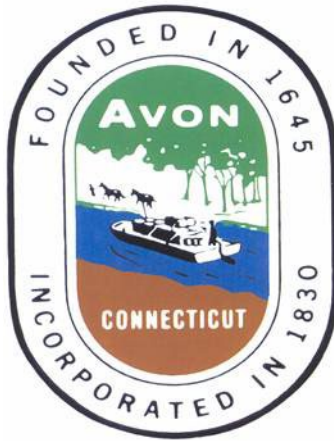


# TOWN OF AVON CONNECTICUT

## ENGINEERING DEPARTMENT DESIGN STANDARDS MANUAL



DATE:  
January 18, 2023

PREPARED BY

TOWN OF AVON ENGINEERING DEPARTMENT  
In collaboration with  
TOWN OF AVON PUBLIC WORKS AND PLANNING DEPARTMENTS

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SECTION 1.0

**INTRODUCTION**

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# INTRODUCTION

## **1.1 General**

In general, the Town of Avon Engineering Design Standards follow the specifications as described in the State of Connecticut Department of Transportation Standard Specifications for Roads, Bridges and Incidental Construction, Form 818 as amended to date, except as otherwise described or amended herein. Any items not listed in the following sections of this manual shall be constructed as specified in the applicable section of the Form 818 or as approved by the Town Engineer. In the case of any discrepancy between this document and the Form 818, the matter shall immediately be submitted to the Town Engineer for review. The Town Engineer shall have sole authority in resolving such discrepancies.

Nothing in this manual shall relieve the Developer, Engineer, or Applicant from utilizing all reasonable design practices or from complying with any and all Federal, State, Town laws and/or regulations. The Developer, Engineer, or Applicant shall contact the Town Engineer to resolve any conflicts with related agencies should they arise.

Unless otherwise indicated, references to Sections throughout the text are references to Sections of this Design Standards Manual.

## **1.2 Applicability**

The requirements set forth in this Design Standards Manual shall apply to all work proposed within an existing or proposed public Right-Of-Way, Easement, and/or Private Construction. This may include, but is not limited to:

- Design and construction of public roadways or infrastructure associated with new subdivisions or developments.
- Improvements to existing public infrastructure required as part of an approved subdivision or site plan.
- Repair and restoration work associated with public service utility work.
- Installation of a new curb cut for a proposed driveway; and,
- Private construction developments receiving approval through the Town Planning and Zoning Commission.

Portions of this document shall also apply to private improvements that will affect the public Right-Of-Way or private property or the traveling public. This may include, but is not limited to, modifications to private property that will:

- Impact existing traffic patterns
- Increase the amount of impervious area on the property
- Change existing drainage patterns
- Provide facilities for vehicular, pedestrian or other traffic

These standards are intended to be a supplement to the policies outlined in the "Subdivision Regulations, Town of Avon", "Zoning Regulations, Town of Avon", "Inland Wetlands and Watercourse Regulations, Town of Avon" and "Code of the Town of Avon" as amended to date. Any conflicts between this manual and the aforementioned regulations should be brought to the attention of the Town Engineer for resolution.

### 1.3 References

These Design Standards may make reference to one or more of the following publications:

- ["Aquifer Protection Zone Regulations"](#) prepared by the Town of Avon and found in Figure A of the Avon Code of Ordinances, as amended;
- ["A Policy on Geometric Design of Highways and Streets, 6<sup>th</sup> Edition, 2011"](#) published by the American Association of State Highway and Transportation Officials, as amended;
- ["Bridge Design Manual"](#) published by the Connecticut Department of Transportation, as amended.
- ["2002 Connecticut Guidelines for Soil Erosion and Sediment Control \(DEP Bulletin 34\)"](#) published by the Connecticut Department of Environmental Protection, as amended.
- ["2004 Connecticut Stormwater Quality Manual"](#) published by the Connecticut Department of Environmental Protection, as amended;
- ["Code of the Town of Avon"](#) as amended;
- ["Department of Public Health Regulations and Public Health Code"](#) published by the Connecticut Department of Health, as amended;
- ["Drainage Manual 2000"](#) published by the Connecticut Department of Transportation, as amended.
- ["Flood Insurance Rate Map"](#) published by the Federal Emergency Management Agency, effective September 26, 2008, as amended.
- ["Flood Insurance Study"](#) published by the Federal Emergency Management Agency, effective September 26, 2008, as amended;
- ["Highway Capacity Manual"](#) published by the Transportation Research Board, as amended.
- ["Highway Design Manual"](#) published by the Connecticut Department of Transportation, as amended.
- ["Manual of Uniform Traffic Control Devices"](#) published by the U.S. Department of Transportation Federal Highway Administration, as amended;
- ["Manual of Transportation Engineering Studies"](#) published by the Institute of Transportation Engineers, as amended;
- ["Plan of Conservation and Development"](#) as amended;
- ["Roadside Design Guide, 4<sup>th</sup> Edition, 2011"](#) published by the American Association of State Highway and Transportation Officials, as amended;
- ["Standard Specifications for Roads, Bridges, and Incidental Construction, Form 818 as amended"](#) published by the Connecticut Department of Transportation, as amended.
- ["Standards for Surveys and Maps in the State of Connecticut"](#) published and adopted by the Connecticut Association of Land Surveyors, as amended;
- ["Traffic Control Signal Design Manual"](#) published by the Connecticut Department of Transportation, as amended;
- ["Subdivision Regulations, Town of Avon"](#) as amended;
- ["Zoning Regulations, Town of Avon"](#) as amended;
- ["Inland Wetlands and Watercourse Regulations, Town of Avon"](#) as amended;
- ["Town of Avon Specifications for the Construction of Sanitary Sewers"](#) as amended.

## 1.4 Definitions

Building Sewer - the sanitary sewer lateral pipe from the main sewer in the street, Right-Of-Way, or easement including the wye connection to its terminus at the service building.

Contractor - the person, firm, utility, or corporation doing work within the Town Right-Of-Way or private property.

Director of Public Works - the Director of Public Works of the Town of Avon or an authorized representative.

Design Engineer/Engineer of Record - Professional Engineer, licensed in the State of Connecticut, representing the Developer or Contractor who is responsible for the design of the proposed improvements.

Developer - the legal or beneficial owner or owners of land included in a development, including the holder of an option or contract to purchase, or other enforceable proprietary interests in such land. Developer shall include agents, successors, and assigns.

Easement - a non-possessing interest held by one party in land of another, whereby the first party is accorded partial use of such land for a specific purpose.

General Contractor / Prime Contractor - the person, firm, utility or corporation doing work or hiring subcontractors to do work within the Town Right-Of-Way or private property – considered to be the overseer of the project construction.

Interceptor Sewers or Collector Sewer - those sanitary sewers that receive part or all of the sewage of the system from within a sub sewershed.

Land Surveyor - a State of Connecticut Licensed Land Surveyor.

Main Line Sewer - a sanitary sewer into which the sewage from one or more laterals is discharged.

Master Sewer Plan - the most recent map approved by the Town of Avon Water Pollution Control Authority showing the limits of projected sanitary sewer extensions and service within the Town.

Right-Of-Way - the area of property between opposing street lines that is owned and maintained by the Town, State, or any public Right-Of-Way as shown on a map of an approved subdivision, whether or not the streets within such subdivision have yet been accepted by the Town.

Right-Of-Way Permit - Town of Avon Permit to Excavate or Obstruct in the Town of Avon Right-of-Way.

Record/As-Built Drawings - a plan prepared and certified by a State of Connecticut Licensed Land Surveyor confirming the As-built locations and elevations of features installed as part of an approved site plan or subdivision plan.

Sewer Specifications - The Town of Avon Specifications for the Construction of Sanitary Sewers.

Sewerage System - any device, equipment, appurtenance, facility, and method for collecting, transporting, receiving, disposing of, or discharging sanitary sewerage.

Standard Details - the Town of Avon Standard Details, as amended.

Standard Specifications - the Town of Avon Connecticut, Department of Public Works, Design Standards Manual, as amended.

Statute - a law or laws enacted by the Connecticut General Assembly, as amended.

Street - any street, avenue, boulevard, road, land, alley or other way, open or proposed to be open to public vehicular traffic and owned and/or maintained, or proposed to be owned and/or maintained, by the Town of Avon or State of Connecticut.

Street Line - the line between the public Right-Of-Way and a private lot.

Town - the Town of Avon, Connecticut.

Town Engineer or Engineer - the Town Engineer of the Town of Avon or an authorized representative.

Tree Warden - the Tree Warden of the Town of Avon or an authorized representative.



## **1.5 Town Departmental Contact Information**

### **Engineering Division:**

Lawrence E. Baril, P.E., GISP Town Engineer  
Phone: 860.409.4322 Email: [lbaril@avonct.gov](mailto:lbaril@avonct.gov)

Matt Brown, L.S., Assistant Town Engineer  
Phone: 860.409.4322 Email: [mbrown@avonct.gov](mailto:mbrown@avonct.gov)

Doug Stahl, Public Works Inspector  
Phone: 860.409.4322 Email: [dstahl@avonct.gov](mailto:dstahl@avonct.gov)

Tim Foster, Superintendent of Sewers  
Phone: 860.409.4322 Email: [tfoster@avonct.gov](mailto:tfoster@avonct.gov)

Sangee Wallace, GIS Manager  
Phone: 860.409.4322 Email: [swallace@avonct.gov](mailto:swallace@avonct.gov)

Nicole Chambers, Administrative Coordinator  
Phone: 860.409.4322 Email: [nchambers@avonct.gov](mailto:nchambers@avonct.gov)

### **Department of Public Works:**

Bruce Williams, Director  
Phone: 860.673.6151 Email: [bwilliams@avonct.gov](mailto:bwilliams@avonct.gov)

### **Planning and Community Development:**

Hiram Peck, AICP, Director  
Phone: 860.409.4328 Email: [hpeck@avonct.gov](mailto:hpeck@avonct.gov)

### **Police Department:**

Paul Melanson, Chief of Police  
Phone: 860.409.4213 Email: [pmelanson@avonct.gov](mailto:pmelanson@avonct.gov)

### **Fire Department:**

Brue Appell, Fire Chief  
Phone: 860.677.2644 Email: [bappell@avonvfd.org](mailto:bappell@avonvfd.org)

### **Fire Marshal:**

Bruce Appell, Fire Marshal  
Phone: 860.409.4316 Email: [bappell@avonct.gov](mailto:bappell@avonct.gov)

### **Wetlands Agent**

Emily Kyle, CZEO, Planning and Community Development Specialist  
Phone: 860.409.4316 Email: [ekyle@avonct.gov](mailto:ekyle@avonct.gov)

## **1.6 Typical Project Chronology**

### Administrative Review

Prior to formal submission, the Developer shall present preliminary plans to Town Staff. Town Staff may recommend an administrative review meeting, scheduled through the Planning Department at 860.409.4328.

The Developer consults with the following Town Staff or their designee, Town Engineer, Town Planner, Building Official, and Fire Marshal as required, to gather input and informal feedback prior to preparation and submission of plans with an application.

### Plan Preparation and Review by Regulatory Commissions

Plans are to be prepared and submitted in accordance with Sections 2.0 through 5.0 and Section 8.0 of these standards, Zoning Regulations, Town of Avon, Subdivision Regulations, Town of Avon, Inland Wetlands and Watercourses Regulations, Town of Avon, Plan of Development, or other pertinent Federal, State, or Town regulations.

Plans are to be submitted directly to the Planning Department for review. Applications are made as required before the Inland Wetlands Commission, Town Planning and Zoning Commission, Town of Avon Water Pollution Control Authority, and various subcommittees for approval of the proposed development.

Upon the granting of approval by the required Boards and Commissions, the plans are to be modified to address any conditions of approval. If required under Section 3.01 of the Town of Avon Subdivision Regulations or Section 6.7 of these standards, the Developer shall be responsible for posting the required bond(s).

If required, the Developer shall coordinate with the Planning Department, the need for filing any mylars for "Conditional" or "Final" approval as described in Section 2.06 of the Subdivision Regulations, Town of Avon. Prior to filing mylars, the conditions for bonding as described in Section 2.06.01 of the Subdivision Regulations, Town of Avon shall be adhered to.

### Construction

Right-Of-Way Permits, Driveway Permits, Sanitary Sewer Permits, and/or Sanitary Sewer Developer's Permit Agreements are to be approved as required, prior to any work within the Town Right-Of-Way, Town Property, Town Easements, or sewer system modifications as described in Sections 6.0 to 6.4. A preconstruction meeting, when necessary, is scheduled by the Engineering Department as described in Section 6.9, and construction shall be completed according to Town Standards and/or the approved plans.

### Project Closeout

After construction of public improvements, Record/As-Built Drawings shall be submitted for all public improvements as described in Section 7.0, and public improvement acceptance procedures are initiated in accordance with Section 7.2 and 7.3.

SECTION 2.0

**PLAN REVIEW PROCEDURES**

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# PLAN REVIEW PROCEDURES

## **2.1 Consultation with Town Staff**

In accordance with Section 1.6, consultation with Town Staff is required before any detailed plans are developed, to avoid costly design changes. Town staff may be aware of other public or private development projects that could affect the proposed project and may also be able to suggest alternative methods or designs that have proven successful within the Town. In addition, submission of plans to the Town for review is likely to proceed more efficiently when Town staff have already had the opportunity to discuss the project with the Developer and consider the project implications.

## **2.2 Applications Before Town Regulatory Agencies**

The majority of site development plans are reviewed by the Town's Engineering and Planning Departments as part of the submission of an application to the Town Planning Zoning Commission or Inland Wetlands Commission. This may include an "Inland Wetlands and Watercourses Permit", a "Subdivision Application", a "Special Permit", or any other site plan or special exception processed through the Town of Avon Planning Department. The specific requirements for site development plans and construction plans can be found in this Section and Figures 2.A and 2.B of this manuals, Section 4 of the Town of Avon Subdivision Regulations, and the Town of Avon Zoning Regulations. Questions on these plan requirements should be directed to the Engineering Department or Planning Department, as appropriate.

## **2.3 Utility Line Assignment Requests**

Any utility company proposing the installation, extension, or upgrade of their facilities within an existing or future Town of Avon Right-Of-Way, Town Property, or Town Easement is required to submit plans to the Town Engineer for review and approval prior to requesting an Excavation Permit for the work. This review and approval is referred to as a Utility Line Assignment Request. Note, that if all of the proposed work is overhead (i.e., on existing poles) or within existing conduit, then a Utility Line Assignment is not required, however the Contractor is still responsible for obtaining an Excavation Permit prior to commencing the work.

Prior to construction of a proposed private or public development, the Developer shall submit plans to all impacted utility companies for their review and approval. Each utility company shall submit either their comments or a letter indicating their approval, to the Town Engineer.

In order for a Utility Line Assignment Request to be reviewed for accuracy in a timely manner, all requests must include the following information:

1. A cover letter indicating the street location and a brief description of the proposed work. The letter should include a name, address, phone number, and email of the contact person to address any review comments. Requests for a Utility Line Assignment shall be addressed to:

Lawrence E. Baril, P.E., GISP  
Town Engineer  
60 West Main Street  
Avon, CT 06001  
Phone 860.409.4322  
Email – [lbaril@avonct.gov](mailto:lbaril@avonct.gov)

2. One hard copy set of construction plans prepared by the utility company or their Design Engineer. The plans should show enough detail regarding the proposed work such as; Right-Of-Way limits, roadway limits, limits of restoration, sidewalks, storm drainage and sanitary sewer facilities, other utilities, street trees, wetlands and watercourses, and adjacent private property to properly demonstrate the effects on the Town Infrastructure and private property not owned by the utility. Plans should describe the type of construction (bore, open trench, etc.) as well as proposed clearances from all existing utilities. It is strongly recommended that the latest information be

obtained with regard to the location of existing Town facilities and other utilities prior to submitting a proposed plan. Minimum recommended horizontal clearance to storm and sanitary sewer facilities is five feet, with the exception that the minimum horizontal clearance between sanitary sewer facilities and potable water shall be 10 feet. Minimum recommended vertical clearance to storm facilities is 12 inches; and to sanitary sewer facilities is 18 inches, or as approved by the Town Engineer.

The sources and quality of the base information shown on the plans provided is to be so indicated. Depending upon the complexity of the work, the Town Engineer may require that the base information shown on the plans be certified by a professional land surveyor licensed in the State of Connecticut to class A2 and T2, and design information stamped by a professional engineer licensed in the State of Connecticut; and,

3. One digital copy of design plans in digital CADD (Computer Aided Design and Drafting) format, shall be submitted if requested by the Town Engineer.

If the request is approved, the utility company will receive one set of plans stamped "Approved for Construction". The Contractor performing the work will need to obtain an Excavation Permit prior to construction. Excavation Permits will not be processed unless a copy of the stamped approved plans accompanies the application, and appropriate approvals have been granted.

## **2.4 Site Plan Requirements**

### **2.4.1 Introduction**

1. Inclusion Requirements for Site Plan Drawings Defined: These "Inclusion Requirements for Site Plan Drawings", prepared as a Figure to the Zoning Regulations of the Town of Avon, Connecticut, present the standards, requirements, and restrictions governing the inclusion and presentation of existing and proposed development information on a set of technical drawings/plans that comprise the site plan drawings for a subject development project; and as such are known as the "Site Plan Drawing Requirements" for the Town of Avon. Any reference to the "Site Plan Drawing Requirements" made in or related to said Zoning Regulations and/or the conduct of business of or relating to the Town of Avon shall mean this document.
2. Plot Plans: Plans included in the application for a Zoning Signoff, (where a Site Plan is not required,) are typically referred to as "Plot Plans" in matters relating to the Zoning Regulations. Plot Plans shall meet all the requirements of these Site Plan Drawing Requirements with the exception of the following sections: 2.4.2.9.j, 2.4.2.9.k, 2.4.4.3.e – 2.4.4.3.i, 2.4.4.6.a, 2.4.4.7.b, 2.4.4.7.e, 2.4.4.7.f, 2.4.4.9, 2.4.4.11, and 2.4.4.12; and amending 2.4.2.8.a to allow sheet sizes of (in inches) 8.5 x 11, 11 x 17, 12 x 18, 18 x 24, 21 x 30, or 24 x 36, with the restriction that all sheets in a set shall be the same size.
3. Design concept sketches: when preparing sketches for either formal or informal review, use of drawings or other materials that were prepared for other purposes by a design professional not associated with the proposed project is strictly forbidden without the design professional's written consent. With their consent, all references on the drawings not directly associated with or pertinent to the proposed project are to be removed.

## **2.4.2 General Requirements**

1. Information shall be presented in a clear, concise, and readily interpretable manner. Use of variations of shading, hatching, symbols, line styles, line widths, line densities, borders, and information tables is strongly encouraged, and in some cases may be required, in order to achieve this requirement. The final plan submission for permit issuance shall be accompanied by an exact replication of the site plan drawings in Adobe® Acrobat® pdf format, version 9 or later, to accommodate reproduction and electronic filing.
2. These requirements represent a minimum standard, and, as such, the Town may require additional information as deemed appropriate thereby to meet these General Requirements and the purposes of the Zoning Regulations.
3. Information shall be presented to a level of scope, detail, accuracy, and completeness as is appropriate and/or necessary to meet all applicable regulations, standards, specifications, and requirements and sound professional and industry standard practices. The presentation of this information shall comprehensively communicate the design and other information necessary for proper construction and use for its intended purpose.
4. The design of all various aspects of the improvements proposed in the site plan shall be in accordance with the Avon Design Standards. In addition, all aspects of the design and construction of any facility or improvement to be owned and/or maintained by the Town of Avon and/or to be constructed within or encroach upon any property or right-of-way owned or enjoyed by the Town of Avon shall be in accordance with the Avon Standard Construction Specifications.
5. Any review of the site plan by the Town of Avon is for purposes of general compliance with the Town requirements. Any approval of the subject overall application, or any portion thereof, shall not, by itself, constitute specific approval of any non-conformance not distinctly identified as being in non-conformance on the site plan. Any standard, regulation, and/or requirement as may be applicable to any such non-conformance shall remain in full force, not to any extent waived or relaxed, with respect the subject project.
6. These Site Plan Drawing Requirements are intentionally written to allow for flexibility on the part of the preparer of the drawings to arrange and present the required information in a manner best suited to the nature and scope of the subject project. However, the final determination regarding compliance with these Requirements, i.e., the applicability, appropriateness, and completeness, and/or lack thereof, of the information provided, its organization and presentation, etc., remains with the Director of Planning, Town Engineer, or designee thereof, in any and all instances.
7. Proposed improvements, and their limits, shall be readily distinguishable from existing improvements.
8. Sheet Size and Scale:
  - a) Full size site plan drawings shall be submitted in bound sets of plain white sheets of paper measuring 24 inches by 36 inches. Smaller sizes may be allowed/accepted solely by express approval of the Director of Planning.
  - b) Scale for various drawing elements on the plan shall be as appropriate to comply with the General Requirements set forth above and shall be to an industry standard scale factor. However, in no case, except as expressly set forth herein or otherwise expressly waived by the Director of Planning, shall the horizontal scale of drawings presenting information relating to any aspect of the construction of or modification to improvements be less than 1" = 40'; (i.e., 1" = 20' is acceptable, 1" = 60' is not acceptable.) The horizontal scale for

drawings limited to presenting the locations of signage, lighting, pavement painting, detour elements and/or general type of material extents may be less than 1" = 40'. This requirement is not intended to cover reference or key sheets or other such sheets that are included to compile general information from other, more detailed sheets to assist in plan interpretation or navigation.

9. 'Floating' Information: The following information is required to be included within the plan set at an appropriate, but not specific, location or locations, and appropriately notated in accordance with its applicability and scope:
  - a) Basis of elevations (i.e., benchmark(s) and reference datum / system.) Unless otherwise approved, the reference datum shall be NAVD 1988. A convenient, usable project benchmark shall be identified on, or within 50 feet of, the project site.
  - b) Coordinate reference or basis of bearings, including reference system / projection, which is to be the North American Datum – 1983 (NAD 83), Connecticut State Plane, US Survey foot unless otherwise approved by the Town Engineer.
  - c) Other applicable construction and development notes.
  - d) Applicable abbreviations legend
  - e) A location map depicting the location of the site in relation to, (as applicable,) the Town Boundary, major and adjacent roads, relevant surface water features, points of interest, etc. The location map is to include a north arrow and the horizontal scale of the map.
  - f) Permits (federal, state, and/or local) required to be obtained, including information on the nature of the permit, who the issuing authority is, who is responsible for obtaining the permit, the current status of the permit or its application process, and the dates of approval and expiration, if applicable.
  - g) Other regulatory approvals (federal, state, and/or local), including variances and waivers, obtained or required to be obtained. Include information on the nature of the approval, the name of the authority granting approval, and the current status of the approval or its application process (including the date or anticipated date of approval.)
  - h) Easements affecting the property and public rights-of-way adjacent to the property, if any.
  - i) Front, side, and rear setback lines.
  - j) Bulk zoning table
  - k) Other required site data tables, if any.
  - l) Key maps, where applicable.
  - m) Overall project development plan, for phased or other larger projects.
10. Font Sizes: It is recommended that fonts are used to indicate proposed vs. existing features and call-outs. Ideally, proposed feature annotation will be larger than existing feature annotation. The smallest text to be used shall be 0.07" on any plan, except reduced size draft plans.

### 2.4.3 Requirements for Every Sheet

1. Title Block:
  - a) Project name
  - b) Project address
  - c) Assessor's lot number of the subject parcel(s)
  - d) Applicant's name
  - e) Owner's / Developer's name, if different than applicant
  - f) Name of lead consultant / preparing entity
2. Name of sub-consultant / sub-preparing entity having significant input on a sheet
  - a) Submittal purpose
  - b) Sheet title – should indicate purpose / information content of the sheet
  - c) Subtitle(s) – e.g., extents or category of this particular sheet
  - d) Sheet number / identifier and total number of sheets in the plan set (lower right corner)
  - e) Scale – horizontal and vertical (if applicable) (must be clearly and readily identifiable)
  - f) Plan set date – all sheets shall have the same plan set date; (month, year min. precision)
  - g) Individual sheet date if appropriate (e.g. – for survey, etc.)
  - h) Revision block – see Section 2.4.5: Revision Identification and Tracking
3. Certifications:
  - a) Applicable textural certification blocks appropriately executed and dated.
  - b) Applicable professional stamps and/or seals, appropriately signed. The signing professional shall be appropriately licensed with the State of Connecticut.
  - c) As a minimum, boundary and topographic survey information require the certification of a Connecticut Licensed Professional Land Surveyor.
  - d) As a minimum, storm drainage improvements, erosion and sedimentation control measures, slope and stream course stabilization measures, subsurface sewage systems, sanitary sewer improvements serving more than one building, water improvements serving more than one building or serving site fire protection facilities, earth retaining improvements retaining over 4 vertical feet at any point, and pavements for carrying vehicular traffic require certification by a Connecticut licensed Professional Engineer.
  - e) Specific certifications are required for developments that encroach upon the 100-year floodplain; see Section 2.4.4.8, "Flood Management Information," for these requirements.
4. Miscellaneous: (where applicable)
  - a) Appropriate legend(s)



- b) North arrow
  - c) A graphical scale indicator
  - d) Street names and state highway route numbers
  - e) Parcel boundary lines
  - f) Project phase lines
5. Map References: All map references used are to be listed including map title, date, scale, source, etc., and a copy of each map reference is to be provided upon request of the Town Engineer or Director of Planning and Community Development.

#### **2.4.4 Construction Specific Information Requirements**

1. The following information regarding existing conditions and the proposed construction of improvements and associated activities is required to be included within the plan set. The requirements are grouped into major functionality categories. These categories are intended as a general guide for how the information should be organized within the plan set. The size, scope, and nature of an individual project should determine how many sheets any given plan set includes, as well as how the information is organized for presentation on those sheets in order to comply with the General Requirements set forth above. The Director of Planning and Community Development and the Town Engineer retain the authority to require the separation of information onto alternate or additional sheets up to an individual sheet, or subset of sheets, for each category presented herein, and/or the inclusion of information detailed elsewhere onto other sheets for reference purposes, as deemed fit in order to obtain better compliance with the General Requirements.
2. Boundary and Topographic Survey Information:
  - a) All survey information shall be compiled and presented in accordance with all applicable provisions of the "Minimum Standards for Accuracy, Content, and Certification for Surveys and Maps" as set forth in Sections 20-300b-1 to 20-300b-20 inclusive of the Regulations of Connecticut State Agencies, as stipulated and refined hereby.
  - b) The boundary survey shall be of type "Property Survey", as set forth in subsection (b) (1) of Section 20-300b-2 of said "Standards", prepared to a Horizontal Accuracy Class of "A-2".
  - c) The topographic survey shall be prepared to a Topographical Accuracy Class of "T-1", "T-2", or "T-3", as is appropriate, and shall include, as a minimum, the following information:
    - The source(s) of topographic information shown on the plans must be clearly delineated graphically and detailed notes are to be provided to indicate the quality (scale and accuracy) of the information shown as well as the intended purpose of the original information if it was not prepared for the subject project.
    - Elevation contour lines at an interval appropriate to the nature of the existing topography and to the scope and nature of the proposed improvements; providing that in no case shall the prevailing contour interval exceed 2 feet. (A larger contour interval may be used locally on a survey to clarify the depiction of steep slopes or radical elevation changes.) Major contour lines, as designated by a distinct alternate linestyle and periodic inserted text identifying the contour's elevation, shall be displayed at contours that are multiples of 10 for a prevailing 2-foot contour interval and at contours that are multiples of 5 for all other contour intervals.

- Existing areas with a slope greater than 25% (4h: 1v) shall be identified by shading.
- Spot elevations to accurately depict the elevation characteristics of the site and at all property corners.
- Apparent structures, improvements and features, (both manmade and natural), including spot elevations; and, known subsurface structures and improvements, (even if out of service or abandoned), including any known or readily measured elevation information. If subsurface entities are known or suspected to exist without accurate and/or reasonably reliable information regarding their location, they should be depicted and noted / described / qualified to the extent appropriate to the accuracy and reliability of the available information.
- The limits of the canopy of existing wooded/forest areas shall be shown and annotated.
- Existing specimen trees shall be properly labeled.
- Existing trees larger than 12" in diameter outside any canopy line shall be properly labeled.
- Topographic information must be shown (on a minimum of the certified topographic survey sheet and the grading sheet) to a minimum distance of 60 feet beyond the boundaries of the subject parcel or the limits of the proposed work, whichever has the greater extents. In the event that the topographic information was generated from a field survey and access to adjacent properties was not possible, then the grading plan shall supplement the project generated topographic information with the best publicly available topographic information, properly noted on the plan and edge matched as best as possible, in order to meet this requirement. It is further stipulated that any such supplemental topographic information must be visually verified for accuracy and completeness, and any discrepancies noted and depicted as accurately as possible.
- The location of the limits of any regulated floodways and/or Special Flood Hazard Areas, (i.e., flood zones) as shown on the FEMA FIRM [map] for Avon shall be included on a sheet certified by a Registered Land Surveyor or Professional Engineer. The FIRM is on file in the Engineering office in Town Hall. If a Special Flood Hazard Area or a floodway is located on or near the subject project site, then the Floodplain Management Regulations, [Article IIIG of the Zoning Regulations,] and Section 2.4.4.8, [Flood Management Information,] of these Site Plan Requirements, should be consulted for additional requirements.
- The location of the limits of any channel encroachment zones as designated by the Connecticut DEEP shall be shown on a sheet certified by a Registered Land Surveyor or Professional Engineer.
- If wetlands and/or watercourses exist on the site, or any portion of the site is within the upland review area for the same, then the [relevant] limits and/or locations of the wetlands and watercourses shall be determined and shown on the survey in accordance with the provisions of Section 3, as well as any other applicable provisions, of the Town of Avon Inland Wetlands and Watercourses Regulations; in addition, the limits and locations of the wetlands and watercourses as shown on the current "Official Map of Inland Wetlands and Watercourses, Avon, Connecticut" as issued by and maintained under the direction of the Avon Inland Wetlands and Watercourses Commission shall be shown and properly annotated. In the event the information locating all or any portion of the subject wetland and watercourse limits on said Official Map was determined in accordance with the requirements of said Section 3, and only to the extents that the Official Map's information meets said requirements, then the

same may be utilized on the survey, and be properly noted thereon, in lieu of having to reflag and field survey those areas. The Town Wetlands Agent or the Town Engineer shall be the sole determiners as to if the subject information is applicable and any extents thereof. The Official Map's information is in Connecticut State Plane Coordinates, NAD 1983. In the event the subject survey is in another coordinate system, the information shall be deemed not applicable unless it may be demonstrated to the satisfaction of the Wetlands Agent and the Town Engineer that the information may be acceptably converted / translated into the other coordinate system without degradation.

- d) Existing recent survey maps on file with the Town of Avon may be used, at the discretion of the Director of Planning, to comply with some or all of the survey information requirements if all of the following are satisfied:
    - The information meets all of the applicable requirements.
    - The information is certified as correct by a professional land surveyor.
    - The subject survey was conducted within 10 years from the date of the current application.
    - For boundary information, that the property owner provides evidence and/or a signed statement that the property boundaries and easements shown have not been altered and remain the correct and total boundary and easement lines relevant to the site. The applicant shall provide a signed commitment that any missing property survey monumentation will be set prior to commencing construction.
    - For topographic information, that the property owner provides a signed statement that no site construction or alterations have taken place since the date of the subject survey that would render the information incorrect. In the event the current property owner acquired the property after the date of the subject survey, then the statement shall also be signed, or an equivalent statement shall be prepared and signed, by any and all previous owners of the property during the subject time period.
  - e) For specific applications where the proposed improvements are completely within the limits of existing improvements and have small probability of encroaching upon property or setback lines and/or where updated topographic information is of minimal relevance to the review and construction of the application and proposed improvements, and at the sole discretion of the Director of Planning, some or all of the survey information requirements may be waived.
3. Site Layout Information:
- a) Site layout information shall be dimensioned, coordinated, annotated, detailed, and otherwise presented in such a manner that the proposed improvements can be accurately staked or otherwise laid out for construction and dimensioned for construction based solely on the site plan information; and such that the same may be properly and adequately interpreted for review and construction.
  - b) All existing and proposed buildings shall have their footprints adequately dimensioned and shall show offset distances to property boundaries as appropriate to any applicable requirements of the Zoning Regulations.
  - c) The limits and purpose of any easements required, whether permanent or temporary, for the construction and/or use of the project shall be clearly identified, and the status of any such easement stated.
  - d) All proposed and existing improvements.

- e) Existing conditions and proposed improvements, (pavement painting and signage included), shall be shown and detailed to an extent necessary to properly present vehicular and pedestrian traffic flow circulation, ingress and egress, parking, emergency access lanes, and loading/unloading areas. Vehicle turning radius analysis shall be applied to design emergency and other non-passenger vehicle circulation elements. Appropriate sight distance analysis shall also be performed for all site ingress and egress drives. A report on either or both of these analyses may be required at the discretion of the Town Engineer.
  - f) Accessible parking spaces, routes, and other facilities shall be in accordance with all applicable state and federal codes and regulations.
  - g) Outside storage areas, including trash and recycling receptacles, and outside mechanical facilities, along with [for both] their proposed screening. The same shall include annotation describing the types of material and/or equipment expected to be stored / present.
  - h) The location, type, material, size, height, mounting, and face design of all proposed signage.
  - i) The location, height, fixture design, lamp type, and wattage of all proposed exterior lighting.
  - j) Any existing facilities or improvements to be demolished shall be clearly identified; and any existing facilities and improvements to remain shall be clearly identified, including any methods, measures, and details for protecting the same during construction, and for restoration of the same as needed.
4. Site Grading Information:
- a) Existing topographic survey, wetlands, floodway, flood zone, and channel encroachment information.
  - b) Proposed elevation contours, at the same, or a more detailed, interval as the existing contours and in a distinct alternate line-style from the existing contours. The proposed contours shall be appropriately labeled.
  - c) Proposed spot elevations as appropriate and necessary for proper interpretation of the plan and construction of the improvements. Proposed spot elevations shall be clearly distinguishable from existing spot elevations, and the intended application of the elevation, including its precise location of application, shall be readily discernable, using labels or abbreviations as necessary. Spot elevations shall be given for all critical locations controlling the elevation layout and construction of the improvements to proper grade and vertical lines; requiring or relying on scaling or interpretation of contours to accomplish this is not acceptable. For emphasis, and not intended to be all-inclusive, spot elevations are required at the following locations:
    - Vertically at the base and the top of all retaining walls at both ends, all angle points, and all changes in slope.
    - At all property corners, (match existing unless easements provided).
    - At property lines where any ingress/egress drives cross.
    - At the intersection of ingress/egress drives and existing roadway improvements, as well as at centerline of the existing roadway improvements adjacent thereto.

