

VIRGINIA DEPARTMENT OF TRANSPORTATION

LOCATION AND DESIGN DIVISION

INSTRUCTIONAL AND INFORMATIONAL MEMORANDUM

GENERAL SUBJECT: EROSION AND SEDIMENT CONTROL	NUMBER: IIM-LD-11.23
SPECIFIC SUBJECT: TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES TO BE INCORPORATED INTO PLANS	DATE: JUNE 26, 2003
	SUPERSEDES: IIM-LD-11.22 LD-94 (D) 182.4
DIVISION ADMINISTRATOR APPROVAL: Mohammad Mirshahi, PE	

Changes are shaded.

CURRENT REVISION

All references to the pay item for "Fabric Removal" have been deleted.

EFFECTIVE DATE

This memorandum is effective upon receipt for all projects that have not progressed beyond the First Submission Stage (where right of way will not be affected by these instructions) or Right of Way Stage (where additional right of way or easements may be required to implement these instructions).

POLICY / GENERAL GUIDELINES

- Requirements of the Virginia Erosion and Sediment Control (ESC) Regulations and the VDOT Erosion and Sediment Control Annual Plan (ESC Annual Plan), as approved by the Department of Conservation and Recreation (DCR) and described herein, shall be incorporated into all erosion and sediment control designs and shall be enforced on all regulated land disturbing activities managed by VDOT.

- Any maintenance or construction activity disturbing more than 2,500 square feet (232 m²) within the area of Tidewater, Virginia, as defined in the Virginia Chesapeake Bay Preservation Act, must have a project specific ESC Plan developed and implemented in accordance with the ESC Annual Plan. Tidewater, Virginia is defined as the counties of Accomack, Arlington, Caroline, Charles City, Chesterfield, Essex, Fairfax, Gloucester, Hanover, Henrico, Isle of Wight, James City, King George, King and Queen, King William, Lancaster, Matthews, Middlesex, New Kent, Northhampton, Northumberland, Prince George, Prince William, Richmond, Spotsylvania, Stafford, Surry, Westmoreland and York and the Cities of Alexandria, Chesapeake, Colonial Heights, Fairfax, Falls Church, Fredericksburg, Hampton, Hopewell, Newport News, Norfolk, Petersburg, Poquoson, Portsmouth, Richmond, Suffolk, Virginia Beach and Williamsburg.
- Any maintenance or construction activity disturbing more than 10,000 square feet (929 m²) in areas other than those within Tidewater, Virginia (as defined above) must have a project specific ESC Plan developed and implemented in accordance with the ESC Annual Plan.
- VDOT shall be responsible for ensuring compliance with the ESC Annual Plan by private entities (i.e., agents, contractors, subcontractors, consultants) conducting regulated land disturbing activities on projects managed by VDOT including those constructed under the Public/Private Transportation Act (PPTA) and Design/Build projects.
- Wherever practical, the disturbed areas of the project shall be isolated from the impacts of stormwater run-off originating beyond the project limits.
- The Hydraulics Engineer shall be responsible for developing the project specific ESC Plan and shall consult with the District Environmental Manager on application of non-standard items or when unusual conditions exist.
- The District Environmental Manager shall be responsible for reviewing each project specific ESC Plan at appropriate stages in the plan development process and providing suggestions as to additions and/or deletions to the plan.
- The details of the ESC Plan may be depicted on the same sheet as other construction details of the project (Single Phase Plan concept) or they may be depicted on one or more individual ESC plan sheets (Multiple Phase Plan concept). The decision as to which type of ESC Plan to develop for each construction project shall be determined by the Hydraulics Engineer and the appropriate District Environmental Manager during the initial stages of plan development.
- The ESC Plan shall depict locations where specific measures are needed in order to control erosion and siltation within the project limits. Specific erosion and sediment control measures include, but are not limited to, protective linings for ditches, pipe outlet protection, filter barrier, silt fence, check dams, silt traps, sediment traps, sediment basins, diversion berms and ditches, etc. The ESC Plan should be based on

the existing field conditions at the time of design and the anticipated sequence of construction.

