufacturer's recommendations, with special care given to cleaning the joint and gasket thoroughly, applying the recommended lubricant, positioning the gasket carefully and avoiding any contact which might tend to cut the gasket. Where mechanical joints are specified, similar care shall be exercised. Mechanical joints shall be made as recommended by the manufacturer.

Pipes, fittings, hydrants and valves shall be carefully handled so as to avoid damage or contamination. Before pipe is laid, all dirt shall be removed from inside the pipe and all lumps, blisters, dirt, oil, grease and moisture shall be removed from inside and outside the ends. After pipe is laid, care shall be taken to prevent the entrance of dirt or water from the trench. Every open end of a pipe or fitting shall be plugged before leaving the work for the day or before backfilling the trench. Plugs shall be on the site before the Contractor commences construction of the waterline.

Concrete thrust blocks shall be poured at all tees, horizontal bends, plugs, and fire hydrants. At each vertical and horizontal bend in the main, and such other location specifically reviewed by the Engineer, the Contractor shall install concrete thrust blocks and shall take one or more of the following steps to prevent movement of the pressurized pipe:

1. Use "Mega-lug" retainer glands as manufactured by EBAA Iron Sales, Inc. Any restrained fitting shall be no closer than 50 feet from an unrestrained pipe joint;

2. Use stainless steel "all-thread" rods from fitting to fitting and a harness from fitting to the pipe; the type, number and location of which will depend on field conditions, but in no case shall be less than 50 feet from the fitting;
3. Use other methods satisfactory to the Engineer.

Pipe sleeves, couplings, bell clamps, etc. shall not be used in the completed installation.

DEWATERING: Any water which collects in an excavation shall be removed by the Contractor before proceeding with the construction of the pipeline or structure.

LINE AND GRADE: The location (line) and grades, if deemed necessary by the Engineer for the water main, shall be established by means of offset stakes, pins or other survey marks. Grades, when necessary, shall be furnished at intervals of 50 feet, minimum. Grade cut sheets shall be prepared by the Developer's Engineer and submitted to the Engineer for review a minimum of three working days prior to construction.

A minimum horizontal separation of 10 feet and a minimum vertical separation of 18 inches shall be maintained between waterlines and sanitary or storm sewers in accordance with Pennsylvania Department of Environmental Protection Public Water Supply Manual, Part II, Community System Design Standards, Chapter 8, Section 8.7 inclusive, or latest version of the governing regulations. When conflicts occur with existing facilities and the separations are less than mentioned above, the corrective methods shall be reviewed by the Engineer.

SETTING VALVES, FIRE HYDRANTS AND FITTINGS: Valves for fire hydrants shall be located 4 feet in front of the curb or as directed by the Engineer/Township. Main line valves in general shall be located on the extensions of right-of-way lines of intersecting streets. Particular care shall be taken to see that all valves are in proper working order. Construction of waterlines in developments consisting of Phases or Sections shall be accomplished in such a manner that subsequent Phases or Sections can be constructed without disruption of water service to a previous Phase or Section. This requirement may involve the installation of valves and/or blow-off assemblies additional to those shown on the plans. These valves and/or blow-off assemblies shall be secured by a method reviewed by the Engineer (see LAYING AND INSTALLING PIPE) or secured by extending the line a minimum of one full pipe length past the valve and by backfilling properly. This extension shall be capped with a blow-off assembly and be pressure tested as described herein. The valve shall be tested with a listening device as described herein. Care shall be taken in setting the mainline valve so that the pipe extension terminates at the project limit. Where hydrant tees are allowed, hydrant valves shall be secured to the hydrant tee using acceptable fastening methods.

Fire hydrants shall be set to line and grade and located as shown on the Standard Construction Details - FIRE HYDRANT - UST-W-1 or as directed by the Engineer/Township Public Works Department. Excavations for fire hydrants shall be three feet square and extend down to a depth 18 inches below the bottom of the hydrant. The excavation shall be filled to the bottom of hydrant elevation with AASHTO No. 3 stone. Hydrants shall be set with the 5-inch pumper connection facing the street, unless otherwise directed by the Engineer/Township. After setting the hydrant, AASHTO No. 3 stone shall be placed to 6 inches above the flange, and the

balance of the excavation filled with suitable material. Particular care shall be taken to set all hydrants vertical and to see that they are in proper working order. Thrust blocks shall not cover the hydrant drains. The traffic break-away section shall be no greater than 4 inches above final grade.

Blow-off valves, air-release valves, and other fittings shall be installed where shown on the plans, or as directed by the Engineer and as shown on the Standard Construction Details - WATERLINE BLOW-OFF - UST-W-4, and AIR RELEASE VALVE AND MANHOLE - UST-W-9.

SERVICE LATERALS: Service laterals shall be installed from the main to the curb stop, which shall be located generally two feet behind the curb, four feet deep below the top of the curb or existing road grade. Corporations, curb stops, and laterals shall be installed only when the water main is at normal working pressure, and shall be observed by the Engineer prior to backfilling. Bury depth shall not be greater than five feet nor less than four feet. An eight inch clay envelope shall be placed around all copper service laterals.

Curb boxes shall be positioned over the curb stops so that there is equal adjustment above and below final grade. The final check of the curb box alignment shall be made by the Observer and personnel of the Township or agency having jurisdiction. A curb stop key shall be satisfactorily placed on every curb stop, if alignment is in question.

When directed by the Engineer, the water lateral shall be extended from the curb stop to a location ten feet from the property line toward the house/structure. This extension is commonly referred to as the "pigtail" of the water lateral. The end of the "pigtail" shall be marked by installing a two lb. per ft. steel post painted with a fluorescent blue paint extending from the pipe end to five feet above grade.

BACKFLOW PREVENTION: Backflow Prevention shall be installed in accordance with the applicable International Building Code in effect at the time of installation, and shall be observed by the Responsible Township Personnel.

BACKFILLING: Backfilling of trenches for pipes which are to be conveyed to the Township shall be accomplished in accordance with these specifications. All trenches and excavations shall be backfilled promptly after the pipes are installed. Method of backfilling shall be as follows:

1. Within State Highway Right-of-Way: Backfilling shall be done in accordance with requirements of the State Highway Occupancy Permit;
2. Within existing streets, the backfill shall consist of:
 - a. A proper bedding of granular material properly formed to fully support the entire length of pipe;
 - b. PENNDOT No. 2A stone for initial backfill of sides and top of the pipe to eight inches below the existing subgrade;

- c. Where required by the Engineer/Township, eight inches of clay placed and tamped to seal the trench at the subgrade elevation;
 - d. In lieu of b. and c. above and with written approval from the Township, "flowable fill"; i.e., "Controlled Low Strength Material" (CLSM), with late-age strength of 80 psi to 100 psi may be placed to existing subgrade elevation. The 180-day settlement period (as referenced below) is replaced by the time required to reach late-age strength;
 - e. New base and surface courses in accordance with the current pavement section for the roadway classification or equivalent to the material of the existing roadway (whichever is greater), as determined by the Engineer;
 - f. When excavation of an existing Township street is necessary, it shall be done in accordance with requirements of the Township.
3. In all other areas (including but not limited to proposed streets) the backfill shall consist of:
- a. A proper bedding of granular material properly formed to fully support the entire length of pipe;
 - b. PENNDOT No. 2A stone for initial backfill of the sides and for 12 inches above the pipe;
 - c. Approved material free from organic matter, large or frozen lumps or stones over ten inches in their largest dimensions. Stones which are used in backfilling shall be so distributed through the mass that all interstices are filled with fine material.

The material shall be moistened or dried, if necessary, to obtain the required compaction. Backfill material shall be reviewed by the Engineer. The use of slag or lightweight aggregate in any form for bedding or backfill is prohibited. Special care shall be taken in placing the backfill. Particular care shall be used to obtain thorough compaction under the haunches and along the sides to the top of the pipe.

All backfill shall be placed in loose layers not exceeding six inches in depth under and around the pipe, and not exceeding eight inch lifts over the pipe. Successive layers shall be added and thoroughly compacted by mechanical and pneumatic tampers until the trench is completely filled to the elevation as directed. Backfilling shall be done in such a manner as to avoid injurious top or side pressures on the pipe.

Underground warning tape shall be installed a minimum of two feet above any pipe in the backfill of any mainline or lateral trench. Tape shall be alkali resistant, 4 mils polyethylene, 4 inches minimum width, continuously printed with name or symbol of utility buried below, color coded as follows:

Red: Electric.
Yellow: Gas, oil, and dangerous materials.
Orange: Telephone, cable TV, and other communications.
Blue: Water systems.
Green: Sewerage systems.

Where plastic water or sewer pipe is used the tape shall be appropriately colored and able to conduct a signal generated by a locating device.

Backfill shall be compacted to a density of not less than 98 percent of maximum density. The maximum density is the maximum dry weight density in pounds per cubic foot as determined by the Standard Proctor Density Test (AASHTO T 99 - Method C). Where the backfill material consists of sand or silt containing less than 20 percent by weight of particles passing the No. 200 mesh sieve, a minimum dry density of 100 percent of Maximum Density will be required.

All backfilled trenches shall be allowed to settle for at least 180 days before the permanent base course or pavement may be constructed. Where less than 180 days of settlement time is anticipated and permitted by the Engineer, all trench backfill shall be PENNDOT No. 2A stone, tamped and when required by the Engineer/Township, capped with 8 inches of clay at subgrade elevation, wherever permanent base course and pavement is to be constructed. In such cases, the delay time until paving permanent base course may be reduced as determined by the Engineer/Township.

AREAS UNDERLAIN BY CARBONATE GEOLOGY: Installation of water mains in these areas shall require placement of a clay or bentonite clay dikes at 20 foot intervals along the length of the main. These dikes shall be constructed in such a manner that there will be six inches of clay/bentonite beneath the main and a minimum of two feet above the top of the pipe for the width of the trench. The thickness of these dikes shall be a minimum of two feet along the length of the main.

All installation of water mains within these areas shall adhere to the following conditions pertaining to backfill requirements. During periods when there is no prediction of precipitation, all open trenches shall be protected properly. During periods when precipitation is anticipated all trenches shall be completely backfilled at the completion of each workday and reopened the following workday. Under no circumstances shall trenches be left open during periods of precipitation.

The Township/Engineer reserves the right to impose more stringent requirements for installations which will occur in these areas. These requirements include but are not limited to the placement of an approved liner to encase the proposed system or other methods and/or materials determined to secure the integrity of these areas.

FILLING, DISINFECTING, AND TESTING PROCEDURES: It shall be the responsibility of the Developer and/or its Contractor to notify the Township Water and Sewer Department at 610-694-0829 or 610-694-8680 prior to performing each of the following consecutive procedures. Forty-eight hours notice is required before each of the following procedures.

1. FILLING OF MAINS
2. DISINFECTION OF COMPLETED MAINS
3. DISINFECTION OF TAPPING SLEEVES
4. LOW VOLUME PURGE
5. BACTERIOLOGICAL TESTS
6. HYDROSTATIC TESTS
7. TESTING VALVES
8. HIGH RATE FLOW TEST

1. FILLING OF MAINS: Water used for initial filling of waterlines shall be supplied by the Township at its discretion, at no cost. The Township reserves the right to charge the Developer for additional water used beyond the initial filling process. The Developer or Contractor shall contact the Township at least three working days in advance to arrange for a Township water system operator to be available on-site to operate valves and hydrants. Under no circumstances shall the Contractor or any person other than a Township water system operator operate any water system components. A Record Plan drawing of the segment of the system to be filled shall be available to the Township prior to filling the main. In lieu of Record Plans at this time, two sets of a schematic "line" diagram of the water system shall be prepared by the Contractor and given to the Superintendent or Foreman of Water to review before the Township will fill the lines. All valves, fire hydrants, pipe size and length of pipe to be filled shall be shown on this diagram. A Township water system operator will monitor all filling;
2. DISINFECTION OF COMPLETED MAINS: Before being placed in service, the newly constructed water main shall be disinfected and tested in accordance with AWWA C651 and as specified herein. Chlorine may be applied by use of calcium hypochlorite comparable to commercial products known as H.T.H., Perchloron, or Maxochlor. This procedure will be under the control of Township personnel who will confirm that all applicable backflow and cross connection precautions are followed.

The chlorinating agent shall be applied in such a manner to treat completely all sections of the system. The chlorinating agent shall be applied in a quantity to produce a dosage of 25 mg/l to 50 mg/l of free chlorine. Disinfection shall continue for a minimum of 24 hours and the residual free chlorine at the end of that time shall be a minimum of 10 mg/l.

During the chlorination process all valves and accessories shall be operated.

3. DISINFECTION OF TAPPING SLEEVES: The developer or its Contractor shall thoroughly clean the exterior of the main to be tapped and the interior surface of the tapping sleeve, and shall swab the interior surface of the tapping sleeve with sodium hypochlorite liquid.
4. LOW VOLUME PURGE: After chlorination, the heavily chlorinated water shall be purged from the line at its extremities until the test results of the replacement water are equal chemically and bacteriologically to those of the permanent source of supply.

All flushing will be controlled by Township personnel. The individual service lines shall also be properly flushed. The purged water shall contain no more chlorine or other residual than allowed by the Pennsylvania Department of Environmental Protection or any other agency having jurisdiction.

5. BACTERIOLOGICAL TESTS: After all of the above testing is satisfactory, samples for the bacteriological tests shall be taken by an independent testing laboratory, certified by the Pennsylvania Department of Environmental Protection and approved by the Township. Samples shall be taken at the locations designated by the Engineer/Township and in accordance with AWWA C651. The Developer or its Contractor shall pay for the tests and shall direct the laboratory to submit only the test results directly to the Engineer (FAX 610-791-1256) and the Township Water and Sewer Department (FAX 610-694-9020). The result for coliform bacteria shall be 0 per 100 ml, and the result for heterotrophic bacteria shall be less than 250 per 100 ml. The concentration of available chlorine shall be generally between 0.4 mg/l and 1.2 mg/l.

Valves isolating new lines from mains already in service shall not be opened until the customary water test certificates have been received from the testing laboratory and approved by the Engineer.

If water quality test results do not meet the Township's minimum standards for water quality, the Contractor shall repeat the disinfection process until acceptable water quality is achieved. The cost of initial water quality testing and any subsequent testing shall be borne by the Developer.

6. HYDROSTATIC TESTS:

CAUTION FOR PRESSURE TESTING: The following caution is applicable to all pressure testing on the project.

Caution: When piping systems are pressure tested, it is extremely important and essential that all plugs including test plugs and all pipe joints are installed and restrained in such a way that blowouts are prevented. It must be realized that sudden expulsion of a poorly installed plug or section of pipe or of a test plug which is partially deflated before the pipe pressure is released can be very dangerous. For this reason it is recommended that every plug and pipe joint be positively braced or otherwise restrained during pressure testing and that no one be allowed in a manhole adjoining a line being tested or in the vicinity of an exposed plug or pipe so long as pressure is maintained in the line.

The complete system shall be tested by one of the following methods:

- a. Before completely backfilling the joints but with sufficient material placed to hold the pipe during the test, the complete installation including the service laterals and fire hydrant (valves to hydrants open) laterals shall be tested at a

hydrostatic pressure of 150 psig, or 50 psig greater than working pressure, whichever is higher;

- b. In lieu of the above requirement and prior to the installation of the service laterals, the water mains alone may be tested at a hydrostatic pressure of 150 psig, or 50 psig greater than working pressure, whichever is higher. After the service laterals are installed the complete installation, including the service laterals, shall be re-tested at a hydrostatic pressure of 100 psig, for a minimum of one hour. During the re-test at 100 psig, the laterals are assumed to be partially backfilled.

NOTE: All corporations shall be installed at normal working pressure (min.) and each corporation, service lateral, and curb stop shall be visually checked for leaks or defects under normal line pressure.

Any corporations which are tapped into the waterline for the purpose of testing (or expelling air) shall be removed and replaced with appropriate plugs following the completion of the testing.

Each section tested shall be slowly filled with water, care being taken to expel all air from the pipes. All control valves from the Township system shall only be operated by Township personnel. If necessary the pipes shall be tapped at high points to vent the air. The required pressure shall be applied for not less than three hours and all pipe, fittings, valves, hydrants and joints shall be carefully examined for defects. Leaking joints shall be made tight and defective work replaced until the leakage is reduced to the allowable amount, which shall be determined by the following formula:

$$L = \frac{SD(P)^{1/2}}{133,200}, \text{ where}$$

L = allowable leakage, in gallons per hour;

S = length of pipe tested, in feet;

D = pipe diameter, in inches;

$(P)^{1/2}$ = square root of the test pressure, P, in pounds per square inch gauge (psig).

For fire lines, the Township Fire Chief shall be notified.

7. TESTING VALVES: The following procedure is given as a guideline for testing the valves. Other procedures may be acceptable, and can be offered as an alternative for review by the Engineer. After the pressure test(s) are completed, every internal valve shall be checked for leaks in the following manner:
 - a. Starting at the most remote point from the source of pressure, each valve shall be closed;
 - b. As each valve is closed, the pressure on the side of the valve away from the source shall be relieved;

- c. Line pressure shall be maintained on the side of the valve toward the source of pressure;
- d. The Developer's utility subcontractor shall supply and operate the proper leak detection equipment, together with the Observer and personnel from the Township Water and Sewer Department shall listen to each valve with a device that can detect a flow of water through the valve;
- e. Each valve shall be checked working systematically back to the source of the pressure.

If there is doubt about the results of the above test on a particular valve, a water pressure test shall be conducted at a differential pressure of at least 100 psig across the valve, as directed by the Engineer.

- 8. HIGH-RATE FLOW TEST: High-rate flow test shall be performed on all newly installed waterlines only after satisfactory completion of the required hydrostatic and bacteriological tests. The Contractor shall provide advance notice conforming to the notification requirements listed above. The high-rate flow test shall normally be scheduled for a Wednesday night after 9:30 p.m., weather and allowable conditions permitting. It shall be of sufficient duration to clean the waterlines thoroughly. The Contractor shall make the necessary provisions for the proper disposal of the chlorinated water discharged during the test. Contractor personnel shall be responsible to perform the work required during the test except for operation of water system valves. The minimum size of the discharge pipe shall be 4 inches.

NOTIFICATION: No connections shall be made to the existing Township system without prior approval and without three working days advance notice to the Township to allow for scheduling of Township personnel. This includes the operation of Township fire hydrants or any connections to mains or other points of connection.

TOWNSHIP REIMBURSEMENT: The costs for Township personnel to operate water system valves and attend hydrostatic, bacteriological and high-rate flow testing, or to perform similar duties associated with the Developer's project shall be borne by the Developer. The Township will invoice the Developer directly for these costs, payment for which shall be made within 15 days of the date of the invoice. In the absence of such reimbursement to the Township, improvements security releases may be withheld by the Township.

SINKHOLES: It is required that the Developer maintain all areas in a well drained condition during the construction period so as to avoid pooling or ponding of water. If a sinkhole should develop during construction, the Developer shall immediately repair the sinkhole at its expense alone and in accordance with the following:

Upon detection of a sinkhole, the Developer or its Contractor shall notify the Township, contact its own geotechnical engineer who shall propose a repair solution and have that procedure reviewed by the Geotechnical Engineer. The Developer's geotechnical engineer

and the Geotechnical Engineer shall monitor the repair in accordance with the reviewed procedure and upon completion of the repair and before any construction activity resumes in the area, the Developer's geotechnical engineer shall send a written report to the Township and to the Geotechnical Engineer that the sinkhole has been repaired in accordance with the reviewed procedure and that construction activities may continue.

Section C STANDARD CONSTRUCTION DETAILS

UPPER SAUCON TOWNSHIP

LEHIGH COUNTY, PENNSYLVANIA

STANDARD CONSTRUCTION DETAILS

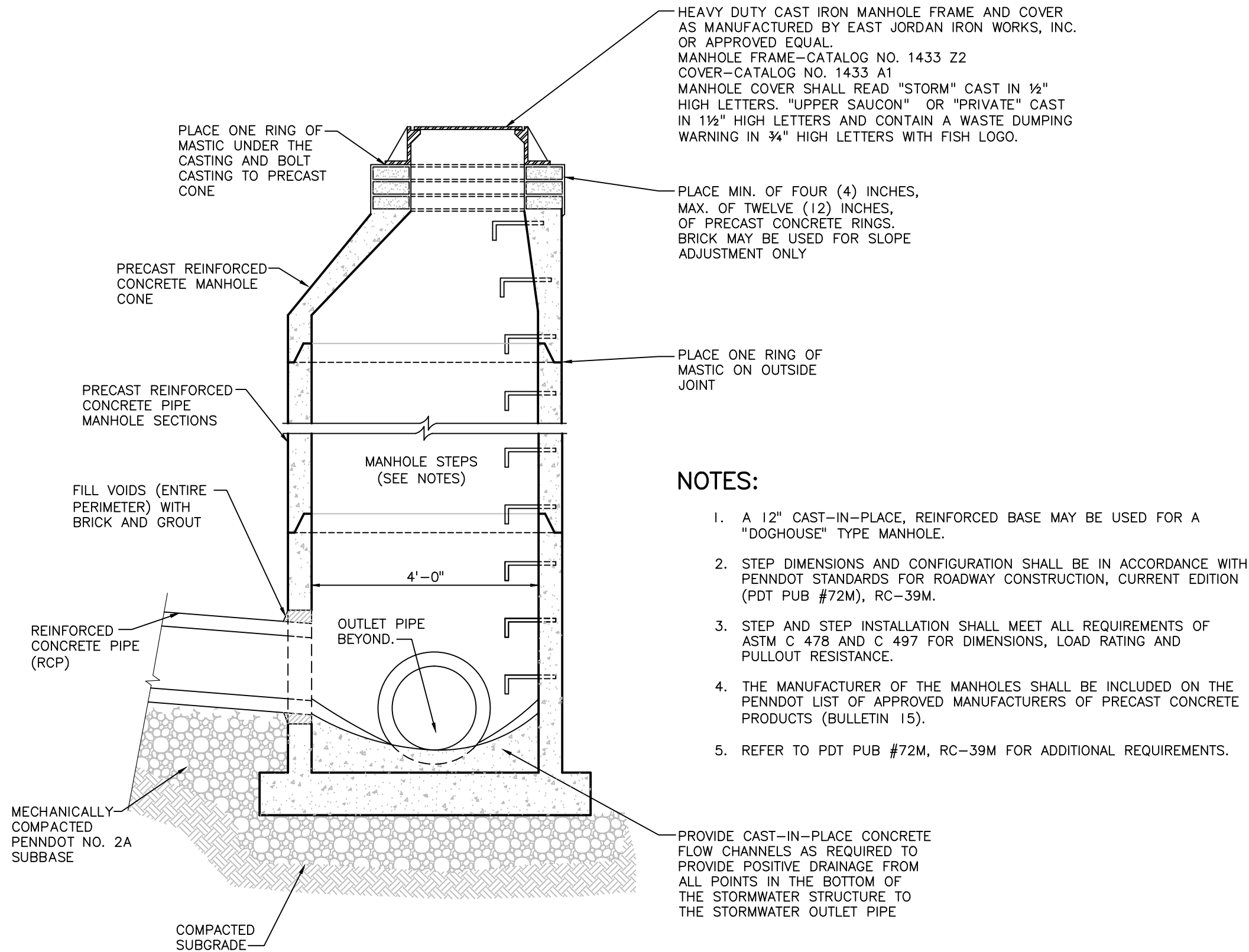
THE PIDCOCK COMPANY
 CIVIL ENGINEERING AND LAND PLANNING ARCHITECTURE LAND SURVEYING
 OXFORD DRIVE AT FISH HATCHERY ROAD
 ALLENTOWN, PENNSYLVANIA

INDEX OF DETAILS

UST NO.	TITLE	PLAN DATE OR LAST REVISION	UST NO.	TITLE	PLAN DATE OR LAST REVISION
UST-D-1	STANDARD PRECAST CONCRETE PIPE MANHOLE	SEPTEMBER 2012	UST-W-1	FIRE HYDRANT	SEPTEMBER 2012
UST-D-2	SHALLOW PRECAST CONCRETE PIPE MANHOLE	SEPTEMBER 2012	UST-W-2	HORIZONTAL THRUST BLOCKS	SEPTEMBER 2012
UST-D-3	PRECAST CONCRETE, TYPE M INLET	SEPTEMBER 2012	UST-W-3	VERTICAL THRUST BLOCKS	SEPTEMBER 2012
UST-D-4	PRECAST CONCRETE, TYPE C INLET	SEPTEMBER 2012	UST-W-4	WATERLINE BLOW-OFF	SEPTEMBER 2012
UST-D-5	MANHOLE TO INLET CONVERSION	SEPTEMBER 2012	UST-W-5	SERVICE CONNECTION	SEPTEMBER 2012
UST-D-6	MODIFIED INLET	SEPTEMBER 2012	UST-W-6	VALVE AND VALVE BOX	SEPTEMBER 2012
UST-D-7	REINFORCED CONCRETE LOW FLOW CHANNEL	SEPTEMBER 2012	UST-W-7	WATER METER/FIRE METER ASSEMBLY AND PIT	SEPTEMBER 2012
UST-D-8	DETENTION BASIN FENCE-WOOD SPLIT RAIL	SEPTEMBER 2012	UST-W-8	CAMPUS WATER METER AND PIT	SEPTEMBER 2012
UST-D-9	DETENTION BASIN FENCE-ALUMINUM	SEPTEMBER 2012	UST-W-9	AIR RELEASE VALVE AND MANHOLE	SEPTEMBER 2012
UST-G-1	STANDARD TRENCH	SEPTEMBER 2012			
UST-R-1	TYPICAL ROADWAY CROSS SECTIONS	SEPTEMBER 2012			
UST-R-2	NON-STATE HIGHWAY PAVEMENT RESTORATION AND TRENCH BACKFILL	SEPTEMBER 2012			
UST-R-3	RESIDENTIAL SIDEWALK AND DRIVEWAY APRON	SEPTEMBER 2012			
UST-R-4	NON-RESIDENTIAL SIDEWALK AND DRIVEWAY APRON	SEPTEMBER 2012			
UST-R-5	CONCRETE CURB	SEPTEMBER 2012			
UST-R-6	SIDEWALK AND CURB RAMP	SEPTEMBER 2012			
UST-R-7	BELGIAN BLOCK GRANITE CURB	SEPTEMBER 2012			

NOTE:
 THESE STANDARD CONSTRUCTION DETAILS TOGETHER WITH THE GENERAL PROVISIONS AND TECHNICAL SPECIFICATIONS CONSTITUTE THE STANDARD CONSTRUCTION DOCUMENTS FOR PUBLIC INTEREST IMPROVEMENTS INSTALLED AS PART OF SUBDIVISIONS/LAND DEVELOPMENTS WITHIN UPPER SAUCON TOWNSHIP.

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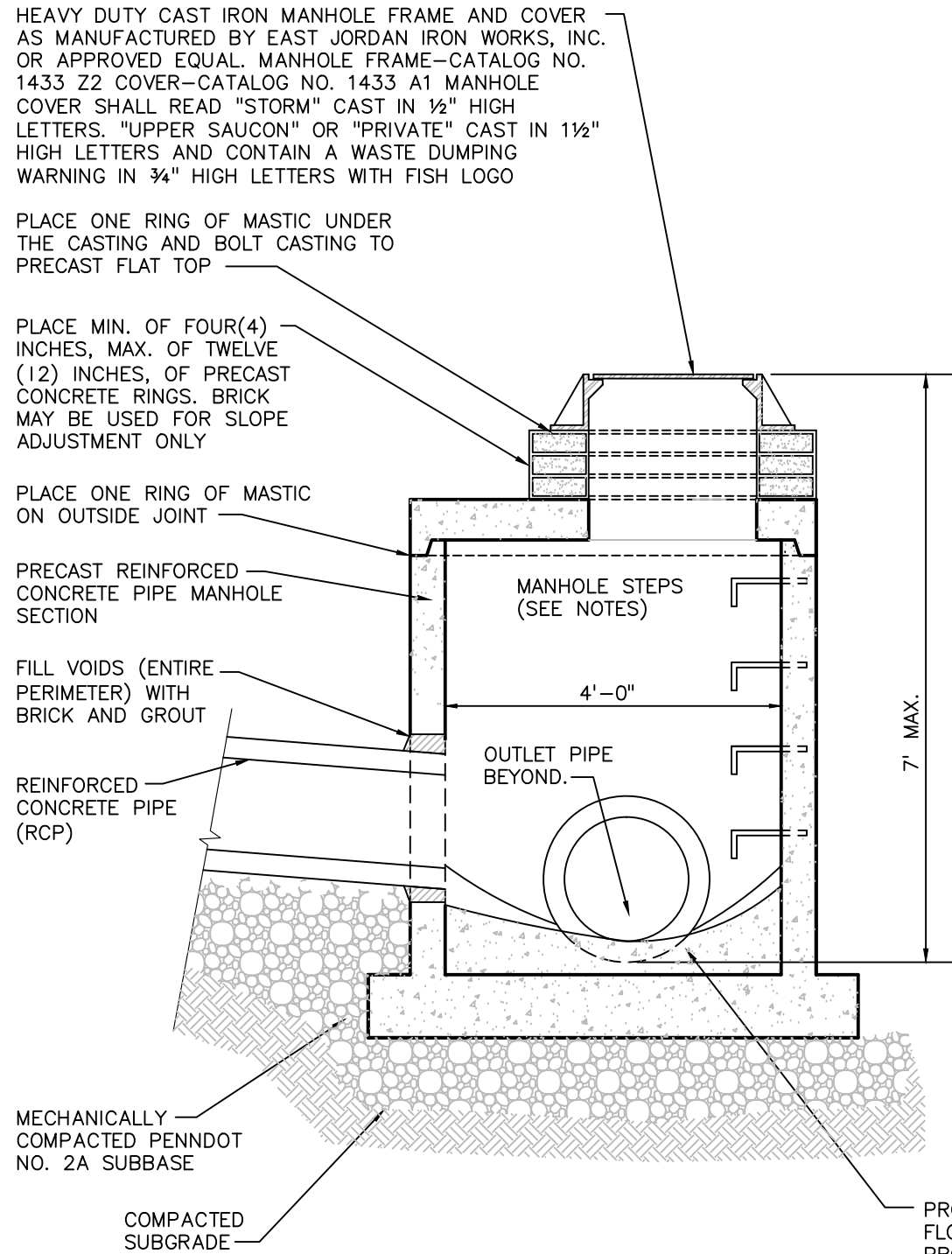
NOTES:

1. A 12" CAST-IN-PLACE, REINFORCED BASE MAY BE USED FOR A "DOGHOUSE" TYPE MANHOLE.
2. STEP DIMENSIONS AND CONFIGURATION SHALL BE IN ACCORDANCE WITH PENNDOT STANDARDS FOR ROADWAY CONSTRUCTION, CURRENT EDITION (PDT PUB #72M), RC-39M.
3. STEP AND STEP INSTALLATION SHALL MEET ALL REQUIREMENTS OF ASTM C 478 AND C 497 FOR DIMENSIONS, LOAD RATING AND PULLOUT RESISTANCE.
4. THE MANUFACTURER OF THE MANHOLES SHALL BE INCLUDED ON THE PENNDOT LIST OF APPROVED MANUFACTURERS OF PRECAST CONCRETE PRODUCTS (BULLETIN 15).
5. REFER TO PDT PUB #72M, RC-39M FOR ADDITIONAL REQUIREMENTS.