- At the ends and changes in slope along drainage swales and channels.
  - At slope changes and angle points along the edge of pavements.
  - At the existing ground immediately exterior to all building corners and high or low points along a building.
  - The finished floor/slab/foundation elevation for, as applicable, first floor level, basement, garage, and any subgrade enclosure for any building existing or proposed on the site.
- d) Accessible routes and sidewalk ramps shall be dimensioned, annotated, detailed, and have spot elevations sufficient to ensure constructability complying with applicable regulations and standards.
  - e) Existing and proposed drainage facilities shall be shown and annotated to an extent required to determine the complete drainage path for any location on the site.
  - f) Drainage swales and channels shall be shown and detailed to their complete extents, (i.e. to their discharge to an existing channel or a drainage facility). "Grade to drain" or other such general instructions are not acceptable when applied to any form of channelized flow.
  - g) Additional drainage shall not be directed onto adjacent property, nor shall the location or manner of drainage onto adjacent property change, without written evidence of proper permission.
  - h) The location, logs, and other pertinent information associated with any subsurface geotechnical investigation performed shall be included.
  - i) Limits of cut slopes, fill slopes, land disturbance, and construction activities, including the total area of vegetation to be cleared shall be shown.
  - j) List the total earthwork volumes calculated for the site based on the design, including stripping, cut, fill, borrow, waste, and export.

5. Site Utilities:

- a) Existing and proposed site-related sanitary sewer, water, electric, communications, and lighting improvements shall be designed, detailed, and shown in accordance with all applicable regulations and standards, and in accordance with standard industry practice.
- b) In addition to the requirements of 4.5.1, pipe invert elevations shall be given at the penetration into the building and at the connection point to the main collection pipe for all building sanitary sewer laterals.

6. Site Drainage and Permanent Stormwater Management Information:

- a) A drainage study, the scope of which is appropriate to the size, scope, and potential drainage impacts of the project, will be required. Reference Section 4 of the Avon Design Standards, for the particular requirements for the study.
- b) All existing and proposed site-related storm drainage, permanent erosion, sedimentation, and other stormwater management and pollution control improvements shall be shown, designed, and detailed in accordance with all applicable regulations and standards, and in accordance with standard industry practice.

7. Construction Erosion and Sedimentation Control Information:

- a) In general, the Erosion and Sedimentation control information shall be in accordance with the E&S Guidelines, except as amended or supplemented hereby, by the Avon Design Standards, the Avon Standard Construction Specifications, and/or by the Avon Inland Wetlands and Watercourses Regulations. The use of industry standard BMPs is strongly encouraged.
  - b) An erosion and sedimentation control narrative. The narrative shall designate the method and location proposed for disposal of clearing debris and materials and any excess or waste materials to be removed from the site.
  - c) Existing topographic survey, wetlands and watercourses, floodway, flood zone, and channel encroachment information.
  - d) Proposed grading and improvement information.
  - e) Any site or potentially impacted areas within public water supply watershed boundaries or aquifer boundaries, and well heads.
  - f) Underlying soils information.
  - g) The limits of the proposed clearing / grading operations.
  - h) All proposed measures for erosion and sedimentation control.
  - i) On-site storage areas for topsoil or other excavated material.
  - j) All other proposed on-site construction staging and/or materials storage areas.
  - k) All proposed construction access or operation roadways.
  - l) For larger projects, as determined by either the Director of Planning and Community Development or the Town Engineer, show and detail phased erosion control measures on the plan.
  - m) Dewatering/water handling plan; if required by the Town Engineer, a detailed water management plan is to be prepared and submitted for review and approval
8. Flood Management Information:
- a) Where any portion of a proposed development, or existing improvements associated therewith, encroach upon a Special Flood Hazard Area, or a regulated floodway, the provisions of this Article shall apply in addition to requirements included within other Town of Avon Regulations.
  - b) The location of the limits of any regulated floodways and/or Special Flood Hazard Areas, as shown on the FEMA FIRM [map] for Avon, shall be included on a sheet certified by a Registered Land Surveyor.
  - c) The Base Flood Elevations (BFEs) within any SFHA as shown on the FIRM and verified based on those designated in the associated Flood Insurance Study (FIS), shall be shown with the SFHA limits, where applicable.
  - d) Where the FIRM SFHS and/or BFEs are found to be inaccurate or incomplete, then the proposed revised information, as appropriately determined and documented, shall also be shown on the same drawing(s) as the foregoing FIRM information in a separate and distinct manner.
  - e) Where compensating storage is required to be provided, such storage area and volume shall be appropriately shown and detailed on the Site Plan.

- f) Proposed elevations, as are compliant with the applicable requirements of the Floodplain Management Regulations, shall be shown for:
- The finished floor/slab for, as applicable, first floor level, basement, garage, and any subgrade enclosure for any building existing or proposed on the site; and/or, if a site is intended to have one or more future buildings that are not currently shown but have general locations indicated, the elevation that the lowest floor, including any basement, must be above to be compliant with the Floodplain Management Regulations.
  - The lowest floor of any manufactured home shown on the Site Plan; and/or, if a site is intended to have one or more future manufactured homes that are not currently shown but have general locations indicated, the elevation that the lowest floor, including any basement, must be above to be compliant with the Floodplain Management Regulations.
  - The top of foundation for any proposed storage tanks, as well as for any associated fill, vent, or other such openings associated therewith.
  - The top of foundation/mounting pad, or the corresponding ground elevation, for any significant external utility, mechanical, or other service equipment or other such facility; or the lowest elevation on any such unit itself if otherwise mounted. Roof mounted units are exempt [assuming the roof elevation is out of the floodplain].
  - The top of foundation/mounting pad, or the corresponding ground elevation, for any non- building structural facility.
  - Where any part of a building is, or is proposed to be, below the BFE, a note shall be included that clearly states the required elevations that any utility and service facilities must be placed at or above the BFE, either unconditionally or to avoid floodproofing [if allowed]; and/or the elevation to which the same must be floodproofed, if appropriate and allowed.
- g) The anchoring system for any building, manufactured home, other structural facility, storage tank, material storage, or any other facility, equipment, or item which may be subject to flooding for which anchoring is required under the Flood Management Regulations, shall be appropriately detailed on the Site Plan.

9. Site Landscaping Information:

- a) Existing trees, vegetated buffer, and other vegetation, and other existing landscaping features, to remain, including methods, measures, and details for protecting the same during construction, and for restoration of the same as needed.
- b) Location, names, size, quantities, and other pertinent information regarding proposed site plantings
- c) Location, extents, description, and other pertinent information regarding other landscaping related features and materials proposed for the site.

10. Construction Details:

- a) Individual detail drawings expounding on particular aspects of more general construction items. Individual details should include:
- b) A title

- c) A scale, if appropriate
- d) Clear indication as to its intended applicability

11. Architectural Information:

- a) General building plans and elevations, including exterior dimensions and finishes, are required.
- b) Roof mounted equipment and structures shall be incorporated into the architectural design of the building so as to be concealed and inconspicuous.

12. Title Sheet:

- a) A title sheet is required for every plan set that contains more than four sheets. At a minimum, the title sheet shall include:
  - b) All of the title block information, presented in title sheet format.
  - c) The names of the entire designing team should be listed
  - d) A sheet index to all of the sheets in the set.
  - e) The location map for the site.

#### **2.4.5 Revision Identification and Tracking**

All revisions to the site plan after the initial submittal shall be clearly identified on the drawings and tracked in the title block of any altered drawing for any subsequent submittals in a manner satisfactory to the Director of Planning. The default, pre-approved manner of identifying revisions is to enclose each revision in a 'cloud' line style and identify with a cross-referenced [in the revision section of the title block] number or letter. The identifier used is to be sequenced with each subsequent revision group. Any revisions that occur subsequent to the final approval of a site plan shall be clearly designated as an "amendment".

### **2.5 Plot Plan Requirements and Procedures**

Individual plot plans are required for all proposed principal buildings to be built within the Town. Plans shall be drawn to a standard scale not to exceed 1"= 40', on paper size 18"x24", 22"x34", or 24"x36". Plans are to be certified by a Connecticut Registered Land Surveyor as an "Improvement Location Survey-Proposed", in accordance with Section 20-300b of the Connecticut General Statutes, and a Professional Engineer licensed in the State of Connecticut as required.

Two copies of the plot plans shall be submitted, and shall show the following information, as applicable:  
 See [Figure 2A](#) Checklist of Required Information for Commercial Site Plans and Residential Subdivisions  
 See [Figure 2B](#) Checklist of Required Information for Residential Plot Plans.  
 See [Figure 7A -7D](#) for As-built checklist requirements.

Questions regarding requirements for wells and/or on-site sewage disposal systems should be directed to the [Farmington Valley Health District](#) 860.352.2333. Questions regarding connections to Town sanitary sewers or storm drainage systems, installation of sidewalks or driveways, or any other proposed work within the Town Right-Of-Way should be directed to the Town of Avon Engineering Department at 860.409.4322. All other questions should be directed to the Planning Department at 860.409.4328.

If connection to Public Water is proposed, applicant is to coordinate with the appropriate water company for their specific requirements and approval process.

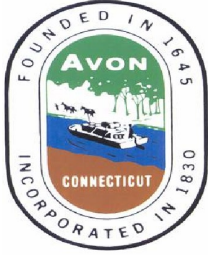
After review by the Town Departments, review comments and/or submittal approval will be conveyed to the



applicant. When plan approval is provided, the applicants must acquire all required permits and agreements prior to commencing any construction activity.

## **2.6 *New Residential Building Permit Approval Process***

Plans will be reviewed by the Planning Department, Engineering Department, and the Building Department at a minimum. All erosion and sediment control measures shall be installed and approved by the Engineering Department and/or Wetland's agent as indicated within the approved plans. The owner shall contact the Farmington Valley Health District and acquire approvals and permits for any plans with private water supply or on-site sewage systems.



**FIGURE 2A**  
**TOWN OF AVON**  
**CHECKLIST OF REQUIRED INFORMATION**  
**FOR ENGINEERING REVIEW OF COMMERCIAL**  
**SITE PLANS AND RESIDENTIAL SUBDIVISION**  
**PLANS**  
**JANUARY 18, 2023**

**APPLICANT NAME** \_\_\_\_\_  
**APPLICANT ADDRESS** \_\_\_\_\_  
\_\_\_\_\_  
**APPLICANT PHONE AND EMAIL** \_\_\_\_\_  
**PROJECT NAME** \_\_\_\_\_  
**PROJECT ADDRESS** \_\_\_\_\_

Place check mark ( ✓ ) for each item supplied.

\_\_\_\_\_ 1. Each sheet of the plans or maps must include a title block with the following information:

- \_\_\_\_\_ a. Name, address and telephone number of applicant
- \_\_\_\_\_ b. Name, address and telephone number of plan preparer (Land Surveyor or Professional Engineer)
- \_\_\_\_\_ c. Name and address of development/property
- \_\_\_\_\_ d. 7-digit Assessor's parcels IDs of Development
- \_\_\_\_\_ e. Date when drawing was prepared
- \_\_\_\_\_ f. Date and description of revisions

\_\_\_\_\_ 2. Site Location Map: An overall map drawn to a scale of 1-inch equals 1,000 feet containing the following:

- \_\_\_\_\_ a. Property Shaded
- \_\_\_\_\_ b. Layout of streets surrounding property
- \_\_\_\_\_ c. Waterbodies and streams
- \_\_\_\_\_ d. Town lines
- \_\_\_\_\_ e. North arrow and scale

- \_\_\_\_\_ 3. Site Plan: A layout map of the proposed site on 24" x 36" sheet drawn to a scale of 1-inch equals 40 feet, 30 feet, or 20 feet, containing the following data:
- \_\_\_\_\_ a. Bearings and Distances of all boundary lines and acreage of site. All iron pins and monuments found, or set are to be depicted on the plan.
  - \_\_\_\_\_ b. Data block containing needed zoning information
  - \_\_\_\_\_ c. Building lines in accordance with zoning regulations
  - \_\_\_\_\_ d. Proposed buildings and other structures, including signs, outside lighting, driveways, and hardscapes, retaining walls, landscape walls, propane tanks, generators, and other "permanent" structures. Buildings are to include offset dimensions to a minimum of the 3 closest property lines
  - \_\_\_\_\_ e. All existing and proposed easements must be shown. Volume and Page of existing easements shall be noted on the plan. The same information must be included for any zoning variances granted for the property
  - \_\_\_\_\_ f. Owner names and addresses of abutting properties
  - \_\_\_\_\_ g. Sight lines from the driveway(s) in both directions (3 feet eye height and 3-foot object) including the published standard for the posted speed limit of street, if required by the Town Engineer
  - \_\_\_\_\_ h. Utilities – locations of utilities serving the property in the right-of-way or easements and locations of utilities within the property (sanitary sewer, electricity, gas, cable, telecom, water, etc)
  - \_\_\_\_\_ i. Footing drains, yard drains, and roof leaders and associated piping including inverts, routing, and outlet protection.
  - \_\_\_\_\_ j. Tree/vegetation clearing limits
  - \_\_\_\_\_ k. Building elevations – existing and proposed first floor, basement, garage floor, and top of foundation elevations
  - \_\_\_\_\_ l. Topographic contours at 2-foot intervals symbolized to differentiate nominal and 10-foot index elevations with sufficient labels and spot elevations. Topographic information should clearly show existing and proposed elevations, pre and post development run-off conditions, grades, slopes of driveways, and tops and bottoms of retaining walls. The plan should also indicate the source of the topographic information. All topographic information within the limits of work shall be to T-2 accuracy standards.
  - \_\_\_\_\_ m. Erosion and sediment control measures (silt fence, hay bales, anti-tracking pad, sedimentation pond, etc.) and locations to include at a minimum: storm water run-off, stock pile, and anti-tracking protection and a narrative describing proposed measures

and maintenance procedures. Stock piles with erosion control measures shall be shown.

- \_\_\_\_\_ n. Wetlands limits, watercourses and water bodies, and regulated wetlands limits
  - \_\_\_\_\_ o. FEMA flood zone designations within the parcel including floodway, 1% (100 year), and 0.2% (500 year) including FEMA map reference information
  - \_\_\_\_\_ p. North Arrow and scale bar
  - \_\_\_\_\_ q. Map references including volume and page of filed maps
  - \_\_\_\_\_ r. Horizontal and vertical datums (note: the Town's preferred horizontal datum is NAD 83, Connecticut state plane, and the Town's preferred vertical datum is NAVD 88)
  - \_\_\_\_\_ s. Legend of Symbols
  - \_\_\_\_\_ t. Improvement Location Survey certification with stamp and seal of preparer
- 
- \_\_\_\_\_ 4. Profile sheets showing existing and proposed roadway centerline profile with final roadway centerline grades at every 50-foot interval and at all low and high intersection points. For all underground utilities, the Profile sheets shall depict pipe sizes and materials, top of frame and invert elevations, and slopes of pipes.
  - \_\_\_\_\_ 5. Details: Sheet(s) as required to include Town approved details for driveways, erosion and sediment control, sanitary sewer connections, storm sewer connections, outlet protection, etc.
  - \_\_\_\_\_ 6. The subdivision map shall be prepared with an accuracy meeting, or exceeding, standards for a "Class A-2 Transit Survey" as defined by the Connecticut Technical Council, Inc. The map shall be clearly and legibly drawn and submitted in six copies of blue or black line prints. The map shall be drawn to a scale of 1" = 40'. The map shall show the following:
    - \_\_\_\_\_ a. Title of the subdivision, which shall not duplicate the title of any previous subdivision in the Town of Avon.
    - \_\_\_\_\_ b. Name and address of the owner of the land to be subdivided, name and address of the applicant if different from the owner.
    - \_\_\_\_\_ c. Date, scale, north point, Town, and State.
    - \_\_\_\_\_ d. Existing and proposed property and street lines; indication of adjoining property lines and street lines for a distance of two hundred feet; and the names of all adjacent subdivisions or property owners.
    - \_\_\_\_\_ e. Existing and proposed wetlands, watercourses and ponds, conservation areas, and easements and rights-of-way; the location and limits of all easement or reservation areas for the protection of swamps, flood plains, and other land subject to potential flooding.

- \_\_\_\_\_ f. Existing and proposed open spaces for parks, stream protection and other open spaces; the square footage or acreage of all lots and open spaces, the total acreage of land included in the subdivision, and proposed lots and lot numbers. The applicant shall contact the Tax Assessor who will assign a multi-digit parcel identification number for each lot.
- \_\_\_\_\_ g. Existing permanent buildings and structures.
- \_\_\_\_\_ h. Dimensions on all lines to the hundredth of a foot; all bearings or deflection angles on all straight lines, and the central angle, tangent distance and radius of all arcs.
- \_\_\_\_\_ i. The width of all streets, rights-of-way and easements; street names.
- \_\_\_\_\_ j. Existing and proposed monuments; any municipal boundary line.
- \_\_\_\_\_ k. A location map showing the location of the subdivision in relation to existing streets in the Town at a scale of 1" = 1,000'.
- \_\_\_\_\_ l. An index map if the proposed subdivision is divided into sections or is of such size that more than one sheet is required, showing the entire subdivision with lots, lot numbers, street, street names, and delineation of areas covered by the section or sheet.
- \_\_\_\_\_ m. The survey relationship of proposed streets to nearby monumented Town streets or State highways, where practical.
- \_\_\_\_\_ n. The words, "Approved by the Avon Planning and Zoning Commission" with a designated place for endorsement by an authorized commissioner, and date of approval.

**\*\*** New construction requires submittal of an as-built record plan containing the following prior to Engineering sign off on the Certificate of Occupancy: See Section 7 for requirements

**Note:** *All annotation is to be printed at a minimum size of 0.07" tall and is to be clearly legible with no overwrites by features, leaders, or other obstructions. It is recommended that annotation for existing features be prepared at a set size and font and that annotation for proposed features be prepared at a larger size and font to clearly differentiate them. It is also recommended that line-work for proposed features be thicker and/or darker than existing features, and screening be used further clarify existing vs. proposed.*

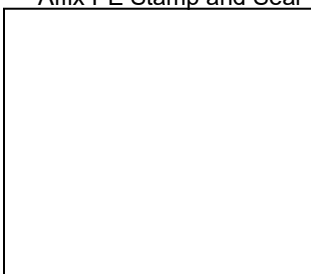
**PLAN PREPARER (P.E. / L.S.):**

(Printed name) \_\_\_\_\_

(Signature) \_\_\_\_\_

Date: \_\_\_\_\_

Affix PE Stamp and Seal





**FIGURE 2B**  
**TOWN OF AVON**  
**CHECKLIST OF REQUIRED INFORMATION**  
**FOR ENGINEERING REVIEW OF RESIDENTIAL**  
**PLOT PLANS**  
**JANUARY 18, 2023**

**APPLICANT NAME** \_\_\_\_\_

**APPLICANT ADDRESS** \_\_\_\_\_

**APPLICANT PHONE AND EMAIL** \_\_\_\_\_

**PROJECT NAME** \_\_\_\_\_

**PROJECT ADDRESS** \_\_\_\_\_

Place check mark ( ✓ ) for each item supplied.

\_\_\_\_\_ **1. Each sheet** of the plans or maps must include a title block with the following information:

- \_\_\_\_\_ **a.** Name, address, and telephone number of applicant
- \_\_\_\_\_ **b.** Name, address, and telephone number of plan preparer (Land Surveyor or Professional Engineer)
- \_\_\_\_\_ **c.** Name and address of development/property
- \_\_\_\_\_ **d.** 7-digit Assessor's parcels IDs of Development
- \_\_\_\_\_ **e.** Date when drawing was prepared
- \_\_\_\_\_ **f.** Date and description of revisions

\_\_\_\_\_ **2. Plot Plan:** A layout map of the proposed site on paper size 18"x24", 22"x34", or 24"x36". Drawn to a scale of 1-inch equals 40 feet, 30 feet, or 20 feet, containing the following data:

- \_\_\_\_\_ **a.** Bearings and Distances of all boundary lines and acreage of site. All iron pins and monuments found, or set are to be depicted on the plan.
- \_\_\_\_\_ **b.** Data block containing needed zoning information
- \_\_\_\_\_ **c.** Building lines in accordance with zoning regulations

- \_\_\_\_\_ d. Proposed buildings and other structures, including signs, outside lighting, driveways, and hardscapes, retaining walls, landscape walls, propane tanks, generators, and other “permanent” structures. Buildings are to include offset dimensions to a minimum of the 3 closest property lines
- \_\_\_\_\_ e. All existing and proposed easements must be shown. Volume and Page of existing easements shall be noted on the plan. The same information must be included for any zoning variances granted for the property
- \_\_\_\_\_ f. Owner names and addresses of abutting properties
- \_\_\_\_\_ g. Sight lines from the driveway(s) in both directions (3 feet eye height and 3-foot object) including the published standard for the posted speed limit of street, if required by the Town Engineer
- \_\_\_\_\_ h. Utilities – locations of utilities serving the property in the right-of-way or easements and locations of utilities within the property (sanitary sewer, electricity, gas, cable, telecom, water, etc.)
- \_\_\_\_\_ i. Footing drains, yard drains, and roof leaders and associated piping including inverts, routing, and outlet protection.
- \_\_\_\_\_ j. Tree/vegetation clearing limits
- \_\_\_\_\_ k. Building elevations – existing and proposed first floor, basement, garage floor, and top of foundation elevations
- \_\_\_\_\_ l. Topographic contours at 2-foot intervals symbolized to differentiate nominal and 10-foot index elevations with sufficient labels and spot elevations. Topographic information should clearly show existing and proposed elevations, pre and post development run-off conditions, grades, slopes of driveways, and tops and bottoms of retaining walls. The plan should also indicate the source of the topographic information. All topographic information within the limits of work shall be to T-2 accuracy standards.
- \_\_\_\_\_ m. Erosion and sediment control measures (silt fence, hay bales, anti-tracking pad, sedimentation pond, etc.) and locations to include at a minimum: storm water run-off, stock pile, and anti-tracking protection and a narrative describing proposed measures and maintenance procedures. Stock piles with erosion control measures shall be shown.
- \_\_\_\_\_ n. Wetlands limits, watercourses and water bodies, and regulated wetlands limits
- \_\_\_\_\_ o. FEMA flood zone designations within the parcel including floodway, 1% (100 year), and 0.2% (500 year) including FEMA map reference information
- \_\_\_\_\_ p. North Arrow and scale bar
- \_\_\_\_\_ q. Map references including volume and page of filed maps
- \_\_\_\_\_ r. Horizontal and vertical datums (note: the Town’s preferred horizontal datum is NAD

83, Connecticut state plane, and the Town's preferred vertical datum is NAVD 88)

\_\_\_\_\_ s. Legend of Symbols

\_\_\_\_\_ t. Improvement Location Survey certification with stamp and seal of preparer

3. Details: Sheet(s) as required to include Town approved details for driveways, erosion and sediment control, sanitary sewer connections, storm sewer connections, outlet protection, etc.
4. As-built topographic plan: new construction requires submittal of an as-built record plan containing the following prior to Engineering sign off on the Certificate of Occupancy:

**Note:** *All annotation is to be printed at a minimum size of 0.07" tall and is to be clearly legible with no overwrites by features, leaders, or other obstructions. It is recommended that annotation for existing features be prepared at a set size and font and that annotation for proposed features be prepared at a larger size and font to clearly differentiate them. It is also recommended that line-work for proposed features be thicker and/or darker than existing features, and screening be used further clarify existing vs. proposed.*

**PLAN PREPARER (P.E. / L.S.):**

(Printed name) \_\_\_\_\_

(Signature) \_\_\_\_\_

Date: \_\_\_\_\_

Affix PE Stamp and Seal





## SECTION 3.0

# STREET DESIGN STANDARDS

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# STREET DESIGN STANDARDS

## **3.1 Purpose**

Maximum livability, safe and efficient traffic movement, and economical construction and maintenance are consistent and compatible objectives for streets. Streets also serve pedestrian and bicycle traffic and accommodate public utility facilities within the Right-Of-Way. It is the intent of these guidelines to assist Design Engineers in the achievement of these objectives in the design of new streets and modifications of existing streets.

## **3.2 Related Town Regulations**

- Town of Avon Subdivision Regulations, Section 5.
- Code of the Town of Avon, Chapter 53.

## **3.3 Background**

The Engineering Department has incorporated information from a variety of sources to assure that sound engineering practices are employed in the design and development of new streets. The standards of the Connecticut Department of Transportation, American Association of State Highway and Transportation Officials, and the Institute of Transportation Engineers form the basis for these guidelines. References to specific guidance documents from these organizations are noted throughout these guidelines as applicable.

## **3.4 Plans**

At a minimum, the Design Engineer shall provide the following proposed design drawings:

- Existing Property Survey
- Plan Sheets (include existing field located topography)
- Profile Sheets
- Construction Details
- Erosion Control Plans, Narrative, and Details

## **3.5 Street Classifications**

Design requirements for new streets are based on three street classifications (Limited Local, Local, Collector, and Industrial) that are defined relative to the character of traffic services they are intended to provide and depend on the character of traffic and degree of land access that is provided.

If the probability exists that a street will provide access for future development, then it shall be designed to the standards required to accommodate the future development. The Town Engineer may consider distinctive design criteria when the classifications are not applicable to the proposed development.

### 3.6 Right-Of-Way (ROW)

The Right-Of-Way shall be conveyed by warrantee deed to the Town in fee simple. The Right-Of-Way width shall provide for, but is not limited to, the following:

- Roadway pavement
- Curbing and sidewalk
- Mailboxes
- Bicycle lanes or multi-use paths
- Municipal and public utilities
- Traffic control devices and street lighting
- Safety and operational control devices
- Snow storage
- Horizontal and intersection sight distance requirements

Right-Of-Way width requirements are described in the Town of Avon Subdivision Regulations Section 5.07 and summarized below in Table 3-1.

**Table 3-1. General Design Guidelines for Streets**

Design Element	Design Speed (mph)			
	25	30	35	40
Pavement Width (ft)	22	26	32	32
Right-Of-Way Width (ft)	50	60	60	60
Clear Zone (ft)	10	10	12	14
Stopping Sight Distance* (ft)	200	250	250	250
Min. Horizontal Radius (ft)	295	450	450	450
Cross Slope	3/8" / Ft	3/8" / Ft	3/8" / Ft	3/8" / Ft
Min. Vertical Grade (%)	1	1	1	1
Max. Vertical Grade (%)	12	12	12	12
Min. Length of Vertical Curve (ft)	See Section 3.11			
Intersection Sight Distance (ft)	See Section 3.13			
Min. Intersection Curb Radius (ft)**	25	25	30	30

\* See Chapter 7 of the [ConnDOT Highway Design Manual](#).

\*\* Curb Radii shall accommodate the Town's largest Fire Apparatus

### 3.7 Design Speed

Selection of Design Speed for new roadways, shall be reviewed and approved by the Town Engineer. The basis of the Design Speed shall be as summarized in Table 3-2. For modifications or extensions to an existing road, the Designer shall utilize field observed Free-Flow 85<sup>th</sup> percentile speeds.

**Table 3-2. General Design Guidelines for Streets**

Plan & Zoning Street Classification	Minimum Design Speed (mph)	Design Element	
		Min. Pavement Width (ft)	Right-of-Way Width (ft)
Limited Local	25	22	50
Local	30	26	50
Collector	35	32	60
Industrial	35	32	60

### 3.8 Street Cross Section

Pavement widths shall be as described within the Town of Avon Subdivision Regulations and are provided in Table 3-1. A wider street cross section may be required by the Town Engineer in areas where provisions for bicycles lanes or on-street parking are determined to be in the best interest of the Town.

Snow shelf widths and grades shall also be provided as shown on the Standard Details and as described in the Town of Avon Regulations for Subdivision.

Table 3-3 below, provides minimum pavement cross section and material required for Town roadways. Material depths depend on street classification and shall be as depicted in Table 3-3, and as shown on the Standard Details.

Based on field conditions, such as poor draining soils or high traffic volumes, the Town Engineer may require a site-specific engineered pavement cross section.

**Table 3-3. Pavement Cross-Section – Minimum Thickness after compaction**

Pavement Materials	Street Classification		
	Local Limited/Local	Collector	Industrial*
Bituminous Pavement Class 2	2" as compacted	2"	2"
Bituminous Pavement Class 1	2"	2"	n/a
Bituminous Pavement Class 4	n/a	n/a	4"
Processed Aggregate Base**	9"	9"	12"
Gravel Subbase Course	As Required	As Required	As Required

\* The Pavement Cross-Section shall be as indicated, unless otherwise approved by the Town Engineer.

\*\* Processed aggregate material with reclaimed materials is NOT acceptable as base material under roadways, either public or private.

All construction plans shall include the following notes:

- A Connecticut Licensed Surveyor shall stakeout the proposed roadway improvements and utilities. The Roadway shall be staked out at a minimum of 50ft intervals along tangents, 25ft intervals along curves, high points, low points, or as required by the Town Engineer. The stakes shall include stationing and structure numbers as applicable and shall include the proposed finished grade elevations.
- The Contractor is to notify the Town of Avon Engineering Department and the Design Engineer a minimum of 24 hours in advance to pull strings to check sub-grade and processed stone grades.
- The Surveyor shall provide to the Town of Avon, for review and approval, as-built locations, and elevations of binder course of pavement, and finished course of pavement.
- The finished course of pavement shall not be installed until the binder course has been installed for one full winter season.

### **3.9 Stopping Sight Distance (SSD)**

Stopping sight distance (SSD) is the length of roadway ahead that is visible to the driver. Minimum SSD shall be provided as described in Table 3-1 and shall be sufficient to enable a vehicle traveling at the design speed, to stop before reaching a stationary object in its path. The SSD is measured from a height of eye of 3.5 feet to an object height of two feet. Adjustments to the minimum SSD for grades over three percent are required in accordance with Chapter 7 of the [ConnDOT Highway Design Manual](#).

### **3.10 Horizontal Alignment**

The design of horizontal alignments shall meet the criteria outlined below. If these criteria cannot be met, a request to waive the requirements, including justification, shall be submitted to the Town Engineer.

- Horizontal curves shall meet the minimum radii described in Table 3-1, shall provide at least the minimum stopping sight distance, and shall have a minimum length of two hundred feet.
- Compound curves and spirals shall not be used for the layout of new streets.
- Superelevation will not be used except when supplemented by an engineering study; and,
- Broken Back Curves shall not be used for the layout of new streets.

For proposed local residential roads, designers should provide a curvilinear horizontal alignment that discourages high speeds by including designed “slow points” with minimum horizontal radii or other traffic calming features at regular intervals, as approved by the Town Engineer. Layout of new local residential streets should also discourage cut-through traffic, by providing a circuitous route for potential through vehicles.

### **3.11 Vertical Alignment**

The design of vertical alignments shall meet the criteria outlined below. If these criteria cannot be met, a request to waive the requirements, including justification, shall be submitted to the Town Engineer.

- Vertical alignment shall be designed to fit as closely as practical to the existing topography.
- Maximum grades based on street classification shall be as provided in Table 3-1.
- Minimum grade of one percent on the longest travel path shall be provided to allow for surface drainage; the longest travel path is generally the outside of horizontal curves and cul-de-sacs (not the centerline). Proposed grades of less than one percent are not allowed.

- Vertical curves shall be incorporated for all changes in grade in excess of 1.0 percent and shall be parabolic with a minimum length of 100 feet. Vertical curves shall be designed in conformance with the [ConnDOT Highway Design Manual](#);
- Vertical curves shall have the stopping sight distance labeled on the profile sheet; and,
- A minimum landing area of 50 feet at a grade of four (4) percent or less is required for all side street intersection approaches.

The design engineer shall incorporate into the proposed roadway design, ample elevation for the roadway to receive a future pavement overlay of 1.5 inches. The designer shall consider in the design, the proposed driveway elevations, sidewalks, front, rear, and side yard elevations within the subdivision.

### **3.12 Intersections**

In the layout of new streets, no more than four streets shall intersect at any one point to form an intersection. The centerline of all streets entering the intersection shall pass through a single point, unless otherwise approved by the Town Engineer. Good traffic engineering practice shall be followed to minimize offset intersections when existing streets are present. Street intersections shall be spaced apart no less than 150 feet as measured from centerline to centerline. However, the Town Planning and Zoning Commission may require distances between intersections, up to eight hundred feet, when a proposed street intersects with a major street (collector class or higher). Intersecting streets shall also be laid out at such intervals that minimum block lengths between streets provide adequate sight distance. Intersections shall connect at or near a 90-degree skew angle as determined by the intersecting centerline. Skew angles less than 80 degrees or greater than one hundred degrees are not acceptable.

Adequate curb radii shall be provided, as indicated in Table 3-1, to avoid unnecessary lane encroachment, and traffic conflict. At street intersections, the curb radius of the higher street classification shall be used, and in all cases shall accommodate all Town of Avon Emergency Vehicles, as deemed appropriate by the Town Engineer and Fire Marshal. Curb radii may be reduced only as approved by the Town Engineer.

Intersection grading plans shall be provided for all intersections, to ensure proper drainage. The grading plans shall be at a scale not greater than 1" = 20', a contour interval not greater than 0.5 ft and proposed spot elevations. Grading plans shall include all proposed sidewalks, accessible curb ramps, and driveways.

### **3.13 Intersection Sight Distance**

Minimum intersection sight distance (ISD) shall be provided according to AASHTO, using gap acceptance methodology. A passenger car design vehicle shall be used for determining required ISD for new local residential roads. Design vehicles for other roadway classifications or for industrial or commercial facilities shall be selected based on the composition of traffic to the site.

Table 3-4 shows guidelines for ISD for turns onto a two-lane road with minor road approach grades less than 3 percent. Designers should refer to Chapter 11 of the [ConnDOT Highway Design Manual](#), for more detailed information.

For the purposes of measuring sight distance, the driver's eye will be located 15 feet from the edge of the major road and in the center of the lane on the minor road. In restricted locations, this may be a minimum of 15 feet from the traveled way of the major road, with prior approval from the Town Engineer. The second part is based on the distance to the center of the vehicle on the major road. For a minor street right-turning maneuver, this is assumed to be the center of the closest travel lane from the left. For a minor street left-turning maneuver, this is assumed to be the center of the closest travel lane for vehicles approaching from the right. For passenger vehicles, the height of the driver's eye shall be 3.5 feet and the viewed height of object shall also be 3.5 feet.

Intersections sight lines shall be indicated on the plan sheet, as well as a profile along the sight line. If the intersection sight line extends outside of the Right-Of-Way, a sight line easement(s) will be required.

**Table 3-4. Minimum Intersection Sight Distances**

**Turn onto a Two-Lane Road with Minor Road Approach at grade less than 3 percent**

Design Speed or 85 <sup>th</sup> Percentile Speed of Major Road**	ISD (feet)*		
	Passenger cars	Single Unit Trucks	Semi-trailers
25	280	350	425
30	335	420	510
35	390	490	595
40	445	560	680
45	500	630	765
50	555	700	850

\* ISD applies for minor road approach grades less than three percent.

\*\* Whichever is greater

### **3.14 Cul-de-Sacs**

Cul-de-sacs shall be designed as described within the Town of Avon Subdivision Regulations. Temporary cul-de-sacs shall be used if there remains developable land adjacent to the property, or when phasing subdivisions. The normal gutter line for the road and all utilities shall be carried through a temporary cul-de-sac.

The minimum diameter of a paved circular cul-de-sac shall be 90 feet, and provide adequate turning radii for a School Bus. Cul-de-sacs which include a center island, shall provide adequate turning radii for a school bus, emergency vehicle, Town plow truck, and an SU Design Vehicle. All cul-de-sacs shall be field tested, on the processed aggregate base, prior to paving. The Design Engineer shall provide a detailed grading plan of the cul-de-sac area.

Center islands shall be maintained by a neighborhood association or designated lots owners. This note shall be included in the subdivision plans filed with the Town Clerks Office, the Association Documents, and the Road Warranty Deed.

A detailed grading plan at a scale of 1"=10', with a contour interval of 0.5 feet and including proposed spot elevations, shall be provided for removal of temporary cul-de-sacs to demonstrate the grading necessary to properly integrate the former cul-de-sac area with the surrounding terrain and to ensure proper drainage.