- The planning for the sequence of construction should address all required erosion and sediment controls and should be used to eliminate or minimize the need for major erosion and sediment control facilities, such as sediment basins, by strategic planning of the timing and location of erosion and sediment control measures, grading operations, temporary and permanent channels and drainage facilities.
- Prior to the Public Hearing stage of the project, the plans should depict major erosion and sediment control items, i.e. sediment traps, sediment basins, etc., as well as any other erosion and sediment control items that may effect the required right of way.
- Prior to the Right of Way stage, the Hydraulics Engineer will finalize the ESC Plan and submit it to the appropriate District Construction Engineer and Environmental Manager for final review and comment. Erosion and sediment control items shall be detailed to scale on the plans where necessary to accurately determine the required right-of-way and/or easement. The proposed measures, means of access for maintenance and required right-of-way and/or easements shall be carefully reviewed and any changes, deletions or additions shall be incorporated into the plans prior to their submission for Right of Way acquisition.
- During the construction phase of the project, the Contractor, in conjunction with the Project Engineer and/or District Environmental Monitor, shall adjust the proposed location, quantity, and type of erosion and sediment control items as necessary in order to accommodate the selected sequence of construction and the actual field conditions encountered.
- Particular attention should be given to environmentally sensitive areas, such as reservoirs, lakes, ponds, streams, wetland areas, etc., that may require more protection than that provided by the standard application of erosion and sediment control items.
- In areas of karst terrain, where stormwater runoff will be ponded for long periods of time (e.g., in temporary sediment traps and basins), the District Geologist shall be consulted for recommendations for any special requirements needed to address the surface area below the permanent water pool elevation.
- The Contractor must provide an ESC Plan in accordance with Section 106 of the applicable VDOT Road and Bridge Specifications for borrow pit sites and disposal area sites utilized to obtain or dispose of project materials. When required, the Contractor must design, construct and maintain sediment basins at these sites. Supporting calculations for sediment basin design and those demonstrating compliance with the Virginia ESC Regulation MS-19 for adequate receiving channel will be required from the Contractor. This information should be reviewed by the District Hydraulics Engineer to ensure accuracy and the use of appropriate methodology.

- The ESC Plan must be fully and effectively implemented throughout the entire construction phase of the project.
 - Maintenance of the erosion and sediment control items must be continually provided during the duration of the land disturbing activity.
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DESIGN GUIDELINES

References

- In addition to the information contained herein, the following references contain design and/or construction guidelines and details:
 - VDOT Road and Bridge Standards.
 - VDOT Road and Bridge Specifications.
 - DCR Virginia Erosion and Sediment Control Handbook.

Diversion of Off-Site Stormwater Run-Off

- Stormwater run-off from areas outside the project limits shall, where practical, be diverted around the disturbed areas of the project.
- Erosion and sediment control measures such as diversion ditches, diversion dikes (VDOT Road and Bridge Standard EC-9) (Reference DCR Standard 3.09), stabilized channels, etc. shall be used to limit the stormwater run-off flowing across the disturbed areas of the project.
- Where diversion of runoff from offsite areas is impractical, the flow can be conveyed through the disturbed area in a culvert or a stabilized channel or ditch. Erosion and sediment control measures, such as temporary filter barrier or silt fence, shall be provided along the sides of the ditch or channel to prevent sediment from adjacent disturbed areas from entering the ditch or channel.

Stabilized Construction Entrances - VDOT Road and Bridge Standard. ESC-INS (Reference DCR Standard 3.02)

Wherever construction traffic will enter or cross a public road, a stabilized construction entrance is required to minimize the transporting of sediment onto the adjoining surface. This entrance is to be constructed in accordance with the details shown on Standard Drawing ESC-INS on page 115.01 of the 2001 VDOT Road and Bridge Standards. In areas where clay or other soils that can be easily tracked onto a public roadway are encountered, a wash rack shall be provided to facilitate removal of sediment from vehicles using the entrance. Sediment laden runoff shall be directed to an approved sediment trapping device.