MANHOLE SECTION
STANDARD PRECAST CONCRETE PIPE MANHOLE
 (SHOWN WITH PRECAST BASE)
 NO SCALE

REVISIONS	UPPER SAUCON TOWNSHIP STANDARD CONSTRUCTION DETAILS LEHIGH COUNTY, PENNSYLVANIA	
	STORM DRAINAGE STANDARD PRECAST CONCRETE PIPE MANHOLE	
	THE PIDCOCK COMPANY <small>CIVIL ENGINEERING AND LAND PLANNING ARCHITECTURE LAND SURVEYING</small> <small>OXFORD DRIVE AT FISH HATCHERY ROAD ALLENTOWN, PENNSYLVANIA</small>	
	<small>DATE: SEPTEMBER 2012</small> <small>CHKD BY: RJG</small> <small>SCALE: NO SCALE</small>	UST-D-1

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MANHOLE SECTION

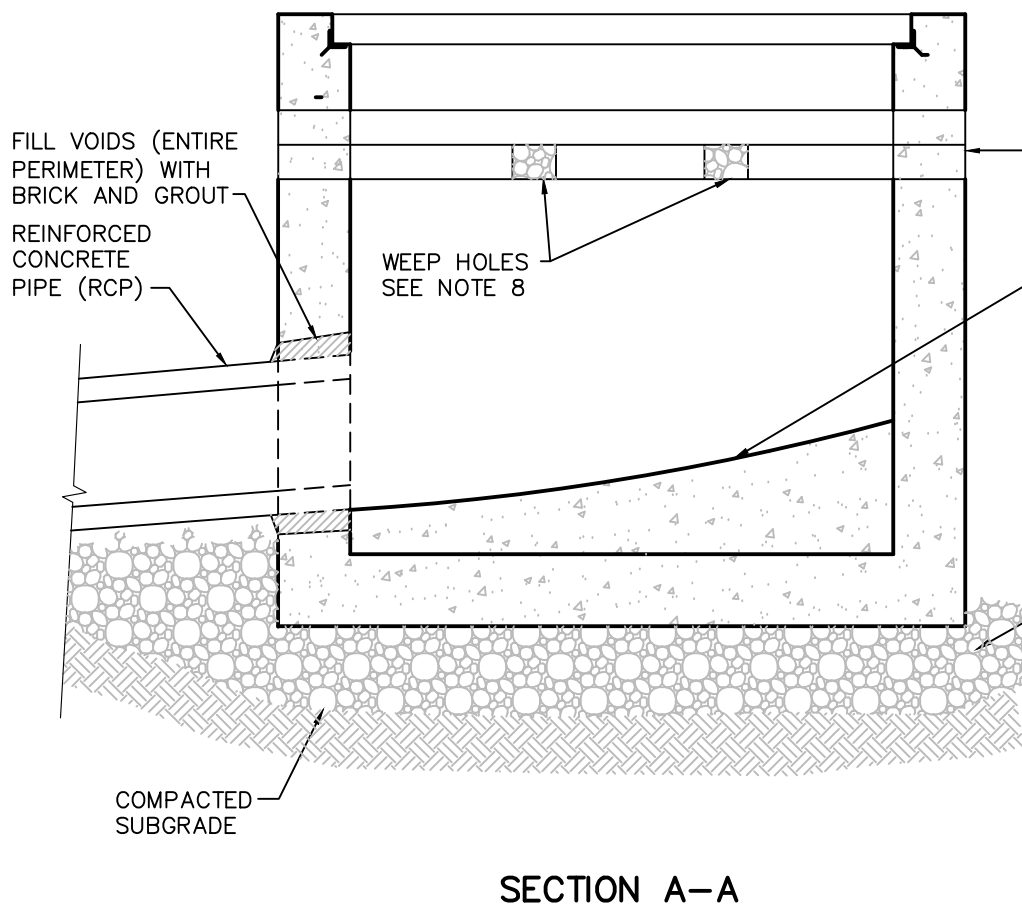
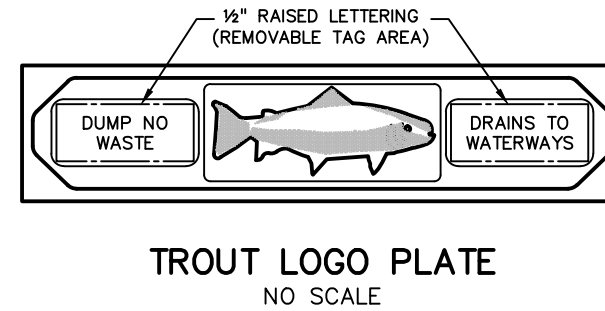
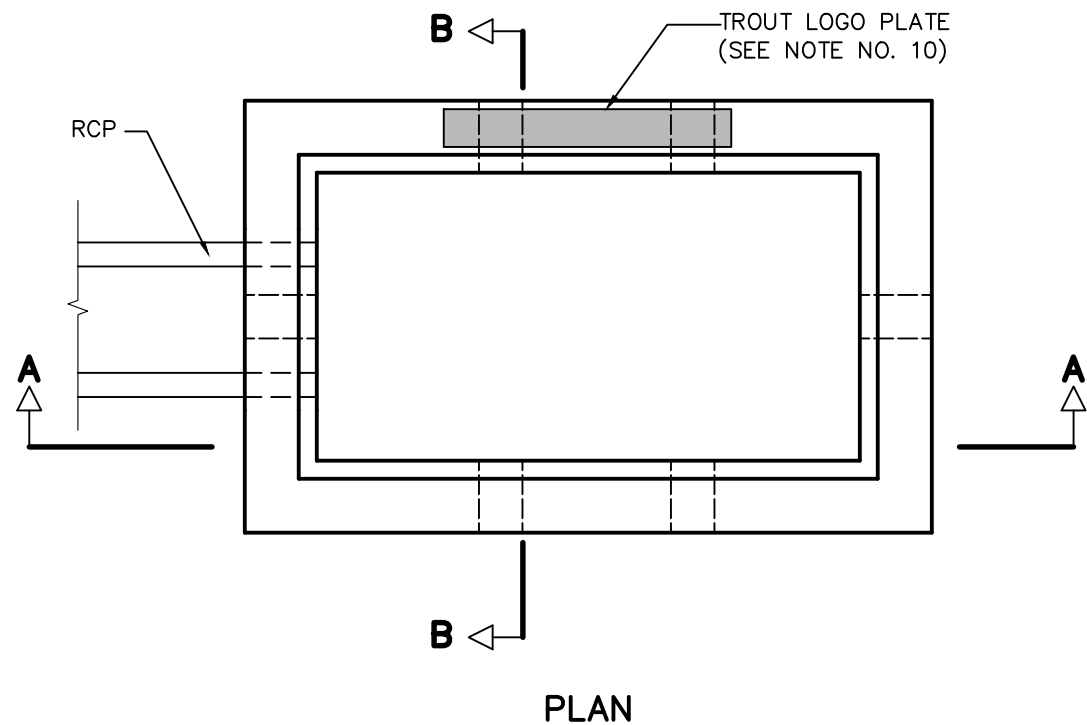
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1. A 12" CAST-IN-PLACE, REINFORCED BASE MAY BE USED FOR A "DOGHOUSE" TYPE MANHOLE.
2. STEP DIMENSIONS AND CONFIGURATION SHALL BE IN ACCORDANCE WITH PENNDOT STANDARDS FOR ROADWAY CONSTRUCTION, CURRENT EDITION (PDT PUB #72M), RC-39M.
3. STEP AND STEP INSTALLATION SHALL MEET ALL REQUIREMENTS OF ASTM C 478 AND C 497 FOR DIMENSIONS, LOAD RATING AND PULLOUT RESISTANCE.
4. THE MANUFACTURER OF THE MANHOLES SHALL BE INCLUDED ON THE PENNDOT LIST OF APPROVED MANUFACTURERS OF PRECAST CONCRETE PRODUCTS (BULLETIN 15).
5. REFER TO PDT PUB #72M, RC-39M FOR ADDITIONAL REQUIREMENTS.

**SHALLOW PRECAST CONCRETE PIPE MANHOLE
(SHOWN WITH PRECAST BASE)**
NO SCALE

REVISIONS	UPPER SAUCON TOWNSHIP STANDARD CONSTRUCTION DETAILS LEHIGH COUNTY, PENNSYLVANIA	
	STORM DRAINAGE SHALLOW PRECAST CONCRETE PIPE MANHOLE	
	THE PIDCOCK COMPANY CIVIL ENGINEERING AND LAND PLANNING ARCHITECTURE LAND SURVEYING OXFORD DRIVE AT FISH HATCHERY ROAD ALLENTOWN, PENNSYLVANIA	
	DATE: SEPTEMBER 2012 CHKD BY: RJG SCALE: NO SCALE	UST-D-2

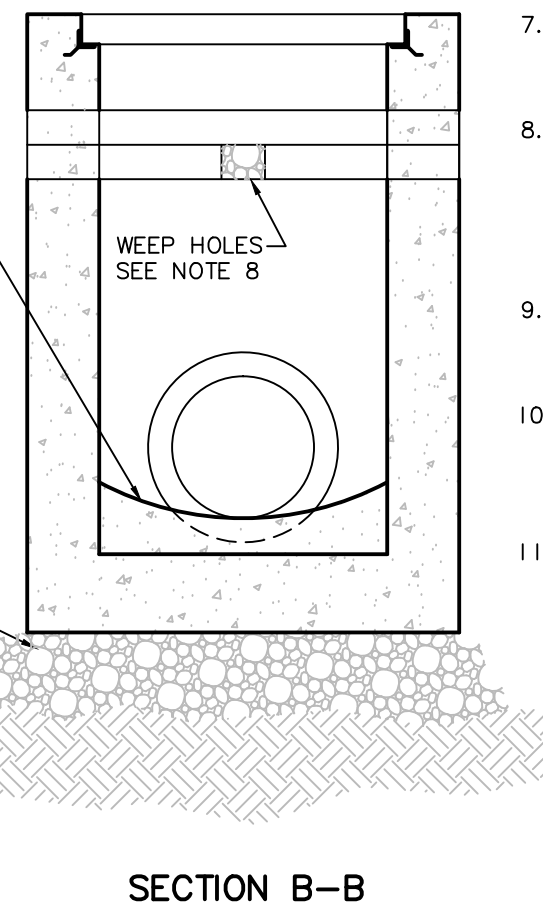
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SEE NOTE 2

CAST-IN-PLACE CONCRETE FLOW CHANNEL. SHAPE TO PROVIDE POSITIVE DRAINAGE FROM ALL CORNERS OF STRUCTURE AND TO THE OUTLET PIPE

MECHANICALLY COMPACTED PENNDOT NO. 2A SUBBASE (FOR PRECAST INLET BOX)



NOTES:

1. CONCRETE INLET AND TOP UNITS SHALL BE AS DETAILED IN PENNDOT STANDARDS FOR ROADWAY CONSTRUCTION, CURRENT EDITION (PDT PUB #72M) RC-34M, "INLETS, CONCRETE TOP UNITS CAST-IN-PLACE AND PRECAST".
2. PROVIDE A MINIMUM OF 4 INCHES AND MAXIMUM OF 8 INCHES VERTICALLY OF PRECAST CONCRETE COLLARS WITH THROUGH-WALL OPENINGS ADJACENT TO SUBGRADE TO SERVE AS WEEP HOLES.
3. ALL EXPOSED EDGES SHALL BE CHAMFERED 1"x1".
4. STEPS SHALL BE PROVIDED WHENEVER STRUCTURE EXCEEDS 4 FEET IN DEPTH.
5. STEP DIMENSIONS AND CONFIGURATION SHALL BE IN ACCORDANCE WITH PENNDOT STANDARDS FOR ROADWAY CONSTRUCTION, CURRENT EDITION (PDT PUB #72M), RC-39M.
6. STEP AND STEP INSTALLATION SHALL MEET ALL REQUIREMENTS OF ASTM C 478 AND C 497 FOR DIMENSIONS, LOAD RATING AND PULLOUT RESISTANCE.
7. PROVIDE STRUCTURAL STEEL GRATE - BICYCLE SAFE, AS DETAILED IN PENNDOT STANDARDS FOR ROADWAY CONSTRUCTION, CURRENT EDITION (PDT PUB #72M) RC-34M, "INLET GRATES".
8. THE BACKFILL AROUND THE WEEPHOLES SHALL NOT CONTAIN SCREENINGS; i.e., PLACE PENNDOT NO. 3 OR LARGER STONES AS REQUIRED BY ENGINEER, WITHOUT SCREENINGS TO ALLOW WATER TO ENTER WEEPHOLES. PLACE GEOTEXTILE FABRIC AROUND BACKFILL TO PREVENT MIGRATION OF SURROUNDING MATERIAL INTO VOIDS OF BACKFILL.
9. THE MANUFACTURER OF THE INLETS SHALL BE INCLUDED ON THE PENNDOT LIST OF APPROVED MANUFACTURERS OF PRECAST CONCRETE PRODUCTS (BULLETIN 15).
10. TOP UNITS MUST CONTAIN THE 24-INCH BY 3-INCH TROUT LOGO PLATE AND TAGS DISPLAYING A DUMPING WARNING AS MANUFACTURED BY EAST JORDAN IRON WORKS INC. (CATALOG NO. 7003PLI).
11. REFER TO PDT PUB #72M, RC-34M FOR ADDITIONAL REQUIREMENTS.

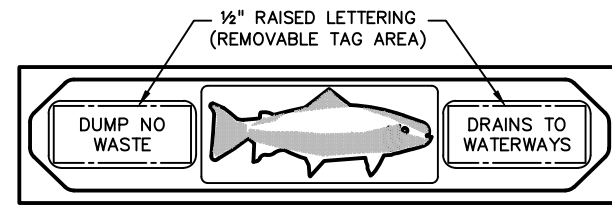
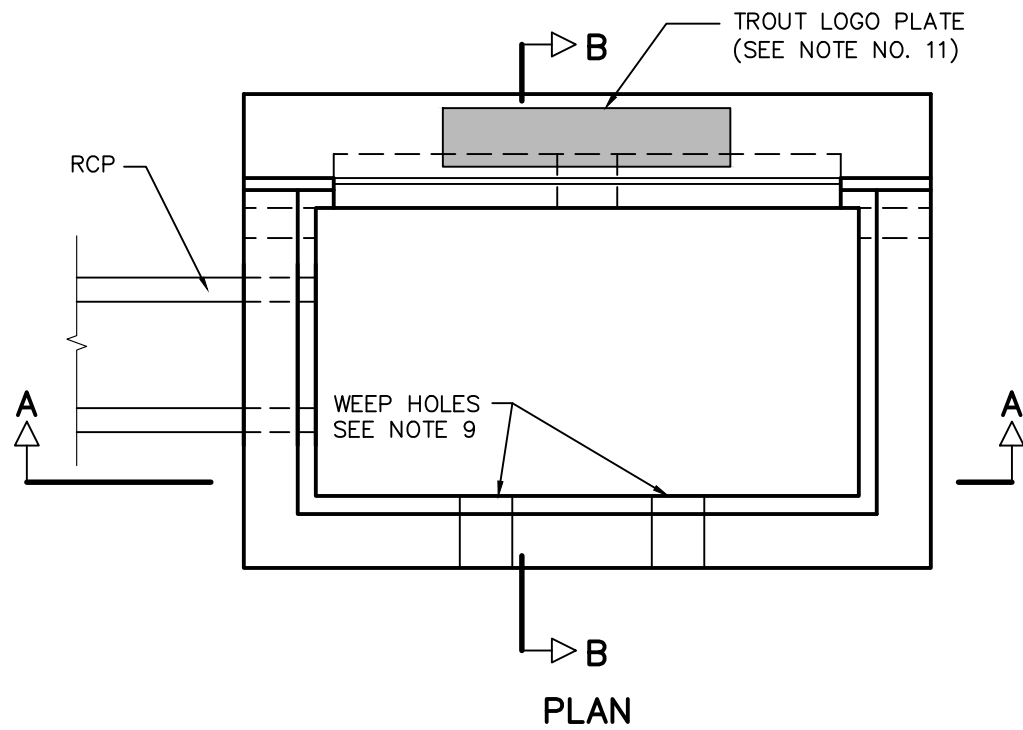
SECTION A-A

SECTION B-B

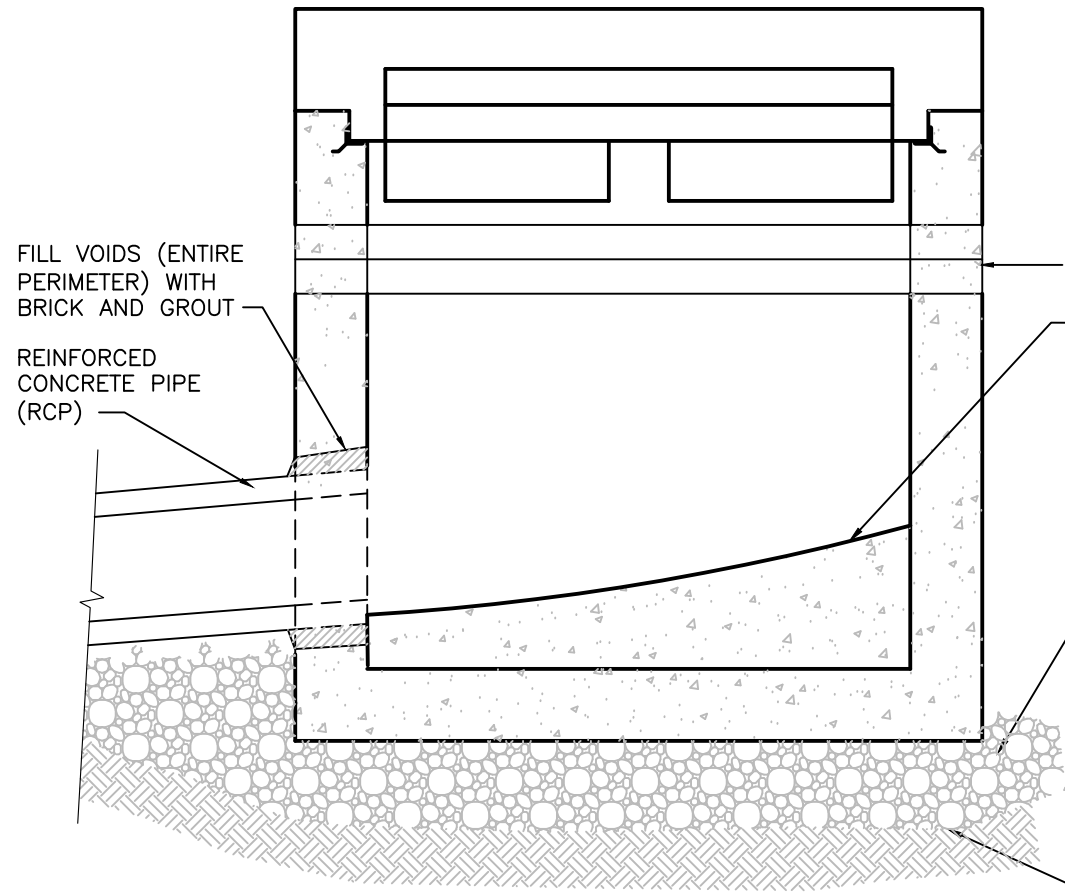
TYPE M INLET
NO SCALE

REVISIONS	UPPER SAUCON TOWNSHIP STANDARD CONSTRUCTION DETAILS LEHIGH COUNTY, PENNSYLVANIA	
	STORM DRAINAGE PRECAST CONCRETE TYPE M INLET	
	THE PIDCOCK COMPANY <small>CIVIL ENGINEERING AND LAND PLANNING ARCHITECTURE LAND SURVEYING OXFORD DRIVE AT FISH HATCHERY ROAD ALLENTOWN, PENNSYLVANIA</small>	
	DATE: SEPTEMBER 2012 CHKD BY: RJG SCALE: NO SCALE	UST-D-3

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TROUT LOGO PLATE
NO SCALE



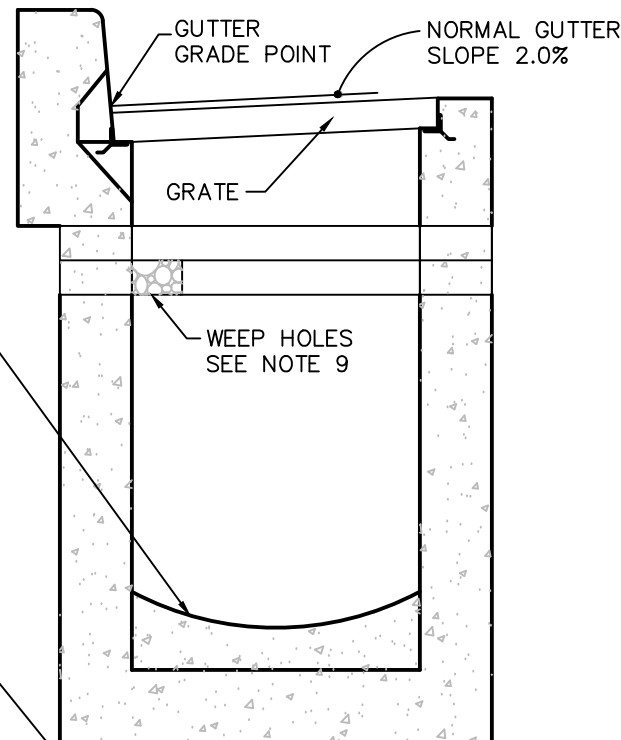
SEE NOTE 2

CAST-IN-PLACE CONCRETE FLOW CHANNEL. SHAPE TO PROVIDE POSITIVE DRAINAGE FROM ALL CORNERS OF STRUCTURE AND TO THE OUTLET PIPE

MECHANICALLY COMPACTED PENNDOT NO. 2A SUBBASE (FOR PRECAST INLET BOX)

COMPACTED SUBGRADE

TYPE C INLET
NO SCALE

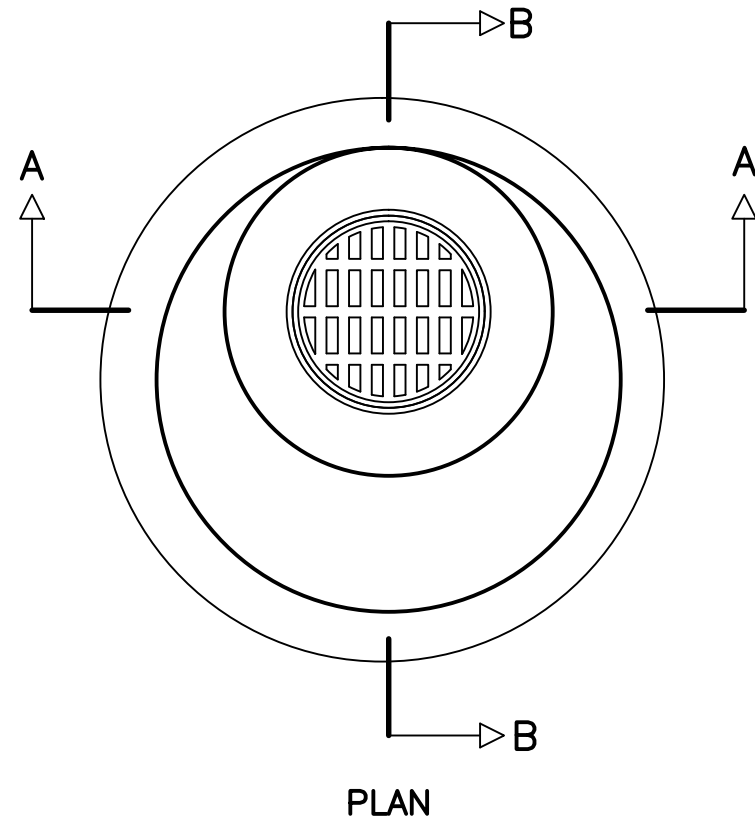


NOTES:

1. CONCRETE INLET AND TOP UNITS SHALL BE AS DETAILED IN PENNDOT STANDARDS FOR ROADWAY CONSTRUCTION, CURRENT EDITION (PDT PUB #72M) RC-34M, "INLETS, CONCRETE TOP UNITS CAST-IN-PLACE AND PRECAST".
2. PROVIDE A MINIMUM OF 4 INCHES AND MAXIMUM OF 8 INCHES VERTICALLY OF PRECAST CONCRETE COLLARS WITH THROUGH-WALL OPENINGS ADJACENT TO SUBGRADE TO SERVE AS WEEP HOLES.
3. ALL EXPOSED EDGES SHALL BE CHAMFERED 1"x1".
4. STEPS SHALL BE PROVIDED WHENEVER STRUCTURE EXCEEDS 4 FEET IN DEPTH.
5. STEP DIMENSIONS AND CONFIGURATION SHALL BE IN ACCORDANCE WITH PENNDOT STANDARDS FOR ROADWAY CONSTRUCTION, CURRENT EDITION (PDT PUB #72M), RC-39M.
6. STEP AND STEP INSTALLATION SHALL MEET ALL REQUIREMENTS OF ASTM C 478 AND C 497 FOR DIMENSIONS, LOAD RATING AND PULLOUT RESISTANCE.
7. THE CENTERLINE OF AN INLET SHALL BE NO CLOSER THAN 8 FEET TO THE EDGE OF A DRIVEWAY.
8. PROVIDE STRUCTURAL STEEL GRATE - BICYCLE SAFE, AS DETAILED IN PENNDOT STANDARDS FOR ROADWAY CONSTRUCTION, CURRENT EDITION (PDT PUB #72M), RC-34M, "INLET GRATES".
9. THE BACKFILL AROUND THE WEEPHOLES SHALL NOT CONTAIN SCREENINGS; i.e., PLACE PENNDOT NO. 3 OR LARGER STONES AS REQUIRED BY ENGINEER, WITHOUT SCREENINGS TO ALLOW WATER TO ENTER WEEPHOLES. PLACE GEOTEXTILE FABRIC AROUND BACKFILL TO PREVENT MIGRATION OF SURROUNDING MATERIAL INTO VOIDS OF BACKFILL.
10. THE MANUFACTURER OF THE INLETS SHALL BE INCLUDED ON THE PENNDOT LIST OF APPROVED MANUFACTURERS OF PRECAST CONCRETE PRODUCTS (BULLETIN 15).
11. TOP UNITS MUST CONTAIN THE 24-INCH BY 5-INCH TROUT LOGO PLATE AND TAGS DISPLAYING A DUMPING WARNING AS MANUFACTURED BY EAST JORDAN IRON WORKS INC. (CATALOG NO. 7001PL1).
12. REFER TO PDT PUB #72M, RC-34M FOR ADDITIONAL REQUIREMENTS.

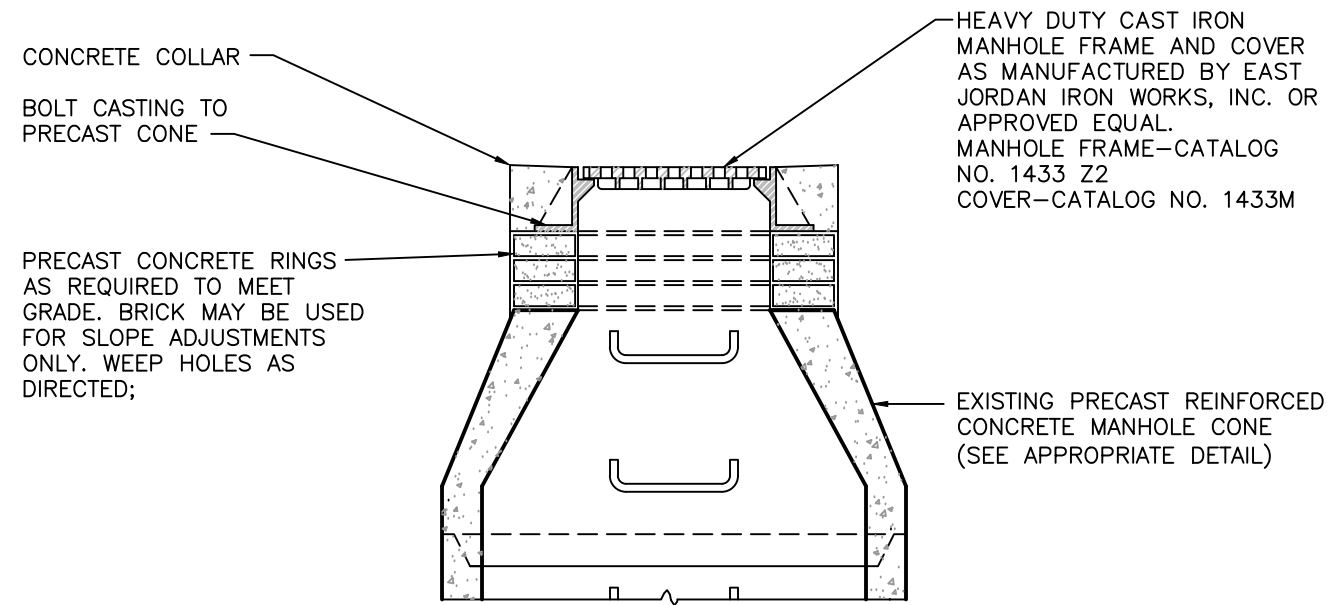
REVISIONS	UPPER SAUCON TOWNSHIP	
	STANDARD CONSTRUCTION DETAILS	
	LEHIGH COUNTY, PENNSYLVANIA	
	STORM DRAINAGE	
PRECAST CONCRETE TYPE C INLET		
THE PIDCOCK COMPANY		DATE: SEPTEMBER 2012
CIVIL ENGINEERING AND LAND PLANNING ARCHITECTURE LAND SURVEYING		CHKD BY: RJG
OXFORD DRIVE AT FISH HATCHERY ROAD		SCALE: NO SCALE
ALLENTOWN, PENNSYLVANIA		UST-D-4

Drawing name: S:\MUNICIPAL STANDARD CONSTRUCTION DOCUMENTS\UPPER SAUCON TOWNSHIP\UST-WORKING DOCUMENTS\UST-2009 DETAILS\UST-D-05.dwg Last Modified: Sep 21, 2012 - 8:50am

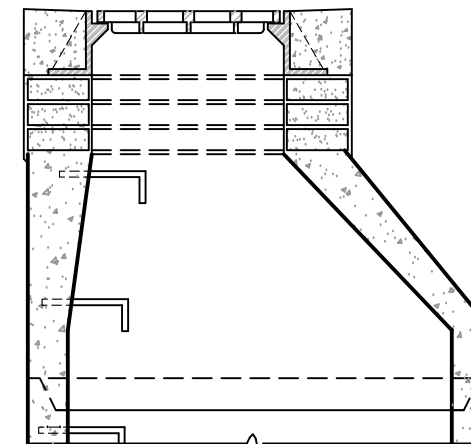


NOTE:

REFER TO PDT PUB #72M, RC-39M FOR ADDITIONAL REQUIREMENTS.