### **3.15 Roadway Widening**

Where roadway widening is required, the designer must analyze all aspects and impacts of the widening, including, but not limited to: surface drainage, utility relocation, slope limits, transitions, driveways, non-motorized transportation, private property impacts, intersecting roadways, signing, pavement markings and Right-Of-Way acquisitions. Existing shoulder widths shall not be reduced. If any widening is to occur on Town or State owned Roadways, with a Street Classification of Collector Street or higher, five foot minimum width shoulders shall be provided to accommodate bicycle traffic.

The existing roadway shall be saw cut at a minimum one foot from the existing edge of pavement. If the cross slope of the existing roadway is greater than 3/8-inch per foot, the existing roadway shall be milled at the centerline of roadway and a shim course shall be installed, prior to the roadway widening, to ensure a consistent cross slope across the traveled lanes.

Transition tapers shall be provided from the existing curb/edge of road to the widened roadway section, according to Figure 11-5G of the [ConnDOT Highway Design Manual](#). Channelizing of Left-Turn Lanes, shall be in accordance with Figure 11-5J, and where bypass is required for left-turning movements, the design shall be in accordance with Figure 11-5K.

Grading plans at a scale not less than 1" = 10' may be required by the Town Engineer.

### **3.16 Curbing**

Curbs shall be provided on new roadways for drainage control and reduction of maintenance operations, unless otherwise approved by the Town Engineer. Developers may propose to utilize low impact design (LID) techniques to manage stormwater, which may eliminate the need for curbing. Curbs shall generally be bituminous concrete lip, park, or Cape Cod curbing, or extruded concrete curbing, or granite curbing and shall be installed as indicated on Standard Details P-7, P-8, or P-9.

During the construction of roadways approved by the Town Planning and Zoning Commission, temporary bituminous curbing shall be installed on the binder course of pavement to prevent erosion while homes are under construction. When the developer is ready to install the finished course of pavement, the temporary curbing shall be removed and the permanent curbing shall be installed.

### **3.17 Underdrains**

The design shall provide for the installation of an underdrain system in all areas where wet conditions prevail or as directed by the Town Engineer. All construction plans for public improvement projects shall have a note stating that "UNDERDRAINS SHALL BE INSTALLED BY THE CONTRACTOR, AT NO EXPENSE TO THE TOWN, IFFIELD CONDITIONS WARRANT OR AS DIRECTED BY THE TOWN ENGINEER". All underdrains shall be inspected by the Town during installation, and located on the final Record/As-Built Drawings.

Underdrains shall be installed below the bottom of the subbase, containing a suitable perforated or slotted straight pipe conduit, a minimum of six inches in diameter, backfilled with a pervious material according to the Standard Detail. Detectable Warning Tape shall be provided for all underdrains according to the Standard Detail.

Connections of outlets for underdrains shall be to catch basins or manholes. If no drainage structure is available, the outlet conduit shall discharge into an existing watercourse or wetland area. Alternate discharges require approval of the Town Engineer.

### **3.18 Side Slopes**

Streets in cut or fill shall be provided with slopes not steeper than one foot vertical to two feet horizontal (1:2). Fill slopes flatter than 1:6 are recommended whenever possible, within the Right-Of-Way.

Where rock cuts steeper than one foot vertical to two feet horizontal (1:2) are necessary within an existing or proposed Right-Of-Way, the completed slopes shall be evaluated and certified to be safe by a Professional Engineer, licensed in the State of Connecticut, who specializes in geotechnical design.

Where new streets abut private property, necessary slope rights shall be shown on the final layout submittal. The Design Engineer shall investigate the effect of fills on existing adjacent properties within the slope right area, and shall provide the Town Engineer with adequate evidence including a detailed grading plan to ensure that no drainage problems will arise on an adjacent property, due to construction of cut or fill areas.

### **3.19 Retaining Walls**

Retaining walls shall not be installed within the Right-Of-Way or otherwise included as part of a subdivision or other public improvement project, unless approved by the Town Engineer. The roadway zone of influence is defined as the area between slope limits using the typical roadway section with side slopes of one foot vertical to two feet horizontal (1:2).

If approval to use a retaining wall is granted, it shall be designed in accordance with the [ConnDOT Bridge Design Manual](#). Protective fencing shall be installed at any headwall or retaining wall with a vertical drop greater than 30 inches at any point along the proposed wall. Form liners or other aesthetic treatments for



cast-in-place concrete walls or modular block walls may be required.

A Professional Engineer, licensed in the State of Connecticut, shall design retaining walls three feet high and greater at any point along the proposed wall. This dimension is the difference in elevation measured from the ground surface elevation at the base of the wall to the top of the proposed wall.

For embankment walls, a minimum eight foot wide bench shall be provided in front of the wall for access and maintenance purposes. An easement may be required, to be conveyed to the Town, for the purposes of accessing the wall for inspection and repair.

### **3.20 Guide Rail and Protective Fencing**

Guide rail shall be installed as required to protect against roadside hazards within the designated clear zone. Designers are to refer to Chapter 13 of the [ConnDOT Highway Design Manual](#), and the AASHTO Roadside Design Guide for guidance.

Guide rail shall be installed for fill slopes adjacent to the roadway where the following conditions exist:

- Side slopes flatter than one foot vertical to four feet horizontal (1:4), and roadside hazards within the clear zone; or
- Side slopes steeper than one foot vertical to four feet horizontal (1:4); or
- Height of the fill section embankment (measured from the edge of the travel way to the toe of slope) exceeds four feet for a slope of one foot vertical to two feet horizontal (1:2), eight feet for slopes of one foot vertical to three feet horizontal (1:3), or otherwise as indicated in Figure 13-3A of the [ConnDOT Highway Design Manual](#).

When guide rail is required, a note shall be provided on all construction plans, indicating it shall be installed within 60 days after installation of the binder course of paving, or prior to the first building permit, whichever occurs first.

Guide rail installations shall be one of the approved types indicated in the ConnDOT highway design manual and approved by the Town Engineer, and shall be designed and installed in accordance with the latest Connecticut Department of Transportation standards and specifications. Upon prior approval of the Town Engineer, weathering steel may be considered as an option, for areas where galvanized steel may not be aesthetically pleasing. Merritt Parkway Guide Rail, meeting the Connecticut Department of Transportation standards, is also an acceptable guide rail, however due to significant maintenance costs it shall not be installed unless required as a condition of approval from the Town Planning and Zoning Commission or as directed by the Town Engineer.

On local and collector streets, the face of the guide rail should typically be set a maximum of 12 inches from the face of curb. When a sidewalk is present, the guide rail should typically be placed along the backside of the sidewalk, with the rail element offset 12 inches from the edge of the sidewalk.

Guide rail anchoring systems shall be ConnDOT Type I or Type II End Anchorages. Only Type II End Anchorages shall be installed inside the designated clear zone, unless otherwise approved by the Town Engineer.

The layout of guiderail shall include appropriate flare rates as indicated in the ConnDOT Highway Design Manual, to allow for installation of the end anchorages outside the designated clear zone.

Easements may be required for the placement of the guiderail or its anchoring system and should be indicated on the plans.

Protective fencing shall be installed with vertical drops greater than 30 inches, including the tops of headwalls, retaining walls, etc.

Protective fencing may be required behind sidewalks where an adjacent fill slope exceeds one foot vertical

to three feet horizontal (1:3) or at other locations where deemed necessary by the Town Engineer.

Protective fencing shall be a minimum of four feet in height, and consist of black vinyl coated galvanized chain link fence, split rail fence, or other suitable fence type for the area of concern, as deemed appropriate by the Town Engineer.

### **3.21 Bridges**

The Town of Avon does not consider bridges a preferred solution for crossings. Only after all other options have been considered, and reviewed with the Town Engineer including consultation with the Town Inland Wetlands Commission, shall the Design Engineer consider a bridge crossing.

All Bridges and Box Culverts shall be designed by a Professional Engineer, licensed in the State of Connecticut, prequalified by the Connecticut Department of Transportation for "Bridge and Structure Design", and shall adhere to all current codes and standards. The Developer shall be responsible for all design, permitting, construction, testing, and inspection costs.

The Bridge shall be designed in accordance with the [ConnDOT Bridge Design Manual](#), latest edition, and approved by the Town Engineer. The Design Engineer is required to meet with the Town, prior to any design work, to discuss such items as structure type, required design parameters, width, roadside safety/guide rail, sidewalks and lighting. The Design Engineer shall be responsible for providing the necessary plans, specifications, and details to properly construct the bridge, and shall provide the necessary construction administration services related to any requests for information that the Contractor may have with regards to the plans/specifications. The Design Engineer shall provide corrective design work as required.

The waterway opening of the bridge shall be designed based on the maximum ultimate development of the entire watershed as permitted by the Town of Avon Zoning Regulations. The bridge shall be designed such that the required head and backwater produced by the structure shall not cause flooding of abutting properties. All bridges shall be designed to pass a 100-year storm event, and checked for a 500-year storm event.

The Construction Contractor and Sub-Contractors must be approved by the Town of Avon, prequalified by Connecticut Department of Transportation for "Bridge Construction", and demonstrate that each firm has performed similar type and size of work for a minimum of 10 years.

The construction inspection shall be performed by a licensed firm, independent of the design firm, and shall conform to the [ConnDOT Bridge Inspection Manual](#). The inspection firm shall be prequalified by ConnDOT for "Construction Engineering and Inspection (Road, Bridge, Aviation)" or "Bridge and Structure Design" with a minimum of 10 years' experience in similar type and size of work, and responsible for overseeing the construction of the bridge. The firm shall be responsible for overseeing all necessary inspections including, but not limited to; soil testing, compaction testing and concrete testing. The inspection firm shall work closely with the Town and provide daily activity updates, including schedules for upcoming work, overseeing third-party inspections, or conflicts in the plan. The Inspector shall have the authority to halt any work that is deemed insufficient or not in accordance with the plans and shall immediately report such activity to the Town. The inspection firm shall provide the Town a complete set of inspection records upon completion of the project.

### **3.22 Sidewalks**

Sidewalks may be required in any zones by the Avon Planning and Zoning Commission and shall be constructed of concrete as shown on the Standard Details.

Bicycle paths or other multi-use paths may also be required in lieu of or in addition to sidewalks for encouragement of non-motorized transportation, when determined to be in the best interest of the Town, or as required by a condition of approval from the Town Planning and Zoning Commission.

Typically, sidewalks shall be designed and installed such that the back of walk is a minimum of one foot in front of the street line.

Sidewalks shall be continuous with minimal grade changes through all residential driveways.

Accessible curb ramps shall be provided in accordance with Standard Details, and as required to meet current American with Disabilities Act (ADA) requirements. Apex curb ramps should only be installed with prior approval from the Town Engineer.

Additional drainage measures, such as catch basins, may be required to prevent ponding of water for sidewalks adjacent to long sag vertical curves.

### **3.23 General Requirements for Driveways**

General guidelines for driveways are provided in the Town of Avon Subdivision Regulations and the Town of Avon Zoning Regulations. Construction of a new driveway or paving of an existing driveway, requires a Driveway permit.

Driveway aprons shall have a minimum 1.5 inch lip at the gutter line, and a positive slope from the gutter line towards the property line as shown on the Standard Details. The height of the lip shall be measured from the finished roadway pavement elevation. The driveway apron shall be designed with a minimum one percent positive grade from the proposed finished gutter elevation (plus 1.5 inch future overlay) to the street line. Certain driveways such as wider commercial driveways shall require a highpoint in the driveway apron in lieu of the 1.5 inch lip. Consult with the Engineering Department as to what the specific detail is required for each case.

Driveways shall be indicated on proposed building plot plans and roadway cross-sections.

For detailed guidance on driveway layout and design, designers should refer to the Town Standard Details and Chapter 11 of the [ConnDOT Highway Design Manual](#).

### **3.24 Residential Driveways**

A typical three foot curb radius shall be provided on each side of a residential driveway, to allow passenger vehicles to enter or exit safely. Larger radii should be considered for residential driveways on high speed/volume roads. See the Avon Subdivision Regulations and the Zoning Regulations for more information. The minimum unobstructed sight distance for a driveway at its intersection with an existing or proposed street, shall meet the Minimum Intersection Sight Distances indicated in Table 3-4.

Culverts for driveways shall be installed as required, to accommodate existing drainage patterns in the area. Culverts shall be designed by a Professional Engineer, licensed in the State of Connecticut. Such culverts shall be privately owned and maintained;

Residential circular driveways shall only be constructed after prior approval by the Town Engineering and Planning Departments.

### **3.25 Commercial and Industrial Driveways**

Commercial and industrial driveways shall not exceed 30 feet in width as measured at the street line, without approval by the Town Engineer. No portion of the driveway shall exceed eight percent in grade. Unless otherwise directed by the Town Engineer, Commercial and Industrial driveway curb radii should generally be designed to accommodate a single unit truck (SU-30) design vehicle, or anticipated delivery vehicle, without encroachment on the opposing lane of traffic. When circumstances dictate, a semi-trailer design vehicle may be required as directed by the Town Engineer.

### **3.26 Signs**

All traffic signs shall conform to the traffic signs and street name signs, latest revision of the "Manual on Uniform Traffic Control Devices" (MUTCD), the "Standard Highway Signs" and the "Connecticut Department of Transportation Catalog of Signs". Traffic signs and their supports shall be constructed as approved by the Town of Avon Traffic Authority and Director of Public Works.

Object marker signs shall be installed to identify all off-road drainage structures and outlet locations. Object markers shall be in accordance with the MUTCD.

### **3.27 Pavement Markings**

All proposed pavement markings shall be painted pavement markings unless otherwise directed by the Public Works Director and the Traffic Authority, and shall be designed in accordance with the latest Connecticut Department of Transportation and MUTCD standards. Stop bars, centerline, and crosswalk markings shall be installed on all streets according to MUTCD and the Standard Details.

### **3.28 Utility Line Assignments**

Utility line assignments are intended to permit a reserved area for construction of utilities with minimum conflict to other utilities. Proposed subdivision roads shall accommodate the line assignments shown on the Standard Details.

Along existing roads, utility line assignments shall be followed to the extent practical, as determined by the Town Engineer. In all cases, utility companies shall submit plans for review and approval by the Town Engineer as described in Section 2.3.

### **3.29 Monuments**

Monuments shall be set at right angles to and opposite all points of curvature and points of tangency of all curves, street intersections, Right-Of-Way angle points, and other points as directed by the Town Engineer. Monuments shall conform to the Standard Detail and be set so that the elevation of the top of the monument is flush with the final grade. In no case shall the monument exceed six inches below final finished grade. Plantings, fences, or other improvements shall not be installed directly over the monument.

Iron rods shall be set along the street line at all property corners, easement corners, and other points as directed by the Town Engineer. Unless otherwise approved by the Town Engineer, driveways, sidewalks, and any other hardscapes shall not be constructed where monuments are to be installed. If approved, the Surveyor shall be required to install the monument within a steel monument box (East Jordan Iron Works #1574 or approved equal). Monument boxes shall be installed prior to construction of the hardscape. The abutting property owner shall own and maintain the monument box accordingly. In areas of rock or concrete, the Surveyor may be allowed to utilize a "MAG" or "PK" nail, and a bronze disk within concrete or rock areas, per written approval by the Town Engineer. Before any monumentation is installed, the Surveyor is required to review the areas with the Town Engineer.

All monumentation shall be furnished and installed by the Developer, and their accuracy certified by a Licensed Land Surveyor, and indicated as such on the Record Drawings, prior to conveying property interests to others.

In the event that any existing monumentation, as shown on the original subdivision plan or found in the field after the start of construction, is destroyed, damaged or disturbed, the Contractor's Land Surveyor shall replace or reset the monumentation to its proper location and is to inform the Town Engineer, in writing, that this has been done.

All monumentation shall conform to Sections 20-300b-1 to 20-300b-20 of the Regulations of Connecticut State Agencies - "Standards for Surveys and Maps."

### **3.30 Traffic Signalization**

New traffic signals and modifications to existing traffic signals shall be designed and installed by the Developer in accordance with the "[Manual on Uniform Traffic Control Devices](#)", and the "[Connecticut Department of Transportation Signal Design Manual](#)". Plans and specifications shall be prepared by a Professional Engineer, licensed in the State of Connecticut, and shall be subject to review by the Town Engineer at the preliminary, semi-final and final design stage. Developers shall be responsible for obtaining approval from Office of the State Traffic Administration (OSTA), for any traffic signal work.

When the need for the traffic signal is to mitigate traffic generated by a development, the development shall be responsible for all design, installation, maintenance and energy costs. A record of responsibilities shall be recorded on the land records, and shall address ownership, construction costs, maintenance, future replacement, and electrical energy costs.

### **3.31 Traffic Impact and Access Studies**

Traffic Impact and Access Studies (TIAS) shall be prepared under the supervision of a Professional Traffic Operations Engineer (PTOE)/Professional Engineer, in the State of Connecticut, who specializes in traffic and transportation engineering. All reports and analysis submitted for review shall bear an original signature and seal of the Professional Engineer responsible for the analysis.

- A TIAS will be required for all projects with greater than 200 parking spaces and/or involving greater than 100,000 square feet of development, or otherwise meeting Major Traffic Generator certification thresholds through the OSTA. When this condition is met, the TIAS shall be subject to review by both the State of Connecticut Department of Transportation (ConnDOT) and the Town Engineer.
- A TIAS will be required for projects not meeting OSTA thresholds but involving a new development or additions to existing developments generating 100 or more trips during the peak hour of the generator or over 750 trips in an average day.
- A TIAS may also be required for developments generating lower peak hour volumes where; current traffic problems or concerns exist, the public may perceive an adverse impact on the adjacent neighborhoods or other areas, the proximity of site drives to other drives or intersections could create traffic concerns, or based on other specific problems or concerns that may be aggravated by the proposed development. Should such conditions arise, the Town Engineer will evaluate the need for the study based on technical merit.

The limits of the traffic study shall be determined by the Town Engineer and/or ConnDOT. Within these limits, manual turning movement counts of adjacent intersections shall be performed as required, to assess the existing operating conditions of the study area.

Traffic counts shall be adjusted according to ConnDOT procedures, to account for the time of year the count was completed. Adjustments shall also be made to include other approved developments within the study area that are not fully developed at the time of the study. The PTOE is to contact the Town of Avon Planning Department for additional information at 860.409.4328.

Site generated traffic for a proposed development, shall be determined utilizing Trip Generation Data compiled by ConnDOT, Institute of Transportation Engineers Trip Generation Manual, or through traffic counts from similar facilities.

Pass-by traffic shall be limited to 20 percent of the site generated traffic, or 10 percent of the adjacent street traffic, whichever is lower.

The planning horizon for the traffic impact study shall generally be the opening year for the proposed facility. However, for larger scale developments, a longer planning horizon may be required, which will be determined by the Town Engineer, based on the traffic generation of the proposed development. Where off-site public improvements are required to mitigate traffic impacts from a proposed development, improvements shall be designed and evaluated to accommodate future 10-year volumes, or as indicated in the ConnDOT Highway Design Manual.

Capacity analysis shall be performed using the recommendations of the Highway Capacity Manual latest edition, and shall be performed using the Highway Capacity Software (HCS) or Synchro. Results of the analysis shall be summarized in tabular form reporting delay, queue, and available storage for each lane group. In addition, supporting documentation including all input data, supportive analysis output and electronic files of the analysis, in their native format shall be provided.

Queuing and Storage Analysis supporting the existing and build traffic conditions shall be provided for all intersections. The available storage and the maximum queue length associated with 95 percent probability occurrence shall be summarized in tabular form, for each lane, and shall be included in the analysis output.

An evaluation of crash history within the study limits shall be performed. Research of existing crash history shall include data from both the Town of Avon Police Department, and ConnDOT as applicable.

### **3.32 Irrigation Systems**

All components of an irrigation system shall not be permitted in the Right-Of-Way, without written consent of the Avon Public Works Director. Any portion of the irrigation system in the Right-Of-Way, will be the responsibility of the property owner to maintain, repair, and relocate as a result of any future construction or maintenance. If the developer proposes irrigation for building lots, the entire irrigation system shall remain on private property, and shall be the responsibility of either the developer or homeowner. The irrigation system shall not cause any icing to the sidewalk or street and at no time shall the spray/flow cross the sidewalk interfering with pedestrian, cyclist, or motor vehicle traffic.

## SECTION 4.0

# STORMWATER MANAGEMENT DESIGN STANDARDS

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# STORMWATER MANAGEMENT DESIGN STANDARDS

## **4.1 General**

The objectives of these design standards are to minimize negative environmental impacts caused by development, ensure there are no downstream impacts from the proposed development, and to conserve the Town of Avon's natural resources. This can be accomplished by the following means:

- Preserving existing natural drainage patterns;
- Reducing the rate of run-off from newly developed land to minimize increases in flooding;
- Emphasizing non-structural approaches to controlling run-off whenever possible;
- Assuring the adequacy of existing and proposed culverts, detention basins, bridges, channels, dams, and other drainage systems;
- Increasing water recharge into the ground using infiltration whenever possible;
- Reducing the soil erosion potential from development or construction projects;
- Decreasing non-point source pollution and water quality degradation;
- Preventing pollution of underground sources of drinking water (aquifers);
- Maintaining stream channels for their biological, recreational, functional, and aesthetic benefits; and,
- Preserving open space and naturally vegetated riparian buffers through stream corridor and floodplain protection.

The design of stormwater management systems shall apply sound engineering practices and judgment, based on all available data, and in conformance with the [State of Connecticut Drainage Manual](#). The design shall satisfy all Federal, State, Town regulations, and applicable permit requirements.

## **4.2 Related Town Regulations**

- [Town of Avon Subdivision Regulations](#)
- [Town of Avon Zoning Regulations](#)
- [Code of The Town of Avon](#)

## **4.3 Components of Stormwater Management**

Each of the following basic components of stormwater management must be investigated and analyzed by the Design Engineer for proposed developments:

### Off-Site Analysis

All proposed projects must identify the upstream tributary drainage area and perform a downstream impact analysis. The level of analysis required, depends on the size and type of project and its potential drainage impact as determined by the Design Engineer, and approved by the Town Engineer.



#### Peak Run-off Control

The discharge of stormwater run-off from proposed developments must not cause adverse impact on downstream areas. Developers must attenuate the peak stormwater flows from the site so as not to exceed the pre-development rate of run-off. Consult Section 4.5 for additional information.

#### Time of Concentration (Tc)

The alteration of the Tc between the existing and proposed development must not cause an adverse impact on downstream areas. Developers must make all efforts to match the existing downstream Tc, so as not to exceed the pre-development rate of run-off. Consult Section 4.6 for additional information.

#### Conveyance Systems

All conveyance systems must be designed and constructed to accommodate existing upstream off-site as well as on-site stormwater flows.

#### Stormwater Quality

Proposed projects shall include provisions for the treatment of surface run-off in order to minimize the discharge of pollutants into water bodies. The levels of treatment depend on the size and type of project, and shall conform to the Connecticut Stormwater Quality Manual.

#### Erosion and Sediment Control Plan

All plans shall include site specific measures to control soil erosion and sediment during construction. Plans shall include sufficient details and a narrative to describe the sequencing of installation and the inspection, maintenance, and repair.

#### Operation and Maintenance Plan

An Operation and Maintenance Plan (O&M) and schedule shall be shown on the plans. Maintenance of all proposed drainage facilities not dedicated to the Town of Avon or other government agency, shall be the sole responsibility of the property owner, Development Association, or abutting property owner as indicated on the plans. The Design Engineer shall prepare an O&M for owners of privately maintained facilities, and shall submit this O&M with the application to the Town for review and approval. The O&M shall be recorded in the Avon Land Records.

### **4.4 Stormwater Management Reports**

Stormwater Management Reports shall detail the proposed drainage design and analysis of a project. The report shall detail the basic components of stormwater management as mentioned in Section 4.3 as it pertains to the proposed project. All Stormwater Management Reports must be signed and sealed by a Professional Engineer, licensed in the State of Connecticut, and submitted with all permit applications.

Stormwater Management Reports are required for all site developments within the Town of Avon, including, but not limited to, development applications to the Town Planning and Zoning Commission, Town Conservation and Inland Wetlands Commission, subdivision applications, public road construction, and any projects that impact the volume or conveyance of stormwater.

The need for a Stormwater Management Report may be waived by the Town Engineer for one of the following reasons:

- The proposed project will have little or no impact to the existing drainage system (i.e. building renovation with no site work); and,
- The proposed project already has an approved Stormwater Management Report on file with the Town of Avon. However, amendments to the originally approved Stormwater Management Report may be required to address compliance with requirements that were not in effect at the time of approval, and or to address conditions that differ from those of the original submission.

The Stormwater Management Report shall include:

- Narrative summarizing the existing conditions, the proposed project, design methodology, and a table comparing post-development peak flows and Tc with pre-development peak flows and Tc;
- Existing and Proposed Drainage Area Maps, with topographical contours, indicating upstream contributing drainage areas labeled to coincide with the drainage computations. Time of Concentration paths for each drainage area shall be indicated on the map;
- Inland Wetland boundaries as field delineated by a licensed soil scientist;
- The analysis of downstream hydraulic structures and watercourses. The report shall detail any impact to structures, watercourses, downstream impacts, or areas of special concern that are identified by the Town Engineer within the downstream zone of influence, under existing or reasonably anticipated future conditions. The downstream zone of influence generally extends to the existing drainage system outlet, downstream of the proposed outlet. If peak flow attenuation is not provided, only after prior approval from the Town Engineer shall these structures be evaluated for their physical condition and flow capacity and upgraded as required;
- Identification of the peak rate of run-off and flow velocities at various key points in the watershed and the relative timing of the peak flow rates;
- Supporting calculations, including times of concentration and run-off coefficients, for all proposed drainage facilities, including but not limited to: piping, structures, riprap, swales, detention basins, drywells, etc.;
- Identification of [Aquifer Protection Areas](#) within the limits of the project; and,
- Identification of [Public Drinking Water Wells](#) within the limits of the project.

All Stormwater Management Reports shall include a pipe report as indicated in Figure 4-1.

Figure 4-1. Sample Stormwater Management Pipe Report

[illegible]

The report shall be submitted with a complete set of construction plans indicating, in both plan and profile, all existing and proposed storm drain features along with the top of frame and invert elevations of all structures. Construction details shall also be provided for all proposed drainage structures. Drainage structures and pipe systems shall be labeled to coincide with the Stormwater Management Report.

All plans for development proposals within or adjacent to a flood zone shall show the location and elevation of the 100-year and 500-year flood zones. This information shall be as described in the most recent [Flood Insurance Rate Maps](#) and [Flood Insurance Study](#) for the area and any amendments thereto.

Electronic copies of drainage computations shall be submitted with the Stormwater Management Report, to the Town Engineer as part of the application submission.

#### **4.5 Peak Run-off Attenuation**

The discharge of stormwater run-off from proposed developments must not cause adverse impact to downstream areas. Proposed projects shall attenuate the post-development peak run-off rate to no more than the pre-development peak run-off rate, unless it is determined that such attenuation will have a detrimental impact downstream. As part of the design of the stormwater system, the Design Engineer shall be required to analyze the existing and proposed runoff volume and how it affects downstream conditions.

Peak run-off attenuation may not be required for certain areas in the lower reaches of a watershed if it can be shown that site run-off flows directly to a watercourse such that the peak flow from the site occurs before the peak flow of the watercourse and attenuation would be problematic.

#### **4.6 Time of Concentration (Tc)**

Proposed projects shall attenuate the post-development Tc, so as not to lower the Tc below the pre-development Tc, unless it is determined that such attenuation will have a detrimental impact downstream. As part of the design of the stormwater system, the Design Engineer shall be required to analyze the existing and proposed Tc and how it affects downstream conditions.

Attenuation of the Tc may not be required for certain areas in the lower reaches of a watershed if it can be shown that the Tc from the site or sub drainage area, to the point of analysis or abutting property, occurs before the peak Tc of the watercourse and attenuation would occur. The Design Engineer shall review the existing and proposed time of concentrations, and how an increase in Tc may affect streams, wetlands, and downstream properties with the increased potential for erosion due to flow being extended over a longer period of time.

#### **4.7 Hydrology Methods**

The Design Engineer shall analyze the peak rates of runoff for the site for both predevelopment conditions and post-development conditions using design procedures outlined in the State of Connecticut Department of Transportation "[Drainage Manual](#)", latest edition, and the criteria specified herein.

The Rational Method ( $Q=CIA$ ) may be used to determine peak rates of runoff from simple watersheds with less than 200 acres and no significant surface impoundments (ponds, detention basins, etc.). Rainfall intensity used for Rational Method drainage calculations shall be as outlined in Chapter 6 of the [ConnDOT Drainage Manual](#), for Hartford County. Times of concentration and weighted runoff coefficients shall be clearly identified within the drainage computations.

For watersheds between 200 and 500 acres in area, or for any watersheds with existing or proposed detention, one of the following hydrology methods shall be used:

- Natural Resources Conservation Service (NRCS) hydrology method TR-55
- Natural Resources Conservation Service (NRCS) hydrology method TR-20
- U.S. Army Corps of Engineers Method HEC-1

For drainage areas greater than 500 acres in area, FEMA regression formulas shall be used.

Note that the Rational Method was developed for determining steady state peak flow rates rather than time based hydrographs and run off volumes, and therefore should not be used for designing peak flow attenuation (detention) systems.

Computerized hydrograph evaluations shall be conducted for both pre-development and post development conditions for storms with average return frequencies of 2, 10, 25, 50 and 100 years. The hydrograph analysis shall include determination of runoff for each subwatershed and routing runoff through storage impoundments and floodplain storage areas. Subwatersheds shall be selected to determine flows at key structures. The analysis must isolate and identify that portion of the peak flow at critical downstream points associated with the proposed project.

If using one of the National Resources Conservation Service (NRCS) methods, the 24-hour rainfall amounts shown in Table 4.1 shall be used, unless more updated information is provided and verified by Town staff.

**Table 4.1 NRCS 24-hour Rainfall Amounts**

<b>Storm Frequency (Year)</b>	<b>Rainfall (inches)</b>
2	3.2
5	4.1
10	4.7
25	5.5
50	6.2
100	6.9

The SCS Type III rainfall distribution pattern shall be used with Antecedent Moisture Condition II. The times of concentration used for all hydrology methods shall be based upon the use of multiple segment flow paths as described in the U.S. Soil Conservation Service TR-55 manual and the [ConnDOT Drainage Manual](#). All flow paths shall be clearly labeled on the drainage area map.

#### **4.8 Design Storm Selection**

Design storm return frequency for all curb inlet storm drainage systems and channels conducting site stormwater (not carrying a watercourse) shall be 25 years.

Design storm return frequency, for cross culverts or channels carrying a watercourse shall be based on watershed area as provided in Table 4.2.

**Table 4.2 Cross Culvert/Channel Design Storm Frequency**

<b>Culvert or Channel Classification</b>	<b>Drainage Area (Sq. Miles)</b>	<b>Design Return Frequency (Year)</b>	<b>Minimum Freeboard (Feet)**</b>
Minor (no established water course)	<1	25	1
Small	<1	50	1
Intermediate*	1 – 10	100	1
Large*	>10	100	2

\* Although not preferred, the designer shall also consider bridge alternatives for this class when area > 1 sq. mile.

\*\* Freeboard is defined as the vertical distance between the design water surface and the upstream control such as the low point of the roadway edge, sill of a building or other controlling element.

Design storm frequency for gutter flow calculations, are based on Town road classification as depicted in Table 4.3. Gutter flow calculations shall be according to Section 11.9 of the ConnDOT Drainage Manual. Allowable gutter flow spread shall be up to ½ of the travel lane.

**Table 4.3 Roadway Gutter Flow Design Storm Frequency**

<b>Street Classification</b>	<b>Typical Design Frequency</b>	<b>Sag Condition Design Frequency</b>
Local and Limited Local	25 years	25 years
Collector and Industrial	25 years	25 years

#### **4.9 Conveyance System Design**

The following guidelines are to assist in the design of storm drainage conveyance systems. The designs should be the product of sound engineering practices and judgment, and based on the best available data, including the following items:

- Layout, sizing, and material selection for storm conduits
- Assessment of hydraulic capacity of the proposed facility
- Design of outlet protection

#### **Hydraulic Grade Line Calculations**

Hydraulic analysis of storm drain systems shall be prepared in accordance with Section 11.11 of the [ConnDOT Drainage Manual](#), except where noted otherwise.

Hydraulic capacity of the storm drain system shall include an evaluation of the hydraulic grade line for all closed systems. Hydraulic Grade Line of storm drain systems shall be prepared in accordance with Section 11.12 of the [ConnDOT Drainage Manual](#), except where noted otherwise.

A minimum freeboard of one foot from the hydraulic grade line to the top of grate shall be provided for all storm structures.

Stormwater discharges into rivers, lakes, as well as detention and/or retention facilities, or other bodies of

water, shall consider the hydraulic impact of having drainage outlets submerged (tailwater effect). The preferred method of determining tailwater levels is based on the use of FEMA Flood Insurance Study. Published studies are available for most rivers with watersheds of over one square mile and they include floodwater elevations for events with average return frequencies of 10, 50, 100, and 500 years. Historic flood levels and high water marks may be available in some areas and are helpful in estimating tail water levels.

For detention and retention facilities, the tailwater elevation for all inlet piping should be based on a 25-year design storm. If in the opinion of the Town Engineer the tailwater can have a negative effect on property during larger storm events, such as the connection of footing drains to the proposed drainage system or the flooding of basements due to the backwater, then the tailwater elevation shall be based on a 100-year design storm or as determined by the Town Engineer.

### **System Layout**

Layout of storm drain systems shall be in accordance with Section 11.8 of the [ConnDOT Drainage Manual](#), except as noted below.

Placement of structures, catch basins, or manholes, shall generally be at each grade change, at each significant change in horizontal direction, and at each junction point.

The location of the first catch basin in a storm drain system shall be based on the gutter flow analysis, but shall be within 300 feet of the roadway high point. Spacing of additional catch basins shall be a maximum of 300 feet apart or as required to meet the allowable gutter flow spread.

The design shall include the installation of catch basins as required to properly drain surface run off from all intersections. Catch basins at intersections shall be located upstream of crosswalks whenever possible, and located to prevent gutter flow by-pass to enter the intersecting streets.

In sag vertical curves, Double Type II Catch Basins shall be set at the low point

Catch basins shall be installed in the “throat” of all cul-de-sacs.

### **Roof Leaders**

It is preferred that roof leaders be tied into the Town’s storm drainage system. If roof leaders are not connected to the Town’s system, the pipes are to be discharged on the ground within ten (10) feet of the structure. Roof leaders which are splashed on the ground shall be kept separate so as not to concentrate water at one discharge point.

### **Footing Drains**

**Whenever possible, footing drains are to be tied into the Town’s storm drainage system.**

A Drainage Agreement is required when connecting roof leaders and/or footing drains to the Town maintained storm drainage system. The agreement shall relieve the Town of Avon of any responsibility in the event of any failure of the storm drainage system caused or impacted by private connections to the Town’s storm drainage system. The Drainage Agreement is included in the Figure 4.A of this manual.