- Surface water shall be piped under the construction entrance. If piping is impractical, a mountable berm with 5:1 slopes will be permitted.
- Maintenance must be provided to assure continuous performance of the stabilized construction entrance.
- The need and potential locations for stabilized construction entrances should be discussed at the Field Inspection meeting or discussed with the appropriate District Environmental Manager or Construction Engineer.

Temporary Silt Fence - VDOT Road and Bridge Standard EC-5
(Reference DCR Standard 3.05 & 3.08)

- Temporary Silt Fence is to be used to control sediment in non-concentrated (sheet) flow areas and around the inlet end of circular culverts with a diameter greater than 36" (900 mm) or other drainage structure shapes with an equivalent hydraulic opening.
- Temporary Silt Fence is to be used at the toe of embankments and culvert locations where the fill height is equal to or greater than 5' (1.5 m).
- Additional erosion and sediment control measures must be provided to supplement Temporary Silt Fences located along the toe of embankments where the area draining to Temporary Silt Fence exceeds 11,000 square feet (1020 m²) per 100 linear feet (30 m) of Silt Fence.

Temporary Filter Barrier - VDOT Road and Bridge Standard EC-5
(Reference DCR Standard 3.05 & 3.08)

- Temporary Filter Barrier is to be used to control sediment in non-concentrated (sheet) flow areas and around the inlet end of circular culverts with a diameter that is equal to or less than 36" (900 mm) or other drainage structure shapes with an equivalent hydraulic opening.
- Temporary Filter Barrier is to be used at the toe of embankments and culvert locations where the height of fill is less than 5' (1.5 m).
- Additional erosion and sediment control measures must be provided to supplement Temporary Filter Barriers located along the toe of embankments where the area draining to Temporary Filter Barrier exceeds 11,000 square feet (1020 m²) per 100 linear feet (30 m) of Filter Barrier.
- Baled Straw Silt Barrier (Reference DCR Standard 3.04) may be substituted for Temporary Filter Barrier, with the approval of the Project Engineer and/or District Environmental Monitor, in non-critical areas, such as pavement locations, where geotextile type filter barrier cannot be installed in accordance with the Standard Drawings and Specifications.

Brush Barriers - VDOT Road and Bridge Standard ESC-INS (Reference DCR Standard 3.06)

- Brush Barriers may to be used to control sediment in non-concentrated (sheet) flow areas.
- Additional erosion and sediment control measures must be provided to supplement Brush Barriers located parallel along the toe of embankments if the area draining to the Brush Barrier exceeds 11,000 square feet (1020 m²) per 100 linear feet (30 m) of Brush Barrier.
- It is desirable, where feasible, that Brush Barriers remain in place after completion of the project in order to provide an area for wildlife habit. Any Brush Barriers left in place must have any geotextile fabric removed.

Drop Inlet Silt Trap - VDOT Road and Bridge Standard EC-6 (Reference DCR Standard 3.07)

- Provide Drop Inlet Silt Trap Type A at:
 - Grate inlets in graded median and roadside ditches.
 - Grate inlets in sump areas along embankment areas.
 - Grate inlets in other ditch locations or areas of concentrated flow.
- Provide Drop Inlet Silt Trap Type B at:
 - Curb opening inlets as needed.
- Sediment forebays shall be utilized at drop inlet locations where increased efficiency of sediment removal is desired or where drainage area/storage volume requirements dictate. The need for sediment forebays may be determined by the Hydraulics Engineer during the design phase of the project or by the Project Engineer or District Environmental Monitor during the construction phase of the project.