SECTION A-A



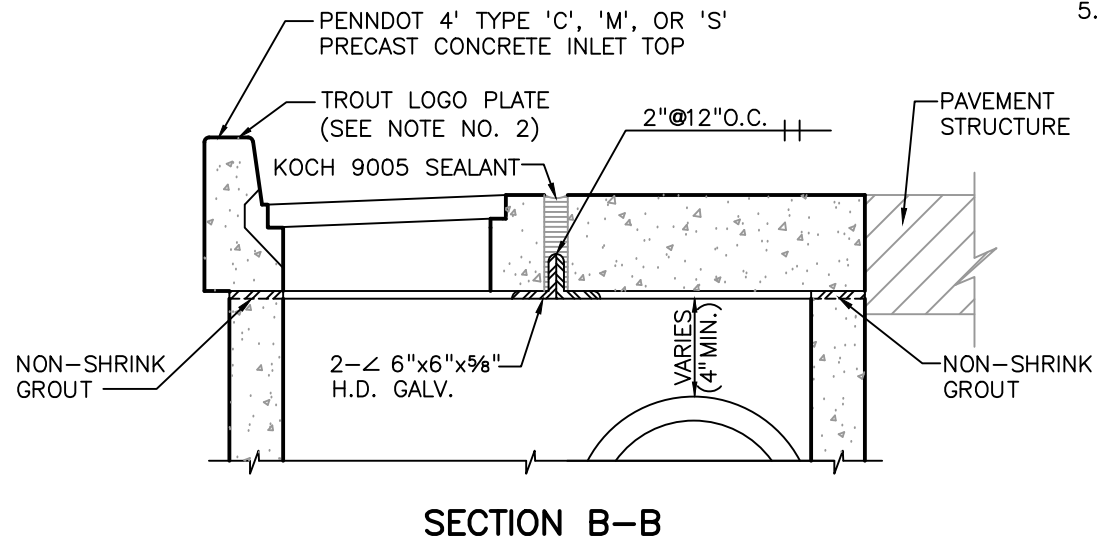
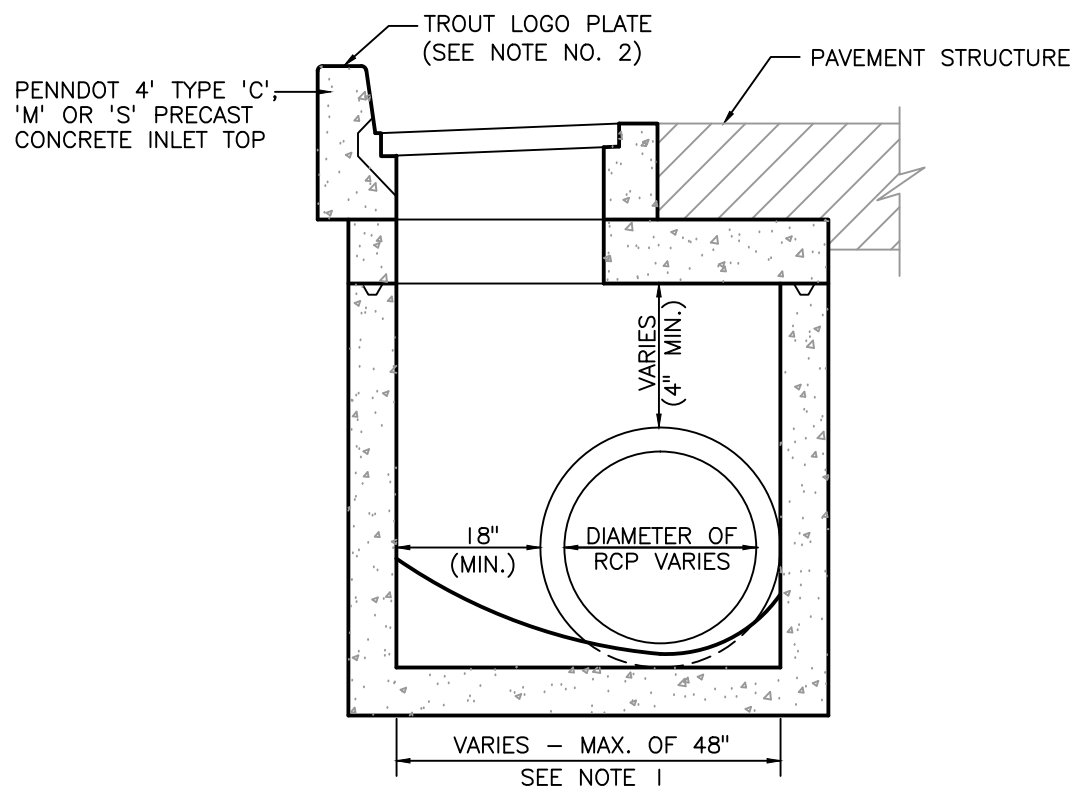
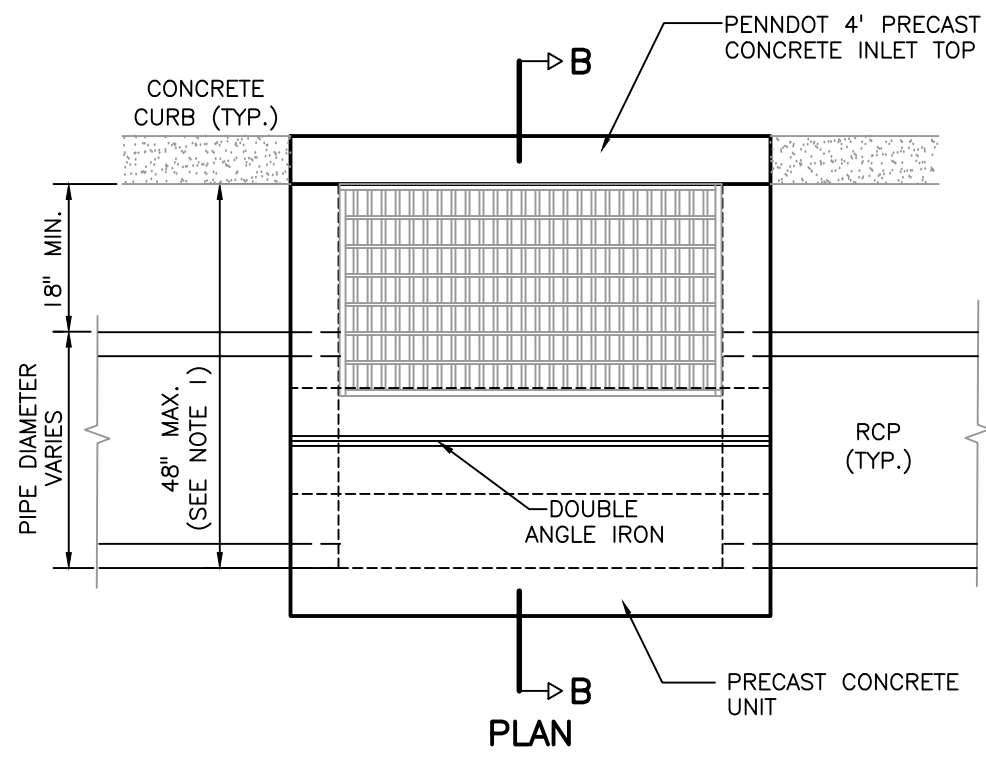
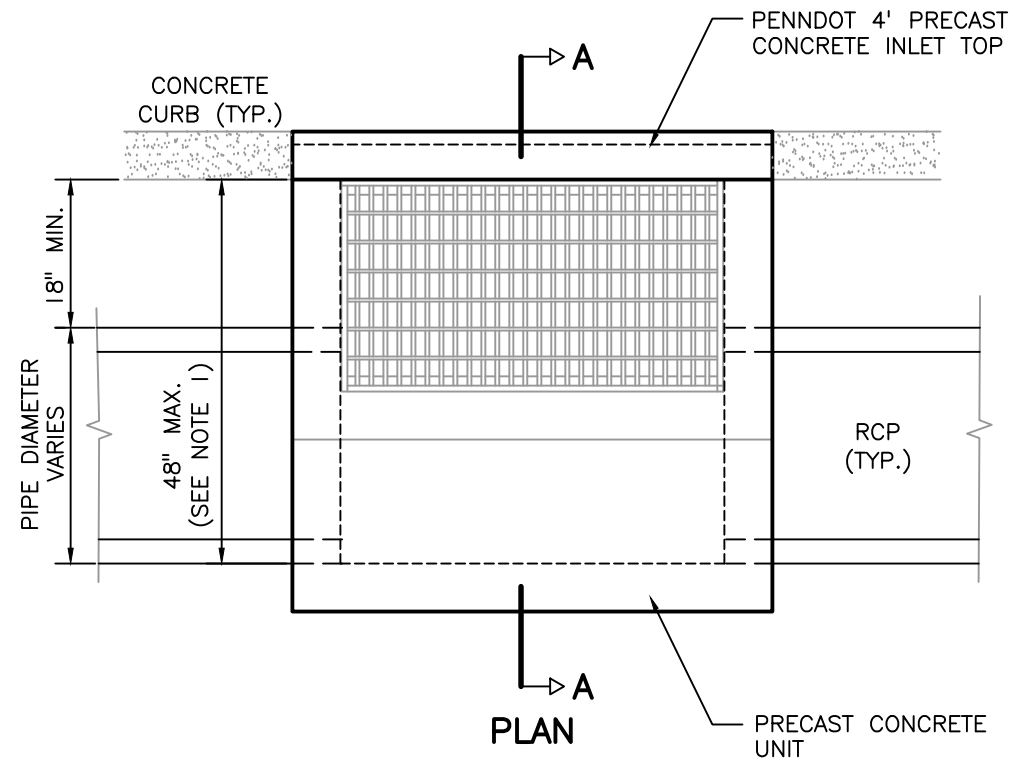
SECTION B-B

MANHOLE TO INLET CONVERSION

NO SCALE

REVISIONS	UPPER SAUCON TOWNSHIP STANDARD CONSTRUCTION DETAILS LEHIGH COUNTY, PENNSYLVANIA
	STORM DRAINAGE MANHOLE TO INLET CONVERSION
	THE PIDCOCK COMPANY <small>CIVIL ENGINEERING AND LAND PLANNING ARCHITECTURE LAND SURVEYING</small> <small>OXFORD DRIVE AT FISH HATCHERY ROAD</small> <small>ALLENTOWN, PENNSYLVANIA</small>
	DATE: SEPTEMBER 2012 CHKD BY: RJG SCALE: NO SCALE
UST-D-5	

Drawing name: S:\MUNICIPAL STANDARD CONSTRUCTION DOCUMENTS\UPPER SAUCON TOWNSHIP\UST-WORKING DOCUMENTS\UST-2009 DETAILS\UST-D-06.dwg Last Modified: Sep 21, 2012 - 8:50am



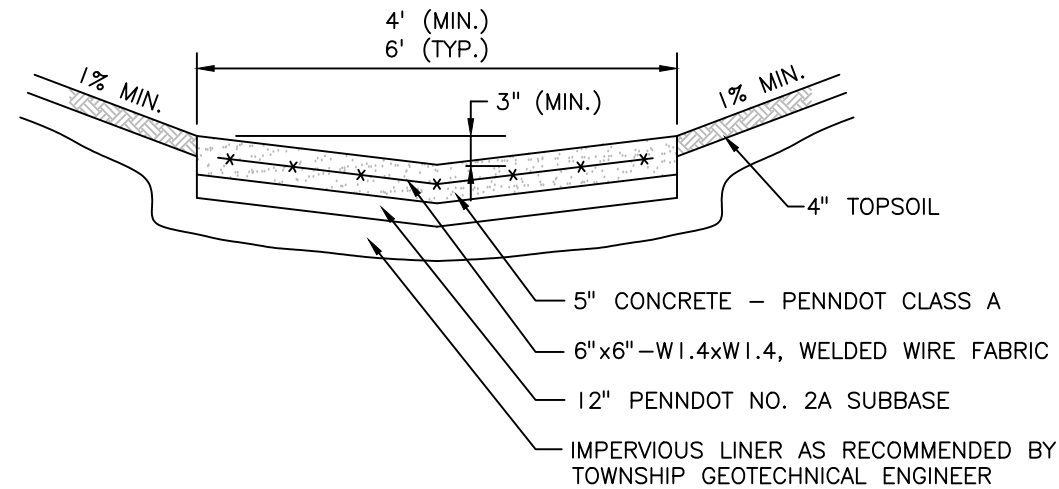
ALTERNATIVE STEEL SUPPORT TO RECEIVE PENNDOT TYPE 'C', 'M', OR 'S' INLET

NOTES:

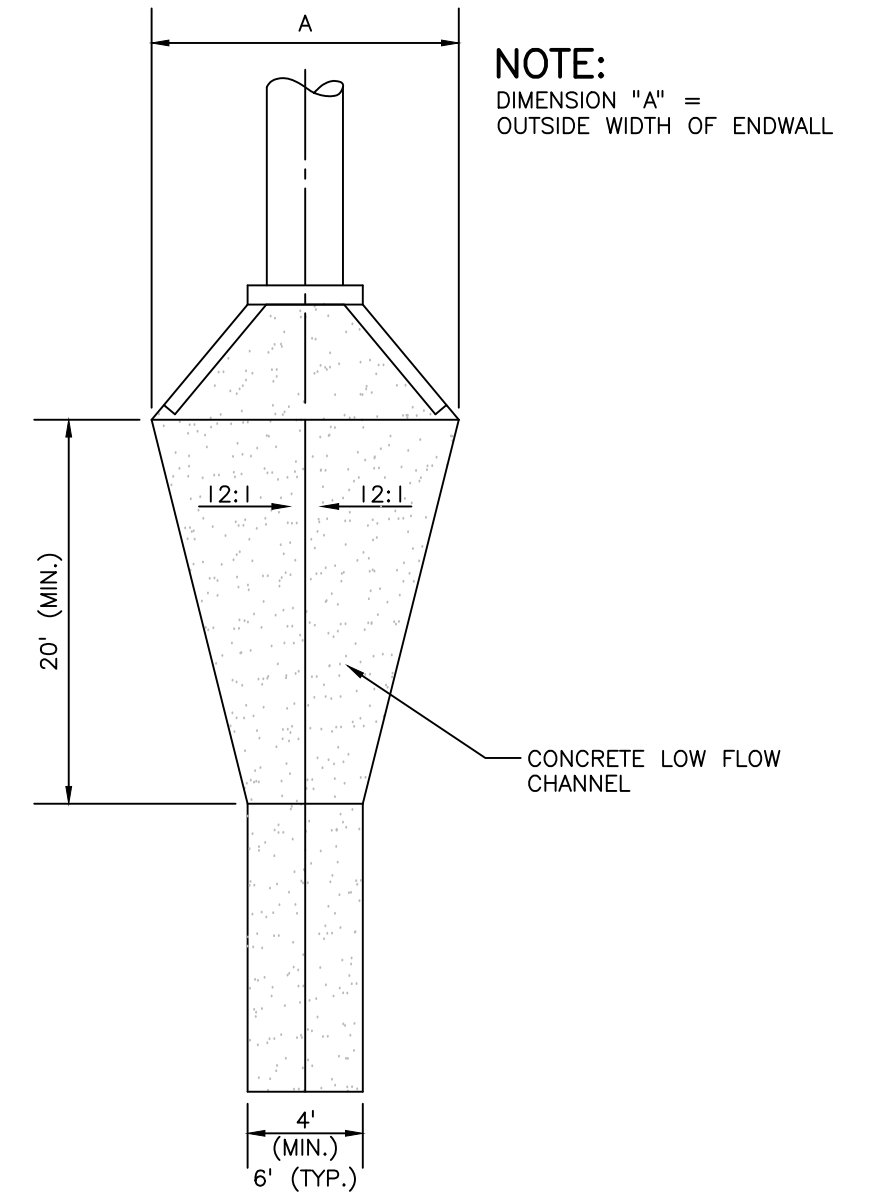
1. FOR ALL INLETS REQUIRING A WIDTH DIMENSION GREATER THAN 48", THE DEVELOPER SHALL PROVIDE FOR TOWNSHIP REVIEW A DESIGN FROM A PROFESSIONAL ENGINEER LICENSED IN THE COMMONWEALTH OF PENNSYLVANIA.
2. TYPE 'C' AND TYPE 'M' TOP UNITS MUST CONTAIN THE TROUT LOGO PLATE AND TAGS DISPLAYING A DUMPING WARNING. SEE DETAILS UST-D-3 AND UST-D-4.
3. THE MANUFACTURER OF THE INLETS SHALL BE INCLUDED ON THE PENNDOT LIST OF APPROVED MANUFACTURERS OF PRECAST CONCRETE PRODUCTS (BULLETIN 15).
4. REFER TO PDT PUB #72M, RC-34M FOR ADDITIONAL REQUIREMENTS.
5. SEE DETAILS UST-D-3 AND UST-D-4 FOR ADDITIONAL NOTES.

REVISIONS	UPPER SAUCON TOWNSHIP STANDARD CONSTRUCTION DETAILS LEHIGH COUNTY, PENNSYLVANIA	
	STORM DRAINAGE MODIFIED INLET	
	THE PIDCOCK COMPANY <small>CIVIL ENGINEERING AND LAND PLANNING ARCHITECTURE LAND SURVEYING OXFORD DRIVE AT FISH HATCHERY ROAD ALLENTOWN, PENNSYLVANIA</small>	
	DATE: SEPTEMBER 2012 CHKD BY: RJG SCALE: NO SCALE	UST-D-6

Drawing name: S:\MUNICIPAL STANDARD CONSTRUCTION DOCUMENTS\UPPER SAUCON TOWNSHIP\UST-WORKING DOCUMENTS\UST-2009 DETAILS\UST-D-07.dwg | Last Modified: Sep 21, 2012 - 8:50am



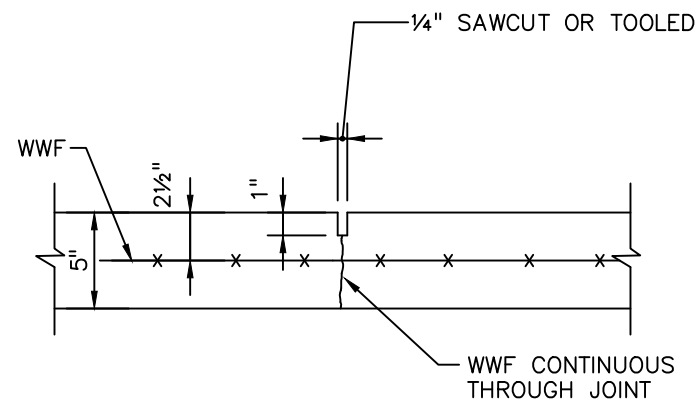
TYPICAL SECTION



NOTE:
DIMENSION "A" =
OUTSIDE WIDTH OF ENDWALL

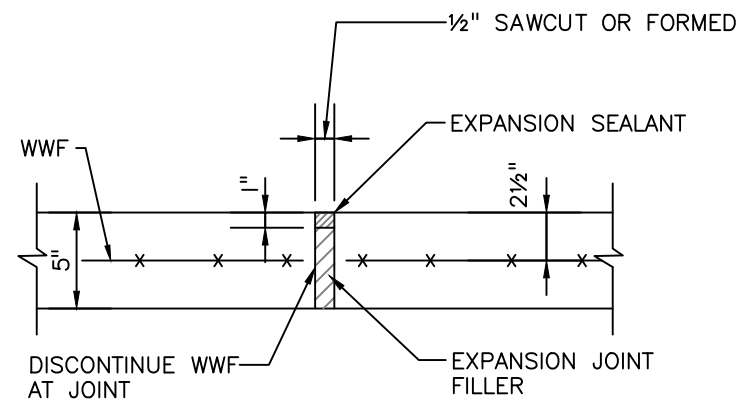
**REINFORCED CONCRETE
LOW FLOW CHANNEL
TRANSITION**

NO SCALE



NOTE:
CONTROL JOINT SPACING SHALL BE 10' (TYP.).

TYPICAL CONTROL JOINT DETAIL



NOTE:
EXPANSION JOINT SPACING SHALL BE 90' (TYP.).

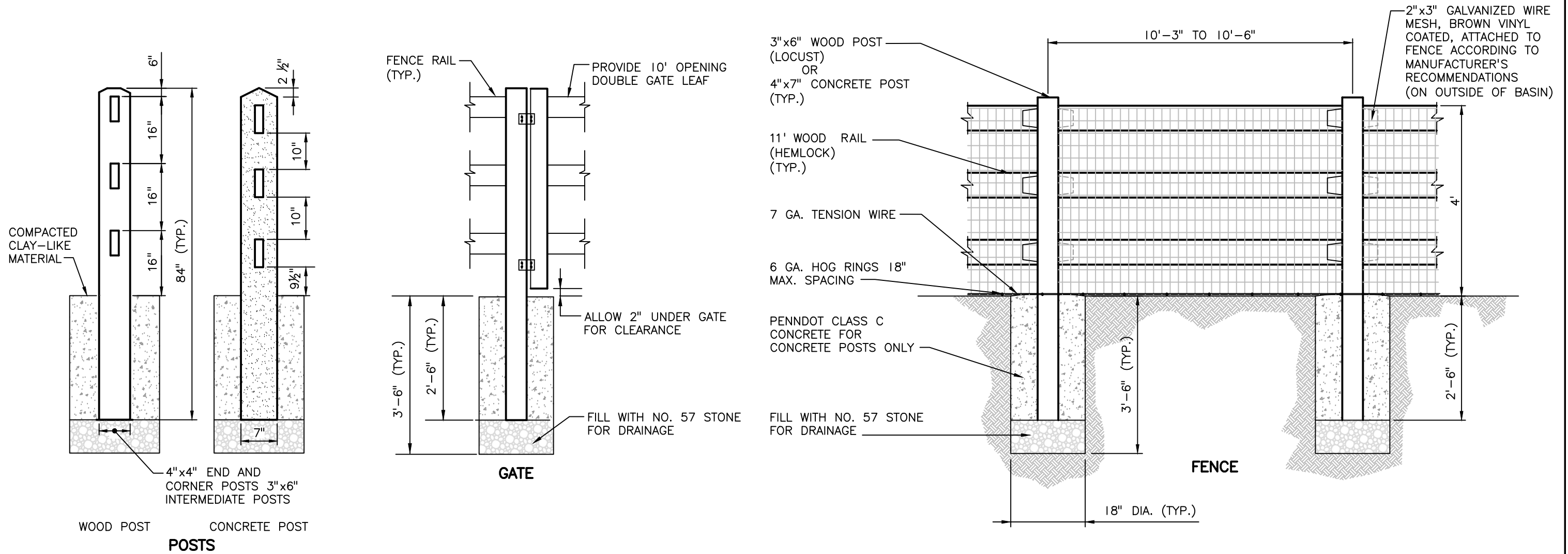
TYPICAL EXPANSION JOINT DETAIL

**REINFORCED CONCRETE
LOW FLOW CHANNEL**

NO SCALE

REVISIONS	UPPER SAUCON TOWNSHIP STANDARD CONSTRUCTION DETAILS LEHIGH COUNTY, PENNSYLVANIA	
	STORM DRAINAGE REINFORCED CONCRETE LOW FLOW CHANNEL	
	THE PIDCOCK COMPANY CIVIL ENGINEERING AND LAND PLANNING ARCHITECTURE LAND SURVEYING OXFORD DRIVE AT FISH HATCHERY ROAD ALLENTOWN, PENNSYLVANIA	
	DATE: SEPTEMBER 2012 CHKD BY: R/JG SCALE: NO SCALE	UST-D-7

Drawing name: S:\MUNICIPAL STANDARD CONSTRUCTION DOCUMENTS\UPPER SAUCON TOWNSHIP\UST--WORKING DOCUMENTS\UST--2009 DETAILS\UST--D-08.dwg Last Modified: Sep 21, 2012 - 8:50am



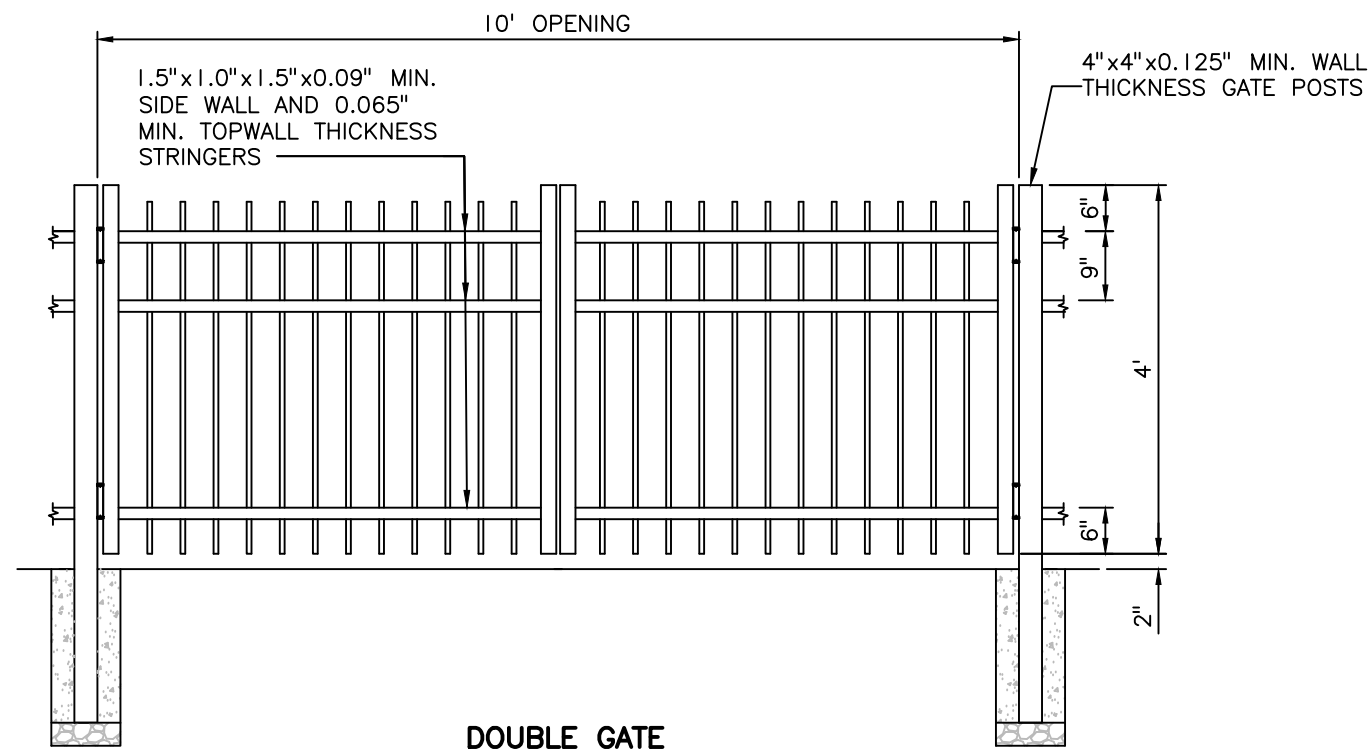
NOTES:

1. FOLLOW MANUFACTURER'S SPECIFICATIONS FOR INSTALLATION.
2. ALL POSTS SHALL BE EITHER WOOD OR CONCRETE.
3. WIRE MESH ON GATE DETAIL NOT SHOWN FOR CLARITY.
4. ALL HARDWARE SHALL BE PER MANUFACTURER'S SPECIFICATIONS AND BE HOT DIPPED GALVANIZED
5. PROVIDE A LOCKABLE (PADLOCK THROUGH A LATCH) ASSEMBLY (NO CHAINING) ON ALL GATES. ALL LOCKS TO BE KEYED ALIKE IN ACCORDANCE WITH TOWNSHIP REQUIREMENTS.