## **Pipe Design**

Design of storm drain conduits shall meet the following requirements:

- Circular conduits for the conveyance of roadway surface drainage should not be less than 15 inches nominal diameter;
- Minimum velocity shall be three feet per second, maximum velocity shall not exceed 12 feet per second;
- Minimum conduit slopes shall be 0.5 percent or those required to achieve the minimum velocities. Whichever is greater;
- Storm drain pipes shall maintain a minimum five foot horizontal separation distance from water mains and other utilities;
- Reinforced Concrete Pipe (RCP) Class IV shall normally be used except where minimum or maximum fills require otherwise. A minimum cover of two feet shall be provided for RCP under the finished roadway grade, or one foot for Class V RCP. This may vary based on recommended manufacturer's specifications and approval by the Town Engineer. Strength computations shall be performed if the cover exceeds 15 feet;
- High Density Polyethylene Pipe (HDPE) is not allowed in the Town R.O.W with the following exceptions; connections from a private storm drainage system, Town managed, off-road storm drainage with prior approval of Town Engineer. HDPE pipe is allowed in privately owned and maintained storm drainage systems.
- High Density Polyethylene Pipe (HDPE) shall be installed in accordance with the manufacturer's specifications or as directed by the Town Engineer. Depending upon the design, proposed elevations and pipe cover, the use of HDPE may not be allowed.
- The installation of any other substitute type of pipe requires approval by the Town Engineer;
- Conduits shall be installed on straight alignments, both horizontally and vertically, with structures providing access;
- Storm drainage conduits along streets should avoid infringement on the snow shelf area and conflict with other utilities; and,
- Storm drainage conduit installation shall conform to the requirements of the Department of Public Health.

## **Structure Requirements**

Drainage structures shall meet the requirements of the Connecticut Department of Transportation, except as indicated otherwise herein or on the Standard Details.

All catch basins shall have a sump to trap sediment. The sump should be a minimum two (2) feet below the lowest pipe invert. Catch basins subject to potentially high pollutant loads of floatable material (i.e. parking lots) shall have a four (4) foot sump and be equipped with a hood or baffle to prevent discharge of the floating material. Deeper sumps may be required under certain circumstances, as noted in the 2004 Connecticut Stormwater Quality Manual.

The design of all special structures such as deep catch basins or manholes (over ten feet deep), non-standard end walls, siltation chambers, and other structures as identified by the Town Engineer, shall be subject to the approval of the Town Engineer.

An object marker sign on a galvanized signpost shall be installed to locate off-road drainage structures and outfalls.



## **Culverts and Bridges**

Culverts and bridges shall be designed in accordance with Chapter 8 and Chapter 9 of the [ConnDOT Drainage Manual](#). Bridges shall be designed based on a 100-year storm event and checked for a 500-year storm event.

## **Open Channels**

The use of open channels within the Right-Of-Way to carry roadway stormwater is only permitted with prior approval from the Town Engineer. When required to accommodate an existing roadside channel or watercourse, the design of a channel shall consist of computing a cross section, grade, and permanent lining that will accommodate the design discharge under the controlling conditions with a minimum one foot of freeboard. Open channel flow shall be evaluated and designed in accordance with Chapter 7 of the [ConnDOT Drainage Manual](#). Design Storm Frequency shall be in accordance with Section 4.8 of this manual.

### **4.10 Outlet Locations**

Stormwater that has been collected or otherwise artificially channeled, shall be discharged into suitable watercourses, wetlands, or with prior approval, into Town or State drainage systems with adequate capacity to carry the discharge.

There shall be no discharge onto or over private property within or adjoining the roadway, unless;

- proper easements and discharge rights have been secured by the applicant;
- such easements and rights are transferable; and,
- there will be adequate safeguards against soil erosion and flood hazards.

No stormwater shall be diverted from one watershed to another without proper DEEP Diversion permits and an evaluation of downstream impacts.

### **4.11 Outlet Protection**

Design of outlet protection shall consist of riprap aprons or preformed scour holes designed according to Section 11.13 of the [ConnDOT Drainage Manual](#), and as shown on the Standard Details.

### **4.12 Stormwater Storage Facilities**

Stormwater storage facilities may be used as a means to attenuate peak flows, increase time of concentrations, or reduce runoff volume. Storage facilities may include, but are not limited to, detention basins, recharge basins, retention basins, ponds, subsurface infiltrators or a combination thereof.

Storage facilities shall be designed to temporarily store runoff, using controls at the outlet structure, designed to release the runoff rates at or below pre-developed conditions. In certain situations, the Town may require an outlet structure to be multi-staged and designed to attenuate the 2-year, 10-year, 25-year and 100-year storm events.

Storage facilities shall also be designed to match existing conditions or minimize downstream impacts. The Town Engineer may designate an area downstream that should be included in the analysis. The designated area may include a flood prone area or road crossing, an eroding stream bank, an existing drainage outlet, or an area where existing homes or business may be of particular concern. The existing watershed for the

designated area shall be delineated and analyzed, and then re-analyzed for the effects of the proposed detention facility.

All storage facilities shall be analyzed with hydrograph and storage routing techniques. Some storage facilities may be considered a dam. The Connecticut Department of Energy and Environmental Protection (CTDEEP) shall be consulted to determine the potential need for a dam construction permit. Impoundments greater than 20 feet deep or storing volumes in excess of 50 acre-feet are subject to the requirements of the Safe Dams Act unless the volume is achieved through excavation. See Section 10.5 of the [ConnDOT Drainage Manual](#), for more detailed guidance. The Town will require a dam determination from CTDEEP.

Some storage facilities may require a State of Connecticut [Water Diversion Permit](#), from the CTDEEP Inland Water Resources Division. The following is a general rule of thumb to determine when a Diversion Permit may be necessary:

1. If the contributing drainage area to the detention basin is greater than 100 acres, or
2. If the contributing drainage area is less than 100 acres and/or wetlands or watercourses are involved.

For proposed discharges to watercourses identified as having significant erosion potential or for other watercourses as directed by the Town Engineer, detention facilities shall be sized for over-control of the two year frequency storm to 50 percent of the pre-development level, as described in Section 10.4.2 of the [Connecticut Stormwater Quality Manual](#).

### **Above Ground Detention Basins**

Unless otherwise required by the Town Engineer, the outlet structure for aboveground detention basins shall be designed such that the detention basin drains completely (i.e., the lowest stage outlet is equal to the bottom of pond elevation and there is a minimum 2 percent slope toward the outlet). The primary outlet pipe shall be designed with a capacity equal to the discharge from a 100-year storm. Basins shall be sized to provide a minimum one foot of freeboard for the 100-year storm event from the top of berm elevation. An emergency spillway must be provided at the elevation of the 100-year storm. The emergency spillway shall be located such that overflow utilizes existing drainage patterns (i.e. does not divert water to a different watershed) and will not be capable of overflowing onto a public roadway.

Detention basins shall incorporate a forebay sized to handle the water quality volume. Detention basin side slopes shall be a maximum of one foot vertical to four feet horizontal (1:4) or flatter for ease of maintenance, unless prior approval is granted by the Town Engineer. Maintenance access roads with appropriate easements, shall be provided to both the forebay and outlet structure. Access roads shall meet the requirements noted under Section 4.15.

Detention basins should be located such that the outer berm of the detention basin is a minimum of 100 feet from the nearest designated building area for a residential home, or as directed by the Town Engineer. Wherever possible, the basin should be located in areas where existing native vegetation between the detention basin and the nearest residence can be preserved to provide visual screening. Installation of fencing and/or screening shall be as required by the Town Inland Wetlands Commission, Town Planning Commission, or Town Engineer. Screening and fencing shall be designed to accommodate access needs of the Town, Association, or other entities.

Other items to be included with the design of a detention basin include:

- Grading plan of scale not less than 1"=40'

- Outlet structure details
- Cross sections of the embankment and spillway
- Inflow hydrograph with outflow hydrograph superimposed
- Elevation-Stage-Storage curve or table
- Elevation-Stage-Discharge curve or table
- Volume required to detain any increase in run-off
- Flood-routing calculations
- Written comments on the subsurface conditions relative to water table, ledge and soil permeability
- Proposed landscaping and vegetative cover used to stabilize slopes

### **Subsurface Detention Facilities**

Subsurface detention facilities are designed to utilize groundwater infiltration and/or underground storage to attenuate peak flows. The same hydrology methods as above ground detention basins shall be used to design subsurface facilities. All designs that utilize groundwater infiltration shall include supporting soil permeability testing, as identified in the [Connecticut Stormwater Quality Manual](#). Infiltration type facilities shall be designed with an overflow to accommodate the 100-year storm. Subsurface detention facilities may not be permitted within Town designated aquifer recharge areas. Unless otherwise approved by the Town Engineer, subsurface detention systems shall not be installed for new public roadways to be constructed as part of a subdivision.

### **Retention Basins**

Retention Basins are designed to contain a permanent pool of water. Since these basins do not include outlets, they can have a detrimental effect to downstream properties. For this reason, retention basins should only be proposed with the consent of the Town Engineer. If the basin maintains permanent standing water, a depth of 5 feet to 10 feet shall be maintained to discourage the growth of weeds. Aeration may be required to prevent anaerobic conditions.

### **Operation and Maintenance of Storage Facilities**

An Operation and Maintenance Plan (O&M) and schedule for all storage facilities, shall be shown on the plans. It shall identify at a minimum, items of routine maintenance, frequency of routine maintenance, responsible party for routine maintenance and emergency operations in the event of a flood. When a private storage facility is proposed, operation and maintenance shall be the sole responsibility of the property owner, Development Association, or abutting property owner as indicated on the plans, and shall be clearly stated on the subdivision plans and included in the Association Documents.

When a storage facility is to be owned by the Town of Avon, routine maintenance such as grass mowing and brush removal, shall be the sole responsibility of the Development Association, or abutting property owner as indicated on the plans, and shall be clearly stated on the subdivision plans and included in the Association Documents.

The O&M shall be recorded in the Avon Land Records.

### **4.13 Stormwater Quality**

All site development plans shall include provisions for the treatment of surface water run-off, in order to minimize the sources and transport of pollutants off-site or into wetlands and watercourses following construction. These requirements are an important part of the Town's strategy to comply with federal, state

and Town regulations, including The Federal Clean Water Act and National Pollutant Discharge Elimination System (NPDES) Permit Phase II requirements. In designated Aquifer Protection Zones, designers should also reference the Town of Avon Aquifer Protection Area Regulations for additional requirements.

The recommendations of the [Connecticut Stormwater Quality Manual](#) shall be incorporated into all site development projects. Engineers shall submit CTDEEP “Stormwater Quality Worksheet”, when required CTDEEP approval is required.

For stormwater management systems serving new public roadways or other private site developments, water quality measures should include a system of both primary and secondary treatment as detailed below, or as directed by the Town Engineer.

### **Primary Treatment**

General requirements for primary treatment shall be as follows:

- Infiltration practices shall be incorporated into other portions of the drainage system as soil conditions allow; and,
- Water quality swales should be incorporated wherever possible to provide additional treatment of water before it reaches the detention basin or outfall. These swales shall be the sole responsibility of the Development Association, or abutting property owner as indicated on the plans, and shall be clearly stated on the subdivision plans and included in the Association Documents.

### **Secondary / Pretreatment**

General requirements for secondary treatment shall be as follows:

- Dry detention basins shall incorporate infiltration practices when applicable, and shall include a sediment forebay sized for the water quality volume;
- Sedimentation structures shall be installed as the last structure in a storm drainage system draining to a detention basin or other primary water quality treatment system. These structures shall be installed with a diversion manhole in an “off-line” configuration. The diversion manhole shall be designed to direct flows up to the water quality flow into the sedimentation structure, with greater flows bypassing the sedimentation structure to avoid flushing of captured soil / sand particles during storm higher intensity storm events;
- Hydrodynamic separators, sized for the water quality flow and designed in accordance with ConnDOT Standards, may be required in areas where storm drains discharge directly to a watercourse as required by the Town Engineer or as conditions of approval from the Town Conservation and Inland Wetlands Commission or the Town Plan and Zoning Commission; and,

#### **4.14 Erosion and Sediment Control**

During construction, soil erosion and sediment control procedures shall be followed in accordance with the [“Connecticut Guidelines for Soil Erosion and Sediment Control”](#), published by the Connecticut Department of Environmental Protection and as directed by Town Staff. Such measures are to be indicated on the design plans and include a detailed narrative describing materials and procedures that are to be followed during the project.

Anti-tracking pads shall be installed at all construction entrances, and shall be maintained as required to prevent tracking of material onto public roadways for the duration of construction or as directed by the Town Engineer. The minimum dimensions shall be 20 feet wide x 50 feet long. Should sediment be tracked onto

public roadways, it is to be removed promptly by sweeping or other means so that it does not adversely impact other property, receiving waters, or storm drainage systems. Other means of erosion and sediment control are to be used such as but not limited to silt fence, hay bales, sedimentation basins, silt sacks, etc.

#### **4.15 Drainage Easements**

Easements for Town owned drainage pipes, ditches, or channels shall be a minimum of 20 feet in width, or as required by the Town Engineer, and shall extend to a suitable discharge location as described in Section 4.10. Easements for ditches and channels shall be of sufficient minimum width to allow ten-foot access strips along the top of each bank. Drainage easement maps shall include flow arrows that depict the general path of flow to the discharge point.

Drainage easements shall incorporate suitable load bearing access roads for access to all drainage structures such as above ground Detention/Retention Basins, Water Quality Basins, subsurface Detention/Retention Facilities, or any other structure or facility as deemed necessary by the Town Engineer. The access road shall be a minimum of 12 feet wide and shall be constructed of 12 inches of process aggregate base formed and compacted in two equal lifts. In lawn areas, access roads shall be covered with four inches of loam and seed. The maximum grade of the access road shall not exceed 15 percent unless approved by the Town Engineer. Long grades steeper than eight percent, may require special treatment to prevent erosion, and requires Town Engineer approval. If additional easements are required for access and/or maintenance of the drainage system, due to the physical or topographic restrictions of the site, they shall be of such width, character, and location as approved by the Town Engineer.

A document containing the typical language for drainage easements to be granted to the Town of Avon is included in Figure 4.B of this manual, and may be modified as required by the Town Engineer.

#### **4.16 Private Drains Connected to the Town System**

The Town Engineer must approve the size and locations of all private storm drains that connect to the Town system. Connection of private systems must be made at a catch basin or manhole structure. Tee connections ("Blind Connections") directly to a Town storm drain are not the preferred method of connection, but will be considered by the Town Engineer on a case-by-case basis. If multiple "Blind Connections" are required, the Engineer shall consider an independent collector pipe to carry the runoff to a drainage structure. These pipes shall be placed outside of the Right-Of-Way, and shall be encompassed by an easement to a homeowners association.

The property owner must also file a Drainage Agreement with the Engineering Department, which shall relieve the Town of Avon of any responsibility in the event of any failure of the storm drainage system. The Drainage Agreement is included in the Figure 4.A of this manual.

The final Record/As-Built Drawings must show yard drains, foundation drains, or other appurtenances, connected to the storm drainage system. The Record/As-Built Drawings shall indicate the pipe location, invert elevations, pipe size, and type of pipe.

#### **4.17 Illicit Discharges and Connections**

The purpose of this section is to provide for the health, safety, and general welfare of the citizens of Avon, through the regulation of non-stormwater discharges to the storm drainage system.

No person shall discharge or cause to be discharged into the municipal storm drainage system or watercourses any materials, including but not limited to pollutants or waters containing any pollutants that

cause or contribute to a violation of applicable water quality standards, other than stormwater. The commencement, conduct or continuance of any illegal discharge to the storm drainage system is prohibited except as identified in the Town of Avon Code of Ordinances, Part II, Chapter 26, Article V.

The construction, use, maintenance or continued existence of illicit connections to the storm drainage system is prohibited. This prohibition expressly includes, without limitation, illicit connections made in the past, regardless of whether the connection was permissible under law or practices applicable or prevailing at the time of connection.

#### ***4.18 Municipal Separate Storm Sewer System Requirements***

There may be additional storm sewer requirements in order to comply with the Connecticut Department of Energy and Environmental Protection discharge permit. In Avon, this is managed by the Director of Public Works. Developers are encouraged to review proposed designs with the Director or his designee.

#### ***4.19 Dams***

The Connecticut Department of Energy and Environmental Protection imposes regulations on dam owners for the inspection, maintenance, repair and reporting depending on the dam classification. Developers that propose the addition of dams or earthen embankments used to detain water must review these requirements and present said review at the time of application.

**FIGURE 4A**  
**DRAINAGE AGREEMENT**  
(TO BE FILLED OUT IN AVON ENGINEERING DEPARTMENT)

This agreement, dated this \_\_\_\_\_ day of \_\_\_\_\_, by and between the Town of Avon, a municipal corporation, in the County of Hartford, State of Connecticut, acting herein by its Town Engineer, and \_\_\_\_\_ (Developer/Owner), of the Town of Avon, County of Hartford, State of Connecticut.

Be it known that the above Developer/Owner has connected a private drain from his property, located at \_\_\_\_\_, Avon, Connecticut, which discharges into a Town of Avon storm water drain system.

Whereas said Developer/Owner has installed the aforesaid drain, and whereas, with this agreement, said Developer/Owner, his heirs and assigns, hereby agree to assume full and complete responsibility and liability which may occur as a result of said installation, and further agree to disconnect the aforesaid drain within 48 hours of receipt of a written notice for such discontinuance from the Town of Avon.

Now therefore, the Town of Avon does hereby absolve itself from any and all claims or damages resulting from the aforesaid installation of the said drain to the property of the said Developer/Owner or to any other person or property receiving damage from the said installation of the drain, and from any responsibility for the maintenance, cleaning or repairing of the said drain.

\_\_\_\_\_  
Witness

\_\_\_\_\_  
Witness

BY: \_\_\_\_\_  
Name:  
Title:

STATE OF CONNECTICUT     )  
  ) ss. Avon  
COUNTY OF HARTFORD     )

On this the \_\_\_\_\_ day of \_\_\_\_\_ (*month, year*) before me personally appeared

\_\_\_\_\_, known to me (or satisfactorily proven) to be the person whose name is subscribed to within the instrument and acknowledged that he/she executed the same for the purposes therein contained as his/her free act and deed.

In Witness Whereof, I hereunto set my hand and official seal.

Notary Public \_\_\_\_\_  
My Commission Expires \_\_\_\_\_

**FIGURE 4B**  
**SAMPLE DRAINAGE EASEMENT**

**IMPROVEMENTS WITH RIGHT TO SURFACE DISCHARGE**

KNOW ALL MEN BY THESE PRESENTS, That \_\_\_\_\_

hereinafter called the Grantors, for the consideration of One Dollar (\$1.00) and other valuable considerations received to their full satisfaction from the TOWN OF AVON, a municipal corporation located in the County of Hartford and State of Connecticut, hereinafter called the Grantee, does hereby give, grant, bargain, sell and confirm unto the Grantee, its successors and assigns forever the perpetual right, privilege and easement to construct, install pipe, alter, repair, replace and maintain on and within the easement premises on the land of the Grantors as is more particularly described in Exhibit A attached hereto and made a part hereof, those improvements and appurtenances thereto necessary or convenient for the operation of the Grantee's storm and surface water drainage system.

Together with the right to discharge said storm and surface waters from the easement premises and to flow said waters over and across the surface of the adjacent land of the Grantors and to enter upon said adjacent land of the Grantors in order to maintain an unobstructed flow of said waters from the easement premises.

Together with the right to keep the easement premises described in Exhibit A free of all trees, bushes and other obstructions, and to perform all work necessary for such purposes.

Together with the right of reasonable access across lands of the Grantors adjacent to the easement premises described in Exhibit A for the purpose of exercising the rights herein granted.

The Grantors, for heirs, successors and assigns of the Grantors, as the case may be, covenants and agrees that no structures or other improvements shall be erected or installed within the limits of the easement premises as described in Exhibit A and that there shall be no filling, flooding, grading or excavating within said easement premises.

The Grantors reserve to the heirs, successors and assigns of the Grantors, as the case may be, the right to use the easement premises described in Exhibit A and the lands of the Grantors adjacent to the easement premises for any use and purpose which does not in any way interfere with the use of said premises by the Grantee, its successors and assigns, in the exercise of the easement rights herein granted.

By acceptance of this grant, the Town of Avon covenants and agrees to loam and seed the premises of the Grantor(s) that are disturbed by the exercise of the rights herein granted.



Signed this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_

Witnessed by:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

STATE OF \_\_\_\_\_ :  
COUNTY OF \_\_\_\_\_ : ss. \_\_\_\_\_, 20\_\_

Personally appeared \_\_\_\_\_, signer and sealer of the foregoing instrument, and  
acknowledged the same to be his/her free act and deed, before me.

\_\_\_\_\_  
Commissioner of the Superior Court  
Notary Public  
My Commission Expires:

SECTION 5.0

**SANITARY SEWER DESIGN STANDARDS**

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# SANITARY SEWER DESIGN STANDARDS

## 5.1 General

The Town of Avon Water Pollution Control Authority (AWPCA) regulates the design and construction of new sanitary sewers with guidance from the Engineering Department. The design of sanitary sewers shall conform to Technical Report #16 (TR-16) "Guides for the Design of Wastewater Treatment Works, Prepared by the New England Interstate Water Pollution Control Commission". The design of sanitary sewers shall also apply sound engineering practices and judgment, based on the best available data, and in conformance with the Town of Avon Master Sewer Plan as adopted under the authority of the State of Connecticut General Statutes. All Federal, State, and Town regulations shall also be satisfied. Sanitary sewers and appurtenances shall meet the requirements of the Public Health Code of the State of Connecticut Regulations and Technical Standards for Subsurface Sewage Disposal Systems, as amended. Sanitary sewer design standards, within Ground Water Protection Zones, shall also conform to the Aquifer Protection Area Regulations. Specifications for the Construction of Sanitary Sewers are provided in Section 5.16.

## 5.2 Related Town Regulations

- [Town of Avon Subdivision Regulations](#)
- [Town of Avon Zoning Regulations](#)
- [Code of The Town of Avon](#)
- [Avon Water Pollution Control Manual](#)

## 5.3 Subdivision and Special Permit Application Procedures

The Design Engineer shall contact the Town Engineer to determine if the proposed project will need to be reviewed and approved by the AWPCA prior to approval of the Town Planning and Zoning Commission.

## 5.4 Sanitary Sewer Engineering Design Report

All commercial developments and proposed residential subdivisions proposing to discharge to the Town sanitary sewer must provide a Sanitary Sewer Engineering Design Report (Figure 5A), along with the Town Planning and Zoning Application submittal, for review.

## 5.5 Capped Sewers

Capped sewers are sewer lines installed for future use, and not connected to existing sewers. One of the principal concerns of the AWPCA, is to assure that any development that occurs, is undertaken with due regard for the future need for sanitary sewers. Developments proposed within the Town's Master Sewer Plan Area, where sewer service is not readily available, must appear before the AWPCA for guidance regarding the need for construction of sewers, including the potential installation of capped sewers.

## 5.6 Developer's Permit Agreements

Construction of new public sanitary sewer mains, requires that the Developer enter into an agreement with the AWPCA. The installation of sanitary sewer mains by the Developer, must meet the criteria as outlined in the AWPCA Manual and these specifications. The standard form for this agreement is included in the AWPCA manual.

## **5.7 Private Community Sewer System Agreements**

Privately owned community sewer systems, as defined in the Connecticut General Statutes Section 7-246F, that serve multiple units and discharge into the Town sewer system, must meet the criteria outlined in the aforementioned statute. These systems are regulated by the Connecticut Department of Energy and Environmental Protection, and require that an agreement be put in place between the AWPCA and the association that will own, operate, and maintain the private community sewer system to ensure that proper funding is set aside for future maintenance, repair, and replacement of said sewer system.

## **5.8 Sewer Assessments and Connection Charges**

Section 7-250 of the Connecticut General Statutes and the AWPCA Manual detail the regulations governing assessment of benefits for sewers against private property owners.

## **5.9 Gravity Sewer Pipe Design**

Sewage should flow at all times with a minimum velocity of two feet per second, to prevent the settlement of any solid matter that enters the sewer. When designing a sewer for a given service area, particular consideration should be given to the actual conditions of operation likely to arise at times of minimum flow during the first few years after construction. It should be made certain that the velocities will not be so low for significant periods of time so as to result in objectionable deposits in the sewer.

General requirements for the design of gravity sewers are as follows:

- Minimum size of main line sewers shall be eight inches in diameter.
- Minimum size of laterals and building connections shall be six inches in diameter. Reduction to four inch diameter is allowed, within five feet of the foundation, for single family residential properties only.
- Materials for gravity sewer pipes shall be as described in Section 5.16 of this manual.
- Tight pipe standards shall be required in ground water protection zones.
- Velocity shall be a minimum of two feet per second and a maximum of ten feet per second at flows of one-half full depth. However, as indicated in Section 2.3.42 of the "TR-16 Guides for the Design of Wastewater Treatment Works, by the New England Interstate Water Pollution Control Commission (NEIWPCC)", if the proposed slope is less than the minimum slope of the smallest pipe, the Design Engineer should calculate the actual depths and velocities at minimum, average, and maximum day and peak hourly flow for each section of the sewer.
- All gravity sanitary sewers shall be laid on straight alignments, both horizontally and vertically, with manholes providing access at all deflection points or at a junction of two or more lines.
- All proposed sewer should maintain continuity of pipe sizes and velocities where possible.
- Minimum or maximum depths shall be in accordance with recommended manufacturers' specifications for the specific type and class of pipe, or as directed by the Town Engineer.
- Minimum cover of four feet shall be maintained over sanitary sewer pipelines. Where the minimum cover cannot be obtained, the pipe can be wrapped on the top and sides with two inch Styrofoam or other approved material, only after prior approval by the Town Engineer
- Minimum slopes for sanitary sewer shall be as follows:

Pipe Diameter (inches)	Minimum Slope (Ft. / Ft.)
8	0.0050
10	0.0030
12	0.0025
12" + larger	0.0025

- Class 52 Ductile Iron Pipe shall be utilized for any proposed sanitary sewer with a depth of fifteen feet or greater. The depth is calculated from invert of the pipe to finished grade. The Town Engineer has the right to determine where the change in pipe material takes place. At a minimum it shall be the full pipe run, manhole to manhole, through the area where the depth equals or exceeds fifteen feet.
- A separation distance of a minimum of 18 inches of vertical separation and 10 feet of horizontal separation between sewer line and potable waterlines is to be maintained. The Public Health Code allows for the 10 feet separation

distance to be reduced, if the trench is benched.

- All portions of the sewer system shall maintain a minimum of 75 feet from any existing or proposed water wells (potable, geothermal or irrigation), or as required by Section 19-13-B51.d of the [State of Connecticut Public Health Code](#).
- Except where indicated by a special study, sanitary sewers shall be designed to flow with a depth of one-half full.
- Sanitary sewers and sewer laterals shall be constructed as indicated on the Standard Details.
- Tee-wyes shall be provided for all laterals and building connections when not tying directly into a manhole.
- Laterals shall be connected to manholes whenever possible.
- Commercial and industrial buildings may require a sanitary manhole, installed on the subject property at the street line, for the purposes of sampling sewage. If the lateral connects directly to a Town-owned sewer manhole, this requirement may be waived at the discretion of the Town Engineer.
- The design engineer shall also design the sewer in conformance with the latest Sewer Facilities Plan for the AWPCA and considerations be incorporated for any potential future connections.

#### **5.10 Gravity Sewer Manhole Requirements**

Manholes shall be located in the centerline of easements or roadways, and all pipes placed as near to the roadway centerline as practical. Manholes shall be constructed at the terminus of the sanitary sewer and at intervals not to exceed a distance of 300 feet, and shall be placed at all changes of grade or direction, and at each junction of two or more sewers.

For manholes with multiple proposed inlet pipes, the Engineer shall consider the velocity and flow of all inlets, and how these flows will merge at the area of confluence. In certain cases, the flows to the area of confluence have the potential to cause flows to back up in other inlet pipes.

In sewers 18 inches and smaller, a deflection of 90 degrees may be made in one manhole. In sewers 21 inches and larger, the maximum deflection shall be 45-degrees, with each manhole located about six pipe diameters from the point or intersection with a straight alignment from manhole to manhole.

Manholes, with sanitary sewers less than 21 inches in diameter, shall be four feet in diameter. Manholes, and sanitary sewers 21 inches or greater, shall be five feet in diameter. Larger diameter manholes may be required, as directed by the Town Engineer, to allow a smooth transition of flow through the manhole and to allow a suitable table for maintenance purposes.

It is the Town's desire to limit the number of piped drops. It shall be at the discretion of the Town Engineer, whether a piped dropped will be required in a manhole. Factors determining the need for a drop will consist of velocity and flow rate. Outside drops are not permitted.

Manholes installed along off-road sanitary sewer easements shall be raised along with the surrounding adjacent grade, to prevent the manholes from collecting surface water. The installation of the off-road manholes shall allow for the passage of utility and service vehicles through the easement areas.

To prevent manholes from acting as catch basins, manholes shall be located outside of the road gutter line. Specifically, manholes shall be located outside of the gutter flow for the design storm event.

All steel used in the construction of sewer manhole frame and covers, shall be produced and manufactured in the United States.

#### **5.11 Low Pressure Sewer**

**The Town Water Pollution Control Authority has adopted a Low Pressure Sewer System Policy.**

##### Force Main Design Requirements

General requirements for low-pressure sewer force mains are as follows:

- The need and requirements for low pressure sewer systems can be found in Figure 5.17, "Low Pressure Sewer System Policy for the Town of Avon".
- Minimum size of force main shall be 1½ inch diameter.

- Materials for force mains shall vary based upon the intended use and pump design.
- An average flow velocity of at least two feet per second shall be used for design of low-pressure sewer force mains.
- Friction losses through the force main shall be based on the Hazen-Williams formula or other acceptable method, as approved by the Town Engineer.
- The force main shall have a minimum 48 inches of cover as measured from the top of the pipe to final finished grade. Cover less than 48 inches shall require insulation. In no case, shall cover be less than 24 inches.
- The force main and building lateral connections shall be installed so as to provide for proper vertical separating distances from other utilities.
- Thrust restraint shall be provided at all fittings and other changes in direction by the method of thrust blocks. Thrust blocks shall be designed by the Design Engineer and approved by the Town Engineer.
- Automatic air relief and vacuum break valve manholes shall be placed at high points in the force main.
- Manholes shall also be incorporated at the terminal end of the sewer, at all changes in size and pipe material, at all junctions with other sewer mains and gravity sewer mains, and at any junctions with future roads.
- The distance between any two consecutive force main manholes shall not exceed 1000 linear feet.
- When connecting into a manhole, a piped drop shall be constructed and secured to the inside of the manhole with stainless steel hardware. The piped drop shall allow for a smooth transition to the invert of the downstream pipe. Provisions shall be made to allow for access to the force main for cleaning purposes.
- Tracing wire as well as detectable warning tape shall be installed to assist with locating the pipe in the future. The tracing wire shall include access points at locations approved by the Town Engineer.
- Flushing stations are to be installed at the lowest points and at the terminus of force main runs and as otherwise directed by the Town Engineer
- All valves, shut-offs, and flushing station fittings are to be of high quality stainless steel

## **Sanitary Sewer Force Main and Lateral Design**

General requirements for Sanitary Sewer Force Mains and Lateral are as follows:

- Force Mains and Laterals shall be installed as indicated on the Standard Details;
- Minimum size of force building sewer pipes shall be 1¼" inch diameter;
- Velocity of at least two feet per second shall be maintained for building force sewers at the design flow rate;
- Building force sewers shall have a minimum of 48 inches of cover, and shall connect to the force main via a "tee" connection. A check valve and gate valve shall be installed on the force building sewer at the Right-of-Way, to isolate it from the force main if needed;
- Thrust restraint shall be provided at all fittings and other changes in direction by the method of joint restraint or thrust blocks; and,
- Tracing wire as well as detectable warning tape shall be installed along force main and lateral pipes to assist with locating the pipe in the future. The tracing wire shall include access points at locations approved by the Town Engineer.

## **Grinder Pump Requirements**

Grinder pumps shall meet the following general requirements when connecting to a Town-owned low-pressure sewer system:

- Pump and pipe sizing information shall be designed by a Professional Engineer, licensed in the State of Connecticut, and submitted to the Town Engineer for review and approval prior to installation;
- Pumps shall be the grinder type only, as manufactured by E-One, Barnes, or approved equal, and shall be enclosed in a concrete, HDPE, or fiberglass vault installed according to the manufacturer's requirements;
- Vaults shall have a minimum liquid storage reservoir of 210 gallons, and shall be located a minimum of 10 feet away from the building foundation;
- All outside grinder pump station installations shall have stainless steel hardware and C-channel rails for ease of pump removal, and include anti-siphon valves and flex connections to the piping;
- A check valve, gate valve, and anti-siphon valve shall be installed at the pump;
- Commercial/Industrial and multi-family dwelling installations shall use duplex pumps;
- Anti-flotation calculations are to be provided for all pump vaults; and,
- Once installed, a Professional Engineer licensed in the State of Connecticut, shall submit an As-built certification

that the installation meets the design parameters as approved.

The Professional Engineer certification and vault reservoir size requirements may be waived by the Town for private grinder pump systems that connect directly to a Town owned gravity sewer system. Under these circumstances, the licensed plumber performing the installation shall submit a letter confirming that the system was installed in accordance with the manufacturer's specifications.

Electrical requirements for the grinder pump installation are as follows:

- The electrical installation shall be in accordance with the current State of Connecticut Electrical Code/National Electrical Code (NEC);
- Electrical controls shall be mounted outside the pump chamber;
- For new Subdivisions:
  - Where it is proposed to pump waste water from a home to a public sewer line or subsurface sewage disposal system, a backup generator shall be provided for each dwelling, except in a case where such home is also proposed to be served by a private well. The type and design of the backup generator and system shall be approved by the Town Engineer. Emergency power connection shall be properly sized and configured to match the electrical power requirements of the pump motor;
- All pump installations shall have an audio/visual alarm at the pump control panel;
- A remote audio alarm may also be required to ensure that the pump failure alarm can be heard from the occupied portion of the premises, as directed by the Building Official; and,
- Alternate configurations must have the prior approval of the Building Official.

#### **5.12 Grease Separator**

The Town of Avon AWPCA, limits the amount of grease permitted to discharge into the Town sanitary sewer system, as indicated in the AWPCA Manual. Grease Separators are required as specified in the CTDEEP "General Permit for the Discharge of Wastewater Associated with Food Preparation Establishments".

Grease Separators shall consist of a minimum 1,000 gallon exterior unit or an AGRU (Automatic Grease Recovery Unit), in accordance with the AWPCA policies, CTDEEP, and the Building Codes. The Grease Separator/AGRU shall collect only waste flow from designated sources of anticipated grease generation. The actual size of the separator shall be designed based on the anticipated design rate of flow, and require advanced approval by the Town Engineer. All submittals shall include a detail of the proposed separator/AGRU as well as the anticipated design flow calculations.

See the AWPCA manual for more specific fats, oils, and grease (FOG) requirements.

#### **5.13 Testing**

All sanitary sewer pipe and manholes installed shall be tested utilizing the methods outlined in Section 5-16. Testing shall include but is not limited to the following:

- Manhole Negative Pressure Test
- Low Pressure Air Test
- Hydrostatic Pressure Test for Force Mains
- Video of Sewer Main
- Final Manhole Inspection

#### **5.14 Sanitary Sewer Easements**

Easements shall be provided for all sanitary sewers, which are not installed within roadways or lands to be dedicated to the Town. Easements shall be a minimum of 20 feet in width, or as required by the Town Engineer, and centered on the sanitary sewer. Easements must be granted to and accepted by the Town prior to the Developer acquiring any permits to construct. If conditions field conditions require alterations in the design resulting in the need to revise easements, said revisions are to be completed prior to the acceptance for flow by the Town Engineer.