Sediment Traps – VDOT Road and Bridge Standard EC-7 (Reference DCR Standard 3.13)

- Temporary Sediment Traps should be used to detain sediment-laden runoff from small disturbed areas. Use of Temporary Sediment Traps should be limited to those locations where the total contributing drainage area is less than 3 acres (1.2 hectares).
- Temporary Sediment Traps are normally located in areas of concentrated flow. The outflow from Temporary Sediment Traps is normally controlled by the use of a rock checkdam.
- Temporary Sediment Traps shall not be constructed in live streams.

- The storage volume for Temporary Sediment Traps shall be 134 cubic yards per acre (254 m³ per hectare) of the total contributing drainage area and shall consist of 50% in the form of wet storage (excavated area) and 50% in the form of dry storage.
- The need and location for Temporary Sediment Traps is to be determined by the Hydraulics Engineer based on the anticipated sequence of construction.
- The general design for Temporary Sediment Traps is to be in accordance with the details shown on Standard Drawing EC-7 on page 114.08 of the 2001 VDOT Road and Bridge Standards. Specific dimensions for each Temporary Sediment Trap are to be determined by the Hydraulics Engineer and summarized on the Temporary Sediment Trap Detail Sheet (Imperial Insertable Sheet Number A6 or Metric Insertable Sheet Number MA6).
- The Resident Engineer, in conjunction with the District Environmental Monitor, shall determine the time schedule for the removal of the Temporary Sediment Traps.

Temporary Sediment Basins (Reference DCR Standard 3.14)

- Temporary Sediment Basins should be used to detain sediment laden runoff from disturbed areas where the total contributing drainage area is 3 acres (1.2 hectares) or greater. The maximum drainage area controlled by a Temporary Sediment Basin should not exceed 100 acres (40 hectares).
- The sediment storage volume for Temporary Sediment Basins shall be 134 cubic yards per acre (254 m³ per hectare) of the total contributing drainage area. The storage volume shall consist of 50% in the form of wet storage (permanent pool) and 50% in the form of dry storage. The hydraulic performance of the Temporary Sediment Basin shall be predicated on the runoff from the entire watershed.
- The need and location for Temporary Sediment Basins is to be determined by the Hydraulics Engineer based on the anticipated sequence of construction.
- Specific details and dimensions for each Temporary Sediment Basin are to be determined by the Hydraulics Engineer and the design details (including wet and dry storage volumes) are to be included in the construction plans.
- Concentrated stormwater discharge from Temporary Sediment Basins shall be discharged directly into an adequate natural or man-made receiving channel as defined by Minimum Standard 19 (MS-19) of the Virginia Erosion and Sediment Control Regulations.
- The Hydraulics Engineer is referred to the Virginia Erosion and Sediment Control Handbook for further design parameters and construction details.
- The Resident Engineer, in conjunction with the District Environmental Monitor, shall determine the time schedule for removal of Temporary Sediment Basins.

- Permanent Stormwater Management (SWM) basins may be used as temporary sediment basins during the construction phase of the project by modifying the outflow control structure in order to provide the required wet and dry storage volumes. Typical details for modifying a standard riser structure are shown on Standard Drawing SWM-DR on page 116.04 of the 2001 VDOT Road and Bridge Standards.

Slope Drains - VDOT Standard EC-INS (Reference DCR Standard 3.15)

- Slope Drains are to be used in high (8' or greater) (2.4 m or greater), long fill situations to control slope erosion. Exceptions would be where the length of fill is less than 100' (30 meters) or at bridge locations where run-off is being handled by other means.
- The need for Slope Drains is to be determined by the Hydraulics Engineer.
- During the construction phase of the project, the Project Engineer and/or the District Environmental Monitor may require additional slope drains as dictated by field conditions.

Culvert Outlet Protection - VDOT Road and Bridge Standard EC-1 (Reference DCR Standard 3.18)

- Stone for Erosion Control shall be provided at the outlet of each culvert where required in accordance with the guidelines set forth in the VDOT Drainage Manual.
- The placement of the stone shall be in accordance with Standard Drawing EC-1 on Page 114.01 of the 2001 VDOT Road and Bridge Standards.
- The Project Engineer and/or the District Environmental Monitor shall inspect the outlet ends of all culverts during the construction phase of the project. Where not specified on the plans, but warranted by field conditions, additional stone shall be added in order to ensure the stability of the area adjacent to the culvert outlet.