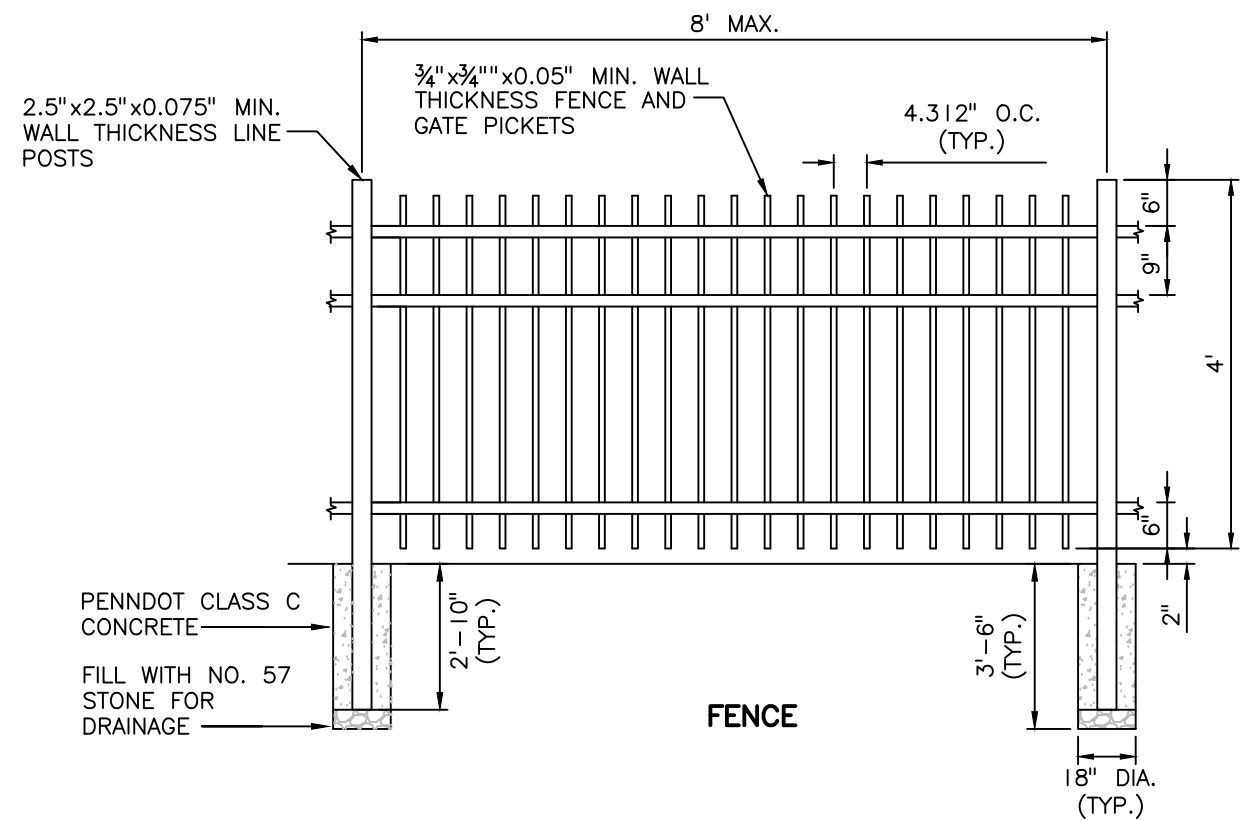
DETENTION BASIN FENCE
(WOOD SPLIT RAIL FENCE WITH WIRE MESH)
NO SCALE

REVISIONS	UPPER SAUCON TOWNSHIP STANDARD CONSTRUCTION DETAILS LEHIGH COUNTY, PENNSYLVANIA
	STORM DRAINAGE DETENTION BASIN FENCE - WOOD SPLIT RAIL
	THE PIDCOCK COMPANY <small>CIVIL ENGINEERING AND LAND PLANNING ARCHITECTURE LAND SURVEYING OXFORD DRIVE AT FISH HATCHERY ROAD ALLENTOWN, PENNSYLVANIA</small>
	<small>DATE: SEPTEMBER 2012 CHKD BY: RJG SCALE: NO SCALE</small>
	UST-D-8

Drawing name: S:\MUNICIPAL STANDARD CONSTRUCTION DOCUMENTS\UPPER SAUCON TOWNSHIP\UST-WORKING DOCUMENTS\UST-2009 DETAILS\UST-D-09.dwg Last Modified: Sep 21, 2012 - 8:51am



DOUBLE GATE



FENCE

NOTES:

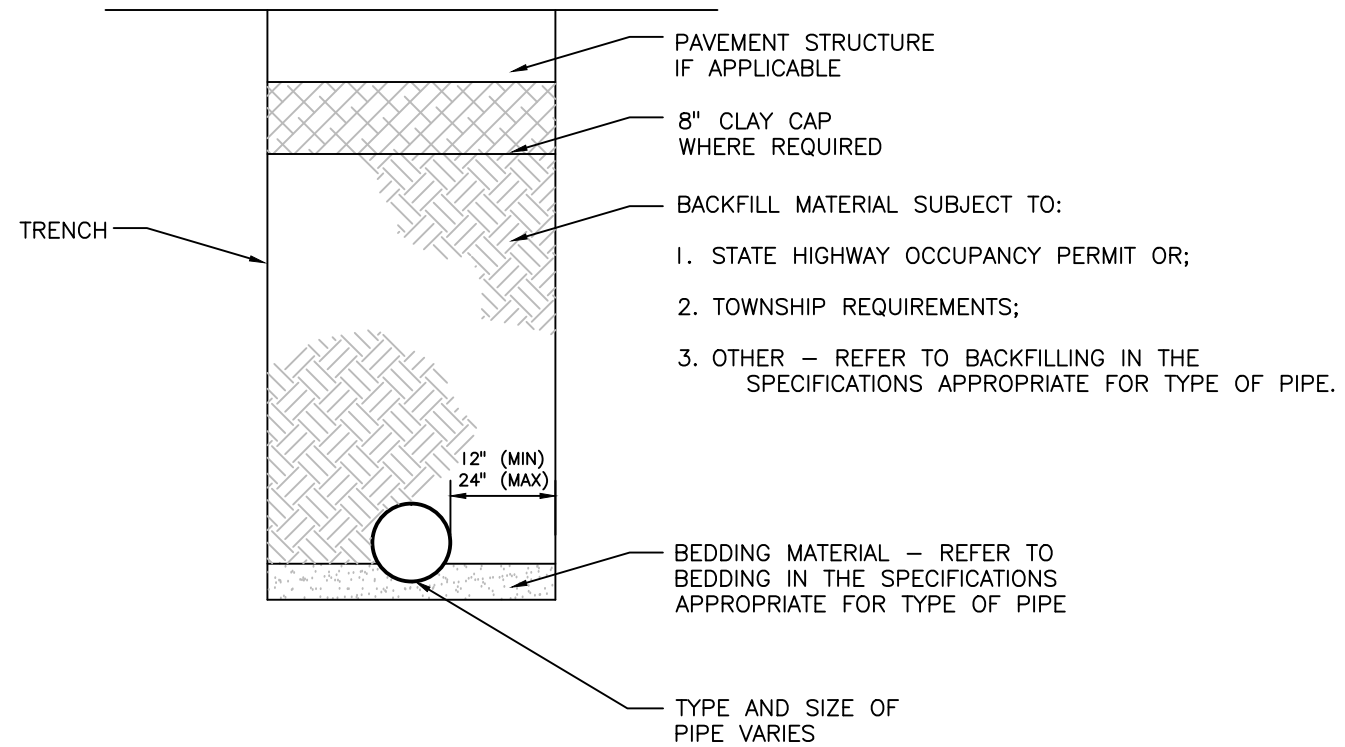
1. ALUMINUM FENCE MATERIAL TO BE ALUMINUM ALLOY 6105-T5 WITH HIGH -SOLIDS ACRYLIC FINISH (BLACK) MEETING REQUIREMENTS OF AAMA 603.8 SPECIFICATIONS.
2. FOLLOW MANUFACTURER'S SPECIFICATIONS FOR INSTALLATION.
3. ALL HARDWARE SHALL BE PER MANUFACTURER'S SPECIFICATIONS AND SHALL BE HOT DIPPED GALVANIZED.
5. PROVIDE A LOCKABLE (PADLOCK THROUGH A LATCH) ASSEMBLY (NO CHAINING) ON ALL GATES. ALL LOCKS TO BE KEYED ALIKE IN ACCORDANCE WITH TOWNSHIP REQUIREMENTS.

DETENTION BASIN FENCE
(ALUMINUM FENCE)
NO SCALE

REVISIONS	UPPER SAUCON TOWNSHIP STANDARD CONSTRUCTION DETAILS LEHIGH COUNTY, PENNSYLVANIA	
	STORM DRAINAGE DETENTION BASIN FENCE-ALUMINUM	
	THE PIDCOCK COMPANY <small>CIVIL ENGINEERING AND LAND PLANNING ARCHITECTURE LAND SURVEYING</small> <small>OXFORD DRIVE AT FISH HATCHERY ROAD ALLENTOWN, PENNSYLVANIA</small>	<small>DATE: SEPTEMBER 2012</small> <small>CHKD BY: R/JG</small> <small>SCALE: NO SCALE</small>

UST-D-9

Drawing name: S:\MUNICIPAL STANDARD CONSTRUCTION DOCUMENTS\UPPER SAUCON TOWNSHIP\UST-WORKING DOCUMENTS\UST-2009 DETAILS\UST-G-01.dwg Last Modified: Sep 21, 2012 - 8:51am

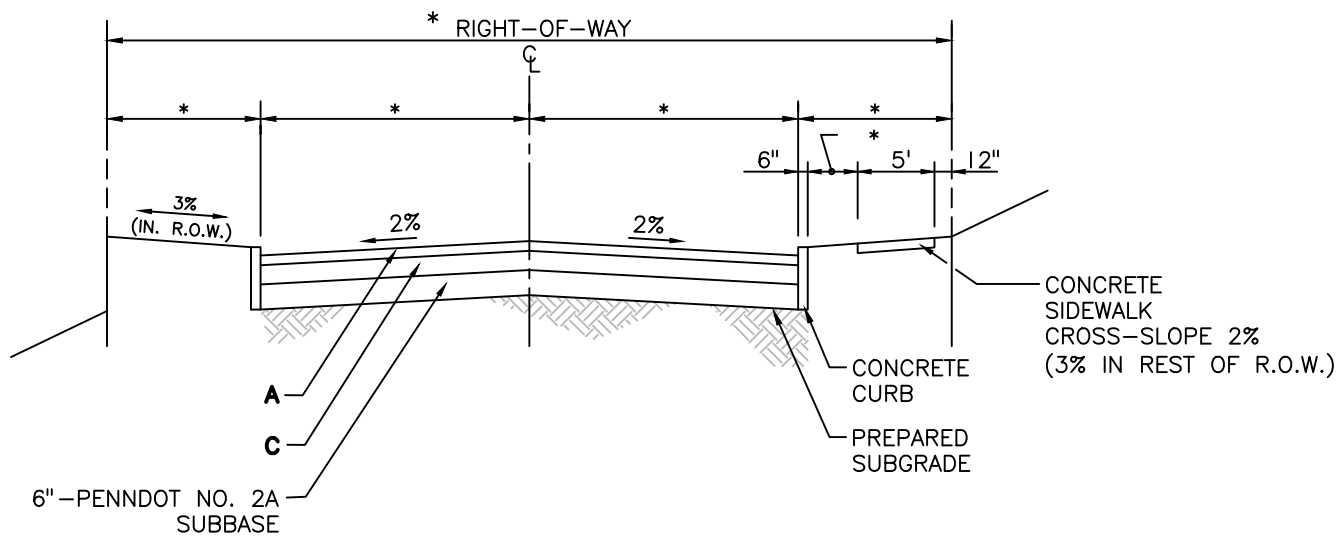


STANDARD TRENCH

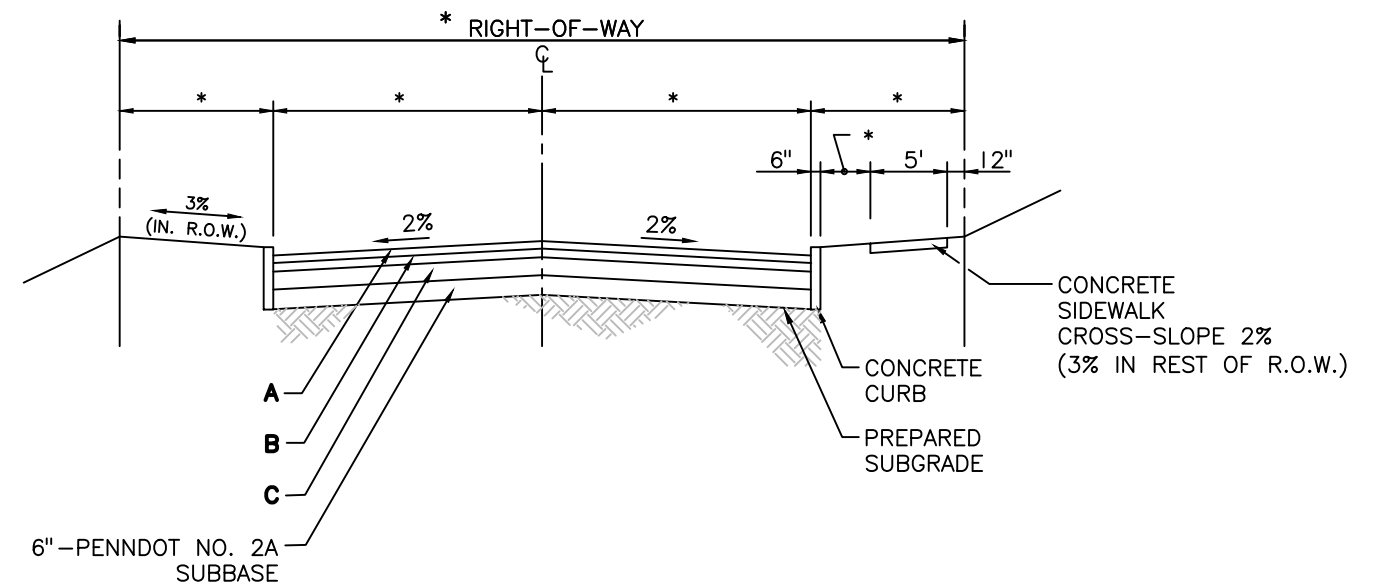
NO SCALE

REVISIONS	UPPER SAUCON TOWNSHIP STANDARD CONSTRUCTION DETAILS LEHIGH COUNTY, PENNSYLVANIA	
	GENERAL CONSTRUCTION STANDARD TRENCH	
	THE PIDCOCK COMPANY <small>CIVIL ENGINEERING AND LAND PLANNING ARCHITECTURE LAND SURVEYING OXFORD DRIVE AT FISH HATCHERY ROAD ALLENTOWN, PENNSYLVANIA</small>	
	DATE: SEPTEMBER 2012 CHKD BY: RJG SCALE: NO SCALE	UST-G-1

Drawing name: S:\MUNICIPAL STANDARD CONSTRUCTION DOCUMENTS\UPPER SAUCON TOWNSHIP\UST-WORKING DOCUMENTS\UST-2009 DETAILS\UST-R-01.dwg Last Modified: Sep 21, 2012 - 8:51am



**TYPICAL CROSS SECTION
(LOCAL STREETS)**
NO SCALE



**TYPICAL CROSS SECTION
(COLLECTOR STREETS)**
NO SCALE

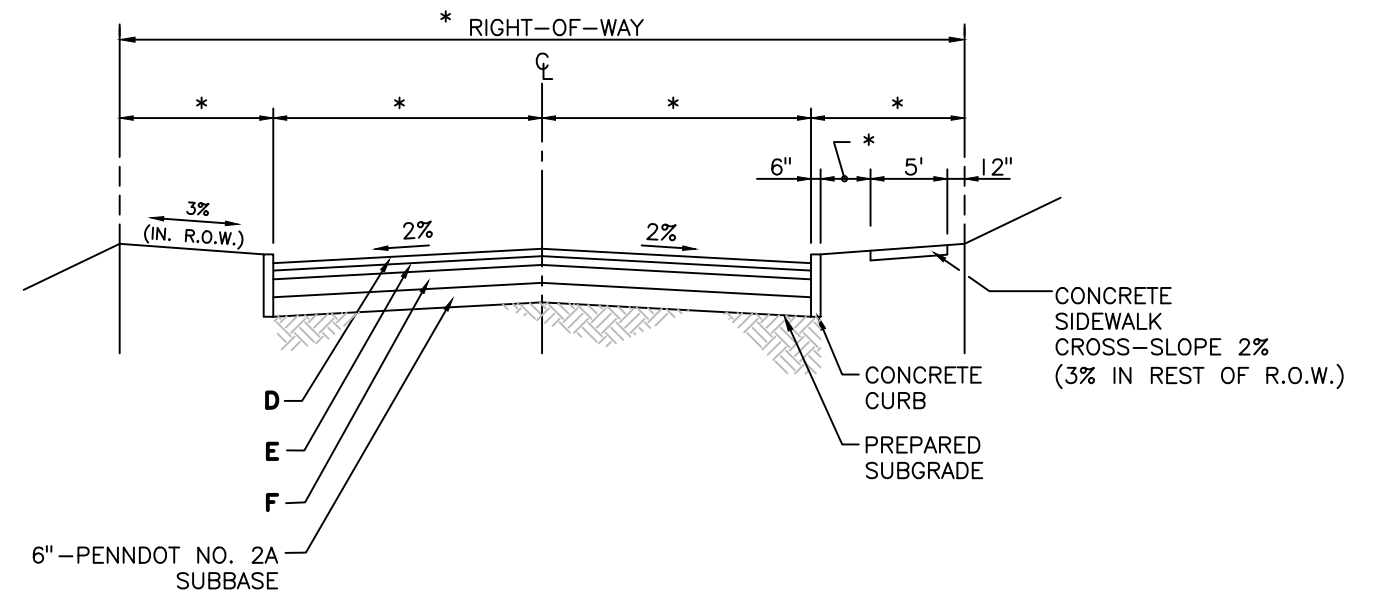
*DIMENSIONS TO BE IN ACCORDANCE WITH TOWNSHIP ORDINANCE OR DETERMINED BY TOWNSHIP ON A CASE BY CASE BASIS IF NOT OTHERWISE SPECIFIED.

PRIMARY PAVEMENT :

- A** - 1/2" SUPERPAVE ASPHALT 9.5mm, PG 64-22, 0.0 TO 0.3 MILLION ESAL, SRL-L, HMA WEARING COURSE.
- B** - 2 1/2" SUPERPAVE ASPHALT, 19.0mm, PG 64-22, 0.0 TO 0.3 MILLION ESAL, HMA BINDER COURSE.
- C** - 5" SUPERPAVE ASPHALT, 25.0mm, PG 64-22, 0.0 TO 0.3 MILLION ESAL, HMA BASE COURSE.
- D** - 1/2" SUPERPAVE ASPHALT 9.5mm, PG 64-22, 0.3 TO 3.0 MILLION ESAL, SRL-M, HMA WEARING COURSE.
- E** - 2 1/2" SUPERPAVE ASPHALT, 19.0mm, PG 64-22, 0.3 TO 3.0 MILLION ESAL, HMA BINDER COURSE.
- F** - 5" SUPERPAVE ASPHALT, 25.0mm, PG 64-22, 0.3 TO 3.0 MILLION ESAL, HMA BASE COURSE.

NOTES:

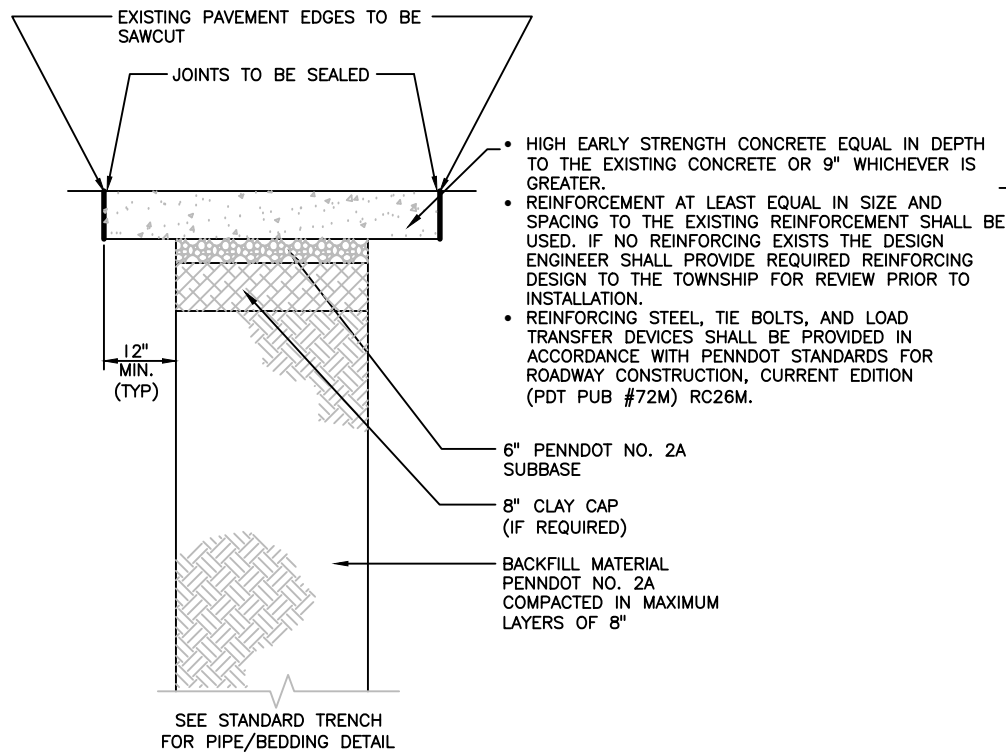
1. PROVIDE MATERIALS AND CONSTRUCTION MEETING THE REQUIREMENTS OF PENNDOT SPECIFICATIONS, PUBLICATION 408, CURRENT EDITION, SECTIONS 203, 204, 205, 206, 210, 350, 309, 409, 630 AND 676.
2. SEAL CURB IN ACCORDANCE WITH CONCRETE CURB DETAILS UST-R-5.
3. THE FOLLOWING ABBREVIATIONS APPEAR ON THIS SHEET:
 - a. ESAL - EQUIVALENT SINGLE AXLE LOAD
 - b. SRL - SKID RESISTANCE LEVEL
 - c. HMA - HOT MIXED ASPHALT
 - d. PG - PERFORMANCE GRADE
4. STREET TREES SHALL BE PLACED BETWEEN THE CURB AND SIDEWALK AS APPLICABLE.



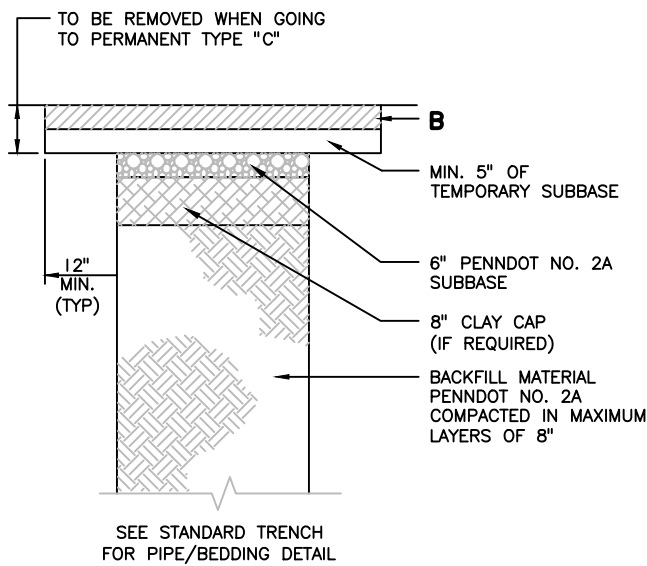
**TYPICAL CROSS SECTION
(ARTERIAL STREETS)**
NO SCALE

REVISIONS	UPPER SAUCON TOWNSHIP	
	STANDARD CONSTRUCTION DETAILS	
	LEHIGH COUNTY, PENNSYLVANIA	
	ROADWAY CONSTRUCTION	
TYPICAL ROADWAY CROSS SECTIONS		
THE PIDCOCK COMPANY		DATE: SEPTEMBER 2012
CIVIL ENGINEERING AND LAND PLANNING ARCHITECTURE LAND SURVEYING		CHKD BY: RJG
OXFORD DRIVE AT FISH HATCHERY ROAD ALLENTOWN, PENNSYLVANIA		SCALE: NO SCALE
		UST-R-1

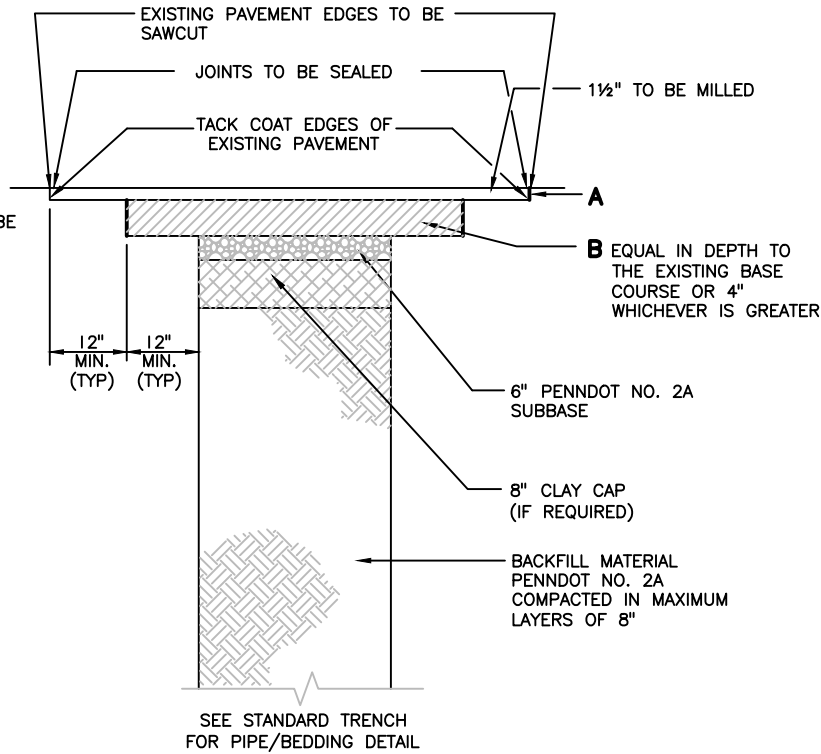
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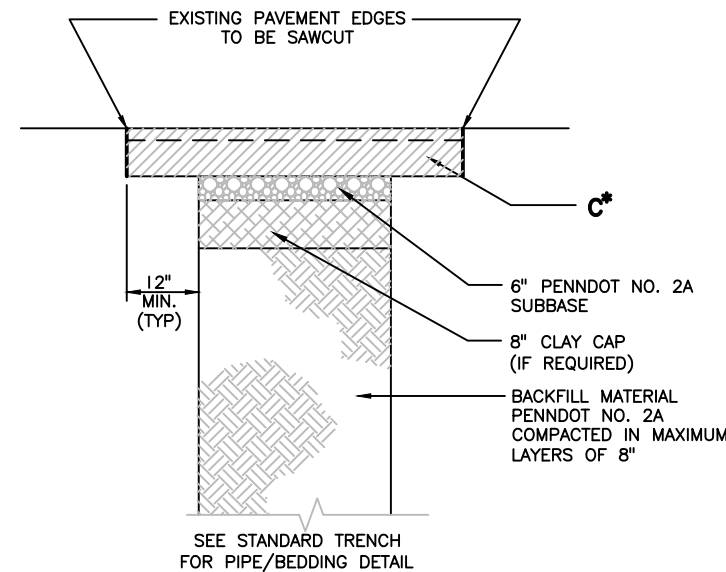
PERMANENT TYPE "C"
REINFORCED CEMENT CONCRETE PAVEMENT



TEMPORARY FOR TYPE "C"
REINFORCED CEMENT CONCRETE PAVEMENT



PERMANENT TYPE "D"
BITUMINOUS PAVEMENT

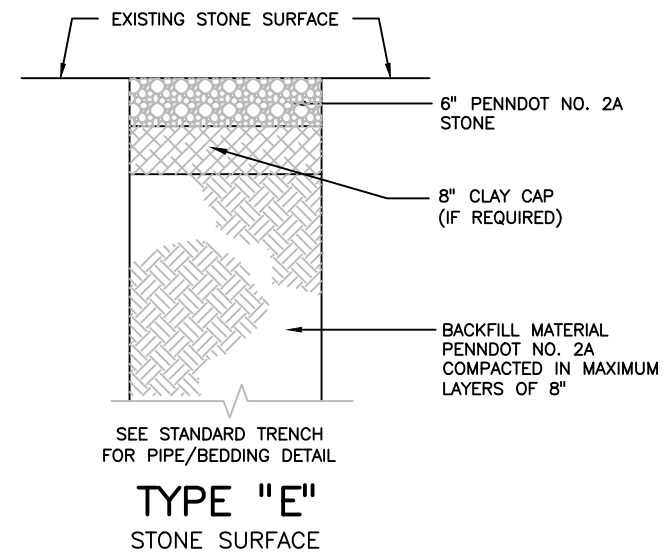


* NOTE:
EMERGENCY TEMPORARY PAVING FOR TRENCH RESTORATION (2" COLD BITUMINOUS MATERIAL WITH 3/8" PENNDOT NO. 2A) MAY BE UTILIZED SUBJECT TO TOWNSHIP REVIEW, ONLY UNTIL MATERIAL AS REFERENCED IN C BECOMES AVAILABLE FOR INSTALLATION.