Access to all sanitary sewer structures must be provided at a grade of 25 percent or less, along a suitable load bearing access road as described under Section 4.15. If additional easements are required for access and/or maintenance of the sewer based on physical or topographic restrictions, they shall be of such width, character, and location as approved by the Town Engineer.

A document containing the typical language for sanitary sewer easements to be granted to the Town of Avon is included in the AWPCA Manual, and may be modified as required by the Town Engineer.

### **5.15 Sanitary Sewer Acceptance**

The AWPCA must formally accept mainline sanitary sewer and appurtenances into the Town-owned collection system. Until this occurs, operation and maintenance of Developer-installed sanitary sewer systems remains with the Developer. At a minimum, prior to acceptance of new sewers by the AWPCA, the following must occur:

1. All leakage tests must be conducted as witnessed by Town personnel and pass
2. The entire new system must be flushed clean of all debris
3. The entire system must be videoed as witnessed by Town personnel and a complete record of the video provided to Avon Engineering
4. All documentation concerning the system must be provided for review and approval by Town staff and the Town's legal authority

### **5.16 Sanitary Sewer Construction Specifications**

The following specifications provide the requirements for materials, installation and construction of sanitary sewer gravity and force mains including lateral connections.

Sewer pipe, both main line and lateral connections, shall be of the type and sizes indicated on the plans approved by the Town Engineer. All pipe shall be installed true to the line and grade as shown on the approved plans.

Main Line Sewer pipe shall be installed utilizing a pipe laser level. It is solely the Contractor's responsibility to ensure that the pipe is installed per the approved plans and specifications. The Contractor's grade sheets shall be provided to the Town's Inspector prior to the installation of main line sewer. See below for actual pipe specifications.

#### **5.16A Inspectors Responsibility And Their Authority**

All work will be conducted in accordance of the Town of Avon specifications and details. All work will be conducted under the supervision of the Town Engineer, or his/her Designee. The Town Engineer gives authorization to the Inspector to inspect any and all work or materials to be incorporated into the work. The Inspector has the authority to reject any material or stop the work if a dispute arises on the method of construction or safety of project personnel, including but not limited to the Contractors personnel and the Inspector. The Inspector has no authority to change the requirements or specifications, or give final approval on any portion of the work in question. The Inspector will not act as any part of the contractor's crew. Any advice the Inspector offers to the Contractor, will not be construed as binding the Town in any way, or release the Contractor from completing the project in accordance with the approved plans. Any work performed without inspection is considered unacceptable and will be subject to removal and replacement solely at the Contractor's expense. No sewer pipe or other appurtenances are to be installed without the Town Engineer's Inspector present unless permission is granted by the Town Engineer.

#### **5.16B Material Requirements**

#### **PHYSICAL PIPE INSPECTION, TESTS AND ACCEPTANCE**

The pipe shall be subject to thorough inspection and tests, the right being reserved for the Town Engineer to apply such of the tests specified as he may, from time to time, deem necessary.

All these tests shall be made in accordance with the methods described by the following specifications, and acceptance or rejection shall be based on the test results. The Contractor shall furnish all labor necessary to assist the Town Engineer in inspecting the pipe. Pipe will be inspected upon delivery, and such as does not conform to the requirements of this



specification shall be rejected and shall immediately be removed from the project site by the Contractor.

### SANITARY SEWER PIPE

All pipe shall be Polyvinyl Chloride (PVC) SDR 35 Sewer and Drain Pipe, Ductile Iron Pipe, or as approved by the Town Engineer and shown on the Approved Plans.

#### *Materials –*

##### **PVC Pipe**

- Pipe shall conform to ASTM specification D-3034, Specification for Type PSM Polyvinyl Chloride Sewer Pipe and Fittings, with the following additions and/or exceptions;
- The pipe and fittings shall be made from Virgin Type 1, Grade 1 Polyvinyl Chloride compounds as defined in ASTM specifications D-1784 for "Rigid Poly (Vinyl Chloride) Compounds and Chlorinated Poly (Vinyl Chloride) Compounds". Clean rework material, generated from the manufacturer's own pipe or fitting production may be used by the same manufacturer, provided the pipe and fittings so produced meet the requirements of the specification;

##### **Ductile Iron Pipe**

- Ductile iron pipe shall be thickness Class 52 FOR 8" PIPE, centrifugally cast in molds conforming to ANSI Specification A21.51-1796 furnished with push-on joints.
- Fittings for all ductile iron pipe shall be grey iron fittings, Class 250 for fittings 12" and below, and Class 150 for fittings 14" and over. Wye fitting shall be of short body design, Class 250, cement lined and shall meet the requirements of ANSI Specification A21.11
- All pipes and fittings shall be subjected to a careful inspection and a hammer test just before being laid
- All push-on joint pipe and mechanical joint fittings shall be provided with sufficient quantities of accessories conforming to above mentioned ANSI Specifications. Gaskets shall be of composition suitable for exposure to sewage or sewage sludge within a pipe.
- All ductile iron pipe and fittings shall be cement lined in accordance with Specification ANSI A21.4 (AWWA 0104) and shall be heavily coated outside with a satisfactory bituminous coating

*Dimensions* - The standard length of PVC Pipe provided under this specification shall be a minimum of 13 feet, except that all pipe used in house connections and/or laterals shall not exceed 13 feet in length unless otherwise specified by the Town Engineer. The pipe shall be manufactured to the following dimensions:

<b>OUTSIDE DIAMETER (in)</b>			<b>MINIMUM WALL THICKNESS (in)</b>	
<u>Nominal Size</u>	<u>PVC</u>	<u>DUCTILE</u>	<u>SDR 35</u>	<u>DUCTILE</u>
				<u>CLASS 52</u>
6	6.275	6.90	0.180	0.31
8	8.400	9.05	0.240	0.33
10	10.500	11.10	0.300	0.35
12	12.500	13.20	0.360	0.37
15	15.300	N/A	0.437	N/A
18	18.701	19.50	0.536	0.41
21	22.047	N/A	0.632	N/A
24	24.803	25.80	0.709	0.44
36	38.300	38.300	1.021	0.53

Fittings shall be made in sizes and to the dimensions of standard pipe as shown above. If dimensions, structural design, or materials from which they are manufactured vary from other provisions of this specification, it shall be done so with the approval of the Town Engineer.

*Joints* - Joints shall be bell and spigot type subject to the approval of the Town Engineer. All joints shall meet the requirements of ASTM D-3212 Tentative Specification for "Joints for Drain and Sewer Plastic Pipes using Flexible Elastomeric Seals".

Joints shall be Push-On Type utilizing an Elastomeric Ring Gasket, factory installed. The gasket shall be as recommended by the pipe manufacturer and approved by the Town Engineer. It shall be of a composition and texture which is resistant to common ingredients of sewage, industrial wastes, including oil and ground water.

"0" Ring Gaskets or Roll-On Gaskets are not acceptable.

*Fittings* - Wyes, Tee-Wyes, Bends and Adapters, and any other fittings required by the Town Engineer shall be provided. The materials used in the manufacture of fittings shall conform to the requirements for the pipe with which they shall be used, and any variations of such requirements shall be subject to the approval of the Town Engineer. No straight Tees will be allowed.

*Testing* - Pipe shall be tested at the cost of the developer, when requested by the Town Engineer, and all sizes of pipe so designated shall be treated as follows: Pipe shall be tested in accordance with ASTM D-2412-68 Standard Method of "Test for External Loading Properties of Plastic Pipe by Parallel - Plate Loading". Pipe joints shall be tested in accordance with ASTM D-3212 Tentative Specification.

The minimum value of Pipe Stiffness of five percent deflection computed from data obtained from the above testing procedure shall be indicated in the following table:

**MINIMUM VALUE OF SDR-35 PIPE STIFFNESS AT 5 PERCENT DEFLECTION**

<b>Nominal Pipe Size (in)</b>	<b>Pipe Stiffness (PSI)</b>
6	46 PSI
8	46 PSI
10	46 PSI
12	46 PSI
15	46 PSI
18	46 PSI
21	46 PSI
24	46 PSI
36	46 PSI

*Marking* - Pipe shall be marked along the outside of the barrel in bold style type and shall indicate the manufacturer's name, pipe size, PVC compound used, i.e. PVC Type 1 Grade 1 and the ASTM material specification for the PVC Compound used, i.e. ASTM D1784. Each pipe unit shall be marked with a "full entry depth line" at the end of the pipe, to assure that the pipe has been installed to its full depth. The pipe shall not be inserted beyond the "full entry depth line".

*Workmanship* - The pipe and fittings shall be homogeneous throughout and free from visible cracks, holes, foreign inclusions or other injurious defects. The pipe shall be as uniform as commercially practical in color, opacity, density and other physical properties.

*Allowable Pipe Deflection* - Plastic pipe provided under this specification shall be so installed in the ground that a horizontal and vertical deflection of no more than five percent can be anticipated. Such deflection shall be computed by dividing the amount of deflection (nominal diameter less minimum diameter when measured) by the nominal diameter of the pipe.

After an initial inspection by the Town Engineer and if, in his opinion, the deflection may be excessive, he may order the Contractor to arrange for and take accurate measurements of the pipe at whatever intervals and whatever locations between such adjacent manholes the Town Engineer deems advisable. Such measurements may be taken or ordered by the Town Engineer at any time during the maintenance period and such measurements shall be performed in a manner and by methods approved by the Town Engineer.

*Straightness* - No single piece of pipe shall be laid on any project covered by these specifications unless it is found to be generally straight. Such pipe shall have a maximum ordinate of 1/2 inch between any two adjacent manholes. This measurement shall apply to the pipe barrel only. The molded bell of each pipe section shall be concentric and true with the wall and theoretical center line axis of the pipe barrel. If the deviation from straightness exceeds these requirements and/or the molded configuration of the bell with respect to the pipe axis is questionable, then the particular piece of pipe shall be rejected for use.

## **5.16C Installation Requirements**

### **STONE FOUNDATION FOR PIPE AND STRUCTURES**

All pipe used for main line sewers, laterals connected thereto, and all manholes, shall be laid on six inches of 3/4 inch stone in earth and 12 inches of 3/4 inch stone if rock is encountered in the trench, compacted on an approved and compacted subgrade. All stone must be from an approved source prior to installation. It shall meet the specification M.01.01 of the State of Connecticut Department of Transportation Standard Specifications for Roads, Bridges and Incidental Construction, Form 818 as amended. The stone shall be brought carefully to the proper grade for the barrel of the pipe after compaction. The stone will extend to the width of the excavated trench. Additional stone may be required by the Town Engineer if site conditions dictate.

### **PIPE INSTALLATION**

*Handling Pipe* - Each pipe unit shall be carefully handled into its position in the trench, only in such a manner as to not cause any damage to the pipe or appurtenances, prior to installation. The Contractor will be required to furnish suitable devices to permit satisfactory support of all parts of the pipe unit when it is lifted.

Each pipe unit shall be inspected before being installed. Any pipe unit or fitting discovered to be defective, either before or after such installation, shall be removed and replaced with a new unit. Each pipe unit shall be marked with a "full entry depth line" at the end of the pipe, in accordance with the manufacturers specifications.

The pipe shall then be laid accurately to line and grade, as shown on approved plans and specifications. The pipe spigot and bell shall be cleaned and lubricated in accordance with the manufacture's specifications. The pipe spigot shall then be inserted into the bell of the previously laid pipe according to the pipe manufacture's specifications and installation details. The pipe will be pushed to the "full entry depth line", by an approved means, against the end of the last pipe previously laid, and held in position. The pipe shall carefully installed without damage to pipe or gasket. Care shall be taken not to use such force as to split or otherwise damage the coupling or machined ends. Where any two pipe units do not fit each other closely enough to enable them to be properly jointed, they shall be removed and replaced. While the pipe is being held in place, stone shall be brought carefully to the top of the pipe and haunched sufficiently to ensure that no settlement or movement in the pipe will occur. Care shall be taken during these operations to ensure that the pipe, in no way, will be disturbed or damaged. No stone will be permitted to be dropped from a distance greater than five feet by any means in which the contractor chooses i.e. excavator, backhoe, loader bucket or truck.

Except as otherwise indicated on the drawings, the pipe shall be supported by compacted stone. No pipe or fitting shall be permanently supported on saddles, blocking or stones. Stone shall be as specified under the stone specification. Suitable coupling holes shall be provided so that after placement, only the barrel of the pipe receives bearing pressure from the supporting material.

Pipe and fittings shall be installed to the lines and grades indicated on the drawings or as required by the Town Engineer. Care shall be taken to insure true alignments and gradients. Before any joint is made, the previously installed unit shall be checked to assure that a close joint with the adjoining unit has been maintained and that the inverts are matched and conform to the required grade. The pipe shall not be driven down to the required grade by striking it with a shovel handle, timber or other unyielding object.

Open ends of pipe and laterals shall be closed with plugs or approved end caps furnished by the supplier for the same size pipe, and properly installed. The end of laterals shall be located by a four inch by four inch, pressure treated piece of lumber. This lumber shall be placed at the end of the lateral flow line. It will extend a minimum of three feet above the proposed finish grade. The lumber shall also be marked with an appropriate green utility color as indicated in the State of Connecticut General Statutes Section 16-345-5.

The Contractor shall take all necessary precautions to prevent flotation of the pipe in the trench. At all times when pipe installation is not in progress, the open ends of the pipe shall be closed with temporary watertight plugs. Extreme care shall be taken to prevent earth, water and other materials from entering the pipeline. As soon as possible after the pipe and manholes are completed, the Contractor shall clean out the pipeline and manholes, being careful to prevent soil, water and debris from entering any existing sewer.

#### DEWATERING OF THE TRENCH

If water is encountered during excavation, it is the Contractors responsibility to provide adequate dewatering. This procedure shall be in compliance with OSHA, and the Connecticut Guidelines for Soil Erosion and Sediment Control. Pipelines shall not be used as conductors for trench drainage during construction. Watertight plugs shall be installed and not removed until all adequate provisions have been made to prevent water, earth or other materials from entering the pipe.

When water is encountered, the water level in the trench shall be maintained at a level below the sewer connection, before the cap is removed, while the connection is being made and until such time as it has been inspected, approved and backfilled. The cap shall not be removed without an Inspector on-site. The contractor shall notify the Town Engineer one (1) working day (24 hours) before starting any work authorized under pertinent permits.

#### WATERSTOPS

*Waterstops* – The material for waterstop, shall be acceptable to the Town Engineer, and shall be applied to the outside of plastic pipe when the pipe is to be closed in any structure where concrete or mortar is used which will prevent leakage along the outer wall of the barrel of the pipe. The Town Engineer may require that clay dams, cast in place concrete dams, or other type of waterstops, be installed depending on the site conditions.

*Installation* - shall be in accordance with Tentative Revision to ASTM specification D-2321, "Recommended Practice for Underground Installation of Flexible Thermoplastic Sewer Pipe". The installation method of the waterstops will be approved by the Town Engineer prior to the start of the proposed work.

#### FILTER FABRIC/PROTECTIVE LAYER

The filter fabric or geotextile material used for the protection layer of the sanitary sewer pipe and foundation shall conform to Section 7.55 and Article M.08.01 26, of the State of Connecticut Department of Transportation Standard Specifications for Roads, Bridges and Incidental Construction, Form 818 as amended.

Upon completion of the installation of the pipe and stone bedding, a protective layer shall be placed over the top of the pipe and stone bedding. This layer will be placed along the entire length of pipe and stone and extend six inches up each side of the trench. The approved material for this procedure is a non-woven filter fabric. Any other type of material used for the protective layer is not acceptable. This protective layer shall be installed around each manhole, cut to fit properly, and extend one foot up each structure. All lap splices shall be a minimum of one foot.

#### SAND BACKFILL

The sand backfill shall conform to Section 6.51.04 6 and Article M.08.01 21, of the State of Connecticut Department of Transportation Standard Specifications for Roads, Bridges and Incidental Construction, Form 818 as amended. Coarse clean sand, approved by the Town Engineer, shall be placed over the protective layer to a depth of one foot, minimum. This backfill shall extend the width of the excavated trench. The sand layer shall be compacted in place. This sand backfill is also required around all manholes and other related structures. Care shall be taken during these operations to assure that the pipe, in no way, will be disturbed or damaged.

#### DETECTABLE WARNING TAPE

Detectable Warning Tape shall be placed over the one foot of sand backfill, and must be secured over the center of the pipe, to ensure that the tape will stay in place during the backfill operation. In addition, the installation method must comply with Section 1.05.15, of the State of Connecticut Department of Transportation Standard Specifications for Roads, Bridges

and Incidental Construction, Form 818 as amended.

### BACKFILLING OF EXCAVATED TRENCH

Upon commencing the backfill operation, the Contractor must exercise care to assure that damage does not occur to the newly installed pipe, manholes or other related structures. There shall be no voids left in the backfill. Native material may be used, however, no large stones, rock fragments, etc. larger than six inches in any dimension, shall be placed within two feet of any sewer or structure and walls of the trench. Depending on the size of the object, the separating distance may increase, or the object will not be allowed within the backfilling of the trench. No fill material will be permitted to be dropped from a distance greater than five feet by any means in which the contractor chooses i.e. excavator, backhoe, loader bucket or truck. Frozen material, rubbish, refuse, construction debris, and or lumber is considered not suitable backfill material and will not be allowed in the trench backfill. Saturated or nearly saturated soil is also considered to be unsuitable as it will not compact properly. The backfill material will be placed in a maximum of two (2) foot lifts only. Lifts will not be permitted to exceed this dimension. Each lift will be compacted prior to the placement of the next lift. The means and methods, tools and equipment, used for backfilling and compaction shall be subject to approval by the Town Engineer prior to the start of any work. Refer to the standard details regarding Temporary & Permanent Trench Restoration.

Puddling of the backfilled trench may be required in addition to compaction. This will minimize any subsequent settlement and fill any voids created during the backfill operation. The puddling will be done by means acceptable to the Town Engineer. This method will be agreed to prior to the start of any work. Sufficient water will be used to wash material into all voids and to assist in the compaction of the trench. Avoid swelling backfill material by utilizing excess water. Spacing and duration of water used in puddling will be determined by the Town Engineer. The intention of puddling is to aid in compaction and fill any voids, to minimize road maintenance and annoyance to the public by subsequent settlements occurring. Puddling will occur twice during the backfill operation, when half of the trench is backfilled, and when the backfill is approximately one foot from the top of the trench. This is subject to change depending upon the depth of each trench. No puddling will be performed when weather conditions will adversely affect the trench backfill.

### PIPE INSTALLED IN ROCK

In trenches excavated through rock, blasted or ripped, the rock shall be removed to one foot below the elevation of the pipe invert. The one foot clearance shall extend the entire width of the trench. Once this clearance limit has been met, the specifications for pipe laying shall be followed, except the required 3/4" stone foundation shall be a depth of 12 inches and completely wrapped in filter fabric the entire trench length and shall overlap a minimum of 12 inches. No large rocks, greater than six inches in the longest dimension, shall be allowed to be placed over the pipe until the trench has been backfilled to a minimum depth of two feet above the pipe. Any questionable material, depth or clearance should be inspected and verified by the Town Engineer, in order to render a decision. All blasted material considered to be unstable, shall be removed from the bottom of the trench, regardless of depth below the flowline of the pipe.

### MAINTENANCE AND PROTECTION OF TRAFFIC

The contractor is responsible to keep the road and driveways open for traffic, as required. The Contractor must plan their work in accordance with the Town of Avon Traffic Authority. A Road Closure Permit shall be required, if construction operations interfere with one or more lanes of traffic. See Section 6.5 "Work Zone Traffic Control" for additional information.

### MANHOLES

#### **Description:**

Work under this heading shall consist of construction of sanitary sewer manholes of the size and at the location indicated on the plans or at the direction of the Engineer. Work shall be in conformity with the lines, grades, dimensions and details as shown on the plans and in accordance with these specifications.

#### **Materials:**

The materials to be used in the construction shall conform to the following:

Materials shall conform to Section 5.07.02 of "Form 818 as amended".

Pre-cast manhole sections shall be similar or equal to that shown on the plans and shall conform to ASTM C478. The manhole base shall be a monolithic combination base and riser section.

Manufacturer's data sheets for all precast concrete units and metal items shall be submitted to the Engineer for approval.

Each manhole structure shall be identified with the name of the manufacturer and the date of the concrete pour from which it was cast, either by casting this information into an exposed face of the unit or by suitable stencil.

The manhole manufacturer shall certify each shipment of precast concrete structures, utilizing a MAT PC-1 in conformance with M.08.02 of "Form 818 as amended".

Precast manholes which are cracked, show evidence of honeycomb, or have over ten percent of their surface areas patched, shall be subject to rejection, even though meeting the other requirements of these specifications.

All precast concrete manhole sections shall have two coats of a bitumastic coating, conforming to ASTM C478, applied to all exterior surfaces of the manhole.

Manhole section joint material shall be butyl rubber joint seal.

Brick shall conform to ASTM Specification C32 for red sewer brick. Brick for manhole shelves and inverts shall conform to grade SM specifications.

Manhole steps shall be of steel reinforced polypropylene plastic as manufactured by M.A. Industries-Model PS-2-PF-SL, Press Seal Gasket -Model 14850 or approved equal.

Manhole frames and covers shall conform to the standard Town of Avon Details. Standard manhole frames shall be Model #0220513 and covers shall be Model #0220511, as manufactured by East Jordan Iron Works, or an approved equal accepted by the Town Engineer. Cast Iron shall conform to ASTM A48, Class 30.

Standard Mortar shall consist of one part cement and two parts clean sand. No lime shall be added to the mortar.

Concrete shall be class "F" and conform to section M.03.01 of "Form 818 as amended".

Class "A" concrete shall be used where indicated on plans and shall conform to section M.03.01 of "Form 818 as amended".

Resilient Manhole Connectors shall be used for all manhole to pipe connections and shall be by Fernco Joint Sealer Company or "Lock Joint Flexible Manhole Sleeve" as manufactured by Interpace Corp., Parsippany, New Jersey, KOR-N-SEAL, or approved equal. Resilient Manhole Connectors shall conform to ASTM C923.

Stone shall meet the requirements of Article M.02.01-2 Grading A "Form 818 as amended".

#### **Construction Methods:**

These structures shall be constructed in accordance with the requirements contained herein for the character of work involved.

Construction methods shall conform to Section 5.07.03 of the Standard Specifications.

Manhole bases shall be set level on a minimum six inch base of 3/4 inch compacted stone.

In areas excavated through rock, blasted or ripped, the rock shall be removed 12 inches below the bottom of the manhole base. The 12 inch clearance shall extend the entire width of excavation.

Bases shall be precast concrete. The precast sections shall be set utilizing a butyl rubber joint seal. The sides of precast base sections shall have circular openings for all pipe connections.

Resilient Manhole Connectors shall be installed in accordance with the manufacturer's recommendations. After assembly of all sections is completed, all lifting holes shall be filled with mortar.

Assembly of all precast sections shall be completed before pipe is connected to the manhole.

Inverts shall be constructed of brick and mortar and shall conform accurately to the size of the adjoining pipes. **The invert in the manhole shall be constructed in the field, with red sewer brick, after the connection of the pipes to the manhole. Inverts shall not be constructed of precast concrete.** The minimum slope of the invert across the manhole shall be 1/4 inch per foot. Filler material for a brick invert and shelf shall be concrete or brick and mortar; loose stones or dry masonry are not acceptable. Side inverts shall be curved and main inverts, where direction changes, shall be laid out in smooth curves of the longest possible radius which is tangent, within the manhole, to the centerlines of the adjoining pipelines. Invert channel depth shall be 0.5 times the diameter of the outlet pipe, and channel shape below pipe spring line shall approximate the pipe shape. There shall be no protrusions, which may impede the flow of solids. Manhole shelves shall slope toward the invert channel. The top course of bricks immediately adjacent to the channel shall be set with the long axis of bricks perpendicular to the axis of the channel. The lift holes, section joints and any brickwork to bring TF to grade are to be parged.

Manhole frames shall be set with the tops conforming to the finished grade of the pavement or ground surface or as directed by the Engineer.

Radius-type concrete masonry units or bricks shall be used as required, up to a maximum of 18 inches, to adjust the manhole to the grade as shown on the drawings. Frames shall be set concentric with the top of the masonry units or bricks, and in a full bed of mortar, so that the space between the top of the manhole masonry and the bottom of the flange of the frame shall be completely filled and watertight. Any Radius-type concrete masonry units or bricks that are found to be cracked or broken, will be rejected and need to be replaced.

#### CONNECTION TO EXISTING MANHOLES

The connection of sewer pipes to existing manholes shall be made by Resilient Manhole Connectors. The manhole shall be cored by mechanical means and the Resilient Manhole Connector boot sleeve installed. If the connection will be a 'Drop' invert elevation, Ductile Iron Pipe (D.I.P.) shall be installed to bridge the space from the manhole to virgin ground. The D.I.P. shall be of the size indicated on the plans, and either Class 52 or 54 D.I.P.

The connection to the SDR 35 PVC shall be made with a Harco PVC fitting with gaskets. The Town of Avon does not allow 'outside piped drops'. The existing shelf or table shall be rebuilt to direct the flow to the existing invert under the supervision of the Inspector. All drops shall be "Inside Pipe Drops". Non-piped drops shall be approved and installed at the discretion of the Town Engineer.

#### CONNECTION TO EXISTING SEWER MAINS

Lateral Connections to existing Sewer Mains without the use of a Manhole shall be cut into the main. Sanitary sewer saddles will not be allowed. The connection will be made with SDR 35 PVC pipe and a Harco fitting, of the required size. The contractor is solely responsible for redirecting, pumping and managing all existing flows. Any re-directing or pumping, will be reviewed by the Town Engineer prior to commencing any work, to ensure that the safety of the public is considered.

#### CONNECTION TO EXISTING SEWER MAINS UTILIZING A NEW MANHOLE

**Description:** Under this heading shall be the construction of manholes in conformity with the lines, grades, dimensions and details shown on the plans, or as ordered by the Town Engineer, and in accordance with the provisions of these specifications for the various materials and work which constitute the completed structure.

#### **Materials:**

The materials to be used in the construction shall be those indicated on the detail or ordered by the Town Engineer and shall conform to Article M.08.02 of "Form 818 as amended". Protective compound material shall be listed on the approved list of ConnDOT for the specified use. The provisions of Article 6.02.03 of "Form 818 as amended" pertaining to bar reinforcement shall apply except that shop drawings need not be submitted for approval, unless called for on the plans or directed by the Town Engineer.

Mortar shall conform to Article M.11.04.

Pervious Structure Backfill material shall conform to Article M.02.05.

**Construction Methods:**

These structures shall be constructed in accordance with the requirements contained herein for the character of work involved.

The existing sewer pipe shall be removed to an existing pipe joint or the existing pipe may be cut to install the new sanitary manhole. Six inches of 3/4 inch stone foundation shall be placed and compacted the total width of the trench and a precast concrete manhole base shall be laid on top of the stone foundation. The sewer pipe shall be installed through the new manhole with the invert of the new pipe acting as the manhole invert as shown on the detail. The new pipe shall be connected to the existing inlet and outlet pipes utilizing a Town approved Resilient Connector. Reinforced precast concrete manhole sections with bitumastic coating, conforming to ASTM C478 with "O-ring" joints shall be placed on the manhole base. Manhole steps shall be constructed using 14 inch by 8 1/4 inch safety rungs spaced 12 inches on center. A reinforced precast concrete cone shall be placed on top of the last manhole section. Brick layers may be placed on top of the cone section up to a maximum height of 18 inches. A Town of Avon standard frame and cover shall be installed at grade on top of the concrete cone section or on top of the brick layers.

Brick for construction of inverts and adjusting manholes to grade shall be Red Sewer Brick, Grade SM, conforming to ASTM C32.

### RESET SANITARY SEWER MANHOLES

**Description:** Under this heading is included the raising or lowering of existing sanitary manholes including the alteration and reconstruction of such structures, all in conformity with the lines, grades, dimensions and details shown on the plans, or as ordered, and in accordance with the provisions of these specifications for the various materials and work which constitute the completed structure.

**Materials:**

The materials to be used in the construction shall be those indicated on the plans or ordered by the Town Engineer and shall conform to these specifications. The provisions of Article 6.02.03 pertaining to bar reinforcement shall apply except that shop drawings need not be submitted for approval, unless called for on the plans or directed by the Town Engineer.

**Construction Methods:** These structures shall be constructed in accordance with the requirements contained herein for the character of work involved.

**Raising of Precast Manholes:** Raise the top and frame of the manhole to the elevation shown on the plans or as directed by the Town Engineer, by installing one or more courses of brick on top of the cone section, up to a maximum total of 18 inches of brick. If additional height is needed, the manhole cone section shall be removed and a four foot diameter precast concrete section shall be installed. The cone section shall be reinstalled and the frame set per the detail and these specifications.

**Raising of Hand-Built Manholes:** Raise the top of frame of the manhole to the elevation shown on the plans or as directed by the Town Engineer, by installing one or more courses of brick on top of the cone section, up to a maximum total of six inches of brick. If additional height is needed, the manhole cone section shall be removed to the point where the manhole no longer is tapered and then the manhole shall be rebuilt with a maximum cone section of three feet in height. Manhole steps shall be constructed using 14 inch by 10 7/8 inch safety rungs spaced 12 inches on center to match the existing stairway.

**Lowering of Precast Manholes:** Lower the top of the frame of the manhole to the elevation shown on the plans or as directed by the Town Engineer, by removing one or more courses of brick or manhole sections. The cone section shall be reinstalled, if removed, and the frame set per the detail and these specifications.

**Lowering of Hand-Built Manholes:** Lower the top of frame of the manhole to the elevation shown on the plans or as directed by the Town Engineer, by removing one or more courses of brick on top of the cone section. If no brick exists on top of the cone section, the manhole cone section shall be removed to the point where the manhole is no longer tapered and one or more courses of brick shall be removed and the cone section rebuilt to a maximum height of three feet. Manhole steps shall be constructed using 14 inch by 10 7/8 inch safety rungs spaced 12 inches on center to match the existing stairway. The frame shall then be set per these specifications.



All masonry units shall be laid in full mortar beds.

Metal fittings for manholes shall be set in full mortar beds or otherwise secured as shown on the plans.

Unless otherwise approved by the Town Engineer, frames and covers which are to be reset shall be removed from their present beds, the walls or sides shall be rebuilt to conform to the requirements of the new construction and the frames and covers reset, or the covers may be raised by extensions of suitable height approved by the Town of Avon. The lower surface of the cover and the corresponding upper surface of the frame shall be machine finished to provide a smooth, flat contact or fit without any tendency for the cover or grate to rock or rattle.

If the frames or covers are broken, or so damaged as to be unfit for further use, they shall be replaced with new, sound material conforming to the above requirements for the material involved and the Town of Avon details.

Certain manhole covers will be replaced with watertight covers as shown on the approved plans. These covers shall have non-penetrating pick holes and a neoprene gasket cemented into a machined groove on the underside of the manhole cover, or other watertight features approved by the Town of Avon.

#### LATERAL INSTALLATION

All laterals installed shall be a minimum six inches in diameter, extended to the property line, and installed at a two percent minimum grade, at the location as shown on the plans. Any field changes shall be approved by the Town Engineer prior to installation.

### **5.16 D Testing Requirements**

#### TESTS REQUIRED FOR GRAVITY SEWERS AND FORCE MAINS

The Town requires four tests to be performed as part of the acceptance of Sanitary Sewer Mains:

1. Manhole Negative Pressure Test
2. Low Pressure Air Test
3. Hydrostatic Pressure Test for Force Mains
4. Video of Sewer Main
5. Final Manhole Inspection

1. Manhole Negative Air Pressure (Vacuum) Test shall be in accordance with ASTM C1244.

- A. It is suggested this test be performed prior to backfilling the manhole, to facilitate any necessary repairs to the manhole.
- B. All lift holes and any pipes entering the manhole are to be plugged. A vacuum will be drawn and the vacuum drop over a specified time period is used to determine the acceptability of the manhole.
- C. Preparation of the Manhole.
  1. All lift holes shall be plugged.
  2. All pipes entering the manhole shall be temporally plugged, taking care to securely brace the pipes and plugs to prevent them from being drawn into the manhole.
- D. Procedure.
  1. The test head shall be placed at the top of the manhole in accordance with the manufacturer's recommendations.
  2. A vacuum of 10 inches of mercury shall be drawn on the manhole, the valve on the vacuum line of the test head closed, and the vacuum pump shut off. The time shall be measured for the vacuum to drop to 9 inches. of mercury.
  3. The manhole shall pass if the time for the vacuum reading to drop from 10 inches of mercury to 9 inches of mercury meets or exceeds the values indicated in Table 5-1.
  4. If the manhole fails the initial test, necessary repairs shall be made by an approved method. The manhole shall then be retested until a satisfactory test is obtained.

Table 5-1

## Minimum Test Times for Various Diameter Manholes.

The manhole shall be considered to pass the vacuum test if the vacuum reading does not drop more than 1" Hg (i.e. from 10" Hg to 9" Hg) during the following minimum test times. Minimum Test Times for Various Manhole Diameters			
MH Depth (feet)	4' Diameter MH	5' Diameter MH	6' Diameter MH
15 Feet or less	50 sec.	1 min. 5 sec.	1 min. 20 sec.
15.01 to 30 Feet	1 min. 20 sec.	1 min. 45 sec.	2 min. 10 sec.

NOTE: For other manhole diameters or greater depths, refer to ASTM C1244.

2. Low Pressure Air Test shall be in accordance with ASTM F1417-92.

The sewer line shall be tested for leakage using low pressure air test method as specified herein. Tests will be made after the pipe installation is complete, including all laterals, manholes, and backfill in the trench has been placed and compacted or consolidated as required by the Town Engineer.

The tests may be conducted by the Contractor using his own equipment, or a subcontractor approved by the Town Engineer. All equipment proposed for use in conducting the low pressure air test shall be subject to the approval of the Town Engineer. The Contractor shall submit shop drawings on the proposed equipment, for review by the Town Engineer. These shop drawings must be in sufficient detail to show the details, set up and proposed operation of the low pressure air test equipment, and no testing will be permitted without prior approval of the proposed equipment by the Town Engineer. The Contractor is required to provide all equipment, test plugs in the required sizes, appurtenances, connecting hose or pipe, labor and materials necessary to conduct the test as herein specified.

Immediately prior to testing, all lines will be cleaned and flushed with clean, potable water. All water, silt and debris shall be pumped out of the manhole by the contractor in an effort to prevent debris from entering into the existing or downstream system. All gauges, controls, and appurtenances for equipment used to conduct the test will be located outside of manholes. Connections to the line under test, test plugs and other equipment will be made with hose or pipe extensions which will safely contain the pressures necessary to conduct and control the test.

The equipment used to introduce the low pressure air into the sewer line shall include a safety valve or release device located in the equipment at a point which will insure that during the build-up of test pressure, the pipe line being tested will not be subjected to an internal pressure that could damage a properly installed sewer pipe. All tests shall be conducted on the completed sewer pipe line between manholes. Testing of shorter sections of pipe line will only be as permitted with the approval of the Town Engineer.

The gauge used to measure the drop in, pressure shall have a 4-inch diameter face, with a scale of 0 to 15 PSI in 0.1 PSI increments, or as approved by the Town Engineer.