Rock Check Dams - VDOT Road and Bridge Standard EC-4 (Reference DCR Standard 3.20)

- Type I Rock Check Dams are to be used in trapezoidal ditches where the bottom width is greater than 2' (0.6 m).
- Type II Rock Check Dams are to be used in triangular (vee) ditches and trapezoidal ditches where the bottom width is 2' (0.6 m) or less.
- Rock Check Dams may be designated as permanent SWM structures that are to be left in place after completion of the project in order to function as a part of the overall SWM Plan for the project. Rock Check Dams designated as permanent structures, and located within the clear zone adjacent to a travelway, shall be designed so as not to present a hazard to traffic (see Standard Drawing EC-4 on page 114.05 of the 2001 VDOT Road and Bridge Standards).

- During the construction phase of the project, the Project Engineer and/or the District Environmental Monitor may approve the use of geosynthetic check dams in lieu of Rock Check Dams Type II provided that the check dams are not designated as permanent stormwater management structures and provided that there is no additional cost to the Department. The Environmental Division maintains a list of approved geosynthetic check dam manufacturers.

Temporary Diversion Channel - VDOT Road and Bridge Standard TD-CL
(Reference DCR Standard 3.24 & 3.25)

- A Temporary Diversion Channel should be used where culvert installation is proposed in a live stream environment (perennial or intermittent) and where it will be necessary to divert the stream in order for the culvert to be installed in the dry.
- The Hydraulics Engineer, using USGS Topographical Maps and/or field observations, shall determine the need for a Temporary Diversion Channel and identify the most feasible location for the channel.
- When it is determined that a Temporary Diversion Channel is required, the Hydraulics Engineer shall determine the following:
 - The length of the Temporary Diversion Channel.
 - The bottom width of Temporary Diversion Channel necessary to essentially match that of the existing low water stream channel.
 - The depth of the Temporary Diversion Channel (average ground surface elevation minus average natural streambed elevation).
 - The class of lining required based on the following:
 - Specify Class A Lining where the Temporary Diversion Channel slope is less than 2 percent.
 - Specify Class B Lining where the Temporary Diversion Channel slope is equal to or greater than 2 percent.
- The location of the Temporary Diversion Channel should be shown on the appropriate ESC plan sheet, when using the Multiple Phase ESC Plan concept, or the Construction plan sheet, when using the Single Phase ESC Plan concept.
- Temporary Silt Fence shall be provided along both sides of the Temporary Diversion Channel.

Dewatering Basins - VDOT Road and Bridge Standard EC-8 (Reference DCR Standard 3.26)

- Dewatering Basins are provided to receive sediment-laden water pumped from a construction site in order to allow for filtration before the water reenters a natural watercourse.
- Accumulated sediment in the Dewatering Basin shall be removed and disposed of in an approved disposal area outside of the 100-year flood plain, unless otherwise noted on the plans.
- Surface water flow shall be diverted around the Dewatering Basin.
- A stabilized conveyance shall be provided from the outlet of the Dewatering Basin to the receiving channel.
- The need for Dewatering Basins is to be determined by the Hydraulics Engineer during the design phase of the project.
- The field location of Dewatering Basins is to be determined by the Contractor during the construction phase of the project.
- During the construction phase of the project, the Project Engineer and/or the District Environmental Monitor may approve the use of a synthetic dewatering basin in lieu of the dewatering basin shown on Standard Drawing EC-8 on page 114.09 of the 2001 VDOT Road and Bridge Standards provided that there is no additional cost to the Department regardless of the number of synthetic dewatering basins required for each site.