TEMPORARY FOR TYPE "D"
BITUMINOUS PAVEMENT

NON-STATE HIGHWAY PAVEMENT RESTORATION

NO SCALE



TYPE "E"
STONE SURFACE

NOTES:

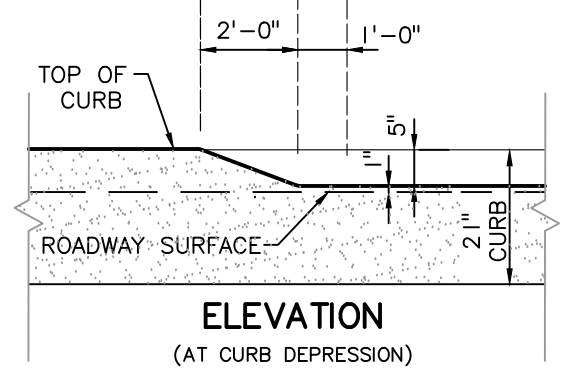
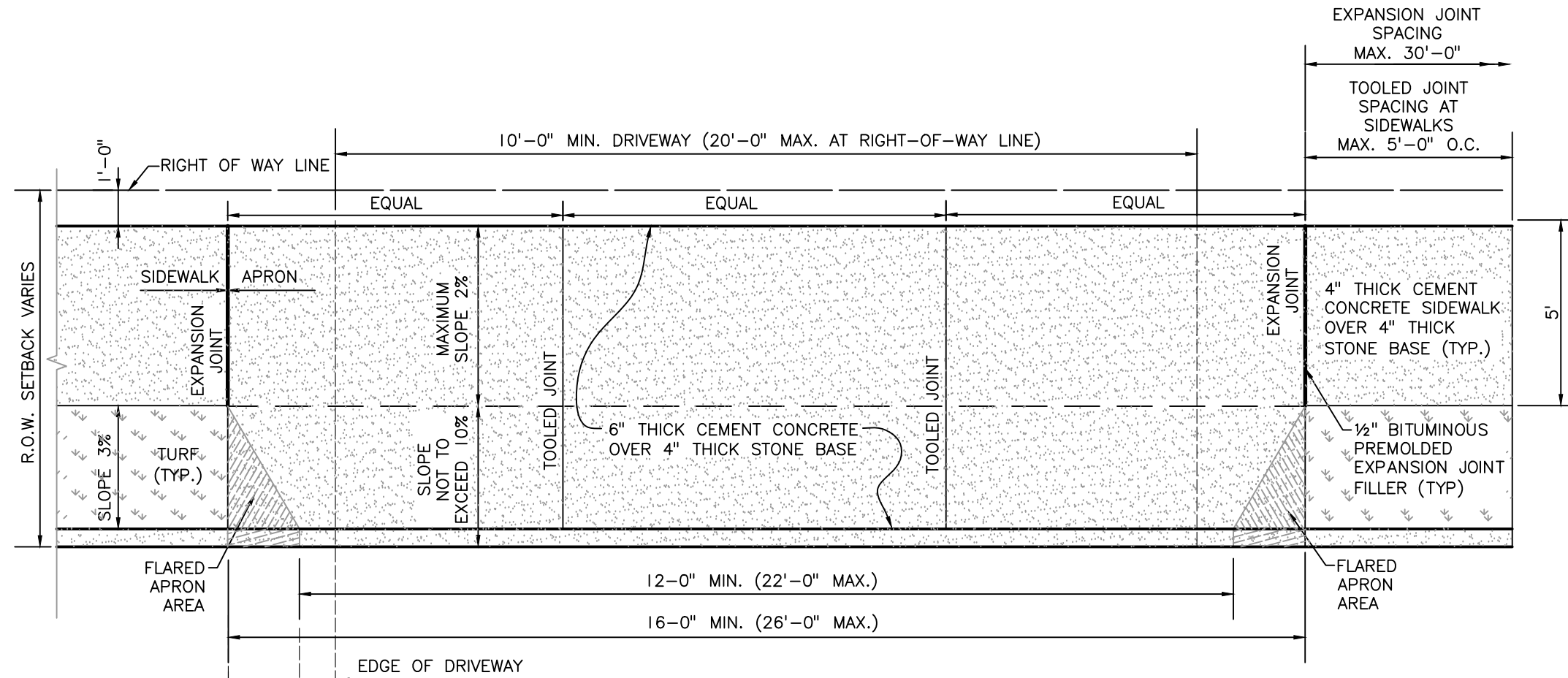
1. PROVIDE MATERIALS AND CONSTRUCTION MEETING THE REQUIREMENTS OF PENNDOT SPECIFICATIONS, PUBLICATION 408, CURRENT EDITION, SECTIONS 203, 204, 205, 206, 210, 350, 309, 409, 630 AND 676
 2. PERMANENT BITUMINOUS PAVING TYPE IN TRENCH SHALL MATCH EXISTING TYPE OF PAVING IN THE ROAD.
 3. WARNING TAPE SHALL BE PLACED AT A MINIMUM OF 2' ABOVE ANY MAINLINE PIPE OR LATERAL.
- A-** 1 1/2" SUPERPAVE ASPHALT 9.5mm, PG 64-22, 0.0 TO 0.3 MILLION ESAL, SRL-L, HMA WEARING COURSE.
- B-** 5" SUPERPAVE ASPHALT, 25.0mm, PG 64-22, 0.0 TO 0.3 MILLION ESAL, HMA BASE COURSE.
- C-** 6 1/2" SUPERPAVE ASPHALT AS DEFINED IN B.

NOTES

1. SEAL CURB IN ACCORDANCE WITH CONCRETE CURB DETAILS UST-R-5
2. THE FOLLOWING ABBREVIATIONS APPEAR ON THIS SHEET:
 - a. ESAL - EQUIVALENT SINGLE AXLE LOAD
 - b. SRL - SKID RESISTANCE LEVEL
 - c. HMA - HOT MIXED ASPHALT
 - d. PG - PERFORMANCE GRADE

REVISIONS	UPPER SAUCON TOWNSHIP STANDARD CONSTRUCTION DETAILS LEHIGH COUNTY, PENNSYLVANIA	
	ROADWAY CONSTRUCTION NON-STATE HIGHWAY PAVEMENT RESTORATION	
	THE PIDCOCK COMPANY <small>CIVIL ENGINEERING AND LAND PLANNING ARCHITECTURE LAND SURVEYING</small> <small>OXFORD DRIVE AT FISH HATCHERY ROAD ALLENTOWN, PENNSYLVANIA</small>	
	DATE: SEPTEMBER 2012 CHKD BY: R/JG SCALE: NO SCALE	UST-R-2

Drawing name: S:\MUNICIPAL STANDARD CONSTRUCTION DOCUMENTS\UPPER SAUCON TOWNSHIP\UST-WORKING DOCUMENTS\UST-2009 DETAILS\UST-R-03.dwg Last Modified: Sep 21, 2012 - 8:51am



**RESIDENTIAL
SIDEWALK AND DRIVEWAY APRON PLAN**
NO SCALE

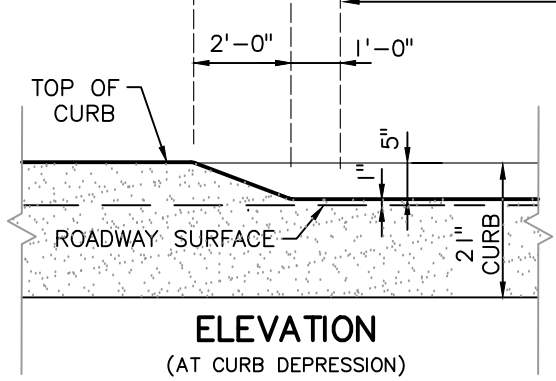
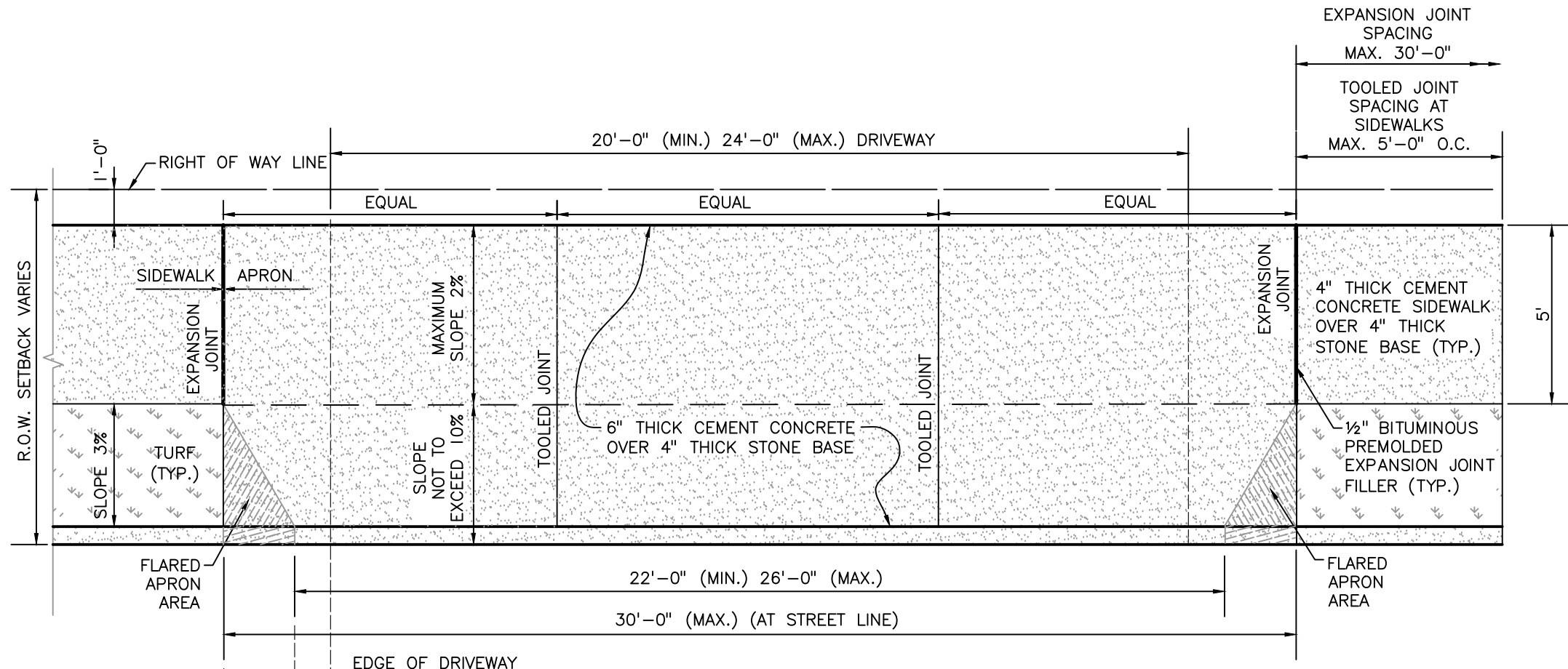
NOTES:

1. BASE SHALL BE PENNDOT NO. 2A MECHANICALLY TAMPED ON A PREPARED SUBGRADE.
2. CONCRETE DRIVEWAY APRONS SHALL BE INSTALLED WHERE CONCRETE CURB DEPRESSIONS HAVE BEEN INSTALLED.
3. THE EDGE OF A DRIVEWAY SHALL BE NO CLOSER THAN 8 FEET FROM THE CENTERLINE OF AN INLET.

REVISIONS	UPPER SAUCON TOWNSHIP STANDARD CONSTRUCTION DETAILS LEHIGH COUNTY, PENNSYLVANIA	
	ROADWAY CONSTRUCTION RESIDENTIAL SIDEWALK AND DRIVEWAY APRON	
	THE PIDCOCK COMPANY <small>CIVIL ENGINEERING AND LAND PLANNING ARCHITECTURE LAND SURVEYING</small> <small>OXFORD DRIVE AT FISH HATCHERY ROAD ALLENTOWN, PENNSYLVANIA</small>	<small>DATE: SEPTEMBER 2012</small> <small>CHKD BY: RJG</small> <small>SCALE: NO SCALE</small>

UST-R-3

Drawing name: S:\MUNICIPAL STANDARD CONSTRUCTION DOCUMENTS\UPPER SAUCON TOWNSHIP\UST-WORKING DOCUMENTS\UST-2009 DETAILS\UST-R-04.dwg Last Modified: Sep 21, 2012 - 8:51am



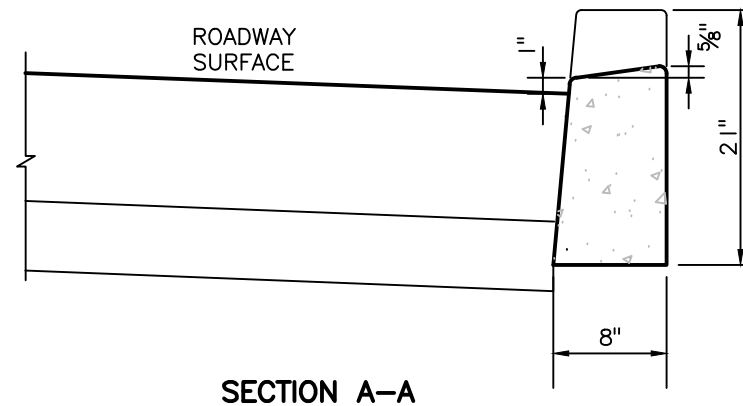
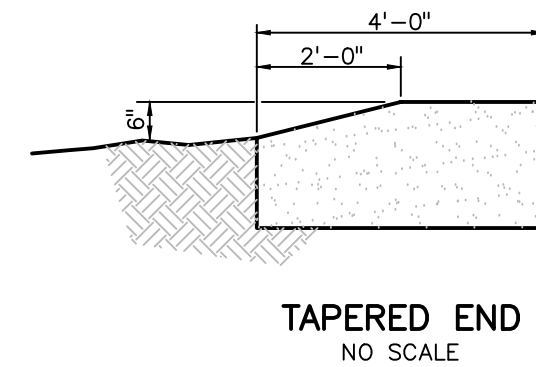
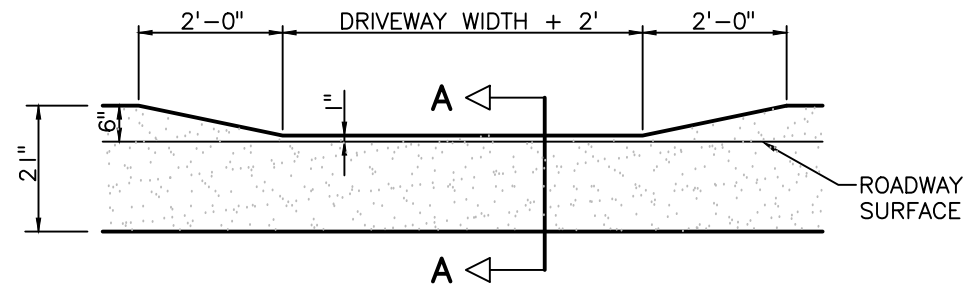
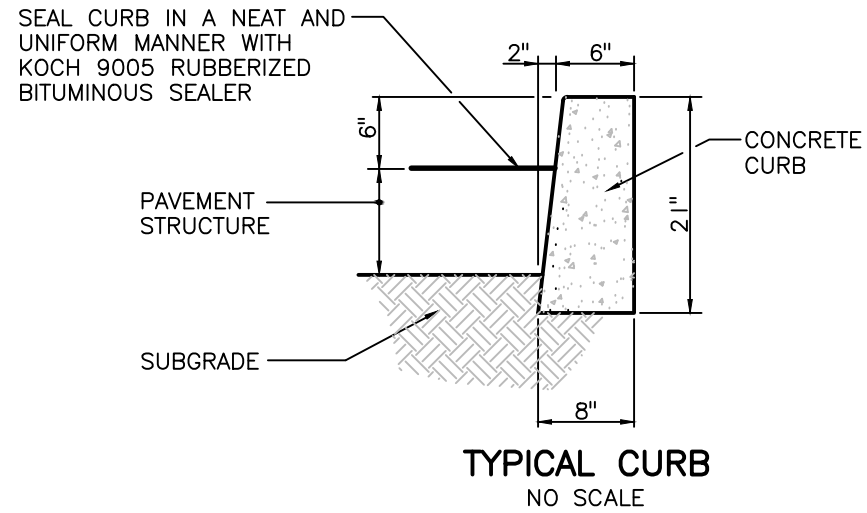
**NON-RESIDENTIAL
SIDEWALK AND DRIVEWAY APRON PLAN**
NO SCALE

NOTES:

1. BASE SHALL BE PENNDOT NO. 2A MECHANICALLY TAMPED ON A PREPARED SUBGRADE.
2. CONCRETE DRIVEWAY APRONS SHALL BE INSTALLED WHERE CONCRETE CURB DEPRESSIONS HAVE BEEN INSTALLED.
3. NON-RESIDENTIAL DRIVEWAY APRON SHALL BE REINFORCED WITH A MINIMUM 6x6-W2.9xW2.9 WELDED WIRE FABRIC. TERMINATE REINFORCING AT EXPANSION JOINTS. REINFORCING SHALL BE AS SPECIFIED BY DESIGN ENGINEER BASED ON SPECIFIC USE/LOADING REQUIREMENTS.
4. PROVIDE DRIVEWAY APRONS AT ACCESS POINTS TO UTILITY EASEMENTS AT LOCATIONS AS DIRECTED BY UPPER SAUCON TOWNSHIP.
5. THE EDGE OF A DRIVEWAY SHALL BE NO CLOSER THAN 8 FEET FROM THE CENTERLINE OF AN INLET.

REVISIONS	UPPER SAUCON TOWNSHIP STANDARD CONSTRUCTION DETAILS LEHIGH COUNTY, PENNSYLVANIA	
	ROADWAY CONSTRUCTION NON-RESIDENTIAL SIDEWALK AND DRIVEWAY APRON	
	THE PIDCOCK COMPANY <small>CIVIL ENGINEERING AND LAND PLANNING ARCHITECTURE LAND SURVEYING OXFORD DRIVE AT FISH HATCHERY ROAD ALLENTOWN, PENNSYLVANIA</small>	
	DATE: SEPTEMBER 2012 CHKD BY: RJG SCALE: NO SCALE	UST-R-4

Drawing name: S:\MUNICIPAL STANDARD CONSTRUCTION DOCUMENTS\UPPER SAUCON TOWNSHIP\UST-WORKING DOCUMENTS\UST-2009 DETAILS\UST-R-05.dwg Last Modified: Sep 21, 2012 - 8:51am



DEPRESSED CURB
NO SCALE

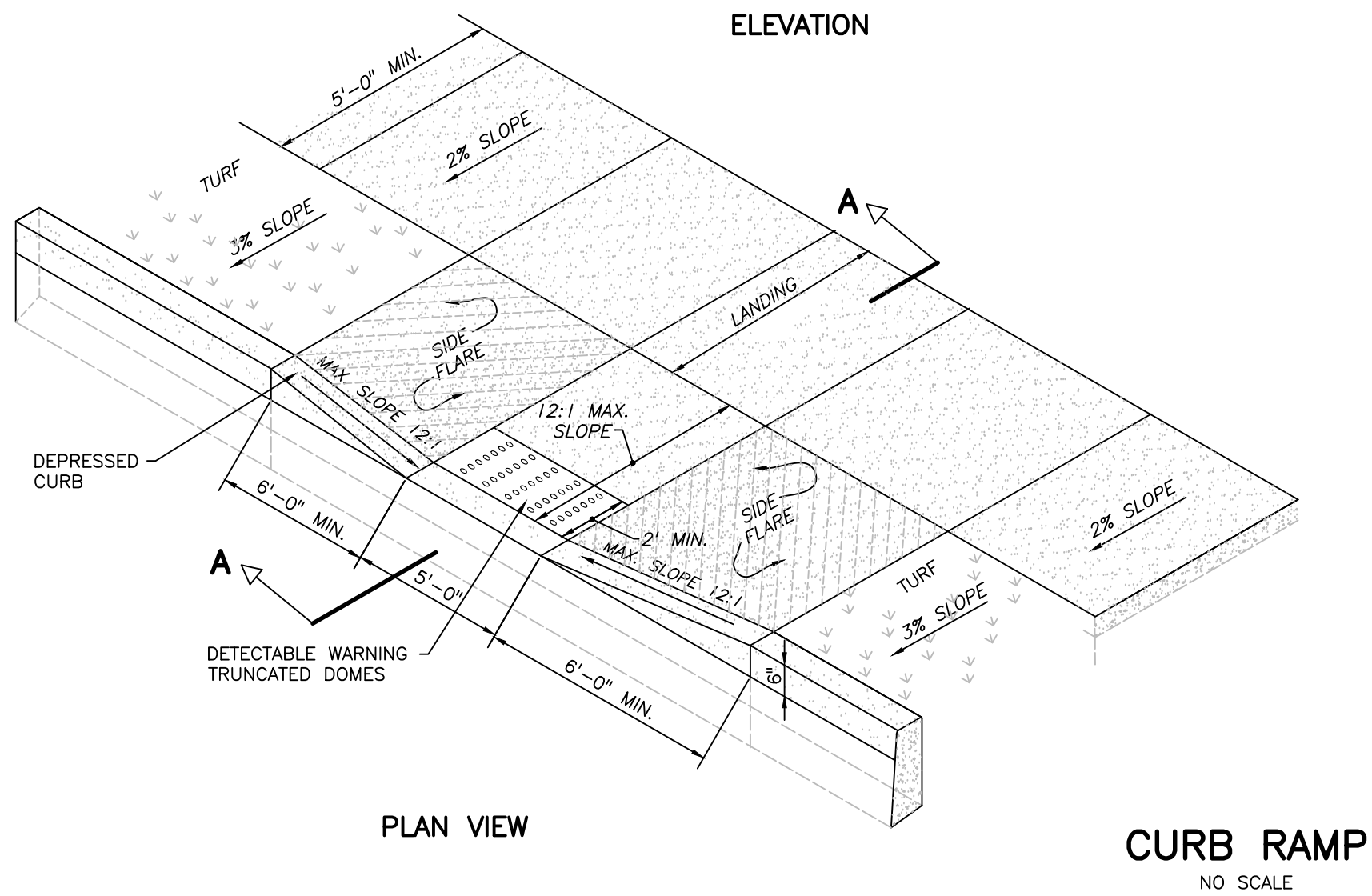
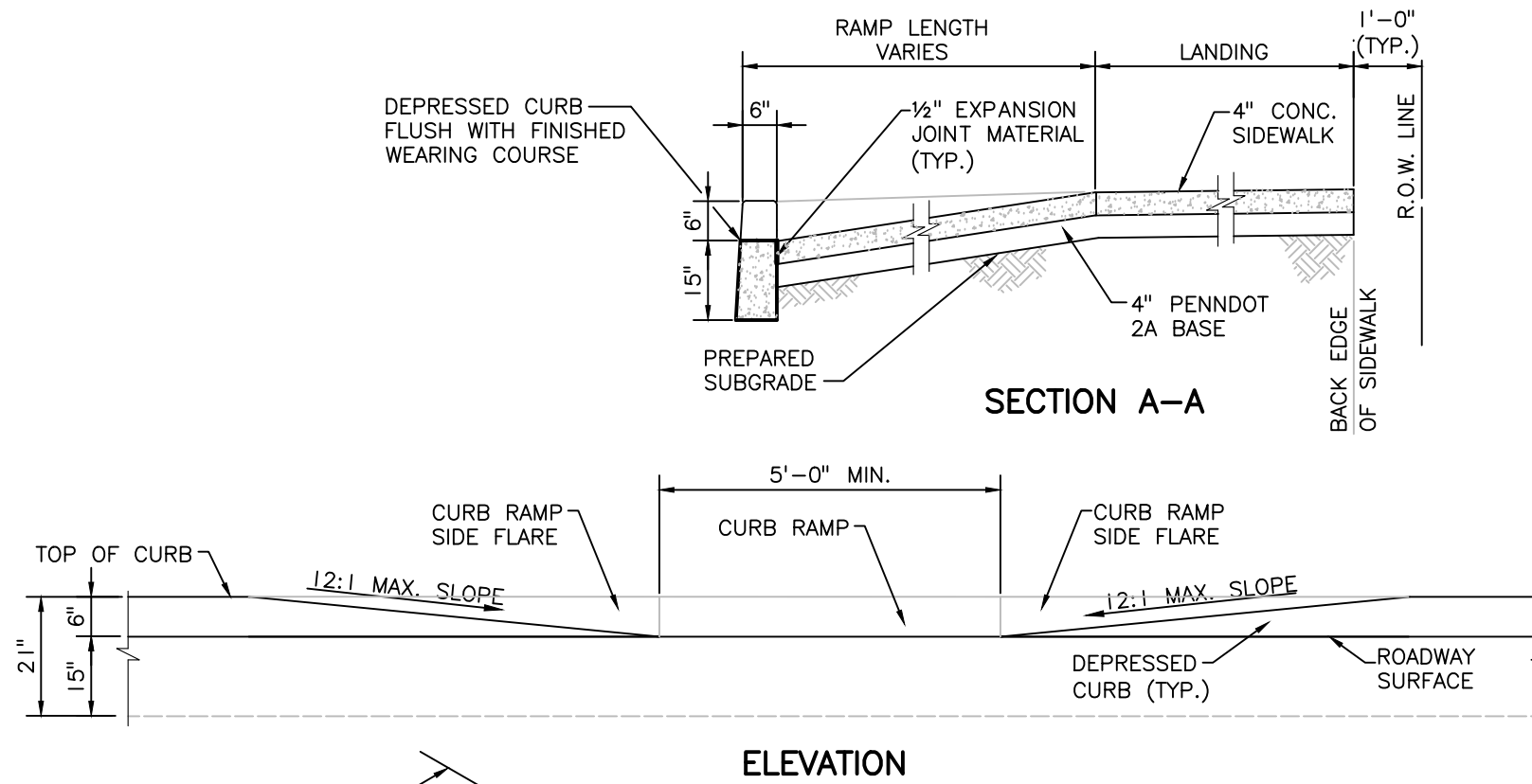
CONCRETE CURB
NO SCALE

NOTES:

- EXISTING CURB REMOVAL SHALL BE IN COMPLETE SECTIONS (JOINT TO JOINT), NOT PARTIAL SECTIONS.
- PROVIDE MATERIALS AND CONSTRUCTION MEETING THE REQUIREMENTS OF PENNDOT SPECIFICATIONS, PUBLICATION 408, CURRENT EDITION, SECTION 630.
- SPACE CONTRACTION JOINTS IN UNIFORM LENGTHS OR SECTIONS, 10'-0" MAX. TO 4'-0" MIN.
- PLACE 1/2 INCH BITUMINOUS PREMOLDED EXPANSION JOINT FILLER MATERIAL AT STRUCTURES AND AT THE END OF THE WORK DAY. CUT MATERIAL TO CONFORM TO AREA ADJACENT TO CURB OR TO CONFORM TO CROSS SECTIONAL AREA OF CURB.
- EXPANSION JOINTS SHALL BE SPACED 30' MAX. O. C.

REVISIONS	UPPER SAUCON TOWNSHIP STANDARD CONSTRUCTION DETAILS LEHIGH COUNTY, PENNSYLVANIA	
	ROADWAY CONSTRUCTION CONCRETE CURB	
	THE PIDCOCK COMPANY <small>CIVIL ENGINEERING AND LAND PLANNING ARCHITECTURE LAND SURVEYING</small> <small>OXFORD DRIVE AT FISH HATCHERY ROAD ALLENTOWN, PENNSYLVANIA</small>	
	DATE: SEPTEMBER 2012 CHKD BY: R/JG SCALE: NO SCALE	UST-R-5

Drawing name: S:\MUNICIPAL STANDARD CONSTRUCTION DOCUMENTS\UPPER SAUCON TOWNSHIP\UST-WORKING DOCUMENTS\UST-2009 DETAILS\UST-R-06.dwg Last Modified: Sep 21, 2012 - 8:51am



NOTES:

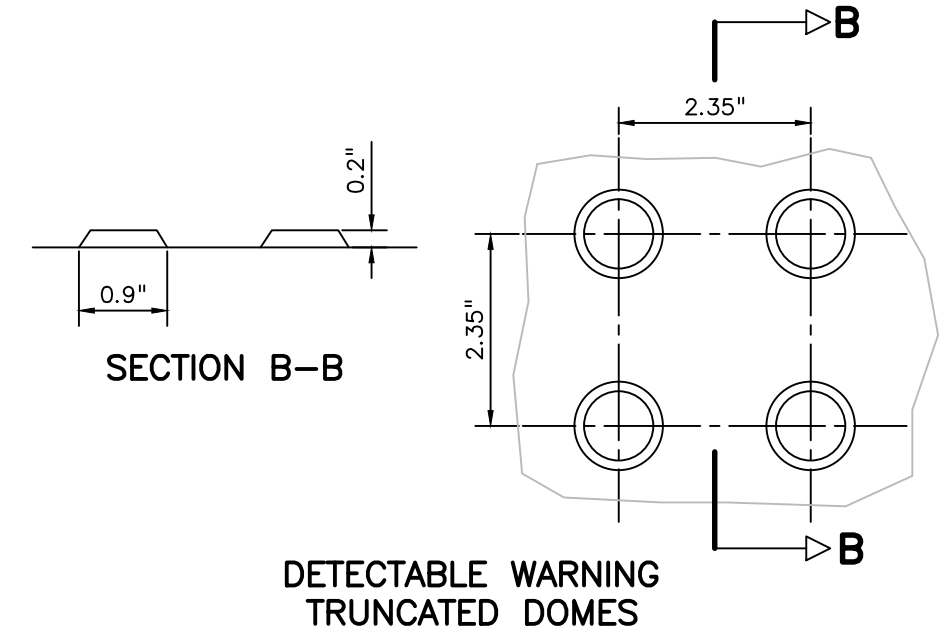
1. PROVIDE MATERIALS AND CONSTRUCTION MEETING THE REQUIREMENTS OF PENNDOT SPECIFICATIONS, PUBLICATION 408, CURRENT EDITION, SECTIONS 630, 676, 420, 421 AND 422.
2. PROVIDE SLIP RESISTANT TEXTURE ON CURB RAMP BY COARSE BROOMING TRANSVERSE TO THE SLOPE OF THE RAMP. EXTEND TEXTURE THE FULL WIDTH AND LENGTH OF THE CURB RAMP INCLUDING FLARED SIDE RAMPS.
3. CONSTRUCTION DETAILS SHALL BE MODIFIED TO ADAPT DIMENSIONS TO EXISTING CURB ALTERATIONS WHERE THE CURB IS NOT THE STANDARD 6-INCH REVEAL.
4. WHENEVER POSSIBLE, CONSTRUCT THE TRANSITION SLOPE FROM THE CURB RAMP AND FLARE SIDES TO ADJOINING SURFACES WITH A GRADUAL CURVE RATHER THAN AN ABRUPT ANGLE.
5. IF THE ELEVATION OF THE SIDEWALK PRODUCES A SLOPE GREATER THAN 12:1 FOR THE RAMP, THEN THE SIDEWALK SHALL BE LOWERED UNTIL THE MAX. SLOPE FOR THE RAMP DOES NOT EXCEED 12:1.
6. BASE SHALL BE PENNDOT NO. 2A MECHANICALLY TAMPED.
7. ALIGN DETECTABLE WARNING DOMES ON A SQUARE GRID IN THE PREDOMINANT DIRECTION OF TRAVEL TO PERMIT WHEELS TO ROLL BETWEEN THE DOMES.
8. PROVIDE DETECTABLE WARNING SURFACES THAT CONTRAST (BY AT LEAST 70%) IN LIGHT REFLECTANCE WITH ADJOINING SURFACES, EITHER LIGHT-ON-DARK OR DARK-ON-LIGHT IN ACCORDANCE WITH THE FOLLOWING FORMULA:

$$\text{CONTRAST} = [(B_1 - B_2) / B_1] \times 100$$

$$B_1 = \text{LIGHT REFLECTANCE VALUE (LRV) OF LIGHTER AREA}$$

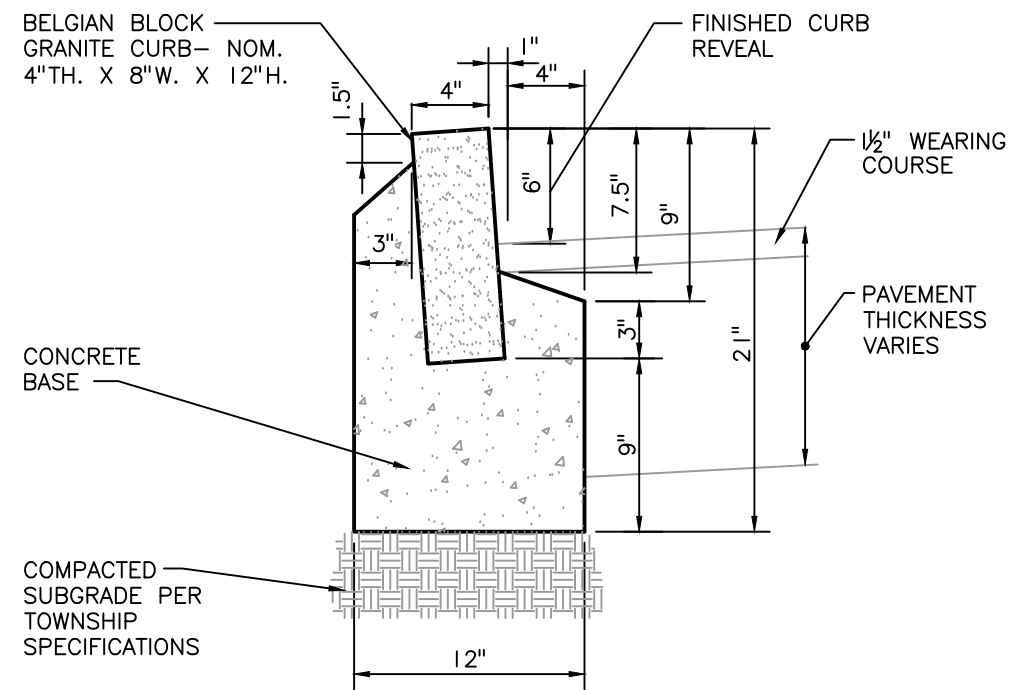
$$B_2 = \text{LIGHT REFLECTANCE VALUE (LRV) OF DARKER AREA}$$

DARK GRAY WARNING SURFACES SHALL BE USED IN RESIDENTIAL DEVELOPMENTS. DETECTABLE WARNING SURFACE MATERIAL SHALL BE AS REVIEWED BY THE TOWNSHIP.
9. THE DEVELOPER SHALL COMPLY WITH REQUIREMENTS OF THE AMERICANS WITH DISABILITIES ACT (ADA) STANDARDS FOR ACCESSIBLE DESIGN, LATEST EDITION.