The Contractor is cautioned herein of the importance of properly installing the end caps used to plug hubs, bends, ends of laterals, and other inlets, and securing them against movement, during the installation of the sewer. Failure to take this precaution can cause a properly installed sewer pipeline to fail the low pressure air test. The Contractor is further cautioned regarding the safety of personnel during the test. Low pressure air can exert a substantial force on a test plug, even on small diameter pipe plugs.

No one will be permitted in a manhole containing a test plug while air is under pressure in the pipeline being subjected to the test.

The Contractor is responsible to insure that all test plugs utilized are in good condition and that they will not be pressurized

beyond the limits recommended by their manufacturer.

After cleaning and flushing the line as required above, test plugs will be installed in the pipeline being subjected to the low pressure air test, and braced as necessary to secure the plugs in place.

Air shall be slowly supplied to the test section, until a constant pressure of 4.0 psi is maintained. The air pressure shall be regulated to prevent the pressure inside the pipe from exceeding 5.0 psi. When constant pressure of 4.0 psi is reached, the air supply shall be throttled to maintain the internal pressure of 4.0 psi for at least 5 minutes, for stabilization.

After stabilization, the air pressure shall be adjusted to 4.0 psi and shut off or disconnected from the air supply. The gauge shall be observed until the air pressure reaches 4.0 psi. At 4.0 psi the pressure drop shall be timed with a stopwatch until the pressure drops to 3.5 psi. The time required for this 0.5 psi pressure drop shall be recorded and compared to the following tabulation:

If the time for the 0.5 psi drop is less than that shown, the section will be considered to have failed and sources of leakage must be located by Contractor, repaired and section retested.

Time Requirements for Air Testing

**TABLE 5-2**  
**MINIMUM TIME REQUIRED FOR A PRESSURE DROP OF 0.5 PSIG**  
**AS REQUIRED FOR LOW PRESSURE AIR TEST**

Pipe Size (Inches)	Time	
	Minutes	Seconds
8"	5	06
10"	6	22
12"	7	39
15"	9	35
18"	11	34

In areas where groundwater is known to exist, the Contractor shall install a 1/2 inch diameter capped pipe nipple, approximately 10" long, through each manhole wall on top of the lowest sewer line entering the manhole. This shall be done at the time the sewer line is installed as directed by Engineer in the field. Immediately prior to the performance of the leakage test, the groundwater shall be determined by removing the pipe to clear it and then connecting a clear plastic tube to the nipple. The plastic tube shall be held vertically and a measurement of the height in feet of water over the invert of the pipe shall be taken after the water has stopped rising in this plastic tube. The height in feet shall be divided by 2.3 to establish the pounds of pressure that will be added to all readings. (For example, if the height of water is 11 1/2 feet, then the added pressure will be 5 psi). This increases the 3.5 psi to 8.5 psi, and the 2.5 psi to 7.5 psi. The allowable drop of one pound and the timing remain the same.

If the installation fails to meet this requirement, the Contractor shall, at his own expense, determine the source of leakage. He shall then repair or replace all defective materials and/or workmanship.

Note: If a section of sewer to be tested is composed of both main line sewer and more than a total of 100 feet of laterals, 1 minute and 30 seconds must be added to the length of time indicated above for the test required for the main sewer

The Contractor is responsible for all costs, and delays incurred due to efforts to locate and repair any leaks in any sewer pipeline which fails the low pressure air test, regardless of whether the failure is due to workmanship, material failure, the result of an improperly installed or braced end cap; or any sewer line damaged due to failure to provide a properly sized and operable safety valve or pressure release device, on the testing equipment for protection of the pipe being tested.

No sewer line will be considered acceptable until it successfully passes the requirements of this test. All testing will be conducted by the Contractor or his approved subcontractor in the presence of the Town's Inspector. The Contractor or his

subcontractor shall keep a written record which will show the results of the tests conducted. The records should include sufficient data on length of line, pressure levels, time for pressure drop, and related features noted during the testing of each segment of the line. A copy of this record shall be given to the Town.

### 3. Hydrostatic Pressure Test for Force Mains

The sewer line shall be tested for leakage using the hydrostatic pressure test method as specified herein. Tests will be made after the pipe installation is complete, including all laterals, manholes, and backfill in the trench has been placed and compacted or consolidated as required by the Town Engineer.

Immediately prior to testing, all lines will be cleaned and flushed with clean, potable water. During the flushing operation, all means necessary will be taken, by the contractor and approved by the Town Engineer, to ensure that all the water is removed from the last manhole installed. This will ensure that unnecessary water is not permitted to enter the Town's sanitary sewer system for treatment and unnecessary cost.

The test will be conducted in a similar fashion to that of the Low Pressure Air Test, however, the line will be slowly filled with water. Once the line is completely filled with water, utilizing the approved equipment, air at low pressure will be slowly introduced into the pipeline until the pressure within the pipeline being tested increases to 50 PSIG. Allow at least 2 minutes to elapse prior to starting the test. If necessary, allow a small amount of air to slowly enter into the pipeline in order to maintain a pressure of 50 PSIG. After the pressure is stabilized at the required level the test may begin.

Disconnect the supply air hose being tested and, start measuring the time for the pressure in the pipeline to drop 1 PSIG.

The test time for the hydrostatic test is 30 minutes. There is no time difference for size of pipe or length. However, each section between each cleanout or blow off manhole shall be tested individually. All sections must not drop at all for acceptance. Any failed sections shall be repaired as stated above in the low pressure air testing section. All procedures listed in the Low Pressure Air Test will be adhered to for the Hydrostatic Test, other than what is listed in this section.

### 4. Video of Sewer Main

A Video recording of the sewer line shall be performed and recorded on a DVD (Digital Video Disk), to view the inside of the pipe for purposes of determining if there are any defects within the Sewer Main. This test will also show if the pipe has been thoroughly cleaned and free of debris, which could cause a future blockage. This test will be made after the low pressure air test and sufficient cleaning has been completed. The video will indicate the location of all lateral connections to the main, distances out of manholes, and distances between manholes. All videos will be in color and should advance going with the flow of the main. The contractor is required to submit a DVD and a written report of the video, for the Town's review. The Town will notify the Contractor and /or Developer of any defects that need to be addressed or if the line has passed this test. The Contractor shall use an approved video recording firm, which has been approved by the Town Engineer. All video tests shall be witnessed by the Town's Inspector, and therefore scheduled with the inspector in advance.

### 5. Final Sewer Manhole Inspection

Final inspection shall include a visual inspection of each section of sewer by looking from the manhole with the aid of reflected sunlight or illumination equipment. The pipe shall be true to both line and grade, show no leaks, free from cracks and protruding joint materials, and contain no deposits of sand, dirt, or other materials.

All manholes will be visually inspected after final paving is completed. This is to ensure that there wasn't any damaged caused to the structures or brickwork during the paving operation and the existing inverts and tables are functioning properly. This inspection will be performed by Town of Avon personnel.

**FIGURE 5A**  
**SANITARY SEWER ENGINEERING REPORT FORM**  
JANUARY 18, 2023

**I. General Information**

1. Name of Project: \_\_\_\_\_
2. Sewershed in Avon (Simsbury, Farmington, Canton): \_\_\_\_\_
3. Estimated population served by proposed system: \_\_\_\_\_,
4. Estimated daily sewage flow for the proposed system at full build out: \_\_\_\_\_,
5. Calculated peak sewage flow capacity of the proposed system: \_\_\_\_\_,
6. Sewage flow allocated for the area based on zoning: \_\_\_\_\_,
7. Sewage flow capacity of connecting Town Sewer: \_\_\_\_\_, Actual ( ); Estimated ( ).
8. Are there any deviations from the Town Standards and Specifications within the proposed design? YES\_\_\_\_ NO\_\_\_\_  
If yes, describe (use additional pages if necessary): \_\_\_\_\_  
\_\_\_\_\_
9. Proposed sewer line(s) is (are) located within the proposed/existing right-of-way? YES\_\_\_\_ NO\_\_\_\_  
If no, explain: \_\_\_\_\_  
\_\_\_\_\_
10. Are easements required for the extension of the sanitary sewer? YES\_\_\_\_ NO\_\_\_\_  
If yes, are they indicated on the plans and completed for filing on the Town Land Records?  
YES\_\_\_\_ NO\_\_\_\_

**II. Sanitary Sewer Line Extension Technical Information**

1. Proposed sanitary sewer pipe material (PVC SDR 35, PVC Sch 80, Ductile Iron Pipe, C900)?  
Circle materials and further describe: \_\_\_\_\_  
\_\_\_\_\_
2. Are there any locations within the proposed mainline or laterals in which a minimum of 48 inches of earth cover is not provided? YES\_\_\_\_ NO\_\_\_\_  
If yes, explain: \_\_\_\_\_  
\_\_\_\_\_
3. Are there any proposed sanitary sewers with a depth to invert greater than or equal to 15 feet? YES\_\_\_\_ NO\_\_\_\_
4. Are there any proposed sanitary sewers within a wetland area? YES\_\_\_\_ NO\_\_\_\_
5. Portion(s) of the proposed sewer system will be at or below normal ground water level? YES\_\_\_\_ NO\_\_\_\_  
If yes, describe the portion(s) and methods of relief \_\_\_\_\_  
\_\_\_\_\_
6. Is the design velocity of each proposed line at full and half full flow is equal to or greater than 2 ft/sec? YES\_\_\_\_ NO\_\_\_\_  
If no, explain \_\_\_\_\_  
\_\_\_\_\_

7. Is a minimum of 1.5 feet of vertical separation and ten feet of horizontal separation between sewer lines and potable waterlines are maintained? YES\_\_\_\_ NO\_\_\_\_

8. Are there any existing or proposed water wells within 75 feet of the sewer? YES\_\_\_\_ NO\_\_\_\_

9. Are there any stream crossings? YES\_\_\_\_ NO\_\_\_\_

If yes, do the plans and/or specifications contain all the requirements of Inland Wetlands Commission approvals? \_\_\_\_\_

If no, explain: \_\_\_\_\_  
Manholes: \_\_\_\_\_

10. Do all of the manholes match the Town of Avon Standards? YES\_\_\_\_ NO\_\_\_\_

If no, explain: \_\_\_\_\_

11. Receiving line:

a. Size of receiving line: \_\_\_\_\_

b. Hydraulic capacity of receiving line: \_\_\_\_\_.

c. Current peak flow in receiving line: \_\_\_\_\_.

Note: At the Town Engineer's discretion, the Town may mandate that the proposed sanitary sewers be modeled within the Town's capacity model at the Developer's expense for determination of potential downstream effects..

12. The proposed sewer lines are located upstream of an existing or proposed Pump Station? YES\_\_\_\_ NO\_\_\_\_

If yes, the following information is required:

Existing Pump Station design capacity: \_\_\_\_\_

Existing flow at Pump Station: \_\_\_\_\_

13. The proposed top of frame of all sewer manholes located at elevations above the 100-year flood elevation? YES\_\_\_\_ NO\_\_\_\_

If no, can the manhole covers be raised above the 100-year flood elevation? YES\_\_\_\_ NO\_\_\_\_

If not, the manhole frames and covers must be bolted and watertight covers approved by the Town Engineer.

14. Does the proposed use include any potential grease production (current or future likely use)? YES\_\_\_\_ NO\_\_\_\_

If yes, have the appropriate design calculations and details been provided for a Grease Separator?

**III. Pump Station and Force Main Technical Information**  
**JANUARY 18, 2023**

**A. Pump Station:**

**NOTE: Any proposed pump stations that are planned to become the responsibility of the Town of Avon / Avon Water Pollution Control Authority will require significant review by the Town. It is likely that the Town will utilize a consultant to perform a detailed review of pump station specifics. Such a review will be at the expense of the Developer**

1. Design capacity of proposed pump station \_\_\_\_\_
2. Number of pumps in the proposed pump station: \_\_\_\_\_
3. Telemetry compatible with the Town of Avon SCADA YES \_\_\_\_\_ NO \_\_\_\_\_
4. Pump specifications:
  - a) Number of pumps: \_\_\_\_\_
  - b) Type of pump: \_\_\_\_\_
  - c) Pump capacity: \_\_\_\_\_
  - d) Total Dynamic Head: \_\_\_\_\_
  - e) Diameter of Suction Line: \_\_\_\_\_
  - f) Provisions for wet well mixing to remove all solids and grease in wastewater?
  - g) Even flow distribution of wastewater to pumps? YES \_\_\_\_\_ NO \_\_\_\_\_
  - h) Is force main "holding time" excessive, thereby causing an odor issue? YES \_\_\_\_\_ NO \_\_\_\_\_
  - i) Odor control measures considered? YES \_\_\_\_\_ NO \_\_\_\_\_
  - j) Pump shut off(s) is available and/or lock out tag out considered? YES \_\_\_\_\_ NO \_\_\_\_\_
  - k) Wet well vent(s) made of corrosion proof materials with carbon filter? YES \_\_\_\_\_ NO \_\_\_\_\_
  - l) Has a pump station O&M agreement been submitted for Town approval? YES \_\_\_\_\_ NO \_\_\_\_\_
  - m) Have appropriate valves been incorporated i.e., gate, check and air vent valves (air release, vacuum break, air/vacuum etc.)? YES \_\_\_\_\_ NO \_\_\_\_\_
  - n) Pumps can be removed without dewatering or manually disconnecting any piping in the well? YES \_\_\_\_\_ NO \_\_\_\_\_
  - o) Pump Station includes a crane system to lift pumps? YES \_\_\_\_\_ NO \_\_\_\_\_
  - p) Pumps, motors, and other mechanical and electrical equipment can be easily removed without entering the wet well? YES \_\_\_\_\_ NO \_\_\_\_\_
  - q) Pumps are capable of passing a three (3) inch sphere? YES \_\_\_\_\_ NO \_\_\_\_\_
  - r) Pumps are submersible? YES \_\_\_\_\_ NO \_\_\_\_\_
  - s) Electrical equipment and controls located in enclosed areas meets National Electrical Code for hazardous conditions? YES \_\_\_\_\_ NO \_\_\_\_\_
  - t) Pumps automatically alternate? YES \_\_\_\_\_ NO \_\_\_\_\_
  - u) Shut-off valves are located on discharge lines of each pump between the pump and the valve? YES \_\_\_\_\_ NO \_\_\_\_\_
  - v) Check valves are located on discharge lines of each pump? YES \_\_\_\_\_ NO \_\_\_\_\_
  - w) Valving is located in a separate pit? YES \_\_\_\_\_ NO \_\_\_\_\_
  - x) A vent has been provided, 3 feet above proposed surrounding grade, to accommodate for snow accumulation? YES \_\_\_\_\_ NO \_\_\_\_\_
  - y) Wet well floor has a minimum slope of 1 to 1 to the pump inlets? YES \_\_\_\_\_ NO \_\_\_\_\_
  - z) Is the pump station protected from high groundwater? YES \_\_\_\_\_ NO \_\_\_\_\_
    1. If yes, cathodic protection has been provided? YES \_\_\_\_\_ NO \_\_\_\_\_
    2. If yes, buoyancy forces have been incorporated into the design and copies of calculations have been provided? YES \_\_\_\_\_ NO \_\_\_\_\_
5. Has an emergency generator been included in the design? YES \_\_\_\_\_ NO \_\_\_\_\_
6. What are the specifics of the emergency generator proposed?
  - Manufacturer \_\_\_\_\_
  - Model number \_\_\_\_\_
  - KW rating \_\_\_\_\_
  - Fuel type \_\_\_\_\_ - \_\_\_\_\_
  - Fuel storage/provisions \_\_\_\_\_

**B. Force Main:**

1. Diameter of force main: \_\_\_\_\_
2. Length of force main: \_\_\_\_\_
3. Force main material: \_\_\_\_\_
4. Calculated velocity in force main (ft/sec): \_\_\_\_\_
5. Hydrostatic Pressure testing is specified for all pipe? YES\_\_\_\_ NO\_\_\_\_
6. Air relief valves are positioned at the high points in the force main? YES\_\_\_\_ NO\_\_\_\_
7. Force main joint restraint is provided? YES\_\_\_\_ NO\_\_\_\_
8. Force main terminates in the receiving manhole with piped drop? YES\_\_\_\_ NO\_\_\_\_
9. Proposed Profile of force main provided? YES\_\_\_\_ NO\_\_\_\_

**Professional Engineer's Certification:**

I certify that all the information provided in this engineering report form is correct and no significant information necessary for a proper evaluation of the project has been intentionally omitted:

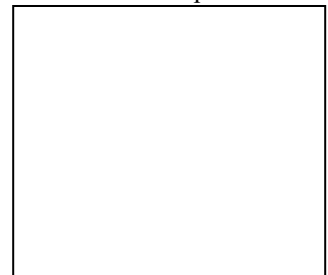
Signature of Professional Engineer: \_\_\_\_\_ Date: \_\_\_\_\_

Affix P.E. Stamp and Seal

Name of Professional Engineer: \_\_\_\_\_

State of Connecticut Professional Engineer No: \_\_\_\_\_

Phone No.: (\_\_\_\_) \_\_\_\_\_





SECTION 6.0

**CONSTRUCTION**

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[Figure 6A Soil Erosion and Sediment Control Inspection Report](#)

[Figure 6B Conn-DOT-Typical Traffic Control Plan Sheets](#)

# CONSTRUCTION

## **6.1 Permit to Excavate in or Obstruct Highway Right-Of-Way**

Requirements for work within the Town Right-Of-Way are described in Chapter 53 of the Code of the Town of Avon. In general, all persons or contractors performing construction activities within existing Town Right-Of-Ways shall obtain an Excavation Permit from the Engineering Department.

A current Permit Bond and properly executed Certificate of Insurance is required to work within the Town Right-Of-Way, and must be renewed on an annual basis. Appropriate state licensure, including plumbing licenses for storm drainage or sanitary sewer construction, shall be demonstrated at the time of application for a permit.

Permits to Excavate, Surety Bonds, and Certificate of Insurance's are non-transferable. Each contractor working within the Town Right-Of-Way, must have a separate permit, bond, and insurance for work being performed. Each permit is site specific, and unless otherwise approved by the Town Engineer, the Contractor must obtain individual permits for each area of work being performed.

Driveway installations within the Town Right-Of-Way must meet the requirements described in Sections 3.23 thru 3.25.

No portion of an irrigation system may be installed within the Town Right-Of-Way without prior approval from the Avon Public Works Director and filing of an Avon Encroachment Agreement. See Section 3.32 for additional information.

Connections of private drains to the Town storm drainage system must meet the requirements described in Section 4.16.

Pavement repairs for street excavations shall be made as shown on the Standard Details, the Avon Pavement Cut Policy, and outlined in this manual. Contractors making such repairs shall be responsible for maintenance of said pavement patches, for one year from completion of the permanent pavement patch. Replacement shall be at the sole discretion of the Town Engineer. Temporary pavement patches shall remain in place for a period of at least six months including one winter season, prior to the installation of the permanent patch, unless otherwise directed by the Town Engineer. See Section 6.13 for additional information.

## **6.2 Sanitary Sewer Permits and Licenses**

Sanitary Sewer Permits are required for all activities performed on the sanitary sewer system whether located within Town owned property or within private property. These activities include the installation or repair of a private sanitary sewer house connection, sewer main lines, or any other activity involving the sanitary sewer system. Specifications for the design and installation of sanitary sewer systems are provided in Section 5 of this manual.

Permits are issued only to Contractors licensed by the State of Connecticut for this type of work. Applicable licenses include:

- P-1 Unlimited Plumbing Contractor
- P-7 Limited Sewer, Storm, and Water Contractor
- W-9 Limited Drainlayer Contractor

Work performed on the sanitary sewer system without a License and a Permit is a violation of the Code of the Town of Avon and State of Connecticut Statutes.

### **6.3 Right-Of-Way Bonds**

As described Section 53 of the Code of the Town of Avon, the applicant shall file a bond with the Engineering Department. Typical permits can be approved with permit-specific \$5,000 bonds. Contractors that anticipate taking out multiple permits may provide one single \$50,000 bond to cover unlimited typical permits. Larger projects that are not typical or have a greater impact on the Town's Right-Of-Way require larger bonds at the discretion of the Town Engineer. The bond form must comply with Town of Avon requirements depending upon the nature of the work, the impact to the Town-owned property, and the risk to the Town of the applicant. The preferred standard bond shall either be a cash bond or a letter of credit. If the Town deems it appropriate to allow surety-type security, the surety bond shall be written by an indemnity or Surety Company authorized to transact business in the State of Connecticut and approved by the Town Manager or his/her designee.

The release of Right-Of-Way bonds will only be allowed after satisfactory completion of the one-year maintenance period after initial approval of the work by the Town for the improvements completed within the Town Right-Of-Way. Requests for bond releases or reductions shall be made in writing by contacting the Engineering Department at 60 West Main Street, Avon, CT 06001.

### **6.4 Insurance Requirements for Work in the Town Right-Of-Way**

Contractors filing for an Excavation, Sewer, or Driveway permit must obtain and keep in force for the entire duration of the work, appropriate Commercial General Liability, and must furnish a valid Certificate of Insurance to the Engineering Department Office. Based on current Town Policy, the Contractor's insurance must satisfy the requirements found on:

#### **Town of Avon Insurance Limitations Coverage Requirements for Contracted Work**

In order to ensure that the Town of Avon is properly protected from insurance claims arising out of work performed on behalf of the Town by outside contractors, the Town established minimum policy limits and coverage requirements that are mandatory as identified on the Town's website. The Town expressly reserves the right, in its sole discretion, to require higher policy limits, additional types of coverage, and additional provisions. These limits and requirements are available as a separate document entitled "Minimum Insurance Requirements for Sewer, Excavation and Driveway Permits". This document can be downloaded from the Town's Engineering, Sewer and GIS Department web page.

### **6.5 Work Zone Traffic Control**

Any work within a Town Right-Of-Way shall require the Contractor to install the proper maintenance and protection of traffic signage, and provide certified traffic control personnel through the work area, in conformance with the Manual on Uniform Traffic Control Devices. At the request of the Town Engineer or Chief of Police, the Contractor shall submit for approval a proposed plan to maintain and protect traffic through the work area. Plans shall show, at a minimum, the size, type and location of signs and other traffic control devices to be used. See Figure 6.B for some of the ConnDOT Typical Traffic Control Plan Sheets. Consult ConnDOT for the current Traffic Control Plan Sheets.

At the time of filing for a Permit to Excavate or Obstruct in a Highway Right-Of-Way, applicants working within a public street shall contact the Engineering Department to determine if certified flaggers or police officers are required for traffic control. Depending upon the size of the project and / or the extent of traffic impediment, the Town Engineer may refer the applicant to the Chief of Police (Legal Traffic Authority) for their determination of traffic control required. The use of Police Officers may be required depending on the nature, duration, and location of the work, at the discretion of the Avon Chief of Police.

### **6.6 Road Closure**

At no time shall a Town owned roadway or any lanes of a Town owned roadway be closed without prior written consent by the Town of Avon Traffic Authority.

All proposed road closures shall provide the following:

- Proposed vehicle and pedestrian detour plan, including the placement of required signs as indicated in the Manual of Uniform Traffic Control Devices;

- Safe passage for school buses. The applicant is to contact the Avon School Business Office at 860.673.8270, and each of the school bus service providers in Avon, to discuss the school bus routes, and the need for limiting the hours of work as needed;
- Safe passage of emergency vehicles. The applicant shall review the proposed closure with the Police Department, to determine if emergency vehicle access could be maintained through the work area. When the closure will effectively prevent the access of emergency vehicles through the area, the applicant shall contact Avon Police Department Dispatch 860.409.4200 each day, before the road is closed and after it is reopened;
- The applicant shall make all efforts to allow property owners access to their driveways and properties. The applicant may be required to contact and inform all property owners in the area of the proposed closure; and,
- When the proposed closure will affect existing businesses, the applicant shall meet with both property and business owners, to discuss the closure, and make all efforts to accommodate their hours of operation or provide an alternative access to their business. The applicant shall install signs informing the public the businesses are open and directing them to the entrance. Letters from the business(s) acknowledging the closure, will be required prior to the application's approval.

### **6.7 Subdivision Bonds and Partial Bond Releases**

Subdivision Bonds for guaranteeing the completion of the approved work shall be posted by the Developer as described in Section 3 of the Town of Avon Subdivision Regulations. As part of this process, the Design Engineer must submit a quantity estimate for proposed public and/or private improvements to the Town Engineer. The Town Engineer will review the estimate and determine the amount of the bond. Note: The bond amount is determined based on the Town Engineer's estimate to have the Town complete the work, including not only the actual materials and work, but also the administrative and legal costs to call the bond, bid the work, manage the work, inspect and test the work, etc..

Public improvement bonds for subdivisions shall be required prior to the transfer of any lot to a buyer. The bond shall guarantee any required public improvements and utilities are completed to the reasonable satisfaction of the Town Engineer and the Director of Planning and Community Development. As part of this process, the Design Engineer must submit a quantity estimate, for the proposed public and/or private improvements, to the Town Engineer. The Design Engineer shall exclude any public improvements that have been completed and approved by the Town as well as any utilities where the Owner/Contractor has a bond filed with the appropriate Utility Company. A copy of this bond or a letter from the appropriate Utility Companies shall be required as part of the estimate. The Town Engineer will make a determination of the required bond for the construction.

Requests for partial bond releases for accepted public improvements may be made by the Developer to the Town Engineer as described in Section 3.03 of the Town of Avon Regulations for Subdivision. As part of the request for release of bonds, the Developer shall submit a construction certification from a Professional Engineer, licensed in the State of Connecticut, that all improvements have been built in accordance with the approved plans and Town requirements, including pavement structure, utilities and all associated items with the approved plans. The pavement structure shall mean subgrade, subbase, processed aggregate base, binder course of pavement and finish course of pavement.

After receiving the request, the Town Engineer will review the work completed for acceptability and will determine an appropriate amount for the bond release based on the value of work completed and remaining work to be done. The amount and frequency of bond releases is described in Section 3.03 of the Town of Avon Regulations for Subdivision, and shall be at the sole discretion of the Town.

### **6.8 Easements and Warranty Deeds**

The Developer shall submit to the Town for review, draft documentation for all easements as identified on the approved plans. Said conveyances are to be in the approved format as described in this manual (for storm and sanitary easements), or as provided by the Planning Department. Upon approval by the Town, the Developer shall deliver executed conveyances for all easements to either the Town Engineer or the Town Planner. After receiving approval from the appropriate Town staff or the Town's consulting attorney, and at the recommendation of the appropriate Department head, the Avon Town Council will conduct a public hearing to accept whatever interest in property is under consideration. Once Town Council has accepted the interest, the Developer will then file the final easement documents along with the appropriate approved mylars in the Town Clerk's office.

All warranty deeds for land to be acquired by the Town of Avon within approved subdivision or site development plans,

shall be submitted to the Town for review and approval. Upon approval by the Town, the Town will hold the warrantee deed in escrow until final acceptance of the Public Improvements by the Town.

#### **6.9 Preconstruction Meeting**

For all construction projects that involve existing or proposed public improvements, the Developer / Utility is responsible for contacting the Engineering Department to request that a pre-construction meeting be scheduled after all maps have been filed and appropriate bonds have been posted. The meeting is to be held at Town offices with the Developer/Utility, Design Engineer, Contractor, Utility Company representatives, and Town Staff to review conditions of approval, address public safety, and ensure good communication and coordination during construction.

If construction includes the installation of public water, gas, telephone, electric, or cable as part of the project, the plans must be approved by the appropriate utility company prior to scheduling the pre-construction meeting with the Town. Fire Hydrant locations shall be approved by the Town Fire Marshal.

Developer/Utility responsibilities for the pre-construction meeting include the following:

- Provide two paper copies of the final construction plans, signed and sealed by the Licensed Land Surveyor and Professional Engineer, for use by the Engineering Division staff;
- Ensure that the Contractor's representative, who will be at the project site supervisor during construction, attends the meeting.
- Provide a realistic and accurate proposed construction project schedule

#### **6.10 Public Improvement Certifications**

As part of the course of construction, the Developer shall submit a construction certification letter, from the Design Engineer licensed in the State of Connecticut, that all improvements have been built in accordance with the approved plans and Town requirements.

The certification letter from the Design Engineer shall be provided indicating all sanitary sewer and stormwater structures, piping, and facilities were constructed in conformance with the approved plans. The certifications shall be submitted to the Town Engineer prior to installation of the pavement structure.

The certification for the pavement structure shall be submitted for the subgrade, sub-base, processed aggregate base, binder course of pavement and finish course of pavement. The Contractor cannot continue onto the next course until the Town has received the certification from Design Engineer indicating the underlying course has been installed to the line and grade of the approved plans

#### **6.11 Construction Design Changes**

The Contractor shall notify the Town immediately of any potential changes to the approved plan. Any changes from the approved plans require review and approval by the Town prior to construction. If deemed necessary by the Town, the Contractor must submit a plan prepared and certified by the Design Engineer of record, documenting the changes to the approved plan. The proposed changes shall be submitted to the Town Engineer or Town Planner as required. Depending upon the nature of the change and/or its impacts, the modifications may require additional approvals, and an application may have to be submitted to the Town Planning and Zoning Commission, Town Inland Wetlands Commission, Town of Avon Water Pollution Control Authority, or other regulatory agencies. Any changes to the approved plans shall be submitted to the Engineering Department for a determination.

#### **6.12 Important Notice to Excavation / Sewer Contractors**

It is the contractor's responsibility to perform all work in accordance with applicable local, State, and Federal rules and regulations. If requested by a Town of Avon Employee, the contractor shall provide the following:

1. Name of support systems such as trench boxes, sheeting, bracing, shoring, etc.as required by OSHA regulations 1926.652 to support the sides of the excavation. Such sheeting, shoring, and bracing shall be installed as required for protection of the work and for the safety of all personnel.
2. Name of the person or persons knowledgeable of the Confined Space Standards, Title 29 Code of Federal Regulations 1910.146, 1926.500 and 1926.650 promulgated by OSHA.

3. The name and qualifications of the "Competent Person" who is capable of identifying existing and predictable hazards in the surroundings and working conditions, and who has the authorization to take prompt corrective measures to eliminate them.
4. Documentation of the protective support system(s) which shall include design methods, limitations, and manufacturers tabulated data as outlined in OSHA regulations 1926.652. If a Registered Professional Engineer is required to design the protective support system, at least one copy of the design and certification shall be stored at the job site.

The Town of Avon assumes no responsibility or liability for work zone safety on a Developer's or Contractor's site. It is the responsibility of each and every contractor working on projects requiring Town permits to comply with local, State, and Federal safety laws. It is the responsibility of the Developer/Utility and/or prime contractor to manage work zone safety within and immediately adjacent to their construction area. Town of Avon staff however retain the right to shut down a work zone if, in their opinion the work zone is unsafe for workers or the public, until measures are taken to mitigate safety concerns.

### **6.13 Road Cut Policy**

On May 2, 2013, the Avon Town Council adopted a Pavement Cut Policy which governs the repair to existing public pavements that are impacted by excavation activities. This policy is available from the Town's web site – Ordinances and Regulations, Figure E – Town Council Policies.

This policy is extended herein to include binder and final course pavement within roads that have not yet been formally accepted by the Town. The intent of this is to protect the structural integrity of pavements that are going to be taken by the Town. Accordingly, no roadway or apron pavement is to be cut or excavated within a subdivision that has not been accepted by the Town without the written approval of the Town Engineer.

### **6.14 Erosion and Sediment Control Reporting**

In addition to compliance with the State of Connecticut Guidelines for Erosion and Sediment Control (see section 4.14), every subdivision, roadway, and sewer extension project requires weekly Erosion and Sediment Control inspection by the Engineer of record and reports (see Figure 6A) to be submitted to the Town Engineer. These reports are to be signed by the Engineer of Record or their representative and are to be submitted within 5 business days of the week for which they are reporting.

Depending upon the size of the project, a Connecticut Department of Energy and Environmental Protection (CTDEEP) General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities may be required. IN such cases, applicants are to provide a completed copy of this application along with approval by the CTDEEP to the Town Engineer prior to applying for a Town permit to begin construction



**FIGURE 6A**  
**SOIL EROSION AND SEDIMENT CONTROL**  
**INSPECTION REPORT**  
**JANUARY 18, 2023**

Project Name: \_\_\_\_\_

Permit: \_\_\_\_\_

Inspection Date: \_\_\_\_\_

Time \_\_\_\_\_

Inspected By: \_\_\_\_\_

**STAGE OF CONSTRUCTION**

- |  |   |
|--|---|
| <input type="checkbox"/> Pre-construction Meeting<br><input type="checkbox"/> Clearing and Grubbing<br><input type="checkbox"/> Temporary Stabilization<br><input type="checkbox"/> Finish Grading | <input type="checkbox"/> Initial Installation of SE/SC Measures<br><input type="checkbox"/> Rough Grading<br><input type="checkbox"/> Building Construction<br><input type="checkbox"/> Final Stabilization |
|--|---|

SITE IS:    IN COMPLIANCE WITH NO ISSUES    \_\_\_\_\_  
               **NOT** IN COMPLIANCE AND REQUIRES REMEDIES    \_\_\_\_\_

**INSPECTION CHECKLIST**

Yes   No   N/A

- |                          |                          |                          |   |
|--------------------------|--------------------------|--------------------------|---|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Have all sediment trapping measures been installed prior to site disturbance?   |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Have all soil erosion and sediment control devices indicated on the permitted plan set been installed?                                    |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Are all soil stockpiles adequately stabilized with the use of temporary seed and a sediment trapping device?                              |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Are all perimeter sediment control devices properly installed and maintained?   |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Are all sediment basins and/or traps properly installed, stabilized and maintained in working condition?                                  |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Have all stormwater management systems been constructed, stabilized and are functioning properly?   |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Have all disturbed areas been stabilized with temporary or permanent measures within 14 days of the end of active hydrologic disturbance? |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Are finished cut and fill slopes adequately stabilized?   |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Has all erosion control blanket, hydro-mulch, mulch or other erosion control devices been installed where required?                       |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Are stormwater conveyance channels adequately stabilized with channel lining and outlet protection?                                       |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Do all operational storm sewer laterals have inlet protection?  |

☐ ☐ ☐ Do all construction ingress and egress points have stabilized construction entrance installed?

☐ ☐ ☐ Are soil and mud being kept off all adjacent public roadways?

YES NO N/A

☐ ☐ ☐ Are measures being taken to control dust?

☐ ☐ ☐ Are all utility trenches being properly backfilled, compacted and stabilized?

☐ ☐ ☐ Are temporary stream crossing of non-erodible material installed where applicable?

☐ ☐ ☐ Is necessary re-stabilization of in-stream construction complete?

☐ ☐ ☐ Have all temporary control structures that are no longer needed been removed within 30 days of stabilization?

☐ ☐ ☐ Is there evidence of sediment leaving the site affecting downstream property?

PLEASE EXPLAIN.

WEATHER CONDITIONS:.