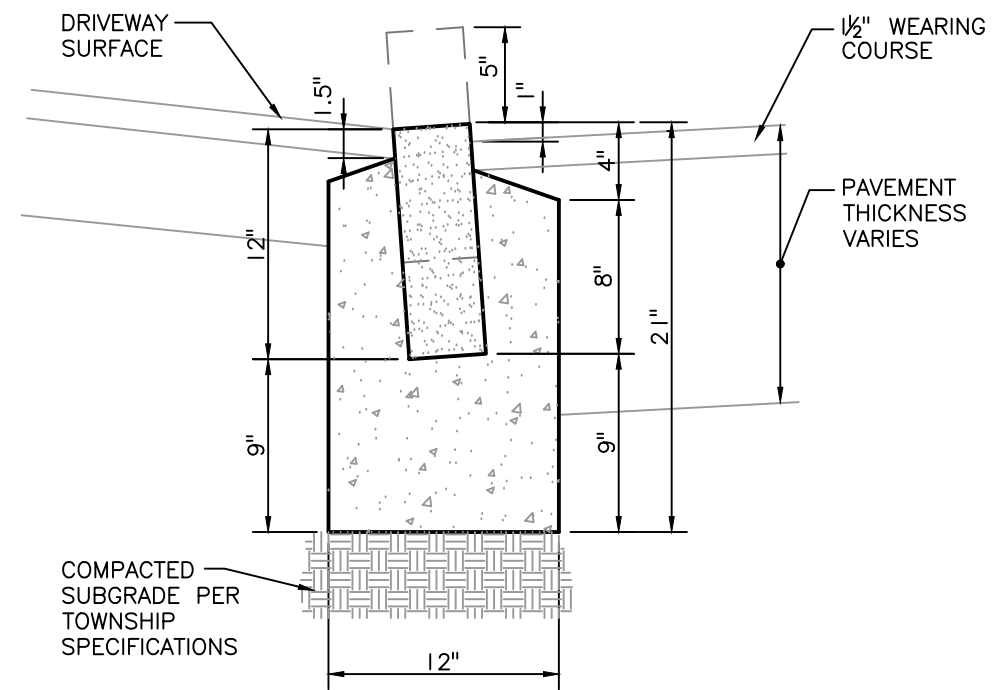


<p>UPPER SAUCON TOWNSHIP STANDARD CONSTRUCTION DETAILS LEHIGH COUNTY, PENNSYLVANIA</p>		<p>ROADWAY CONSTRUCTION SIDEWALK AND CURB RAMP</p>	
		<p>THE PIDCOCK COMPANY CIVIL ENGINEERING AND LAND PLANNING ARCHITECTURE LAND SURVEYING OXFORD DRIVE AT FISH HATCHERY ROAD ALLENTOWN, PENNSYLVANIA</p>	
<p>REVISIONS</p>	<p>DATE: SEPTEMBER 2012 CHKD BY: RJG SCALE: NO SCALE</p>	<p>UST-R-6</p>	

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**TYPICAL
BELGIAN BLOCK GRANITE CURB**



**TYPICAL
BELGIAN BLOCK GRANITE CURB AT
DRIVEWAY APRON**

NOTES:

1. 1:1 CEMENT-SAND MORTAR JOINTS SHALL NOT BE MORE THAN $\frac{3}{8}$ " WIDE.
2. TRANSVERSE JOINTS $\frac{1}{2}$ " WIDE SHALL BE INSTALLED IN THE CURB A MAXIMUM OF 60' APART, AND ON BOTH SIDES AT ALL INLETS, AND SHALL BE FILLED WITH PREFORMED BITUMINOUS-IMPREGNATED FIBER JOINT FILLER RECESSED $\frac{1}{4}$ " IN FROM FRONT FACE AND TOP OF CURB.

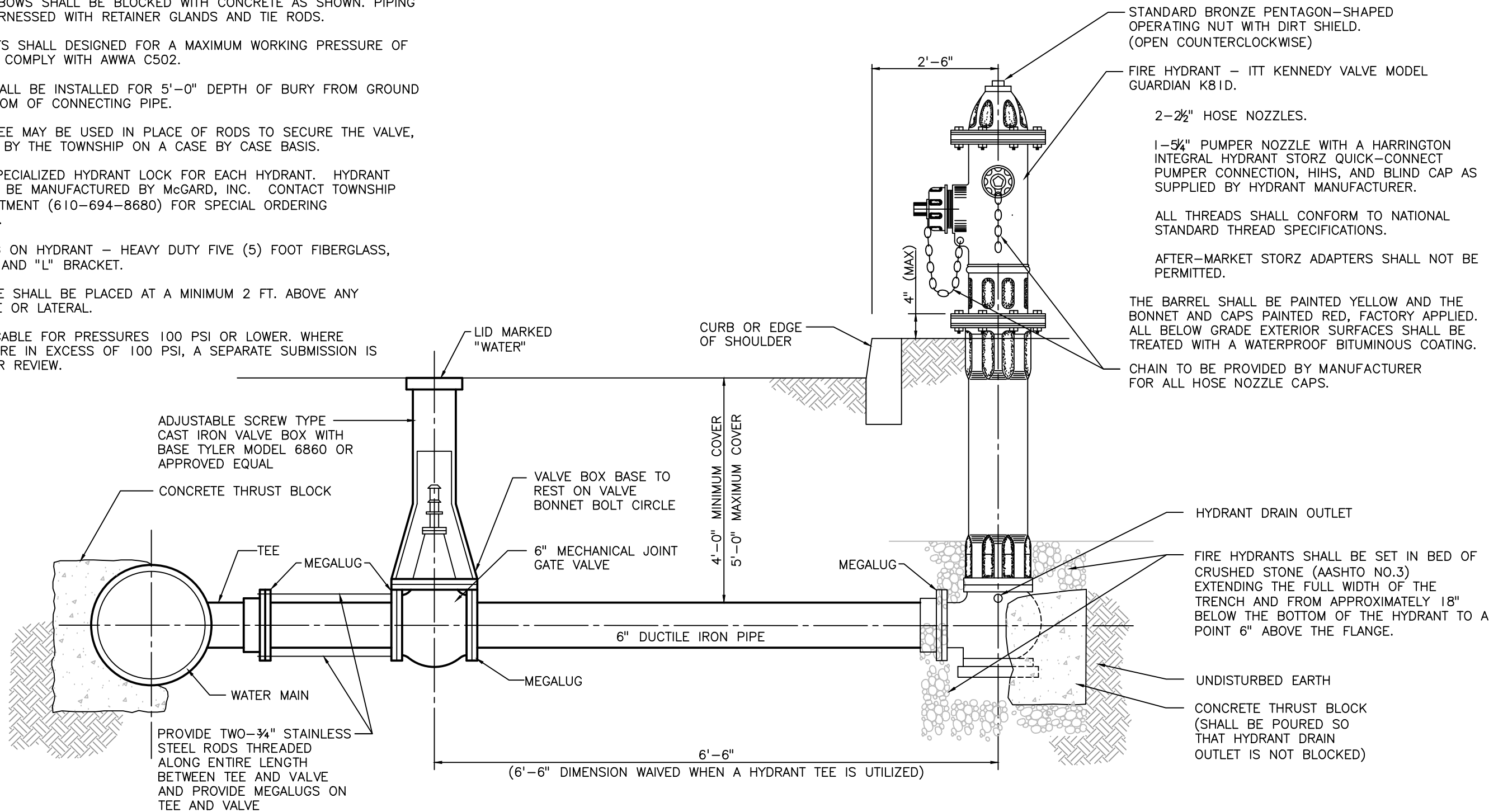
**BELGIAN BLOCK
GRANITE CURB**

NO SCALE

REVISIONS	UPPER SAUCON TOWNSHIP STANDARD CONSTRUCTION DETAILS LEHIGH COUNTY, PENNSYLVANIA	
	ROADWAY CONSTRUCTION BELGIAN BLOCK GRANITE CURB	
	THE PIDCOCK COMPANY CIVIL ENGINEERING AND LAND PLANNING ARCHITECTURE LAND SURVEYING OXFORD DRIVE AT FISH HATCHERY ROAD ALLENTOWN, PENNSYLVANIA	
	DATE: SEPTEMBER 2012 CHKD BY: RJG SCALE: NO SCALE	UST-R-7

NOTES:

- TEES AND ELBOWS SHALL BE BLOCKED WITH CONCRETE AS SHOWN. PIPING SHALL BE HARNESSSED WITH RETAINER GLANDS AND TIE RODS.
- FIRE HYDRANTS SHALL DESIGNED FOR A MAXIMUM WORKING PRESSURE OF 250 PSI AND COMPLY WITH AWWA C502.
- HYDRANTS SHALL BE INSTALLED FOR 5'-0" DEPTH OF BURY FROM GROUND LINE TO BOTTOM OF CONNECTING PIPE.
- A HYDRANT TEE MAY BE USED IN PLACE OF RODS TO SECURE THE VALVE, AS REVIEWED BY THE TOWNSHIP ON A CASE BY CASE BASIS.
- PROVIDE A SPECIALIZED HYDRANT LOCK FOR EACH HYDRANT. HYDRANT LOCKS SHALL BE MANUFACTURED BY McGARD, INC. CONTACT TOWNSHIP WATER DEPARTMENT (610-694-8680) FOR SPECIAL ORDERING INSTRUCTIONS.
- PROVIDE FLAG ON HYDRANT - HEAVY DUTY FIVE (5) FOOT FIBERGLASS, WITH SPRING AND "L" BRACKET.
- WARNING TAPE SHALL BE PLACED AT A MINIMUM 2 FT. ABOVE ANY MAINLINE PIPE OR LATERAL.
- DETAIL APPLICABLE FOR PRESSURES 100 PSI OR LOWER. WHERE PRESSURES ARE IN EXCESS OF 100 PSI, A SEPARATE SUBMISSION IS REQUIRED FOR REVIEW.



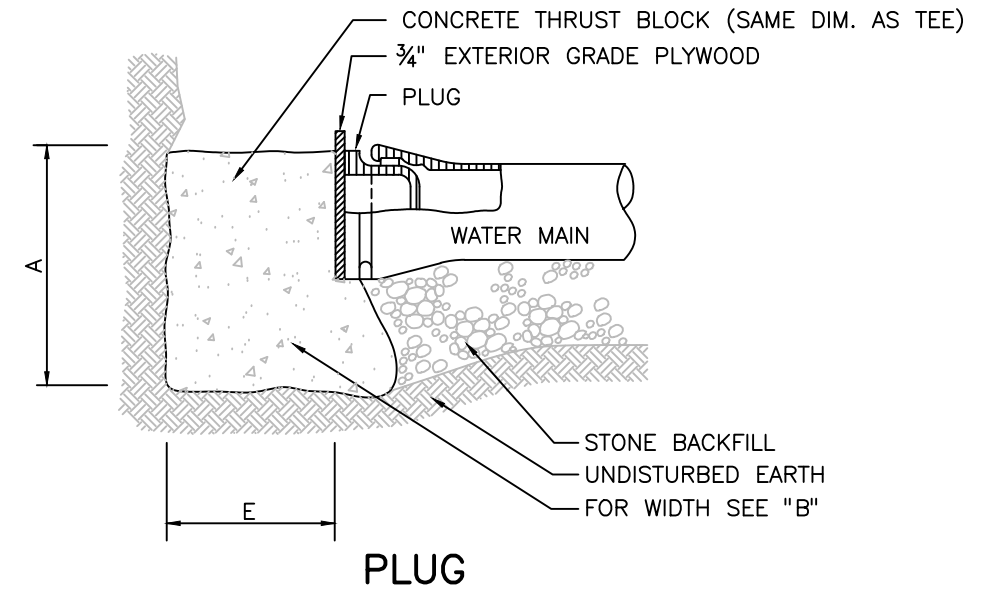
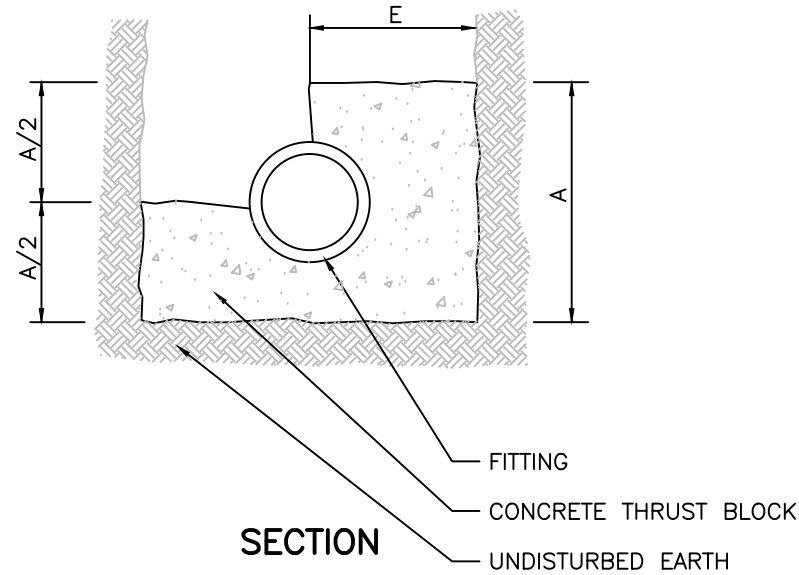
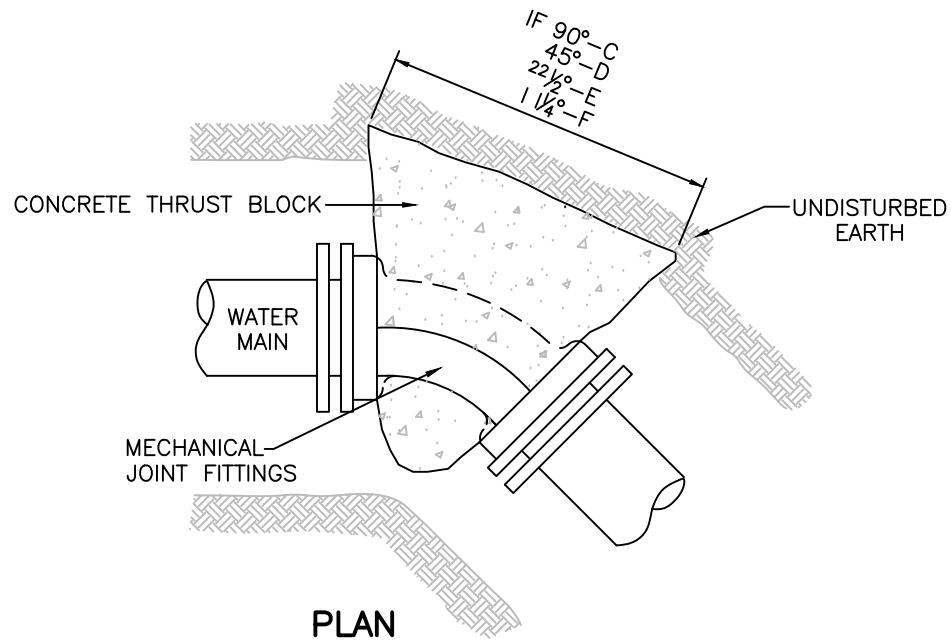
CAUTION:
 WHEN PIPING SYSTEMS ARE PRESSURE TESTED, IT IS EXTREMELY IMPORTANT AND ESSENTIAL THAT ALL PLUGS INCLUDING TEST PLUGS AND ALL PIPE JOINTS ARE INSTALLED AND RESTRAINED IN SUCH A WAY THAT BLOWOUTS ARE PREVENTED. IT MUST BE REALIZED THAT SUDDEN EXPULSION OF A POORLY INSTALLED PLUG OR SECTION OF PIPE OR OF A TEST PLUG WHICH IS PARTIALLY DEFLATED BEFORE THE PIPE PRESSURE IS RELEASED CAN BE VERY DANGEROUS. FOR THIS REASON IT IS RECOMMENDED THAT EVERY PLUG AND PIPE JOINT BE POSITIVELY BRACED OR OTHERWISE RESTRAINED DURING PRESSURE TESTING AND THAT NO ONE BE ALLOWED IN A MANHOLE ADJOINING A LINE BEING TESTED OR IN THE VICINITY OF AN EXPOSED PLUG OR PIPE SO LONG AS PRESSURE IS MAINTAINED IN THE LINE.

FIRE HYDRANT
 NO SCALE

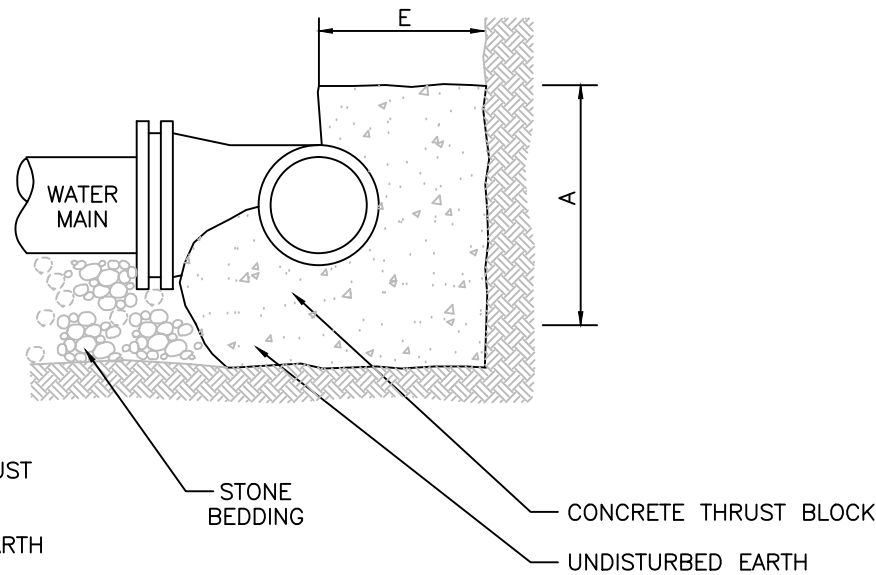
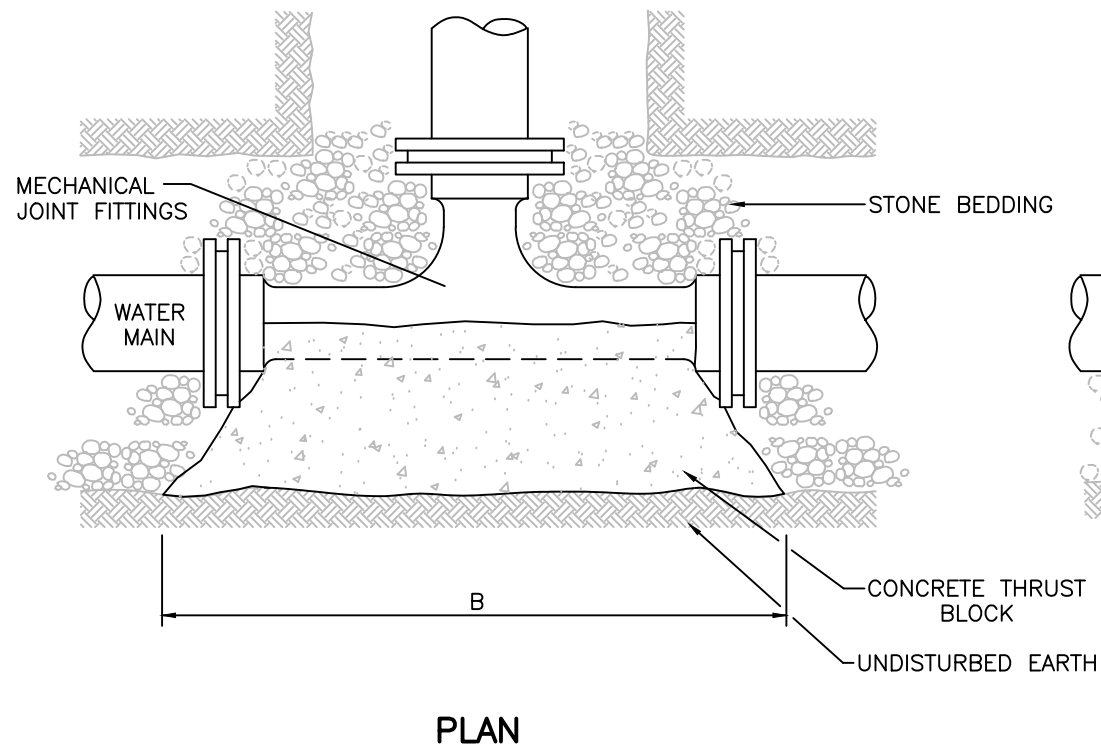
REVISIONS	UPPER SAUCON TOWNSHIP STANDARD CONSTRUCTION DETAILS LEHIGH COUNTY, PENNSYLVANIA	
	WATER DISTRIBUTION SYSTEM FIRE HYDRANT	
	THE PIDCOCK COMPANY CIVIL ENGINEERING AND LAND PLANNING ARCHITECTURE LAND SURVEYING OXFORD DRIVE AT FISH HATCHERY ROAD ALLENTOWN, PENNSYLVANIA	DATE: SEPTEMBER 2012 CHKD BY: SRH SCALE: NO SCALE

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HORIZONTAL BENDS



TEE

CAUTION:

WHEN PIPING SYSTEMS ARE PRESSURE TESTED, IT IS EXTREMELY IMPORTANT AND ESSENTIAL THAT ALL PLUGS INCLUDING TEST PLUGS AND ALL PIPE JOINTS ARE INSTALLED AND RESTRAINED IN SUCH A WAY THAT BLOWOUTS ARE PREVENTED. IT MUST BE REALIZED THAT SUDDEN EXPULSION OF A POORLY INSTALLED PLUG OR SECTION OF PIPE OR OF A TEST PLUG WHICH IS PARTIALLY DEFLATED BEFORE THE PIPE PRESSURE IS RELEASED CAN BE VERY DANGEROUS. FOR THIS REASON IT IS RECOMMENDED THAT EVERY PLUG AND PIPE JOINT BE POSITIVELY BRACED OR OTHERWISE RESTRAINED DURING PRESSURE TESTING AND THAT NO ONE BE ALLOWED IN A MANHOLE ADJOINING A LINE BEING TESTED OR IN THE VICINITY OF AN EXPOSED PLUG OR PIPE SO LONG AS PRESSURE IS MAINTAINED IN THE LINE.

HORIZONTAL THRUST BLOCKS

NO SCALE

NOTES:

1. CONCRETE THRUST BLOCKS SHALL NOT COVER MECHANICAL JOINTS, NUTS OR BOLTS.
2. PLACE BOND BREAKER BETWEEN PIPE AND CONCRETE (TYP.).
3. ALL JOINTS SHALL BE RESTRAINED WITH MEGALUGS.
4. DETAIL APPLICABLE FOR PRESSURES 100 PSI OR LOWER. WHERE PRESSURES ARE IN EXCESS OF 100 PSI, A SEPARATE SUBMISSION IS REQUIRED FOR REVIEW.

PIPE SIZE	TABLE OF REACTION BACKING MINIMUM DIMENSIONS					
	A	B	C	D	E	F
24"	4'-6"	7'-2"	8'-10"	5'-9"	3'-0"	1'-1"
20"	4'-0"	6'-8"	8'-4"	5'-3"	2'-6"	1'-5"
16"	3'-4"	5'-5"	7'-10"	4'-3"	2'-1"	1'-3"
10"-12"	2'-6"	4'-3"	6'-0"	3'-3"	1'-7"	1'-0"
8"	1'-8"	3'-0"	4'-3"	2'-4"	1'-2"	1'-0"
6"	1'-3"	2'-2"	3'-4"	1'-10"	1'-0"	1'-0"
3"	1'-0"	2'-0"	3'-0"	1'-6"	1'-0"	1'-0"

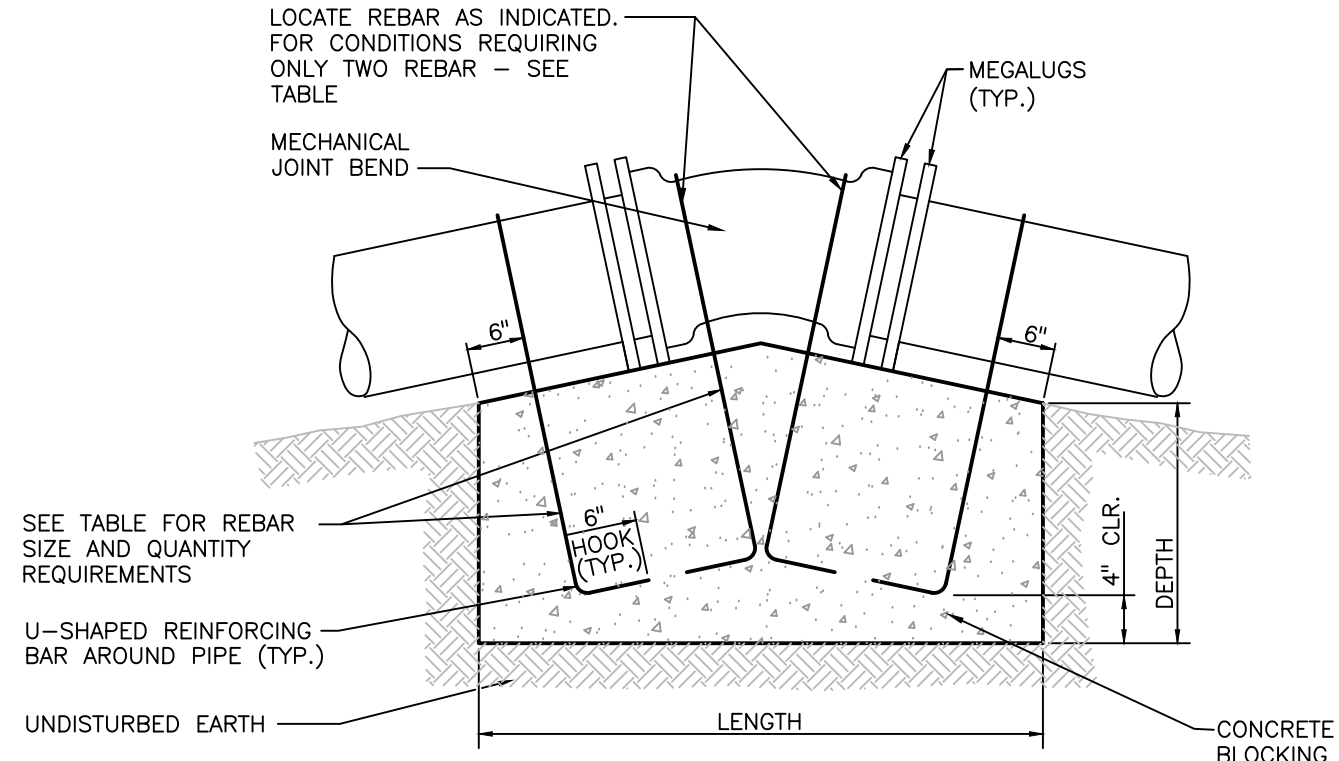
THRUST BLOCK DIMENSIONS FOR PIPE 20" AND LARGER ARE APPLICABLE ONLY TO PRESSURE BELOW 100 PSI.

DESIGN CALCULATIONS SHALL BE PROVIDED FOR ANY OTHER SIZES NOT LISTED.

DIMENSIONS IDENTIFIED ABOVE ARE MINIMUM REQUIREMENTS. THE DESIGN ENGINEER SHALL REVIEW THE ADEQUACY OF THE NOTED DIMENSIONS AND INCREASE DIMENSIONS AS NEEDED BASED ON THE SPECIFIC SITE DESIGN CONDITIONS.

REVISIONS	UPPER SAUCON TOWNSHIP	
	STANDARD CONSTRUCTION DETAILS	
	LEHIGH COUNTY, PENNSYLVANIA	
	WATER DISTRIBUTION SYSTEM	
HORIZONTAL THRUST BLOCKS		
THE PIDCOCK COMPANY		DATE: SEPTEMBER 2012
CIVIL ENGINEERING AND LAND PLANNING ARCHITECTURE LAND SURVEYING		CHKD BY: SRH
OXFORD DRIVE AT FISH HATCHERY ROAD		SCALE: NO SCALE
ALLENTOWN, PENNSYLVANIA		UST-W-2

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VERTICAL BEND DOWNWARD

TABLE OF MINIMUM DIMENSIONS FOR CONCRETE BLOCKING FOR VERTICAL BEND DOWNWARD												
PIPE SIZES	LENGTH			WIDTH			DEPTH			REBARS		
	1 1/4°	2 1/2°	45°	1 1/4°	2 1/2°	45°	1 1/4°	2 1/2°	45°	1 1/4°	2 1/2°	45°
4", 6" & 8"	3'	4'	6'	3'	3'	3'	2'	3'	4'	2-#4	2-#4	2-#5
12"	4.5'	6'	8'	3'	3'	4'	3'	4.5'	5'	2-#4	2-#6	3-#6
16"	6'	8'	11'	3.5'	3.5'	5'	3.5'	5'	5'	2-#5	4-#5	6-#6
20"	7'	9'	13'	4'	5'	5.5'	4'	5'	6'	3-#5	6-#5	6-#7

DESIGN CALCULATIONS SHALL BE PROVIDED FOR ANY OTHER SIZES NOT LISTED.