SITE CONDITIONS:

ADDITIONAL COMMENTS:

**REPORTED BY:**

Inspector signature:

Inspector printed name

Date:



**FIGURE 6B**

**CONNDOT**

**TYPICAL**

**TRAFFIC CONTROL PLAN SHEETS**

## NOTES FOR TRAFFIC CONTROL PLANS

1. IF A TRAFFIC STOPPAGE OCCURS IN ADVANCE OF SIGN (A), THEN AN ADDITIONAL SIGN (A) SHALL BE INSTALLED IN ADVANCE OF THE STOPPAGE.
2. SIGNS (AA), (A), AND (D) SHOULD BE OMITTED WHEN THESE SIGNS HAVE ALREADY BEEN INSTALLED TO DESIGNATE A LARGER WORK ZONE THAN THE WORK ZONE THAT IS ENCOMPASSED ON THIS PLAN.
3. SEE TABLE 1 FOR ADJUSTMENT OF TAPERS IF NECESSARY.
4. IF THIS PLAN REMAINS IN CONTINUOUS OPERATION FOR MORE THAN 36 HOURS, THEN TRAFFIC DRUMS SHALL BE USED IN PLACE OF TRAFFIC CONES.
5. ANY LEGAL SPEED LIMIT SIGNS WITHIN THE LIMITS OF A ROADWAY / LANE CLOSURE AREA SHALL BE COVERED WITH AN OPAQUE MATERIAL WHILE THE CLOSURE IS IN EFFECT, AND UNCOVERED WHEN THE ROADWAY / LANE CLOSURE IS RE-OPENED TO ALL LANES OF TRAFFIC.
6. IF THIS PLAN REMAINS IN CONTINUOUS OPERATION FOR MORE THAN 36 HOURS, THEN ANY EXISTING CONFLICTING PAVEMENT MARKINGS SHALL BE ERADICATED OR COVERED, AND TEMPORARY PAVEMENT MARKINGS THAT DELINEATE THE PROPER TRAVELPATHS SHALL BE INSTALLED.
7. DISTANCES BETWEEN SIGNS IN THE ADVANCE WARNING AREA MAY BE REDUCED TO 100' ON LOW-SPEED URBAN ROADS (SPEED LIMIT < 40 MPH).
8. IF THIS PLAN IS TO REMAIN IN OPERATION DURING THE HOURS OF DARKNESS, INSTALL BARRICADE WARNING LIGHTS - HIGH INTENSITY ON ALL POST-MOUNTED DIAMOND SIGNS IN THE ADVANCE WARNING AREA.
9. A CHANGEABLE MESSAGE SIGN SHALL BE INSTALLED ONE HALF TO ONE MILE IN ADVANCE OF THE LANE CLOSURE TAPER.
- 10 SIGN (P) SHALL BE MOUNTED A MINIMUM OF 7 FEET FROM THE PAVEMENT SURFACE TO THE BOTTOM OF THE SIGN.

TABLE 1 - MINIMUM TAPER LENGTHS

POSTED SPEED LIMIT (MILES PER HOUR)	MINIMUM TAPER LENGTH FOR A SINGLE LANE CLOSURE
30 OR LESS	180' (55m)
35	250' (75m)
40	320' (100m)
45	540' (165m)
50	600' (180m)
55	660' (200m)
65	780' (240m)

METRIC CONVERSION CHART (1" = 25mm)

ENGLISH	METRIC	ENGLISH	METRIC	ENGLISH	METRIC
12"	300mm	42"	1050mm	72"	1800mm
18"	450mm	48"	1200mm	78"	1950mm
24"	600mm	54"	1350mm	84"	2100mm
30"	750mm	60"	1500mm	90"	2250mm
36"	900mm	66"	1650mm	96"	2400mm



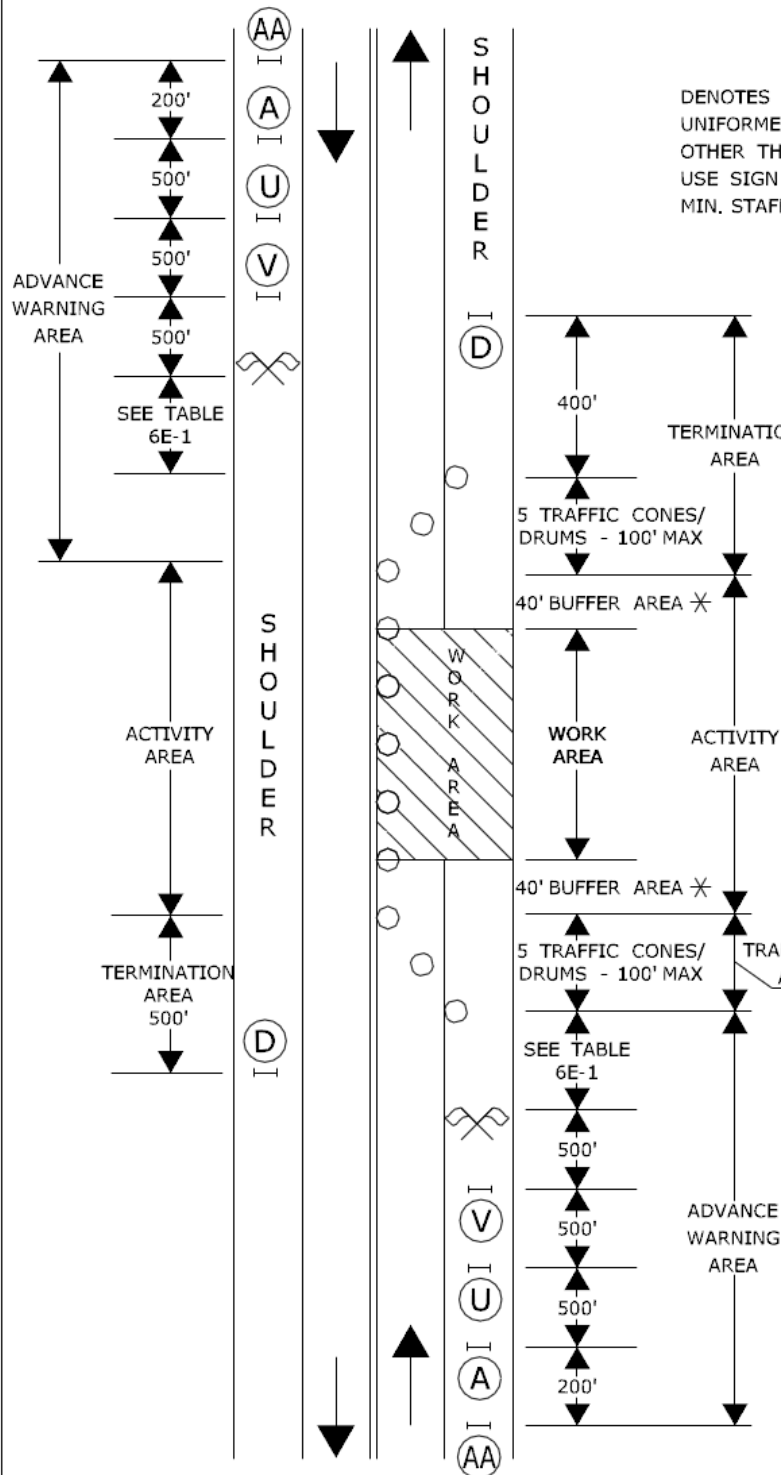
SCALE: NONE

CONSTRUCTION TRAFFIC CONTROL PLAN

### NOTES

# WORK IN TRAVEL LANE AND SHOULDER TWO LANE HIGHWAY ALTERNATING ONE-WAY TRAFFIC OPERATIONS

SIGN FACE  
108 SQ. FT (MIN.)

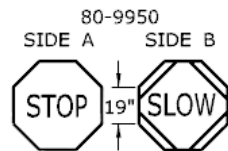
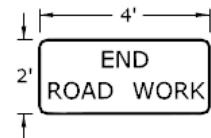


DENOTES APPROXIMATE LOCATION OF  
UNIFORMED FLAGGER, TRAFFICPERSON  
OTHER THAN POLICE OFFICERS SHALL  
USE SIGN 80-9950 MOUNTED ON A 6'  
MIN. STAFF.

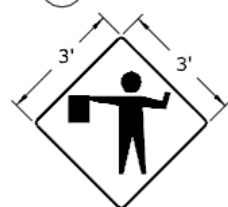
FROM THE MUTCD  
(2009 EDITION)  
Table 6E-1. Stopping Sight Distance  
as a Function of Speed.

Speed (mph)	Distance (ft)
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495

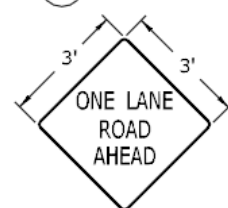
(D) 80-9612



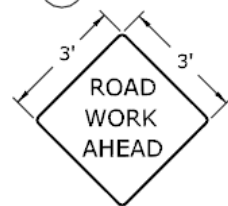
(V) 80-9803



(U) 80-9834



(A) 80-9603



(AA) 31-1906



- TRAFFIC CONE **OR** TRAFFIC DRUM
- ✱ OPTIONAL ✕ TRAFFIC DRUM — PORTABLE SIGN SUPPORT
- ← HIGH MOUNTED INTERNALLY ILLUMINATED FLASHING ARROW



SCALE: NONE

CONSTRUCTION TRAFFIC CONTROL PLAN  
**PLAN 13 - SHEET 1 OF 2**  
SEE NOTES 1, 2, 4, 6, 7, 8

CONNECTICUT DEPARTMENT OF TRANSPORTATION  
BUREAU OF ENGINEERING & CONSTRUCTION

APPROVED

*Charles S. Harlow*  
PRINCIPAL ENGINEER

Charles S. Harlow  
2012.06.05 15:55:23-04'00'

# WORK IN TRAVEL LANE AND SHOULDER TWO LANE HIGHWAY ALTERNATING ONE-WAY TRAFFIC OPERATIONS

SIGN FACE  
108 SQ. FT (MIN.)

## HAND SIGNAL METHODS TO BE USED BY UNIFORMED FLAGGERS

THE FOLLOWING METHODS FROM SECTION 6E.07, FLAGGER PROCEDURES, IN THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES," SHALL BE USED BY UNIFORMED FLAGGERS WHEN DIRECTING TRAFFIC THROUGH A WORK AREA. THE STOP/SLOW SIGN PADDLE (SIGN NO. 80-9950) SHOWN ON THE TRAFFIC STANDARD SHEET TR-1220 01 ENTITLED, "SIGNS FOR CONSTRUCTION AND PERMIT OPERATIONS" SHALL BE USED.

### A. TO STOP TRAFFIC

TO STOP ROAD USERS, THE FLAGGER SHALL FACE ROAD USERS AND AIM THE STOP PADDLE FACE TOWARD ROAD USERS IN A STATIONARY POSITION WITH THE ARM EXTENDED HORIZONTALLY AWAY FROM THE BODY. THE FREE ARM SHALL BE HELD WITH THE PALM OF THE HAND ABOVE SHOULDER LEVEL TOWARD APPROACHING TRAFFIC.



### B. TO DIRECT TRAFFIC TO PROCEED

TO DIRECT STOPPED ROAD USERS TO PROCEED, THE FLAGGER SHALL FACE ROAD USERS WITH THE SLOW PADDLE FACE AIMED TOWARD ROAD USERS IN A STATIONARY POSITION WITH THE ARM EXTENDED HORIZONTALLY AWAY FROM THE BODY. THE FLAGGER SHALL MOTION WITH THE FREE HAND FOR ROAD USERS TO PROCEED.



### C. TO ALERT OR SLOW TRAFFIC

TO ALERT OR SLOW TRAFFIC, THE FLAGGER SHALL FACE ROAD USERS WITH THE SLOW PADDLE FACE AIMED TOWARD ROAD USERS IN A STATIONARY POSITION WITH THE ARM EXTENDED HORIZONTALLY AWAY FROM THE BODY. TO FURTHER ALERT OR SLOW TRAFFIC, THE FLAGGER HOLDING THE SLOW PADDLE FACE TOWARD ROAD USERS MAY MOTION UP AND DOWN WITH THE FREE HAND, PALM DOWN.



○ TRAFFIC CONE **OR** TRAFFIC DRUM  
✱ OPTIONAL ✕ TRAFFIC DRUM — PORTABLE SIGN SUPPORT  
◀ HIGH MOUNTED INTERNALLY ILLUMINATED FLASHING ARROW



SCALE: NONE

CONSTRUCTION TRAFFIC CONTROL PLAN  
**PLAN 13 - SHEET 2 OF 2**  
SEE NOTES 1, 2, 4, 6, 7, 8

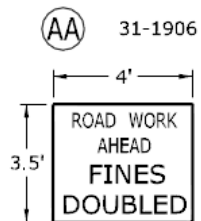
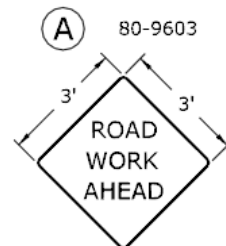
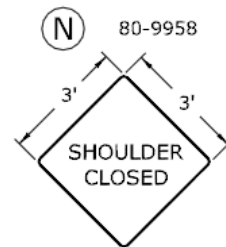
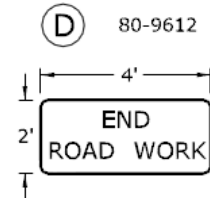
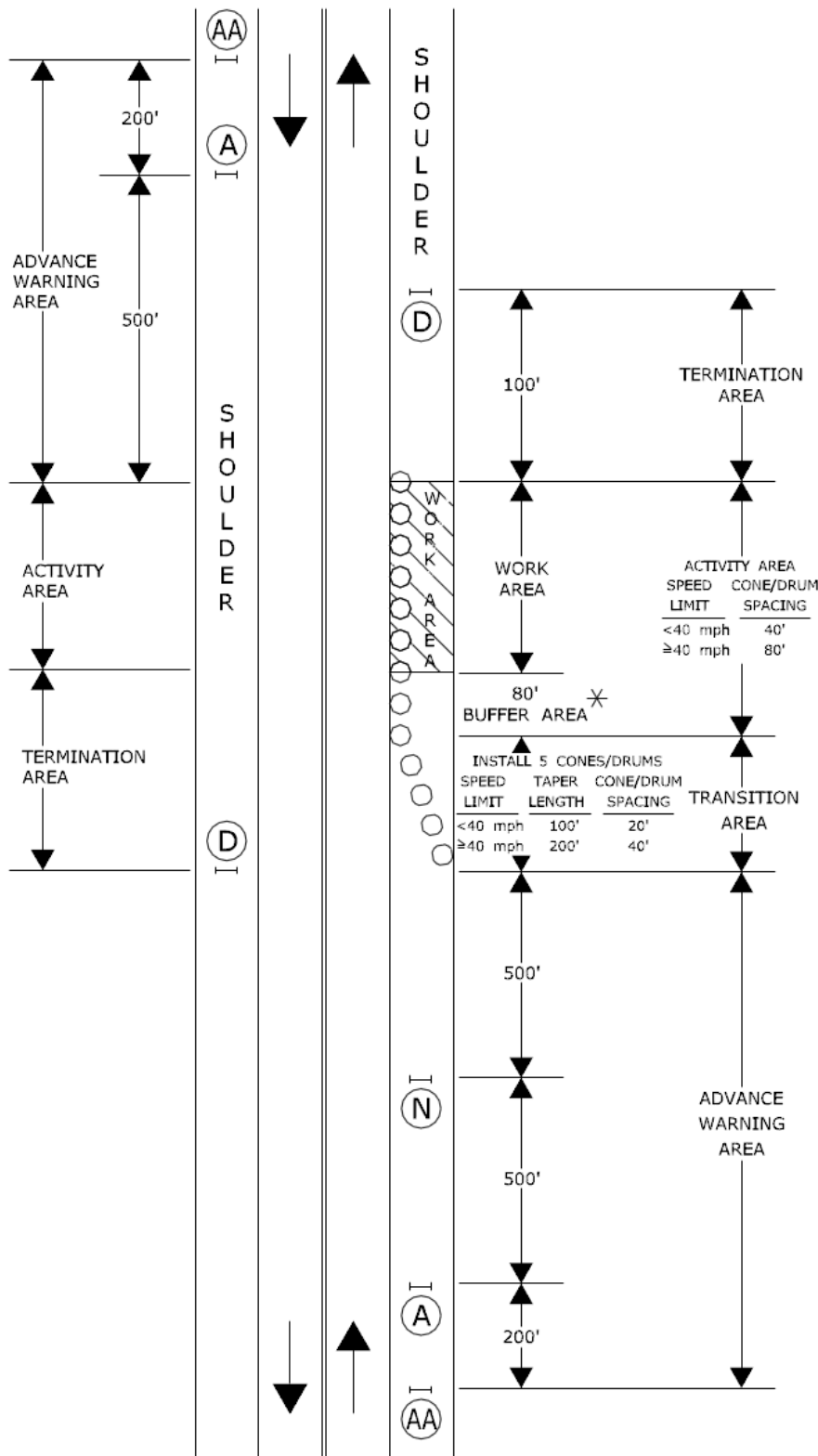
CONNECTICUT DEPARTMENT OF TRANSPORTATION  
BUREAU OF ENGINEERING & CONSTRUCTION

APPROVED

*Charles S. Harlow*  
Charles S. Harlow  
2012.06.05 15:55:45-04'00'  
PRINCIPAL ENGINEER

# WORK IN SHOULDER - TWO LANE HIGHWAY

SIGN FACE  
71 SQ. FT (MIN.)



- TRAFFIC CONE **OR** TRAFFIC DRUM
- \* OPTIONAL ⊗ TRAFFIC DRUM — PORTABLE SIGN SUPPORT
- ← HIGH MOUNTED INTERNALLY ILLUMINATED FLASHING ARROW



SCALE: NONE

CONSTRUCTION TRAFFIC CONTROL PLAN

**PLAN 14**

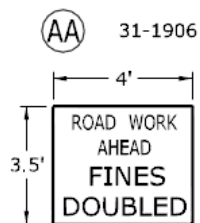
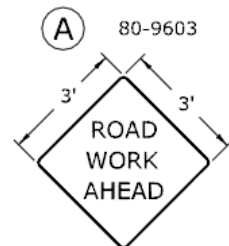
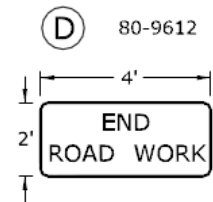
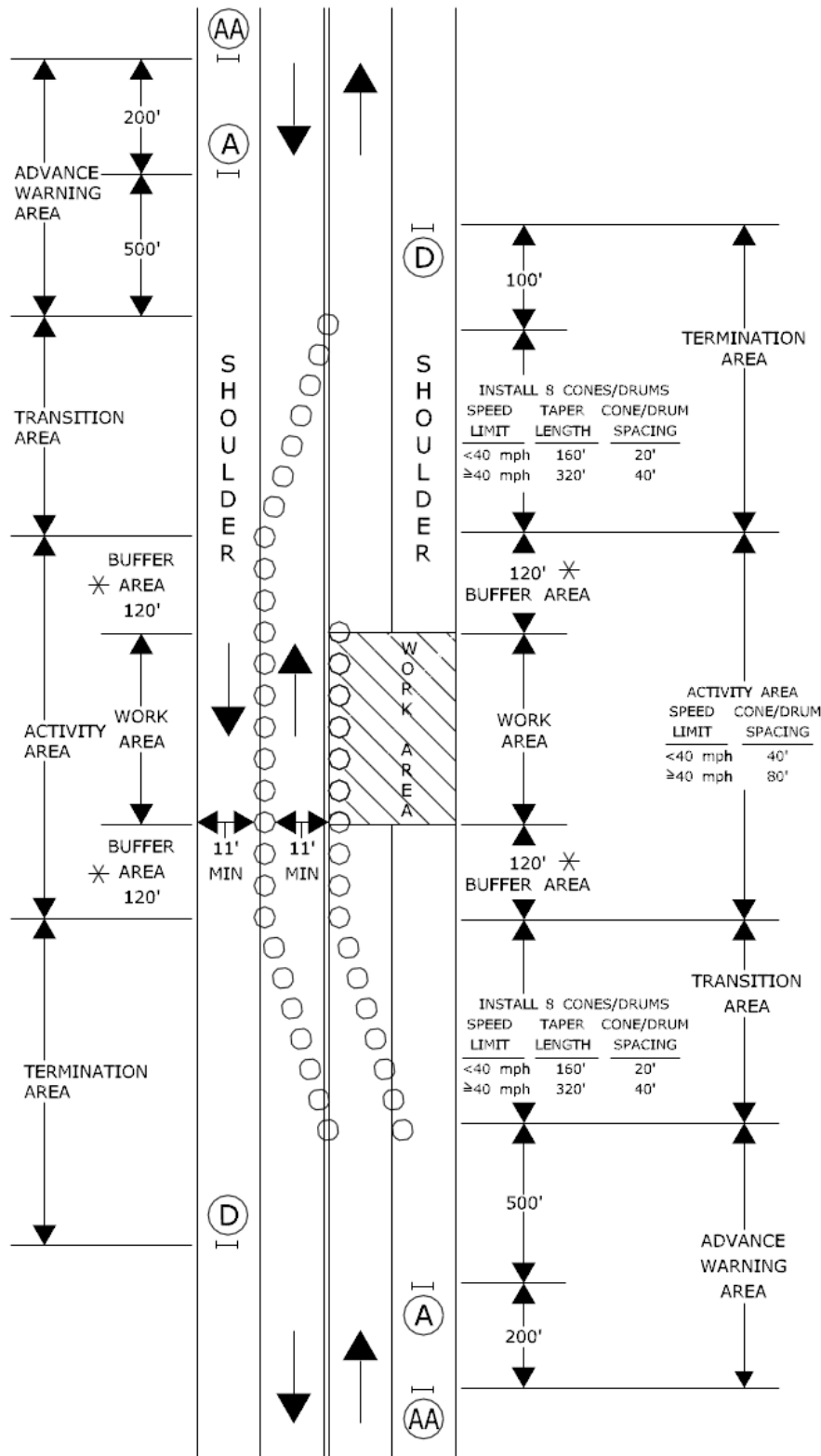
SEE NOTES 1, 2, 4, 7, 8

CONNECTICUT DEPARTMENT OF TRANSPORTATION  
BUREAU OF ENGINEERING & CONSTRUCTION

APPROVED

*Charles S. Harlow*  
Charles S. Harlow  
2012.06.05 15:56:09-04'00'  
PRINCIPAL ENGINEER

SIGN FACE  
62 SQ. FT (MIN.)



SCALE: NONE

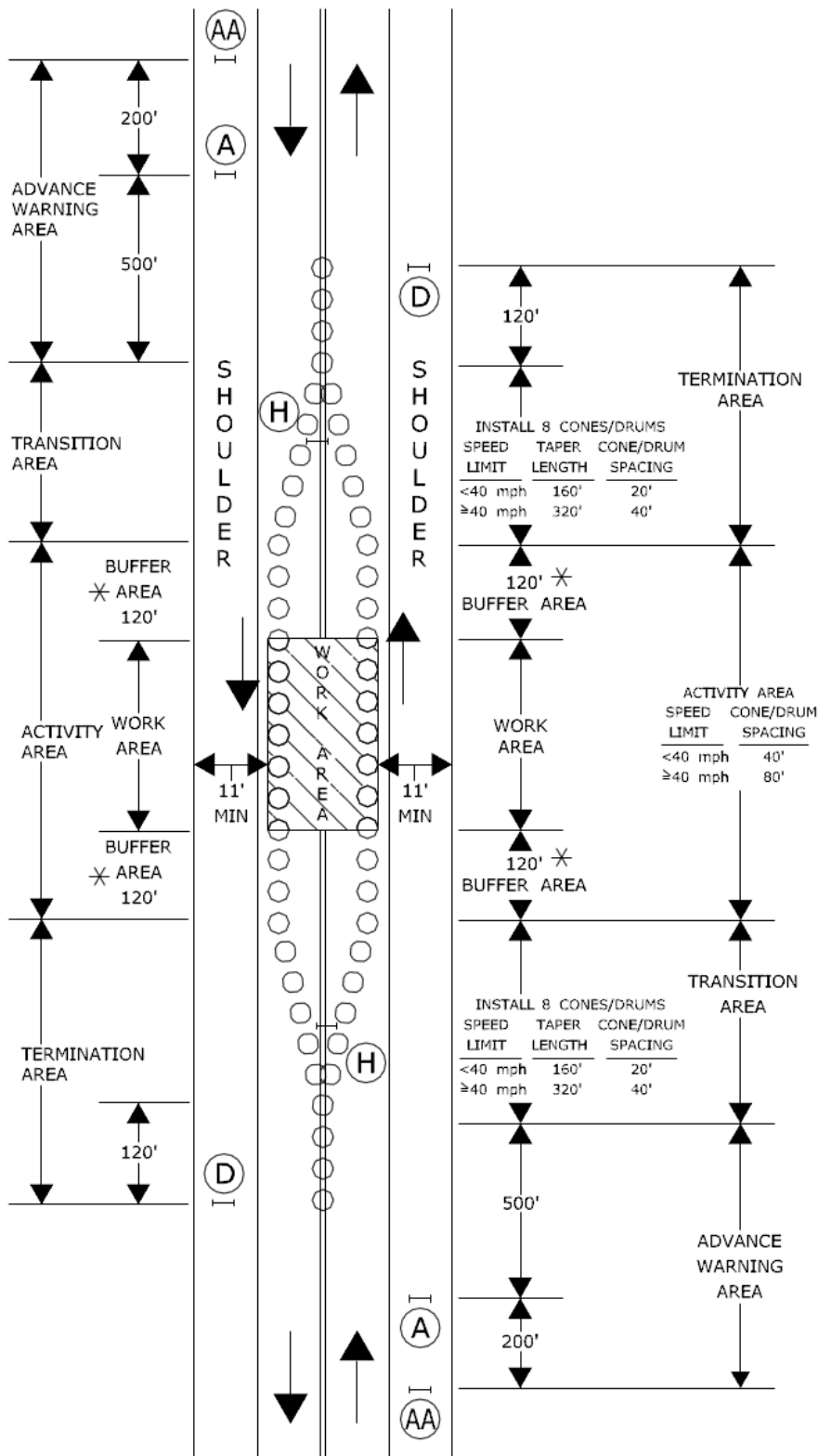
SEE NOTES 1, 2, 4, 6, 7, 8

APPROVED

Charles S. Harlow  
2012.06.05 15:56:29-04'00'

# WORK IN MIDDLE OF ROADWAY TWO LANE HIGHWAY

SIGN FACE  
72 SQ. FT (MIN.)



SPEED LIMIT	TAPER LENGTH	CONE/DRUM SPACING
<40 mph	160'	20'
≥40 mph	320'	40'

SPEED LIMIT	CONE/DRUM SPACING
<40 mph	40'
≥40 mph	80'

SPEED LIMIT	TAPER LENGTH	CONE/DRUM SPACING
<40 mph	160'	20'
≥40 mph	320'	40'

- TRAFFIC CONE **OR** TRAFFIC DRUM
- \* OPTIONAL ⊗ TRAFFIC DRUM — PORTABLE SIGN SUPPORT
- ◀ HIGH MOUNTED INTERNALLY ILLUMINATED FLASHING ARROW



SCALE: NONE

CONSTRUCTION TRAFFIC CONTROL PLAN

PLAN 16

SEE NOTES 1, 2, 4, 6, 7, 8

CONNECTICUT DEPARTMENT OF TRANSPORTATION  
BUREAU OF ENGINEERING & CONSTRUCTION

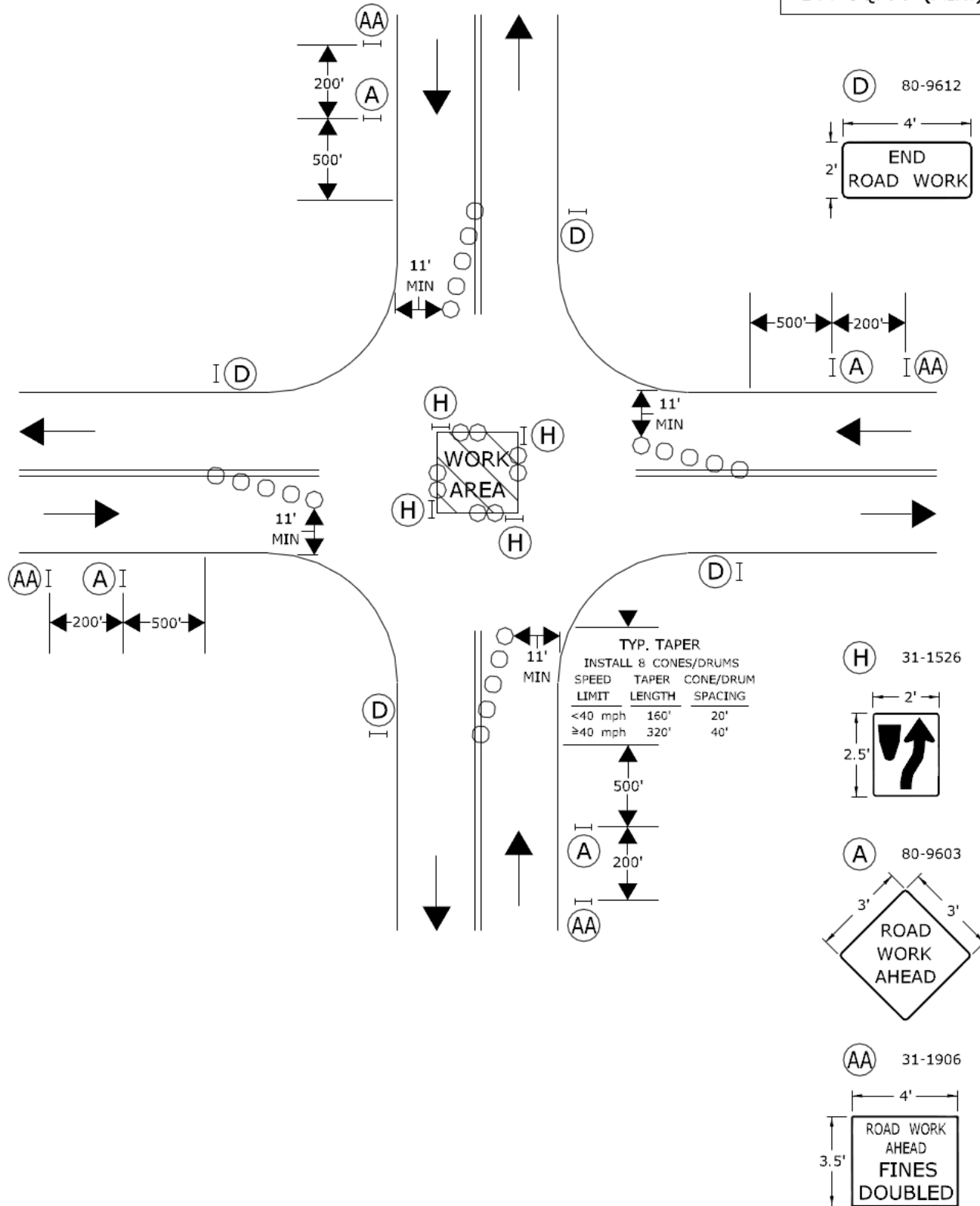
APPROVED

*Charles S. Harlow*  
Charles S. Harlow  
2012.06.05 15:56:51-04'00'  
PRINCIPAL ENGINEER



# WORK IN MIDDLE OF ROADWAY AT INTERSECTION

SIGN FACE  
144 SQ. FT (MIN.)



CONNECTICUT DEPARTMENT OF TRANSPORTATION  
BUREAU OF ENGINEERING & CONSTRUCTION



SCALE: NONE

CONSTRUCTION TRAFFIC CONTROL PLAN

**PLAN 17**

SEE NOTES 1, 2, 4, 6, 7, 8

APPROVED

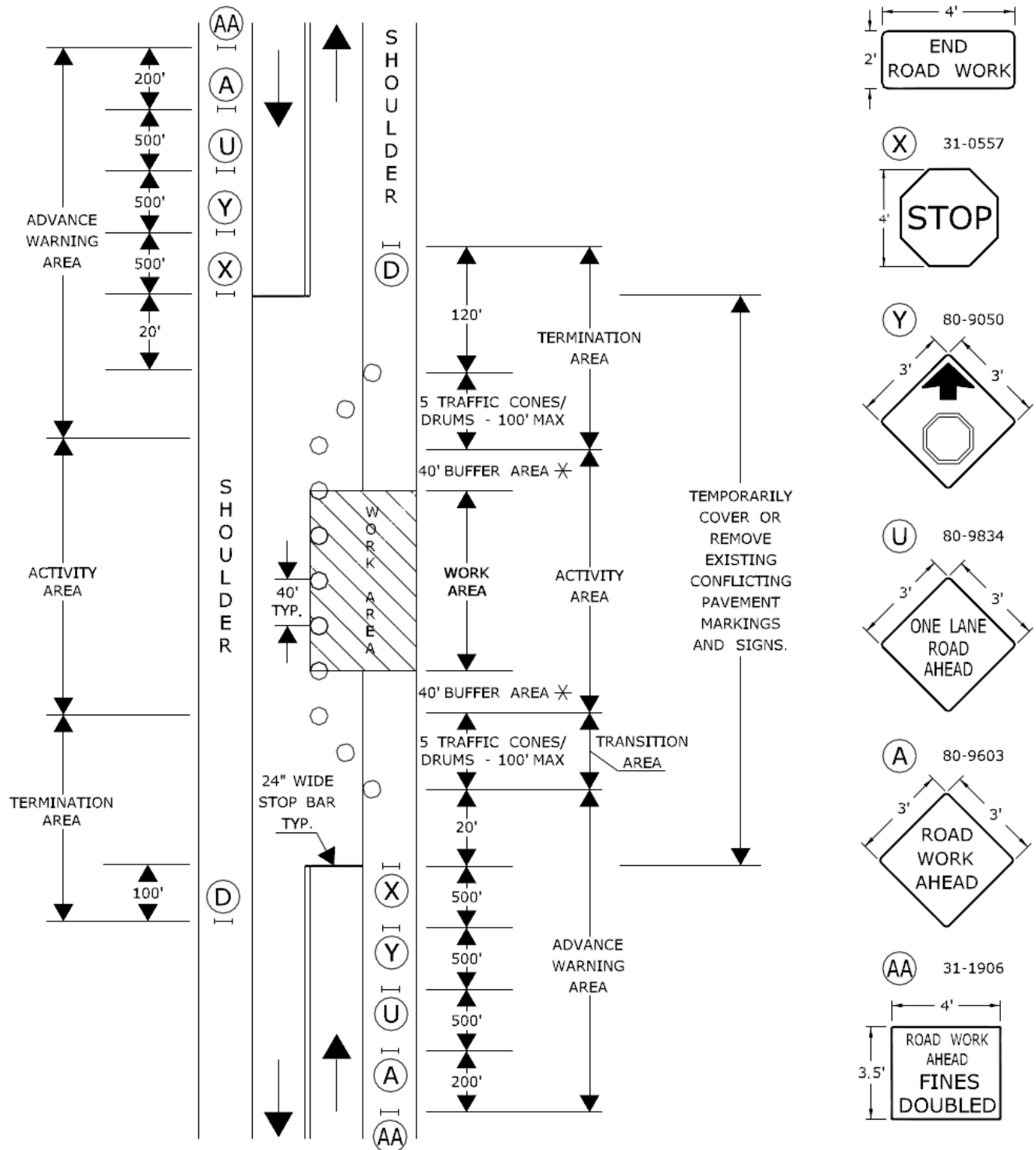
*Charles S. Harlow*  
PRINCIPAL ENGINEER

Charles S. Harlow  
2012.06.05 15:57:16-04'00"



# WORK IN TRAVEL LANE AND SHOULDER TWO LANE HIGHWAY ALTERNATING ONE-WAY TRAFFIC OPERATIONS STOP SIGN CONTROL

SIGN FACE  
125 SQ. FT (MIN.)