DIMENSIONS IDENTIFIED ABOVE ARE MINIMUM REQUIREMENTS. THE DESIGN ENGINEER SHALL REVIEW THE ADEQUACY OF THE NOTED DIMENSIONS AND INCREASE DIMENSIONS AS NEEDED BASED ON THE SPECIFIC SITE DESIGN CONDITIONS.

CAUTION:

WHEN PIPING SYSTEMS ARE PRESSURE TESTED, IT IS EXTREMELY IMPORTANT AND ESSENTIAL THAT ALL PLUGS INCLUDING TEST PLUGS AND ALL PIPE JOINTS ARE INSTALLED AND RESTRAINED IN SUCH A WAY THAT BLOWOUTS ARE PREVENTED. IT MUST BE REALIZED THAT SUDDEN EXPULSION OF A POORLY INSTALLED PLUG OR SECTION OF PIPE OR OF A TEST PLUG WHICH IS PARTIALLY DEFLATED BEFORE THE PIPE PRESSURE IS RELEASED CAN BE VERY DANGEROUS. FOR THIS REASON IT IS RECOMMENDED THAT EVERY PLUG AND PIPE JOINT BE POSITIVELY BRACED OR OTHERWISE RESTRAINED DURING PRESSURE TESTING AND THAT NO ONE BE ALLOWED IN A MANHOLE ADJOINING A LINE BEING TESTED OR IN THE VICINITY OF AN EXPOSED PLUG OR PIPE SO LONG AS PRESSURE IS MAINTAINED IN THE LINE.

NOTE:

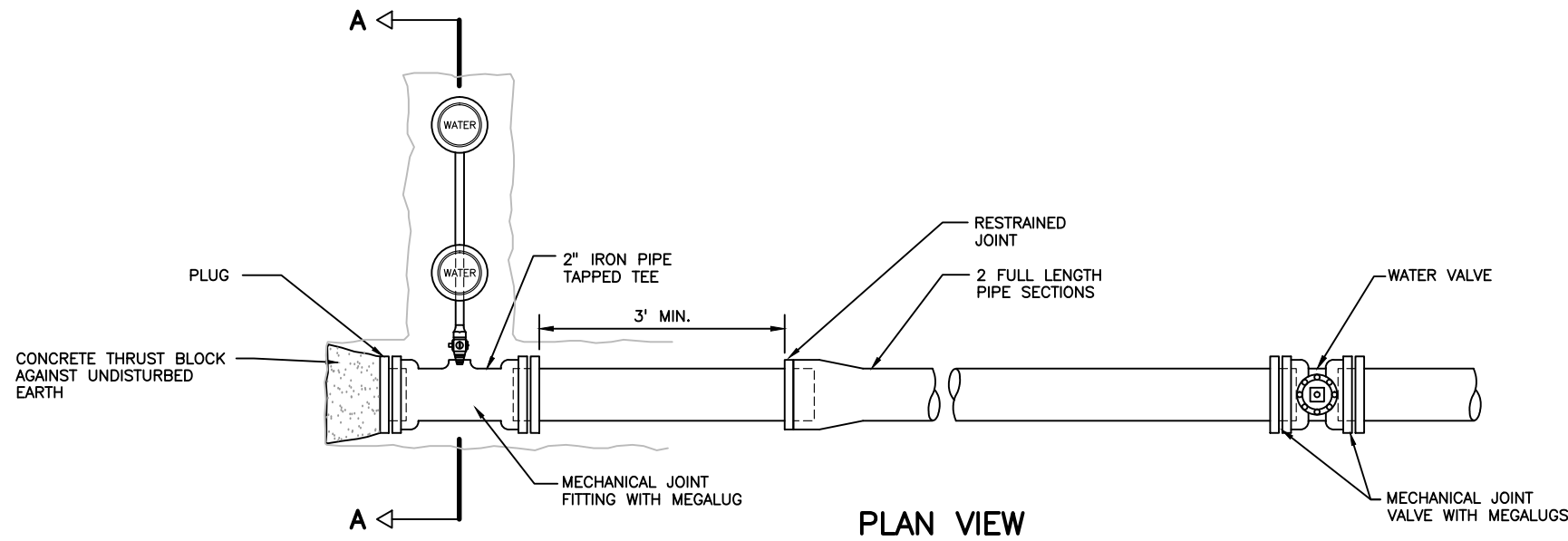
DETAIL APPLICABLE FOR PRESSURES 100 PSI OR LOWER. WHERE PRESSURES ARE IN EXCESS OF 100 PSI, A SEPARATE SUBMISSION IS REQUIRED FOR REVIEW.

VERTICAL THRUST BLOCKS

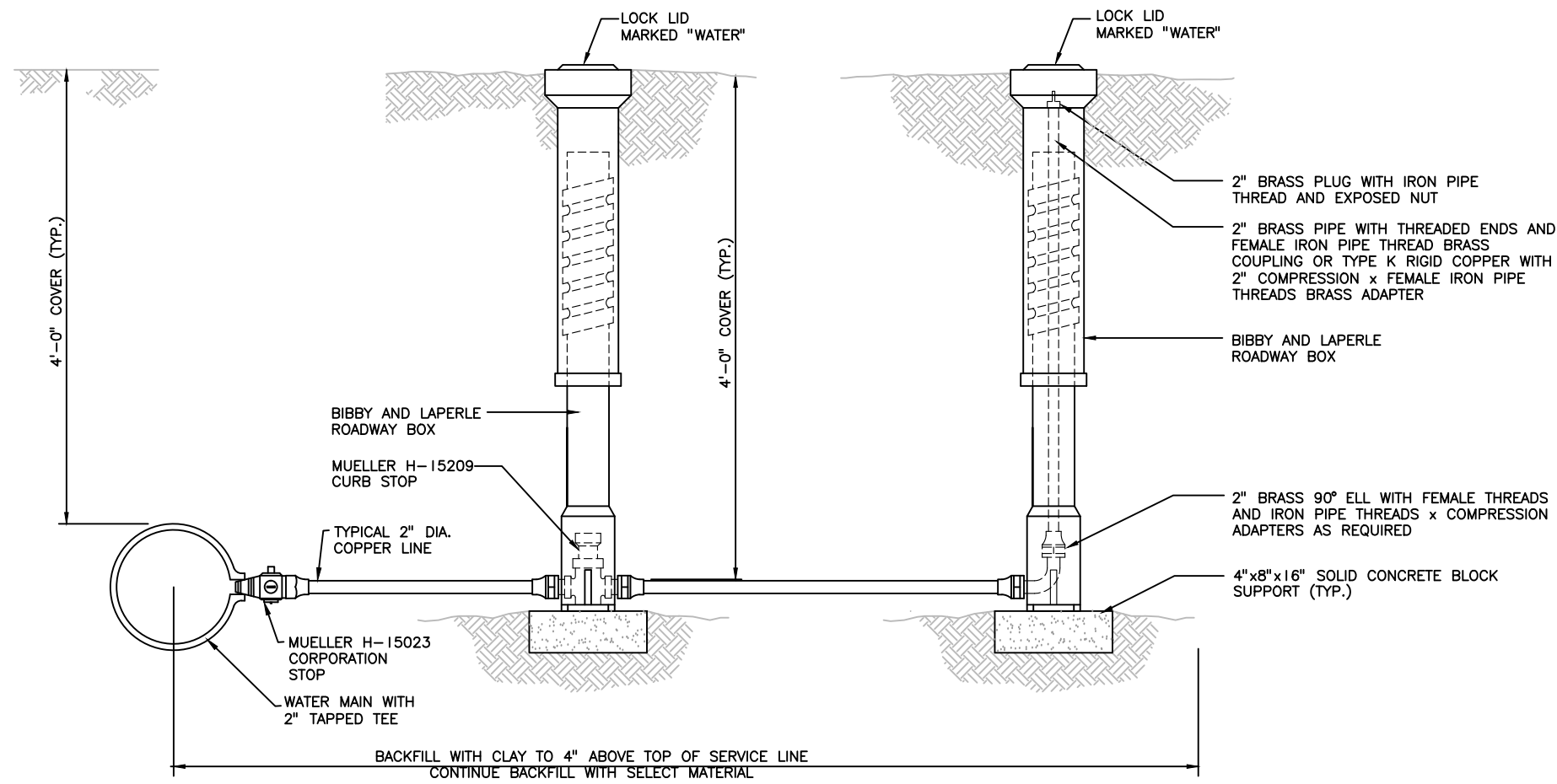
NO SCALE

REVISIONS	UPPER SAUCON TOWNSHIP STANDARD CONSTRUCTION DETAILS LEHIGH COUNTY, PENNSYLVANIA
	WATER DISTRIBUTION SYSTEM VERTICAL THRUST BLOCKS
	THE PIDCOCK COMPANY CIVIL ENGINEERING AND LAND PLANNING ARCHITECTURE LAND SURVEYING OXFORD DRIVE AT FISH HATCHERY ROAD ALLENTOWN, PENNSYLVANIA
	DATE: SEPTEMBER 2012 CHKD BY: SRH SCALE: NO SCALE
	UST-W-3

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PLAN VIEW



SECTION A-A

WATERLINE BLOW-OFF

NO SCALE

NOTES:

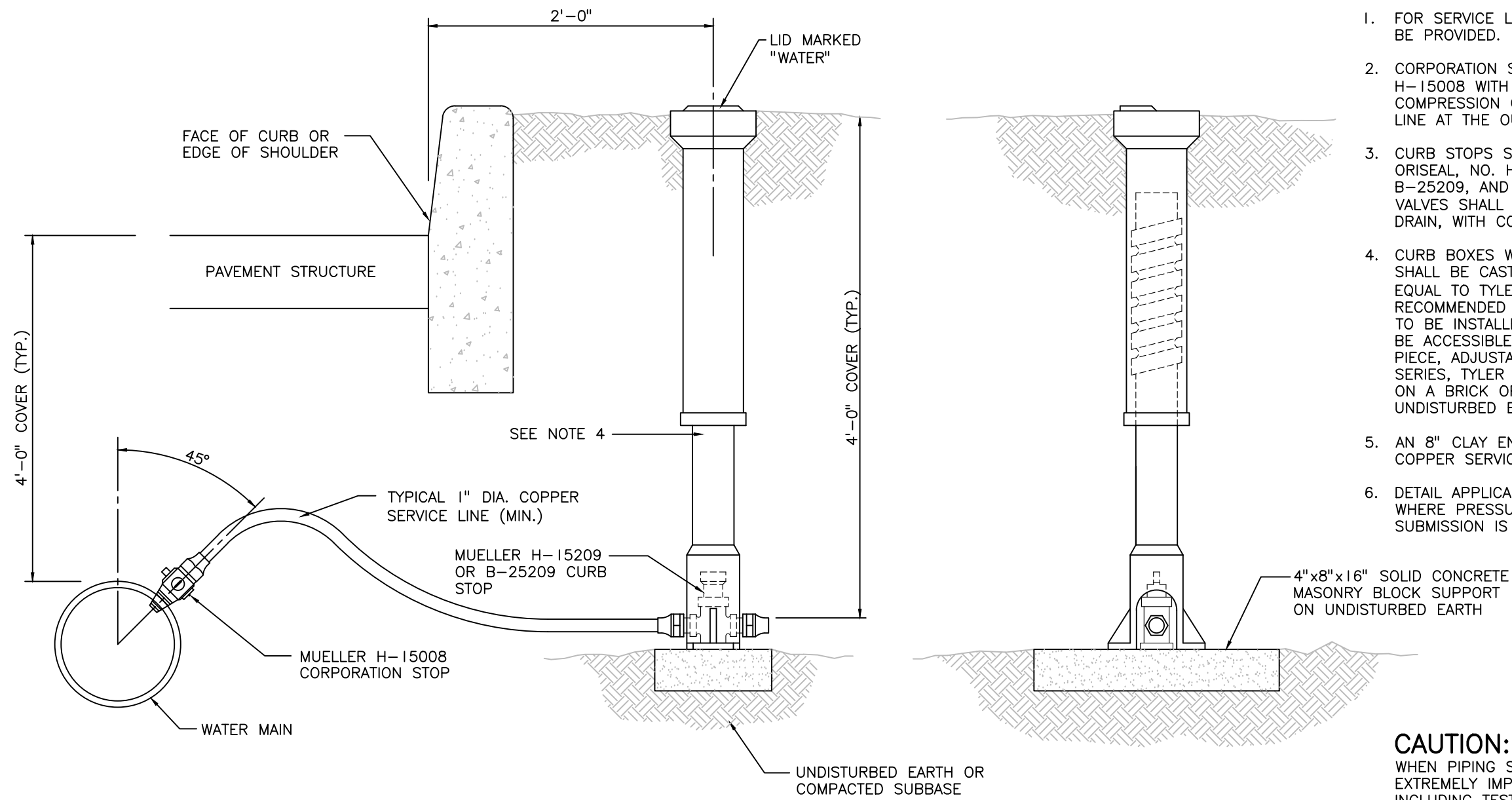
1. WHERE 2 FULL LENGTH PIPE SECTIONS CANNOT BE INSTALLED ON BLOW-OFF SIDE OF VALVE, HARNESS VALVE TO WATERLINE AND RESTRAIN JOINTS FOR 50 FEET ON SOURCE SIDE OF VALVE.
2. CORPORATION STOPS SHALL BE MUELLER H-15023, 2" DIA. WITH MALE IRON PIPE INLET CONNECTION AND COMPRESSION CONNECTION FOR THE OUTLET.
3. CURB STOPS SHALL BE MUELLER H-15209, 2" DIA. WITH COMPRESSION CONNECTIONS.
4. VALVE BOXES SHALL BE CAST IRON ADJUSTABLE SCREW TYPE BIBBY AND LAPERLE TWO-PIECE, ARCH BASE WITH 4/4" INSIDE DIA., LOCKABLE LID.
5. AN 8" CLAY ENVELOPE SHALL BE PLACED AROUND ALL COPPER LINES.
6. DETAIL APPLICABLE FOR PRESSURES 100 PSI OR LOWER. WHERE PRESSURES ARE IN EXCESS OF 100 PSI, A SEPARATE SUBMISSION IS REQUIRED FOR REVIEW.

CAUTION:

WHEN PIPING SYSTEMS ARE PRESSURE TESTED, IT IS EXTREMELY IMPORTANT AND ESSENTIAL THAT ALL PLUGS INCLUDING TEST PLUGS AND ALL PIPE JOINTS ARE INSTALLED AND RESTRAINED IN SUCH A WAY THAT BLOWOUTS ARE PREVENTED. IT MUST BE REALIZED THAT SUDDEN EXPULSION OF A POORLY INSTALLED PLUG OR SECTION OF PIPE OR OF A TEST PLUG WHICH IS PARTIALLY DEFLATED BEFORE THE PIPE PRESSURE IS RELEASED CAN BE VERY DANGEROUS. FOR THIS REASON IT IS RECOMMENDED THAT EVERY PLUG AND PIPE JOINT BE POSITIVELY BRACED OR OTHERWISE RESTRAINED DURING PRESSURE TESTING AND THAT NO ONE BE ALLOWED IN A MANHOLE ADJOINING A LINE BEING TESTED OR IN THE VICINITY OF AN EXPOSED PLUG OR PIPE SO LONG AS PRESSURE IS MAINTAINED IN THE LINE.

REVISIONS	UPPER SAUCON TOWNSHIP STANDARD CONSTRUCTION DETAILS LEHIGH COUNTY, PENNSYLVANIA	
	WATER DISTRIBUTION SYSTEM WATERLINE BLOW-OFF	
	THE PIDCOCK COMPANY <small>CIVIL ENGINEERING AND LAND PLANNING ARCHITECTURE LAND SURVEYING</small> <small>OXFORD DRIVE AT FISH HATCHERY ROAD ALLENTOWN, PENNSYLVANIA</small>	
	DATE: SEPTEMBER 2012 CHKD BY: SRH SCALE: NO SCALE	UST-W-4

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SIDE VIEW

FRONT VIEW

SERVICE CONNECTION

NO SCALE

NOTES:

1. FOR SERVICE LINES LARGER THAN 1" A TAPPED TEE SHALL BE PROVIDED.
2. CORPORATION STOPS SHALL BE EQUAL TO MUELLER NO. H-15008 WITH MUELLER "CC" THREAD ON THE INLET AND COMPRESSION COUPLING FOR CONNECTION TO THE SERVICE LINE AT THE OUTLET END.
3. CURB STOPS SHALL BE EQUAL TO MUELLER MARK II, ORISEAL, NO. H-15209 OR 300 BALL CURB VALVE, NO. B-25209, AND SHALL HAVE COMPRESSION COUPLINGS. VALVES SHALL BE QUARTER-TURN "CHECK" VALVE WITHOUT DRAIN, WITH COMPRESSION CONNECTION ON BOTH ENDS.
4. CURB BOXES WHICH ARE TO BE INSTALLED BEHIND CURBS SHALL BE CAST IRON, TWO-PIECE, ADJUSTABLE SCREW TYPE EQUAL TO TYLER 6500 SERIES (ITEM 93-E) WITH BASE AS RECOMMENDED BY MANUFACTURER. CURB BOXES WHICH ARE TO BE INSTALLED IN PAVED AND UNPAVED AREAS WHICH WILL BE ACCESSIBLE TO TRAFFIC SHALL BE CAST-IRON, TWO PIECE, ADJUSTABLE SCREW TYPE EQUAL TO TYLER 6870 SERIES, TYLER PIPE, TYLER, TX. CURB BOXES SHALL BE SET ON A BRICK OR MASONRY BLOCK FOUNDATION LAID ON UNDISTURBED EARTH OR COMPACTED SUBBASE.
5. AN 8" CLAY ENVELOPE SHALL BE PLACED AROUND ALL COPPER SERVICE LATERALS.
6. DETAIL APPLICABLE FOR PRESSURES 100 PSI OR LOWER. WHERE PRESSURES ARE IN EXCESS OF 100 PSI, A SEPARATE SUBMISSION IS REQUIRED FOR REVIEW.

CAUTION:

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REVISIONS	UPPER SAUCON TOWNSHIP STANDARD CONSTRUCTION DETAILS LEHIGH COUNTY, PENNSYLVANIA	
	WATER DISTRIBUTION SYSTEM SERVICE CONNECTION	
	THE PIDCOCK COMPANY <small>CIVIL ENGINEERING AND LAND PLANNING ARCHITECTURE LAND SURVEYING</small> <small>OXFORD DRIVE AT FISH HATCHERY ROAD ALLENTOWN, PENNSYLVANIA</small>	
	DATE: SEPTEMBER 2012 CHKD BY: SRH SCALE: NO SCALE	UST-W-5

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NOTES:

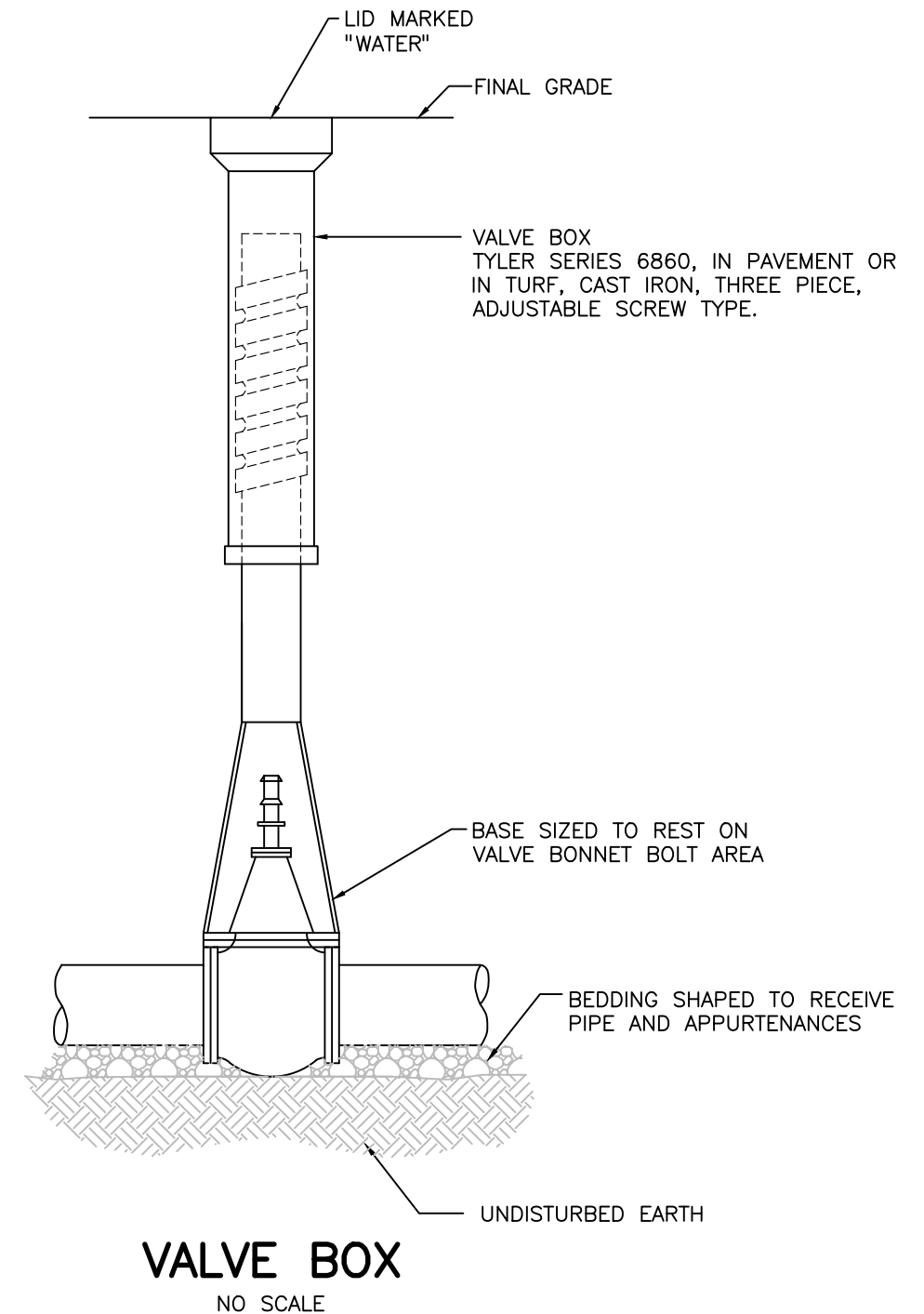
1. GATE VALVES SHALL BE IRON BODY, BRONZE MOUNTED VALVES, WITH MECHANICAL JOINT ENDS, NON-RISING STEM. VALVES SHALL OPEN IN A COUNTER-CLOCKWISE DIRECTION AND SHALL BE 250 PSI WORKING PRESSURE. ALL INTERNAL CAST IRON SURFACES SHALL RECEIVE A FACTORY APPLIED, CORROSION RESISTANT COATING. ALL GATE VALVES SHALL CONFORM TO AWWA SPECIFICATION C509 OR C515 AND SHALL BE KENNEDY VALVE MODEL KENSEAL II OR MUELLER A-2360 RESILIENT-SEATED GATE VALVE.
2. WHEN PERMITTED BY THE ENGINEER, A DEEP VALVE, WHICH WOULD NOT PERMIT THE USE OF THE 6860 SERIES VALVE BOXES, SHALL HAVE A PERMANENT EXTENSION ATTACHED. THE EXTENSION SHALL BE REVIEWED BY THE ENGINEER AND ENABLE THE OPERATION OF THE DEEP VALVE BY USING A STANDARD SIX-FOOT VALVE KEY.
3. BOXES SHALL BE SET TO ALLOW EQUAL MOVEMENT ABOVE AND BELOW FINAL GRADE.
4. TAPPING SLEEVES AND VALVES:

TAPPING SLEEVES SHALL BE FABRICATED OF DUCTILE IRON AND SHALL HAVE A MECHANICAL JOINT BODY, A FLANGED OUTLET END AND A 3/4 INCH NPT TEST PLUG. TAPPING SLEEVES SHALL BE MUELLER CO. MODELS H-615 THROUGH H-619, AS APPROPRIATE, BASED UPON THE SIZE AND TYPE OF THE EXISTING MAIN, OR EQUAL. THE SLEEVE SHALL HAVE A 3/8 INCH TAP TO PERMIT PRESSURE TESTING OF THE ASSEMBLY AT 100 PSI (MINIMUM) FOR 15 MINUTES WITHOUT LEAKAGE, BEFORE TAPPING THE MAIN.

TAPPING VALVES SHALL BE RESILIENT-WEDGE GATE VALVES AND SHALL HAVE A FLANGED INLET AND A SPECIALIZED MECHANICAL JOINT OUTLET TO PERMIT CONNECTION TO DRILLING EQUIPMENT.
5. DETAIL APPLICABLE FOR PRESSURES 100 PSI OR LOWER. WHERE PRESSURES ARE IN EXCESS OF 100 PSI, A SEPARATE SUBMISSION IS REQUIRED FOR REVIEW.

CAUTION:

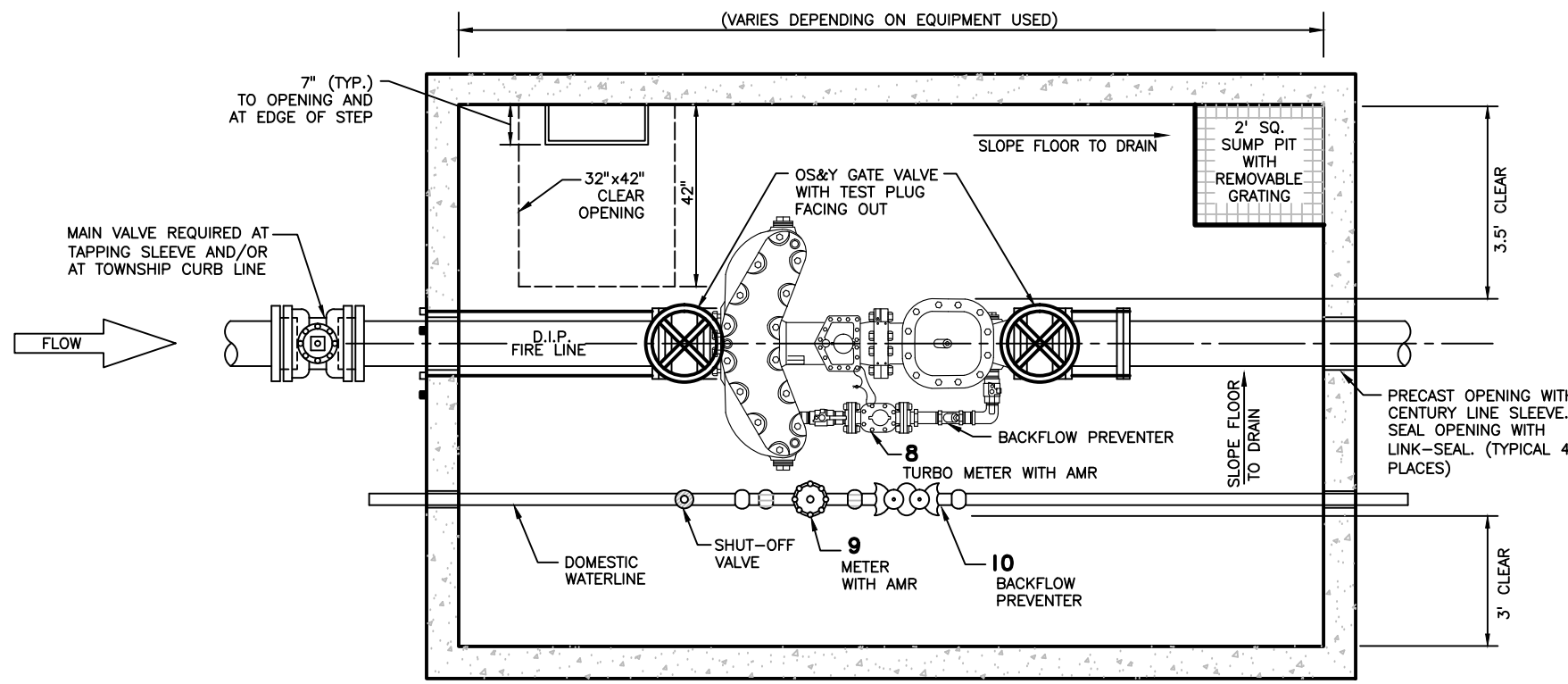
WHEN PIPING SYSTEMS ARE PRESSURE TESTED, IT IS EXTREMELY IMPORTANT AND ESSENTIAL THAT ALL PLUGS INCLUDING TEST PLUGS AND ALL PIPE JOINTS ARE INSTALLED AND RESTRAINED IN SUCH A WAY THAT BLOWOUTS ARE PREVENTED. IT MUST BE REALIZED THAT SUDDEN EXPULSION OF A POORLY INSTALLED PLUG OR SECTION OF PIPE OR OF A TEST PLUG WHICH IS PARTIALLY DEFLATED BEFORE THE PIPE PRESSURE IS RELEASED CAN BE VERY DANGEROUS. FOR THIS REASON IT IS RECOMMENDED THAT EVERY PLUG AND PIPE JOINT BE POSITIVELY BRACED OR OTHERWISE RESTRAINED DURING PRESSURE TESTING AND THAT NO ONE BE ALLOWED IN A MANHOLE ADJOINING A LINE BEING TESTED OR IN THE VICINITY OF AN EXPOSED PLUG OR PIPE SO LONG AS PRESSURE IS MAINTAINED IN THE LINE.



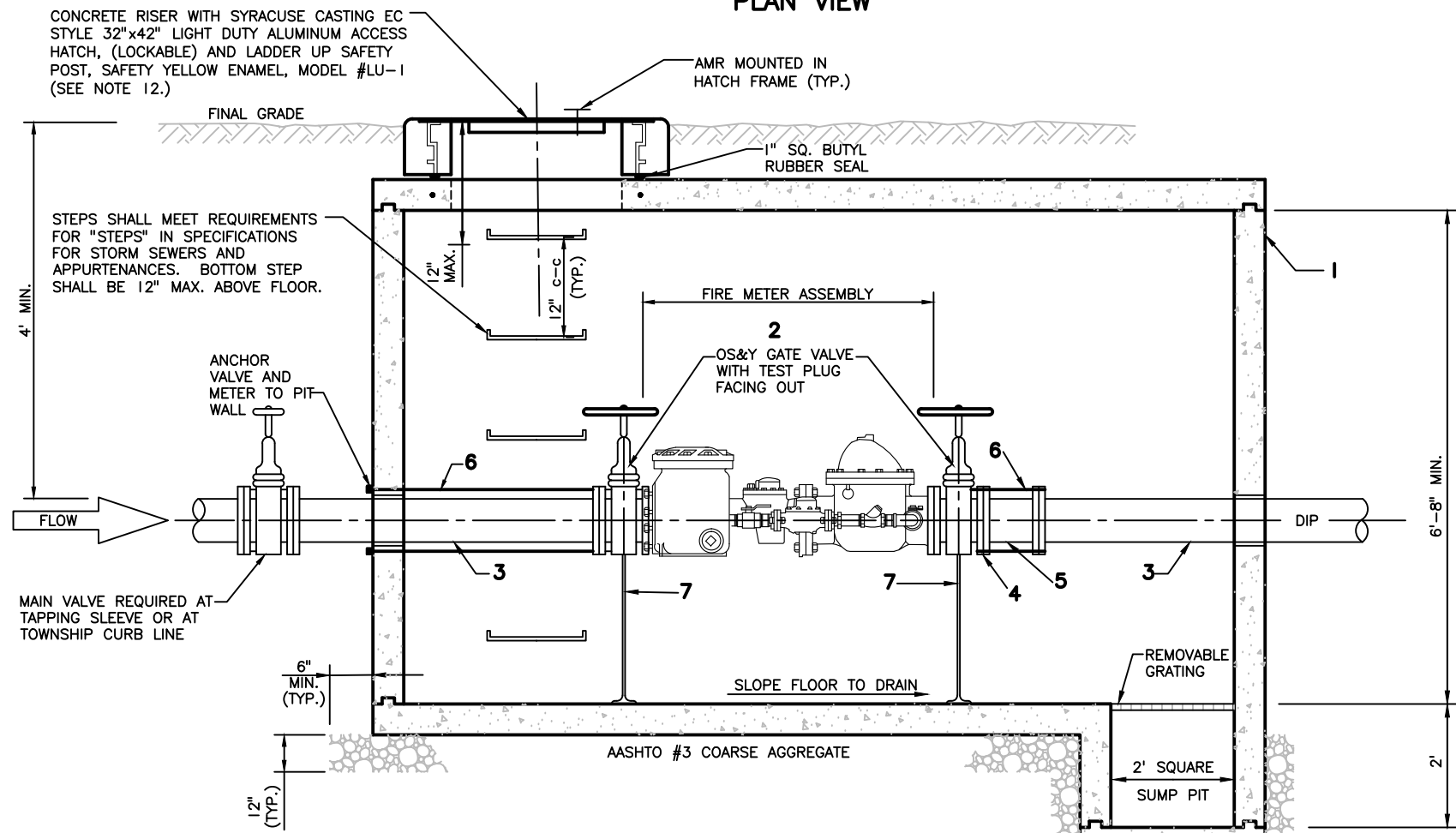
VALVE BOX
NO SCALE

REVISIONS	UPPER SAUCON TOWNSHIP STANDARD CONSTRUCTION DETAILS LEHIGH COUNTY, PENNSYLVANIA	
	WATER DISTRIBUTION SYSTEM VALVE AND VALVE BOX	
	THE PIDCOCK COMPANY CIVIL ENGINEERING AND LAND PLANNING ARCHITECTURE LAND SURVEYING OXFORD DRIVE AT FISH HATCHERY ROAD ALLENTOWN, PENNSYLVANIA	
	DATE: SEPTEMBER 2012 CHKD BY: SRH SCALE: NO SCALE	UST-W-6

Drawing name: S:\MUNICIPAL STANDARD CONSTRUCTION DOCUMENTS\UPPER SAUCON TOWNSHIP\UST-WORKING DOCUMENTS\UST-2009 DETAILS\UST-W-07.dwg Last Modified: Sep 21, 2012 8:52am



PLAN VIEW



SECTION

WATER METER/FIRE METER ASSEMBLY AND PIT
NO SCALE

GENERAL NOTES

- PIT AND LID SHALL BE DESIGNED TO WITHSTAND HS-25 LOADING. SUBMIT SHOP DRAWINGS TO ENGINEER PRIOR TO STARTING CONSTRUCTION. MANUFACTURERS OF THE PIT AND LID SHALL HAVE A PROFESSIONAL ENGINEER LICENSED IN THE COMMONWEALTH OF PENNSYLVANIA CERTIFY THAT THE PIT AND LID CAN SUPPORT AN HS-25 LOADING AND THAT THE PIT DESIGN CONFORMS TO ALL APPLICABLE FEDERAL, STATE AND LOCAL STANDARDS, INCLUDING OSHA, LABOR & INDUSTRY, ETC. THE INFORMATION CONTAINED HEREIN IS PROVIDED AS GENERAL GUIDELINES. THE DESIGN ENGINEER SHALL BE RESPONSIBLE FOR FINAL DESIGN CONFORMANCE WITH ALL APPLICABLE REQUIREMENTS, INCLUDING BUT NOT LIMITED TO OSHA, ETC.
- CONCRETE:
FC= 4000 PSI @ 28 DAYS, ENTRAINED AIR=6% ± 1- ½% ACI TYPE 3 CEMENT WITH ASTM C-33 #67 COARSE AGGREGATE.
- REINFORCEMENT:
DEFORMED STEEL TO CONFORM TO ASTM A615 GRADE 60; WELDED WIRE FABRIC TO CONFORM TO ASTM A185.
- FLEXIBLE JOINT MATERIAL TO CONFORM TO FEDERAL SPECIFICATIONS SS-S-210.
- PIT EXTERIOR SHALL RECEIVE TWO COATS OF PROPOXY 3009 COAL TAR EPOXY COATING.
- CONCRETE PIERS SUPPORTING PIPING SHALL NOT ENCASE THE PIPING OR FLANGES.
- ALL PIPING SHALL BE SET LEVEL IN A HORIZONTAL PLANE.
- ALL METERS WITHIN THE PIT REQUIRE WATERTIGHT RADIOREAD AUTOMATIC METER READER (AMR) MODEL 520R PIT SET UNIT AND AMR MOUNTED ON CASTING HATCH, AS MANUFACTURED BY SENSUS. ALL WIRE SHALL BE IN CONDUIT.
- IF STEEL PIPE SUPPORTS ARE USED, THEY SHALL BE BOLTED TO THE PIT FLOOR.
- THE SUMP PIT SHALL BE WATERTIGHT.
- A POST INDICATOR VALVE IS REQUIRED ON AN EXTERIOR BYPASS LINE, WHICH WILL REQUIRE SEPARATE APPROVAL.
- ALL EQUIPMENT AND DEVICES ON THE FIRE LINE SHALL BE LISTED FOR FIRE PROTECTION BY AN ORGANIZATION ACCEPTABLE TO THE TOWNSHIP.
- METER SIZE BASED ON MAXIMUM FIXTURE LOAD FLOW @ 100% ACCURACY. MINIMUM FLOW OF ½-¾ GPM @ 95% ACCURACY (DEPENDING ON METER SIZE AND AS SPECIFIED BY MANUFACTURER).
- PROVIDE SYRACUSE CASTING EC-HD STYLE HEAVY DUTY ALUMINUM HATCH (LOCKABLE) FOR HS-25 LOADING IF HATCH WILL BE INSTALLED WITHIN A VEHICLE PARKING LOT AREA.

PROVIDE A HEAVY DUTY MANHOLE FRAME AND COVER WITH GASKET SEAL, EAST JORDAN IRON WORKS CATALOG NUMBER 1161, WITH WORDS "PRIVATE WATER" CAST INTO LID, IF POSITIONING THE ACCESS OPENING WITHIN A VEHICULAR DRIVE, ACCESS LANE OR ROADWAY IS UNAVOIDABLE.
- DETAIL APPLICABLE FOR PRESSURES 100 PSI OR LOWER. WHERE PRESSURES ARE IN EXCESS OF 100 PSI, A SEPARATE SUBMISSION IS REQUIRED FOR REVIEW.

CAUTION:

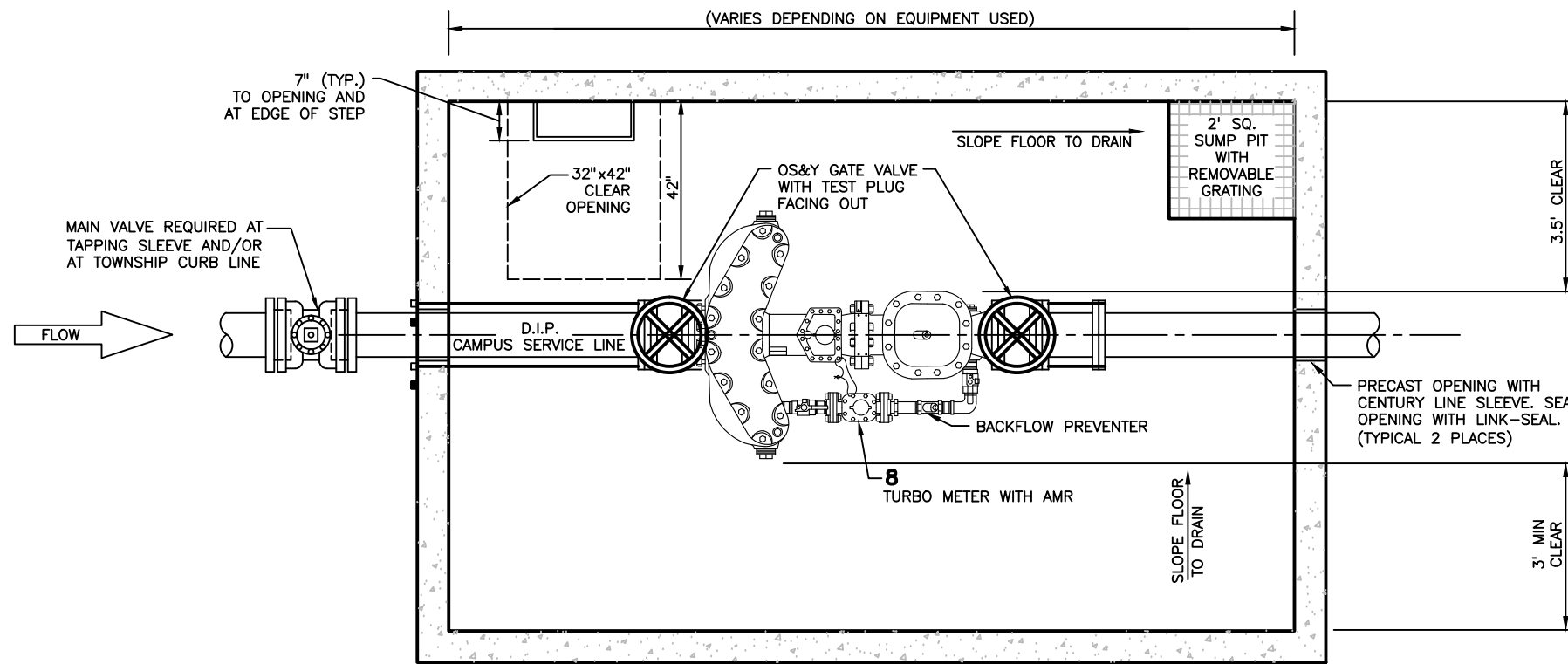
WHEN PIPING SYSTEMS ARE PRESSURE TESTED, IT IS EXTREMELY IMPORTANT AND ESSENTIAL THAT ALL PLUGS INCLUDING TEST PLUGS AND ALL PIPE JOINTS ARE INSTALLED AND RESTRAINED IN SUCH A WAY THAT BLOWOUTS ARE PREVENTED. IT MUST BE REALIZED THAT SUDDEN EXPULSION OF A POORLY INSTALLED PLUG OR SECTION OF PIPE OR OF A TEST PLUG WHICH IS PARTIALLY DEFLATED BEFORE THE PIPE PRESSURE IS RELEASED CAN BE VERY DANGEROUS. FOR THIS REASON IT IS RECOMMENDED THAT EVERY PLUG AND PIPE JOINT BE POSITIVELY BRACED OR OTHERWISE RESTRAINED DURING PRESSURE TESTING AND THAT NO ONE BE ALLOWED IN A MANHOLE ADJOINING A LINE BEING TESTED OR IN THE VICINITY OF AN EXPOSED PLUG OR PIPE SO LONG AS PRESSURE IS MAINTAINED IN THE LINE.

ITEM DESCRIPTION

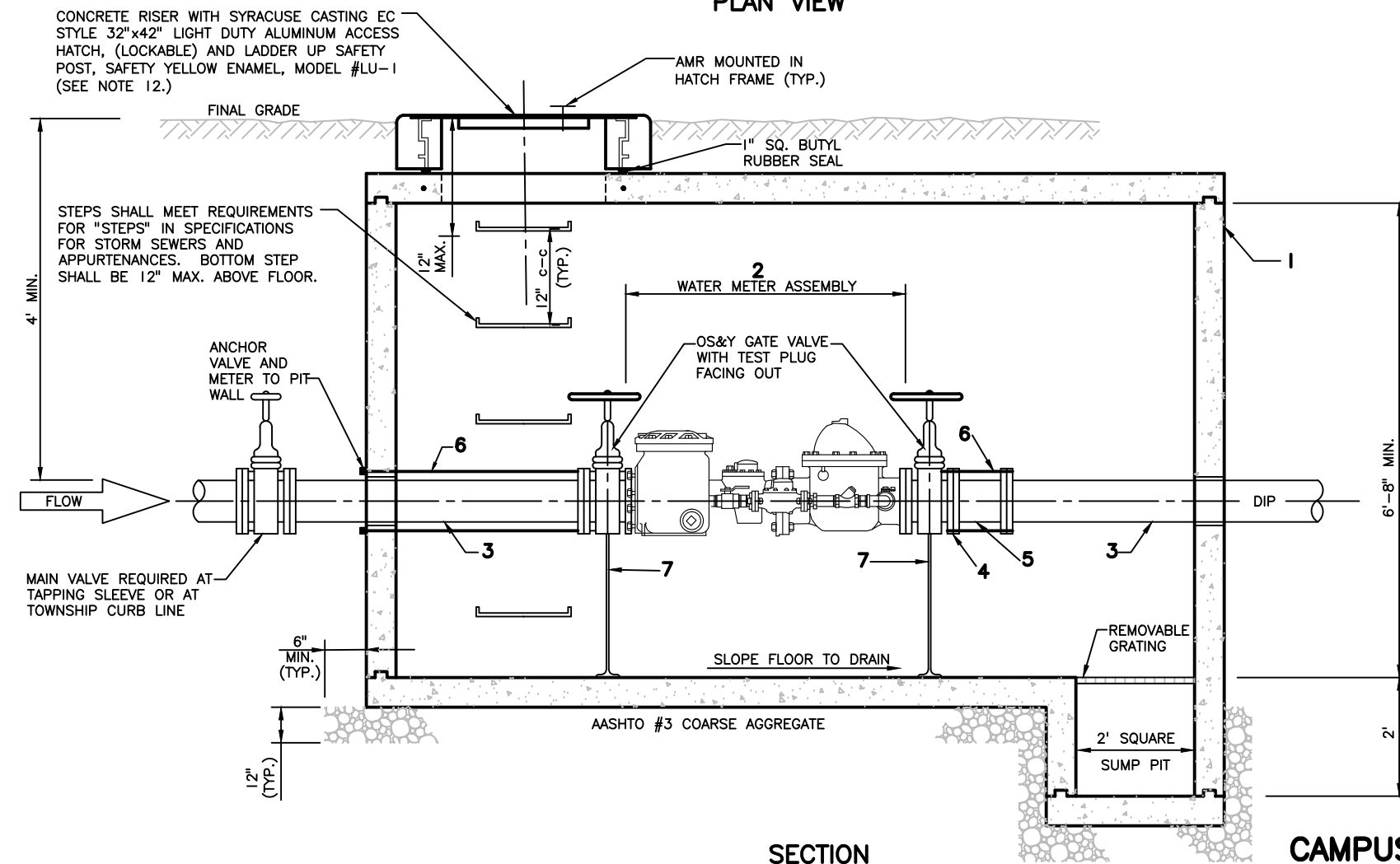
- REINFORCED CONCRETE PIT AND LID - (SEE NOTES)
- FIRELINE METER SHALL BE SENSUS WITH ECR ENCODER REGISTER UNIT IN U.S. GALLONS.
- DIP SPOOL PIECE, PE (OUTSIDE END), FLANGE (INSIDE END)
- FLANGED COUPLING ADAPTER FORD (FFCA-XXX STYLE), SMITH BLAIR 912, OR APPROVED EQUAL
- DIP SPOOL PIECE, PLAIN END (TOWARD ASSEMBLY), FLANGE END (TOWARD WALL)
- ¾" DIA. ALL THREAD TIE RODS (4)
- 2" STEEL PIPE STAND OR FORMED CONCRETE SUPPORTS
- BY-PASS METER SHALL BE SENSUS WITH ECR ENCODER REGISTER IN U.S. GALLONS.
- DOMESTIC METER SHALL BE SENSUS SERIES SRH COMPOUND METER WITH ECR ENCODER REGISTER UNIT IN U.S. GALLONS.
- WATTS SERIES 007 DCDA (2-3 IN.)

REVISIONS	UPPER SAUCON TOWNSHIP	
	STANDARD CONSTRUCTION DETAILS	
	LEHIGH COUNTY, PENNSYLVANIA	
WATER DISTRIBUTION SYSTEM		
WATER METER/FIRE METER ASSEMBLY AND PIT		
THE PIDCOCK COMPANY		DATE: SEPTEMBER 2012
CIVIL ENGINEERING AND LAND PLANNING ARCHITECTURE LAND SURVEYING		CHKD BY: SRH
OXFORD DRIVE AT FISH HATCHERY ROAD		SCALE: NO SCALE
ALLENTOWN, PENNSYLVANIA		UST-W-7

Drawing name: S:\MUNICIPAL STANDARD CONSTRUCTION DOCUMENTS\UPPER SAUCON TOWNSHIP\UST-WORKING DOCUMENTS\UST-2009 DETAILS\UST-W-08.dwg Last Modified: Sep 21, 2012 - 8:52am



PLAN VIEW



SECTION

CAMPUS WATER METER AND PIT DETAIL
NO SCALE

GENERAL NOTES

- PIT AND LID SHALL BE DESIGNED TO WITHSTAND HS-25 LOADING. SUBMIT SHOP DRAWINGS TO ENGINEER PRIOR TO STARTING CONSTRUCTION. MANUFACTURERS OF THE PIT AND LID SHALL HAVE A PROFESSIONAL ENGINEER LICENSED IN THE COMMONWEALTH OF PENNSYLVANIA CERTIFY THAT THE PIT AND LID CAN SUPPORT AN HS-25 LOADING AND THAT THE PIT DESIGN CONFORMS TO ALL APPLICABLE FEDERAL, STATE AND LOCAL STANDARDS, INCLUDING OSHA, LABOR & INDUSTRY, ETC. THE INFORMATION CONTAINED HEREIN IS PROVIDED AS GENERAL GUIDELINES. THE DESIGN ENGINEER SHALL BE RESPONSIBLE FOR FINAL DESIGN CONFORMANCE WITH ALL APPLICABLE REQUIREMENTS, INCLUDING BUT NOT LIMITED TO OSHA, ETC.

CONCRETE:
FC= 4000 PSI @ 28 DAYS, ENTRAINED AIR=6% ± 1- 1/2% ACI TYPE 3 CEMENT WITH ASTM C-33 #67 COARSE AGGREGATE.

REINFORCEMENT:
DEFORMED STEEL TO CONFORM TO ASTM A615 GRADE 60; WELDED WIRE FABRIC TO CONFORM TO ASTM A185.
- FLEXIBLE JOINT MATERIAL SHALL CONFORM TO FEDERAL SPECIFICATIONS SS-S-210.
- PIT EXTERIOR SHALL RECEIVE TWO COATS OF PROPOXY 3009 COAL TAR EPOXY COATING.
- CONCRETE PIERS SUPPORTING PIPING SHALL NOT ENCASE THE PIPING OR FLANGES.
- ALL PIPING SHALL BE SET LEVEL IN A HORIZONTAL PLANE.
- ALL METERS WITHIN THE PIT REQUIRE WATERTIGHT RADIOREAD AUTOMATIC METER READER (AMR) MODEL 520R PIT SET UNIT AND AMR MOUNTED ON CASTING HATCH, AS MANUFACTURED BY SENSUS. ALL WIRE SHALL BE IN CONDUIT.
- IF STEEL PIPE SUPPORTS ARE USED, THEY SHALL BE BOLTED TO THE PIT FLOOR.
- THE SUMP PIT SHALL BE WATERTIGHT.
- A POST INDICATOR VALVE IS REQUIRED ON AN EXTERIOR BYPASS LINE, WHICH WILL REQUIRE SEPARATE APPROVAL.
- VALVES MAY BE DIRECTLY BOLTED TO THE METER IF APPROVED BY THE MANUFACTURER.
- METER SIZE BASED ON MAXIMUM FIXTURE LOAD FLOW @ 100 % ACCURACY. MINIMUM FLOW OF 3/8-1 GPM @ 95% ACCURACY (DEPENDING ON METER SIZE AND AS SPECIFIED BY MANUFACTURER)
- PROVIDE SYRACUSE CASTING EC-HD STYLE HEAVY DUTY ALUMINUM HATCH (LOCKABLE) FOR HS-25 LOADING IF HATCH WILL BE INSTALLED WITHIN A VEHICLE PARKING LOT AREA.

PROVIDE A HEAVY DUTY MANHOLE FRAME AND COVER WITH GASKET SEAL, EAST JORDAN IRON WORKS CATALOG NUMBER 1161, WITH WORDS "PRIVATE WATER" CAST INTO LID, IF POSITIONING THE ACCESS OPENING WITHIN A VEHICULAR DRIVE, ACCESS LANE OR ROADWAY IS UNAVOIDABLE.
- DETAIL APPLICABLE FOR PRESSURES 100 PSI OR LOWER. WHERE PRESSURES ARE IN EXCESS OF 100 PSI, A SEPARATE SUBMISSION IS REQUIRED FOR REVIEW.

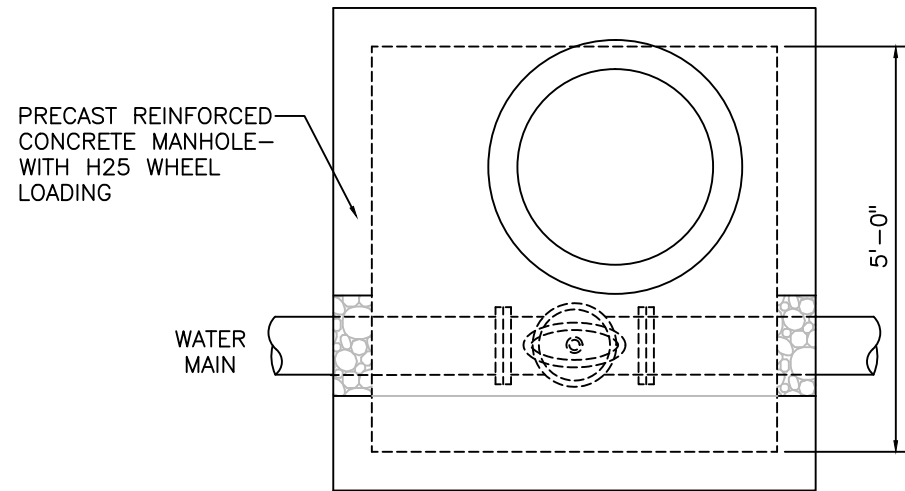
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ITEM	DESCRIPTION
1	REINFORCED CONCRETE PIT AND LID - (SEE NOTES)
2	SENSUS FIRELINE METER WITH ECR ENCODER REGISTER IN US GALLONS.
3	DIP SPOOL PIECE, PE (OUTSIDE END), FLANGE (INSIDE END)
4	FLANGED COUPLING ADAPTER FORD (FFCA-XXX STYLE), SMITH BLAIR 912, OR APPROVED EQUAL
5	DIP SPOOL PIECE, PLAIN END (TOWARD ASSEMBLY), FLANGE END (TOWARD WALL)
6	3/4" DIA. ALL THREAD TIE RODS (4)
7	2" STEEL PIPE STAND OR FORMED CONCRETE SUPPORTS
8	BY-PASS METER SHALL BE SENSUS WITH ECR ENCODER REGISTER IN U.S. GALLONS.

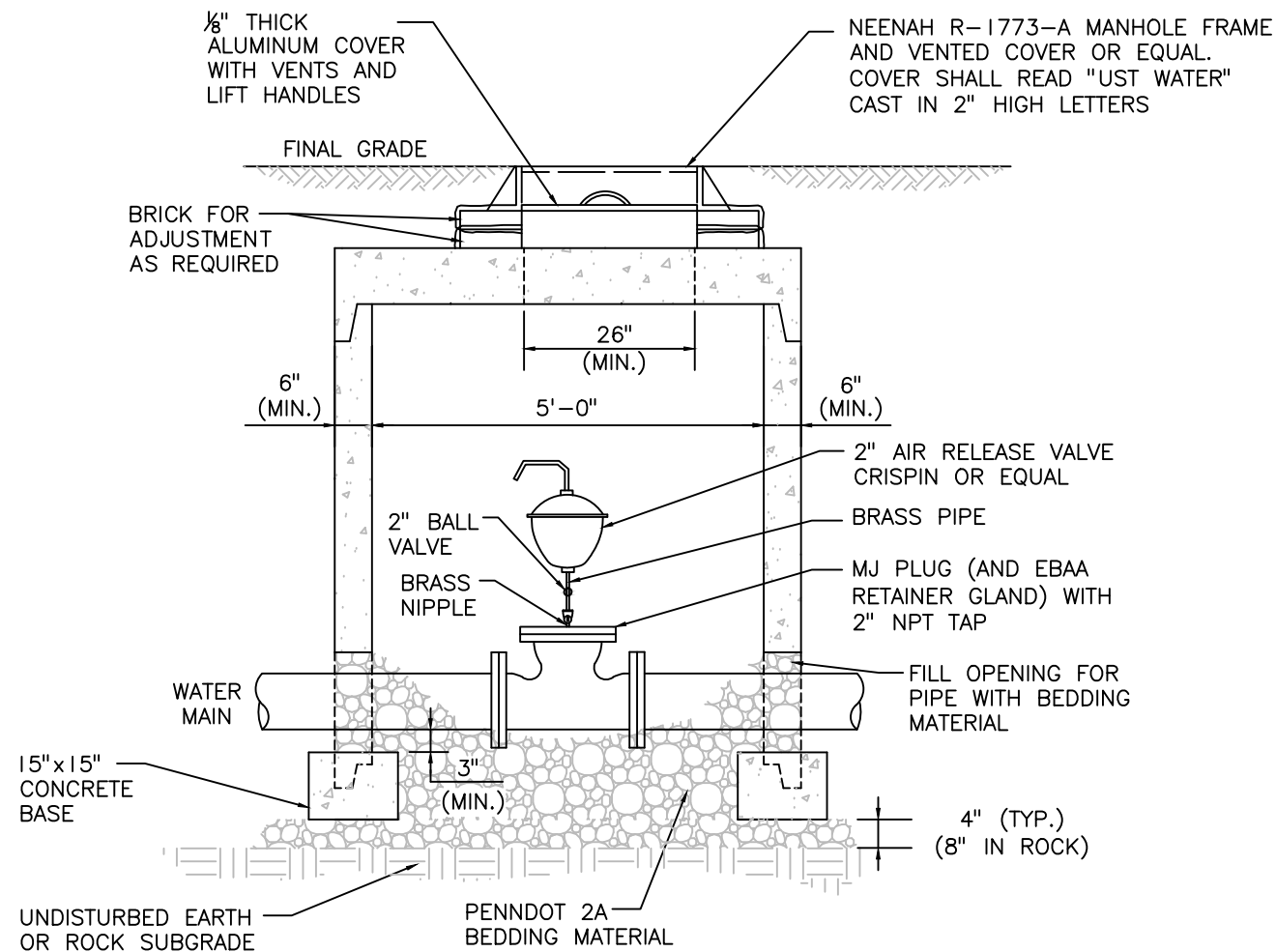
REVISIONS	UPPER SAUCON TOWNSHIP STANDARD CONSTRUCTION DETAILS LEHIGH COUNTY, PENNSYLVANIA
	WATER DISTRIBUTION SYSTEM CAMPUS WATER METER AND PIT
	THE PIDCOCK COMPANY CIVIL ENGINEERING AND LAND PLANNING ARCHITECTURE LAND SURVEYING OXFORD DRIVE AT FISH HATCHERY ROAD ALLENTOWN, PENNSYLVANIA
	DATE: SEPTEMBER 2012 CHKD BY: SRH SCALE: NO SCALE
	UST-W-8

Drawing name: S:\MUNICIPAL STANDARD CONSTRUCTION DOCUMENTS\UPPER SAUCON TOWNSHIP\UST-WORKING DOCUMENTS\UST-2009 DETAILS\UST-W-09.dwg Last Modified: Sep 21, 2012 - 8:52am



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NOTE:

DETAIL APPLICABLE FOR PRESSURES 100 PSI OR LOWER. WHERE PRESSURES ARE IN EXCESS OF 100 PSI, A SEPARATE SUBMISSION IS REQUIRED FOR REVIEW.

AIR RELEASE VALVE AND MANHOLE
NO SCALE

REVISIONS	UPPER SAUCON TOWNSHIP STANDARD CONSTRUCTION DETAILS LEHIGH COUNTY, PENNSYLVANIA	
	WATER DISTRIBUTION SYSTEM AIR RELEASE VALVE AND MANHOLE	
	THE PIDCOCK COMPANY <small>CIVIL ENGINEERING AND LAND PLANNING ARCHITECTURE LAND SURVEYING OXFORD DRIVE AT FISH HATCHERY ROAD ALLENTOWN, PENNSYLVANIA</small>	
	DATE: SEPTEMBER 2012	CHKD BY: BBB
	SCALE: NO SCALE	UST-W-9