- TRAFFIC CONE **OR** TRAFFIC DRUM
- ✱ OPTIONAL ✕ TRAFFIC DRUM — PORTABLE SIGN SUPPORT
- ◀ HIGH MOUNTED INTERNALLY ILLUMINATED FLASHING ARROW



SCALE: NONE

CONSTRUCTION TRAFFIC CONTROL PLAN

**PLAN 18**

SEE NOTES 1, 2, 4, 7, 8

CONNECTICUT DEPARTMENT OF TRANSPORTATION  
BUREAU OF ENGINEERING & CONSTRUCTION

APPROVED

*Charles S. Harlow*  
PRINCIPAL ENGINEER

Charles S. Harlow  
2012.05.05 15:57:37-0400'

SECTION 7.0

**PROJECT CLOSEOUT**

**Table of Contents**

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7.3      Public Improvement Acceptance Procedures.....	7-3
 <a href="#"><u>Figure 7A Sanitary Sewer As-built Checklist</u></a>	
<a href="#"><u>Figure 7B As-built Checklist for Subdivisions and Utility Plans</u></a>	
<a href="#"><u>Figure 7C As-built Checklist for Commercial Site Plans</u></a>	
<a href="#"><u>Figure 7D As-built Checklist For New Residential Home or Addition</u></a>	

# PROJECT CLOSEOUT

## 7.1 *Record/As-Built Drawings*

**Purpose:** The purpose, expectation, and requirement for As-Built Record Maps is to accurately represent the as-built record information in a clear and non-confusing manner so as to allow the reader to readily 1) locate, interpret, evaluate, and comprehend the facilities, improvements, and work completed, and 2) identify and quantify deviations of the as-built product from the intended design.

**General Requirements:** The Town of Avon requires that a survey by a registered Connecticut professional Land Surveyor be performed, and a map be prepared to show the existing positions of improvements and other information following completion of construction in streets, site construction or subdivision improvements. In association with a Certificate of Zoning Compliance, the as-builts must be delivered and approved prior to the issuance of a Certificate of Occupancy. For other types of projects/work, the as-builts must be delivered and approved prior to release of any performance bond/security that may have been posted, and/or issuance of a Certificate of Completion, and or acceptance of a street/project, and/or final approval of the project/work, as may be applicable. As-built maps must be prepared in compliance with all applicable provisions of the "Minimum Standards for Accuracy, Content, and Certification for Surveys and Maps" as set forth in Sections 20-300b-1 to 20-300b-20 inclusive of the Regulations of Connecticut State Agencies complying with accuracy classes A-2 & T-2. As-Built maps shall be appropriately certified, signed, and sealed by a registered land surveyor. In addition to the survey, the Town Engineer may require a report from the project architect or engineer that addresses the project's completeness, adherence to design and construction integrity. For private and public streets, this report is mandatory; for other projects it will be decided on a case-by-case basis.

The scale of the drawings shall be the same as the originally approved development plans. Mylars are to be stamped with a live signature, by a Licensed Land Surveyor in the State of Connecticut, responsible for the record drawing.

**Content:** Clearly printed/stamped on each sheet in a large bold and/or filled font in an open area near the title block shall be the words "As-Built Record Map" with the date the map was prepared appearing below. In essence, the information required to be shown on an As-Built Record Map is the same information as required for the approval/construction (i.e. design) plans, updated to reflect the actual locations, elevations, dimensions, materials, configurations, etc. resulting from construction. Where applicable when there is a discrepancy between the design and as-built information, both the design and as-built information shall be presented, with the design information being crossed out with a single thin, but distinguishable line, or other appropriate means of designating it as being superseded without rendering the information as unreadable. In such cases, the as-built information shall be shown nearby its associated design information in a consistent and readily distinguishable, (use of a bold, italic font, for instance,) manner; or otherwise presented in a clear and readily interpretable manner, (e.g. a table, etc.) Where the scope or nature of discrepancy is such that the preceding approach is not practicable or will not meet the stated purpose (Section 6.1) of this requirement, the as-built information shall be presented by either 1) detailing the as-built information of the subject area on the same or a separate sheet, with proper identification, (e.g. clouding and crossing out,) and referencing [on the design plan] of the information superseded, or 2) creating a whole new sheet presenting the as-built information with discrepancies clearly identified, (e.g. clouding); in such case, the superseded design sheet is to be clearly identified as such and attached to the end of the as-built record set.

**Digital [Electronic] Submission:** The submission of the final approved As-Built Record Maps shall include digital information in accordance with the Town of Avon Digital Data Submittal Standards. This includes an exact replication of the maps in Adobe® Acrobat® pdf format, version 6 or later, to accommodate reproduction and electronic filing and, at minimum, information to digitally recreate the linework for subdivision lot and easement lines, road and site layout, grading, storm drainage, and utility improvements to accommodate incorporating such information into the Town's GIS platform. Ideally this means providing as-built information in native CADD format such as DXF or AutoCAD DWG formats. The purpose of this is to avoid the needless expenditure of public funds in recreating such information.

Electronic copies of the record drawing shall be provided to the Town in digital CADD format, and shall reference NAD 83 horizontal datum and NAVD 88 vertical datum. However, with prior approval from the Town Engineer, NAD 1927 horizontal datum and NGVD 1929 vertical datum may be approved. This submitted information is to have title block, professional stamps, or other information removed so that liability of the originating professional is relieved. The drawing file(s) are to include the survey control points so that the Town may perform field checks as desired, however individual points other than control/traverse points are not required.

## **7.2 Public Improvement Certifications**

The Design Engineer shall provide a letter certifying that the project has been constructed in accordance with the approved plans and details. The record surveyor shall provide a letter stating that all pins and monuments have been set in accordance with the approved plans.

## **7.3 Public Improvement Acceptance Procedures**

### **A. Sanitary Sewer Acceptance**

#### **1. Acceptance for Flow:**

Prior to acceptance of public Sanitary Sewers by the Town, the following shall be completed and approved by the Town:

- a) All air testing, video inspections and reports, manhole testing, and final inspection, as indicated in Figure 5.16, have been performed and approved;
- b) Sanitary Sewers along new public roadways will not be accepted for flow until the binder course of pavement has been installed.
- c) Instruments acceptable to the Town, properly executed and in recordable form, conveying to the Town all easement rights across lands of the Developer or others that may be necessary to permit the maintenance of the Sewer by the Town after acceptance of the Sewer by the Town;
- d) A title insurance policy in favor of the Town, in form and substance satisfactory to the Town, setting forth and/or insuring as the case may be, that each and every easement right to be conveyed to the Town under 'c' above is superior in right to any interests or rights in the premises conveyed by such easement rights except:
  - 1. Any and all provisions of any ordinance, municipal regulation or public or private law.
  - 2. Current taxes to the Town not yet due and payable.

#### **2. Sanitary Sewer Acceptance as a Public Improvement:**

The Developer shall submit to the Town the following items as outlined within the Developer's Sewer Permit Agreement.

- a) An affidavit stating the total costs thereof, including engineering and an affidavit stating the amounts of money or any consideration paid the Developer and by any other owner who may be served by the Sewer.
- b) An "As-built" plan and profile of the completed sewer and appurtenances and will submit same to the Town Engineer prior to the Town accepting said Sewer (see Figure 7A). The drawing or drawings shall be in ink on mylar, with an overall measurement of 24" x 36". As-built plans shall also be provided in digital

format in conformance with section 7.1 of these specifications

- c) A Cash Bond with no expiration date shall be secured by the Town Clerk of The Town of Avon in an amount not less than ten (10%) percent of the sum set forth in the affidavit described in A(2) (a) above assuring maintenance and repair of the completed sewer at the sole expense of the Developer for a period of one year after the acceptance of the sewer by the Town for incorporation in its public sewer system and assuring the repair, at the sole expense to the Developer, of any damage to any public ways, private ways, properties, structures or improvements which has been caused during construction of the Sewer or the maintenance or repair of the Sewer during the one (1) year maintenance period or caused by any defect or failure of said sewer during said period. Once the maintenance period has expired, the Developer will remain liable for any damage to the manholes, until the finish course of pavement is installed, and the roadway has been accepted.
- d) An assignment to the Town of all right, title and interest of the Developer in and to the Sewer and all appurtenances thereto free and clear of all encumbrances.
- e) An affidavit of the Developer that all persons furnishing labor or materials in the construction of the Sewer have been fully paid or have waived all lien rights that may have accrued to such persons by reason of furnishing such labor or materials.

#### **B. Public Improvement Acceptance**

1. All items as required by the Town Attorney in Section 7.3.C
2. "As Built" drawing of all improvements. (See Figure 7B). Submit approved copies for review and approval prior to submitting mylars.
3. The Town will prepare a punch list detailing Record/As-Built Drawings and construction items that may need to be addressed. The Developer must address these punch list items, and provided the required documentation
4. A letter from the Engineering or Consulting firm employed by the Developer, certifying to the construction of the improvements in accordance with the Town of Avon's specifications (Inspection Dates and comments to be attached).
5. A letter from the surveying firm employed by the Developer, certifying to the placement of all monuments in accordance with the approved subdivision map; certifying all property corners have been marked, as required by the applicable subdivision regulation; and, certifying that all storm and sanitary sewers have been installed within those areas designated on the approved subdivision map. Certification shall be in accordance with Section 5.01.04 of the Town of Avon Subdivision Regulations.
6. Any other documents or letters if required by the Attorney for the Town of Avon, or the Town Engineer.
7. Certification that all requirements of the Planning and Zoning Commission and Inland Wetlands Commission have been met.
8. A letter from the Town Fire Marshall or State agency requiring the installation of fire protection facilities, certifying to the installation of same.
9. Certification from all utility companies as to the installation and acceptance of all utilities and appurtenances. Utilities and services shall be noted on final As- Built Drawings.

10. Standard Town of Avon forms, where possible, shall be used to transfer title to the Town of Avon of all right-of-ways, easements or other property.
11. State of Connecticut Real Estate Conveyance Tax Return Form #OP-236 Rev. 05/05- Town Tax ID #06-6001957.
12. Only **COPIES** of the original executed forms are to be submitted for review. It is the responsibility of the Developer to file all required documents after acceptance by the appropriate Town authority.
13. A detailed affidavit of costs stating the total cost of each improvement to become the property and responsibility of the Town including engineering of all public improvements. (see Figure 7E)

**C. Town Attorney Items for Road Acceptance:**

1. In the discretion of the Town and its attorney, (i) a certification by an attorney admitted to practice in Connecticut and/or (ii) a title insurance policy in favor of the Town, in form and substance satisfactory to the Town, setting forth and/or insuring as the case may be that, each and every easement right to be conveyed to the Town under Paragraph A(12) (c) above is superior in right to any interests or rights in the premises covered by such easement rights except:
  - a) Any and all provisions of any ordinance, municipal regulation or public or private law.
  - b) Current taxes to the Town not yet due and payable.
2. Title Transfer Document:
  - a) It is suggested that a draft of the proposed title transfer document be submitted to the Town prior to execution by the property owner for review as to form and content. This will avoid disappointment on the part of the owner which can arise out of a delay in acceptance if an executed instrument is rejected and returned for good reason.
  - b) The Grantor in the title instrument must be identical with the name appearing in the title opinion.
  - c) The encumbrances affecting the property described in the title instrument and set forth in the title instrument should be identical to the encumbrances stated in the title opinion except for those items for which the owner may be simultaneously submitting unrecorded release or subordination instruments.
  - d) The title transfer document should be warrantee in form and executed in the manner provided by law.
  - e) If the title transfer document also grants to the town drainage or other easement rights on adjacent property or properties, the areas affected by those rights must be adequately described in the title transfer document.
  - f) The Grantee in the title transfer document should be "Town of Avon, a municipal corporation, located in the County of Hartford, State of Connecticut."
3. Release and Subordinations:
  - a) All encumbrances affecting the property interests being conveyed to the Town must either be:
    - i. released in full as to those property interests being conveyed to the Town in fee, such as the road.

- ii. released in full or subordinated as to those property interests being conveyed to the Town other than in fee, such as drainage easement rights on adjacent properties.
- b) Release and/or subordination instruments fully executed and in proper form for recording should be submitted to the Town at the same time the Title Opinion and the Title Transfer Document(s) are submitted with respect to any encumbrances set forth in the Title Opinion.

**D. One-Year Maintenance Period**

Upon final acceptance of the road and public improvements by the Town Council, the Developer shall provide a ten (10%) One Year Maintenance Bond in a form acceptable to the Town. After receipt of the Maintenance Bond, the Subdivision Bonds will be released.

After completion of the one-year maintenance period and satisfactory resolution of all maintenance items that may arise during this period, the Town Engineer will recommend the release of the One-Year Maintenance Bond.

**NOTE:** When the Developer has satisfactorily addressed items from Section 7.3.C, 7.3.D, and 7.3.E, and provided the required documentation, the Town Engineer will recommend acceptance of the public improvements to the Town Council. Upon final acceptance of the improvements by the Town Council, the Developer shall file the warrantee deed for the property transfers on the Town Land Records.



**FIGURE 7A  
TOWN OF AVON  
AS-BUILT CHECKLIST FOR  
SANITARY SEWER ONLY PLANS  
JANUARY 18, 2023**

**APPLICANT NAME** \_\_\_\_\_

**APPLICANT ADDRESS** \_\_\_\_\_

**APPLICANT PHONE AND EMAIL** \_\_\_\_\_

**PROJECT NAME** \_\_\_\_\_

**PROJECT ADDRESS** \_\_\_\_\_

Record drawings shall be prepared by a Licensed Land Surveyor in the State of Connecticut in conformance with "Minimum Standards for Surveys and Maps in the State of Connecticut", prepared and adopted by the Connecticut Association of Land Surveyors, September 26, 1996, as amended.

The scale of the drawings shall be the same as the originally approved subdivision plans. Mylars are to be stamped with a live signature, by a Licensed Land Surveyor in the State of Connecticut, responsible for the record drawing.

Place check mark ( ✓ ) for each item supplied.

\_\_\_\_\_ **1. Each sheet** of the plans or maps must include a title block with the following information:

- \_\_\_\_\_ **a.** Name, address and telephone number of applicant
- \_\_\_\_\_ **b.** Name, address and telephone number of plan preparer (Land Surveyor)
- \_\_\_\_\_ **c.** Name and address of development/property
- \_\_\_\_\_ **d.** 7 digit Assessor's parcels IDs of Development
- \_\_\_\_\_ **e.** Date when drawing was prepared
- \_\_\_\_\_ **f.** Date and description of revisions

\_\_\_\_\_ **2. Plan & Profile:** A layout map of the proposed site on 24" x 36" sheet drawn to a horizontal scale of 1" = 40' and a vertical scale of 1" = 4', containing the following data:

- \_\_\_\_\_ **a.** North arrow;
- \_\_\_\_\_ **b.** Graphic Scale;
- \_\_\_\_\_ **b.** Title block indicating "Sanitary Sewer As-built" with a date;



- \_\_\_\_\_ c. As-built location of sanitary sewer mains (with type of pipe, length, and slope), laterals, and manholes (with top of frame and invert elevations). Include station/distance for each sanitary sewer lateral along the mainline, and include the tie dimensions to the ends of all sanitary sewer laterals;
- \_\_\_\_\_ d. Depth and length of pipe for each building connection installed during construction.

**\*\* When there is a discrepancy between the design and as-built information, both the design and as-built information shall be presented, with the design information being crossed out with a single thin, but distinguishable, line, or other appropriate means of designating it as being superseded without rendering the information as unreadable.**

**Note:** *All annotation is to be printed at a minimum size of 0.07" tall and is to be clearly legible with no overwrites by features, leaders or other obstructions. It is recommended that annotation for existing features be prepared at a set size and font and that annotation for proposed features be prepared at a larger size and font to clearly differentiate them. It is also recommended that line-work for proposed features be thicker and/or darker than existing features, and screening be used further clarify existing vs. proposed.*

**PLAN PREPARER (L.S.):**

(Printed name) \_\_\_\_\_  
 (Signature) \_\_\_\_\_  
 Date: \_\_\_\_\_

Affix P.E. Stamp and Seal





**FIGURE 7B  
TOWN OF AVON  
AS-BUILT CHECKLIST FOR  
SUBDIVISIONS AND UTILITY PLANS  
JANUARY 18, 2023**

**APPLICANT NAME** \_\_\_\_\_

**APPLICANT ADDRESS** \_\_\_\_\_

**APPLICANT PHONE AND EMAIL** \_\_\_\_\_

**PROJECT NAME** \_\_\_\_\_

**PROJECT ADDRESS** \_\_\_\_\_

Record drawings shall be prepared by a Licensed Land Surveyor in the State of Connecticut in conformance with "Minimum Standards for Surveys and Maps in the State of Connecticut", prepared and adopted by the Connecticut Association of Land Surveyors, September 26, 1996, as amended.

The scale of the drawings shall be the same as the originally approved subdivision plans. Mylars are to be stamped with a live signature, by a Licensed Land Surveyor in the State of Connecticut, responsible for the record drawing.

Place check mark ( ✓ ) for each item supplied.

\_\_\_\_\_ **1. Each sheet** of the plans or maps must include a title block with the following information:

- \_\_\_\_\_ **a.** Name, address and telephone number of applicant
- \_\_\_\_\_ **b.** Name, address and telephone number of plan preparer (Land Surveyor)
- \_\_\_\_\_ **c.** Name and address of development/property
- \_\_\_\_\_ **d.** 7 digit Assessor's parcels IDs of Development
- \_\_\_\_\_ **e.** "As-built" shall be noted in title block
- \_\_\_\_\_ **f.** Date when drawing was prepared
- \_\_\_\_\_ **g.** Date and description of revisions

\_\_\_\_\_ **2. Plan & Profile:** A layout map of the proposed site on 24" x 36" sheet drawn to a horizontal scale of 1" = 40' and a vertical scale of 1" = 4', containing the following data:

- \_\_\_\_\_ **a.** North arrow;
- \_\_\_\_\_ **b.** Graphic Scale;
- \_\_\_\_\_ **c.** As-built location of sanitary sewer mains (with type of pipe, length, and slope), laterals, and manholes (with top of frame and invert elevations). Include station/distance for each sanitary sewer lateral along the mainline, and include the tie dimensions to the ends of all sanitary sewer laterals;

- \_\_\_\_\_ d. Depth and length of pipe for each building connection installed during construction.
- \_\_\_\_\_ e. As-built location and elevations of all types of sidewalks, curbs, sidewalk ramps, street trees or plantings, driveway openings, guide rail, traffic signs, pavement markings, and protective fence;
- \_\_\_\_\_ f. Profile sheets showing existing and finished roadway centerline profile with final roadway centerline grades at every 50-foot interval and at all low and high intersection points. For all underground utilities, the Profile sheets shall depict pipe sizes and materials, top of frame and invert elevations, flow lines and slopes of pipe;
- \_\_\_\_\_ g. Dimensions of major features, such as width of roadway and sidewalk, cul-de-sac radius, etc.;
- \_\_\_\_\_ h. Locations of all drainage structures together with top of frame elevations, top of headwall elevations, invert elevations, underdrains, and riprap splash pad dimensions at drainage outlets;
- \_\_\_\_\_ i. As-built topography of detention basins, including top of berm elevations, inverts of inlet and outlet structures and elevations of spillway;
- \_\_\_\_\_ j. As-built location of water mains, water services, curb boxes, valve boxes, hydrants;
- \_\_\_\_\_ k. As-built locations of all underground utilities (i.e. electric, gas, telephone, and cable) as well as all above ground utility transformer pads, manholes, junction boxes, vaults (with dimensions) and hand holes;
- \_\_\_\_\_ l. Lot numbers and street addresses;
- \_\_\_\_\_ m. Volume and page of all easements conveyed to the Town of Avon;

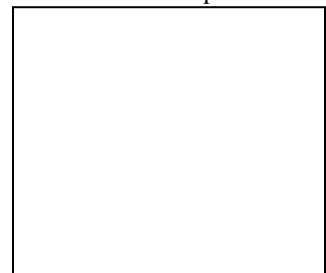
**\*\* When there is a discrepancy between the design and as-built information, both the design and as-built information shall be presented, with the design information being crossed out with a single thin, but distinguishable, line, or other appropriate means of designating it as being superseded without rendering the information as unreadable.**

**Note:** *All annotation is to be printed at a minimum size of 0.07" tall and is to be clearly legible with no overwrites by features, leaders or other obstructions. It is recommended that annotation for as-built features be prepared at a larger size than that for proposed features to clearly differentiate them. It is also recommended that line-work for as-built features be thicker and/or darker than proposed features, and screening be used further clarify as-built vs. proposed.*

**PLAN PREPARER (L.S.):**

(Printed name) \_\_\_\_\_  
 (Signature) \_\_\_\_\_  
 Date: \_\_\_\_\_

Affix P.E. Stamp and Seal





**FIGURE 7C**  
**TOWN OF AVON**  
**AS-BUILT CHECKLIST FOR COMMERCIAL SITE PLANS**  
**JANUARY 18, 2023**

**APPLICANT NAME** \_\_\_\_\_

**APPLICANT ADDRESS** \_\_\_\_\_

**APPLICANT PHONE AND EMAIL** \_\_\_\_\_

**PROJECT NAME** \_\_\_\_\_

**PROJECT ADDRESS** \_\_\_\_\_

Record drawings shall be prepared by a Licensed Land Surveyor in the State of Connecticut in conformance with "Minimum Standards for Surveys and Maps in the State of Connecticut", prepared and adopted by the Connecticut Association of Land Surveyors, September 26, 1996, as amended.

The scale of the drawings shall be the same as the originally approved subdivision plans. Mylars are to be stamped with a live signature, by a Licensed Land Surveyor in the State of Connecticut, responsible for the record drawing.

Place check mark ( ✓ ) for each item supplied.

\_\_\_\_\_ **1. Each sheet** of the plans or maps must include a title block with the following information:

- \_\_\_\_\_ a. Name, address and telephone number of applicant
- \_\_\_\_\_ b. Name, address and telephone number of plan preparer (Land Surveyor)
- \_\_\_\_\_ c. Name and address of development/property
- \_\_\_\_\_ d. 7 digit Assessor's parcels IDs of Development
- \_\_\_\_\_ e. "As-built" shall be noted in title block
- \_\_\_\_\_ f. Date when drawing was prepared
- \_\_\_\_\_ g. Date and description of revisions

\_\_\_\_\_ **2. Site Plan:** A layout map of the proposed site on 24" x 36" sheet drawn to a scale of 1 inch equals 40 feet, 30 feet, or 20 feet, containing the following data:

- \_\_\_\_\_ a. Bearings and Distances of all boundary lines and acreage of site. All iron pins and monuments found or set are to be depicted on the plan.
- \_\_\_\_\_ b. Depth and length of pipe for each building connection installed during construction.
- \_\_\_\_\_ c. As-built location and elevations of all types of sidewalks, curbs, sidewalk ramps, street trees or plantings, driveway openings, guide rail, traffic signs, pavement markings, and protective fence;
- \_\_\_\_\_ d. Profile sheets showing existing and finished roadway centerline profile with final roadway centerline grades at every 50-foot interval and at all low and high intersection points. For

all underground utilities, the Profile sheets shall depict pipe sizes and materials, top of frame and invert elevations, flow lines and slopes of pipe;

- \_\_\_\_\_ e. Dimensions of major features, such as width of roadway and sidewalk, cul-de-sac radius, etc.;
- \_\_\_\_\_ f. Locations of all drainage structures together with top of frame elevations, top of headwall elevations, invert elevations, underdrains, and riprap splash pad dimensions at drainage outlets;
- \_\_\_\_\_ g. As-built topography of detention basins, including top of berm elevations, inverts of inlet and outlet structures and elevations of spillway;
- \_\_\_\_\_ h. As-built locations of all underground utilities (i.e. sanitary sewer, storm drainage, water, electric, gas, telephone, and cable) as well as all above ground utility valves boxes, curb boxes, hydrants, transformer pads, manholes, junction boxes, vaults (with dimensions) and hand holes;
- \_\_\_\_\_ i. Data block containing needed zoning information
- \_\_\_\_\_ j. Building lines in accordance with zoning regulations
- \_\_\_\_\_ k. As-built buildings and other structures, including signs, outside lighting, driveways and hardscapes, retaining walls, landscape walls, propane tanks, generators, and other “permanent” structures. Buildings are to include offset dimensions to a minimum of the 3 closest property lines
- \_\_\_\_\_ l. Easements and variances noting and Volume and Page
- \_\_\_\_\_ m. Owner names and addresses of abutting properties
- \_\_\_\_\_ n. As-built locations of all above-ground physical features such as: buildings, driveway, walks, retaining walls, well, septic system, clean outs, curb stops, deck, patio, swimming pool, fences, utility structures, and other “permanent” structures. Buildings are to include offset dimensions to a minimum of the 3 closest property lines
- \_\_\_\_\_ o. As-built footing drains, yard drains, and roof leaders and associated piping including top of frames, inverts, routing, and outlet protection.
- \_\_\_\_\_ p. As-built tree/vegetation clearing limits
- \_\_\_\_\_ q. As-built first floor, basement, garage floor, and top of foundation elevations
- \_\_\_\_\_ r. Topographic contours at 2 foot intervals symbolized to differentiate nominal and 10 foot index elevations with sufficient labels and spot elevations.
- \_\_\_\_\_ s. Wetlands limits, watercourses and water bodies, and regulated wetlands limits
- \_\_\_\_\_ t. FEMA flood zone designations within the parcel including floodway, 1% (100 year), and 0.2% (500 year) including FEMA map reference information
- \_\_\_\_\_ u. North Arrow and scale bar
- \_\_\_\_\_ v. Map references including volume and page of filed maps
- \_\_\_\_\_ w. Horizontal and vertical datums (note: the Town’s preferred horizontal datum is NAD 83, Connecticut state plane, and the Town’s preferred vertical datum is NAVD 88)
- \_\_\_\_\_ x. Legend of Symbols

**Note:** All annotation is to be printed at a minimum size of 0.07” tall and is to be clearly legible with no overwrites by features, leaders or other obstructions. It is recommended that annotation for as-

*built features be prepared at a larger size than that for proposed features to clearly differentiate them. It is also recommended that line-work for as-built features be thicker and/or darker than proposed features, and screening be used further clarify as-built vs. proposed.*

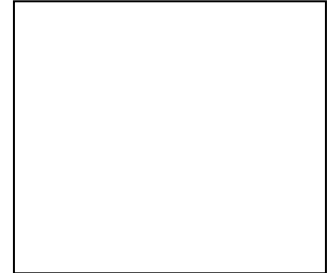
**PLAN PREPARER (P.E./L.S.):**

Affix P.E. Stamp and Seal

(Printed name) \_\_\_\_\_

(Signature) \_\_\_\_\_

Date: \_\_\_\_\_





## FIGURE 7D TOWN OF AVON AS-BUILT CHECKLIST FOR NEW RESIDENTIAL HOME OR ADDITION JANUARY 18, 2023

APPLICANT NAME \_\_\_\_\_

APPLICANT ADDRESS \_\_\_\_\_

APPLICANT PHONE AND EMAIL \_\_\_\_\_

PROJECT NAME \_\_\_\_\_

PROJECT ADDRESS \_\_\_\_\_

New home construction requires submittal of an as-built record plan containing the following in addition to the information required on the Plot Plan prior to Engineering sign off on the Certificate of Occupancy:

Place check mark ( ✓ ) for each item supplied.

\_\_\_\_\_ 1. **Each sheet** of the plans or maps must include a title block with the following information:

- \_\_\_\_\_ a. Name of owner
- \_\_\_\_\_ b. Name, address and telephone number of plan preparer (Land Surveyor)
- \_\_\_\_\_ c. Name and address of property
- \_\_\_\_\_ d. 7 digit Assessor's parcel ID number
- \_\_\_\_\_ e. "As-built" shall be noted in title block
- \_\_\_\_\_ f. Date when drawing was prepared
- \_\_\_\_\_ g. Date and description of revisions

\_\_\_\_\_ 2. **Plot Plan:** An as-built map of the site on paper size 11" x 17", 18"x24", 22"x34", or 24"x36". Plans must be same scale as approved site plan.

- \_\_\_\_\_ a. Bearings and Distances of all boundary lines and acreage of site. All iron pins and monuments found or set are to be depicted on the plan. Iron pins are required at all property angle points, must be set prior to issuance of permanent certificate of occupancy, and must be shown on as-built. (Iron pins on individual lots which are part of a bonded subdivision need not be set prior to issuance of permanent C.O.) Monuments at corners and angles of all new streets and new street lines, at all points of curvature and tangency.
- \_\_\_\_\_ b. Building lines in accordance with zoning regulations
- \_\_\_\_\_ c. As-built locations of all above-ground physical features such as: buildings, driveway, walks, retaining walls, well, septic system, clean outs, curb stops, deck, patio, swimming pool, fences, utility structures, and other "permanent" structures. Buildings are to include offset dimensions to a minimum of the 3 closest property lines

- \_\_\_\_\_ d. Easements and variances granted noting Volume and Page
- \_\_\_\_\_ e. Owner names and addresses of abutting properties
- \_\_\_\_\_ f. Utilities – locations of utilities serving the property in the right-of-way or easements and locations of utilities within the property (sanitary sewer, electricity, gas, cable, telecom, water, etc.) as well as all above ground utility transformer pads, manholes, junction boxes, vaults (with dimensions) and hand holes.
- \_\_\_\_\_ g. As-built locations footing drains, yard drains, and roof leaders and associated piping including top of frames, inverts, routing, and outlet protection.
- \_\_\_\_\_ h. As-built limit of tree/vegetation clearing limits
- \_\_\_\_\_ i. As-built Building elevations – first floor, garage floor, and top of foundation elevations
- \_\_\_\_\_ j. Finished grade topographic contours at 2-foot intervals symbolized to differentiate nominal and 10-foot index elevations with sufficient labels and spot elevations.
- \_\_\_\_\_ k. Wetlands limits, watercourses and water bodies, and regulated wetlands limits
- \_\_\_\_\_ l. FEMA flood zone designations within the parcel including floodway, 1% (100 year), and 0.2% (500 year) including FEMA map reference information
- \_\_\_\_\_ m. North Arrow and scale bar
- \_\_\_\_\_ n. Map references including volume and page of filed maps
- \_\_\_\_\_ o. Horizontal and vertical datums (note: the Town's preferred horizontal datum is NAD 83, Connecticut state plane, and the Town's preferred vertical datum is NAVD 88)
- \_\_\_\_\_ p. Legend of Symbols.
- \_\_\_\_\_ q. If a septic system was installed, show the septic system including tanks, distribution boxes, grease traps, leach fields, etc. with dimensions, invert elevations and ties to major structures.

**Note:** *All annotation is to be printed at a minimum size of 0.07" tall and is to be clearly legible with no overwrites by features, leaders, or other obstructions. It is recommended that annotation for existing features be prepared at a set size and font and that annotation for proposed features be prepared at a larger size and font to clearly differentiate them. It is also recommended that line-work for proposed features be thicker and/or darker than existing features, and screening be used further clarify existing vs. proposed.*

**PLAN PREPARER (P.E./L.S.):**

(Printed name) \_\_\_\_\_

(Signature) \_\_\_\_\_

Date: \_\_\_\_\_

Affix P.E. Stamp and Seal







**FIGURE 7E  
TOWN OF AVON  
SAMPLE AFFIDAVIT  
COSTS FOR PUBLIC IMPROVEMENTS  
JANUARY 18, 2023**

An affidavit of related costs is required to be on file prior to reduction / release of any financial guarantee covering public infrastructure construction. Please fill out the affidavit accurately and add actual line-item cost values in tabular form as applicable. Provide additional lines as necessary to the list all items by size and material as installed. This form must be signed and sealed by the Engineer of Record for the project.

I, [NAME]\_\_\_\_\_, representing [DEVELOPER OF RECORD]\_\_\_\_\_, do hereby attest by my signature affixed hereto that the following information is true and accurate and based on a calculation of the actual construction costs for public improvements related to this development project. This calculation includes all public improvement covered under referenced permit(s) as itemized below. This Affidavit of Costs is intended to identify all of the costs incurred for the **public** improvements of the referenced development which are required for the Town's GASB reporting.

**Development Name:** \_\_\_\_\_

**Development Phase:** \_\_\_\_\_

**Address:** \_\_\_\_\_

**Phone:** \_\_\_\_\_

**Email:** \_\_\_\_\_

**Is this Affidavit of Cost part of a final request for acceptance:** Y \_\_\_\_ N \_\_\_\_

**Developer's Signature:** \_\_\_\_\_

**Printed Name:** \_\_\_\_\_

**Date:** \_\_\_\_\_

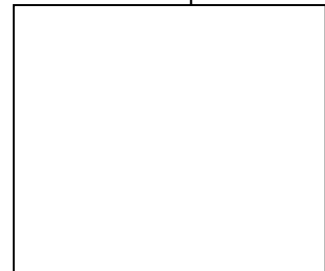
**PLAN PREPARER (P.E. / L.S.) (seal/stamp to be provided):**

(Printed name) \_\_\_\_\_

(Signature) \_\_\_\_\_

Date: \_\_\_\_\_

Affix P.E. Stamp and Seal



Sample cost affidavit table for use or example:

Type of Improvement (A)	Date of Final Installation	Quantity / Length/Area (A)	Line-item Cost (B)	Value (AxB)	Description
Eng. Design inc. incidental requirements					
Drainage - Catch Basins - Type C-I					
Type C					
Drainage - Culverts					
Drainage - Det/Ret/Sed Ponds					
Drainage - Headwalls					
Drainage - Inlets/Outlets					
Drainage - Manholes					
Drainage - Pipe by Size and Material					
15" RCP					
18" RCP					
21" RCP					
12" CPP					
Drainage - Separators					
Hydro-dynamic					
Vortex					
Glastonbury					
<b>Subtotal Drainage Costs</b>					Sum of <i>Storm Drainage</i> related costs
Misc - Fencing					
Misc - Irrigation Systems					
Misc - Landscaping					
Misc - Retaining Walls					
Misc - Sidewalk					
Misc - Trails/Paths					
<b>Subtotal Misc. Costs</b>					Sum of <i>Miscellaneous</i> related costs
Sanitary Sewer - Force Main					
Sanitary Sewer - Lateral Stubs					
Sanitary Sewer - Mainline Pipe					
Sanitary Sewer - Manholes					
Sanitary Sewer - Pump Station					
<b>Subtotal Sanitary Costs</b>					Sum of <i>Sanitary Sewer</i> related costs
Soft Costs (Eng., legal, survey, etc.)					
Street - Bridges					
Street - Curbing					
Street - Guide Rails					
Street - Paving					
Street - Signage					
Street - Striping					
<b>Subtotal Street Costs</b>					Sum of <i>Street</i> related costs
Other					
Other					
Other					
<b>Subtotal Other Costs</b>					Sum of <i>Other</i> related costs
<b>TOTAL OF ALL COSTS</b>					Total of <i>ALL</i> costs listed

Note: the table above is provided for use or example purposes to indicate the level of detail required for the cost affidavit and is to include the cost of materials and labor as installed.

SECTION 8.0

**STANDARD DETAILS**

**Table of Contents**

**SUB-SECTION**

8.1 ConnDOT Standard Details – See Avon Engineering website and CTDOT .....
8.2 Town of Avon Standard Details – See Avon Engineering website .....
8.3 Town of Avon Standard Details – CAD Format – See Avon Engineering website.....