Turbidity Curtains (Reference DCR Standard 3.27)

- A Turbidity Curtain is used to provide sedimentation protection for a watercourse from up-grade land disturbance or from dredging or filling operations within the watercourse.
- A Turbidity Curtain may be used in both non-tidal and tidal watercourses where intrusion into the watercourse by construction activities or sediment movement is unavoidable.
- Turbidity Curtains should not be placed across the main flow of a significant body of moving water but instead should be located parallel to the direction of flow.
- The Turbidity Curtain should extend for the entire depth of the water to the bed (bottom) of the channel except in locations subject to tidal action and/or significant wind or wave forces.
- At locations subject to tidal action and/or significant wind and wave forces, the bottom of the Turbidity Curtain should extend no closer than 1.0' (0.3 m) above the bed (bottom) of the channel at mean low water.

- An impervious material should be used for the Turbidity Curtain for general applications.
- A pervious material should be used for the Turbidity Curtain for special applications in areas of tidal or moving water where there is a need to extend the curtain all the way to the bed (bottom) of the channel.
- The maximum depth (height) of the curtain shall be no greater than 10 feet (3.0 m) for all stages of water level anticipated during the duration of the curtain's installation.
- The Hydraulics Engineer is referred to the Virginia Erosion and Sediment Control Handbook for further design parameters and construction details.

DESIGN CONSIDERATIONS

Right of Way/Easement:

- Prior to the Public Hearing Stage of the project, the need for fee right-of-way, permanent easement or temporary easement to accommodate the construction and maintenance of temporary diversion channels, sediment traps, sediment basins or other perimeter erosion and sediment control devices should be addressed.
- All right of way or easements needed to accommodate the construction and maintenance of temporary diversion channels and erosion and sediment control measures shall be shown on the plans prior to their submission for right-of-way acquisition.

Safety

- Guardrail or fencing around sediment traps or sediment basins should be specified where it is determined to be needed for the safety of pedestrians or vehicles.
- The need for guardrail or fencing should be determined by the District Construction Engineer or other person so designated.

Maintenance Access

- The need to maintain erosion and sediment control control measures during construction shall be considered in the development of the ESC plan.

The plan design shall incorporate a means of access (e.g., sufficient right-of-way, easements, flattened slopes, etc.) for the maintenance of sediment traps, sediment basins and other erosion and sediment control measures.

FIELD Revisions and Evaluations

- During the construction phase of the project, the Project Engineer and the District Environmental Monitor shall continuously evaluate the project for areas that require immediate field engineering decisions for the need to construct or install additional erosion and sediment control measures not include on the construction plans. Additional erosion and sediment control measures may be needed due to unforeseen site conditions or changes in field conditions. When such engineering decisions require detailed hydrologic/hydraulic analysis/calculations, the Project Engineer or District Environmental Monitor will provide documentation (including digital photos, site sketches, additional field survey, inspection reports, etc.) to the Hydraulics Engineer for evaluation. The Hydraulics Engineer will then provide additional design details, as needed, for addressing the specific problem areas.
 - During the construction phase of the project, the Project Engineer and/or the District Environmental Monitor will periodically (or at the Hydraulics Engineer's request) provide the Hydraulics Engineer with detailed evaluation report that notes the success or failure of the proposed erosion and sediment control measures depicted in the construction plans and/or the implementation of different measures as a result of the advent of new design technologies.
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Plan Development FOR SAAP AND NO PLAN PROJECTS

Definitions

- A "No Plan" project is an assembly of letter size sketches and narratives depicting the project's location, typical cross section, estimated quantities and any other specific details necessary for the construction of the project. A project developed under the "No Plan" concept is one that generally requires little or no survey, engineering or hydraulic analysis in order to produce the necessary contract documents. Any required right of way is generally acquired through donations in lieu of the purchase/condemnation process. See Appendix A of the VDOT Road Design Manual for additional information on the No Plan concept.
- SAAP Projects are those advertised under the Special Advertisement and Award Process. SAAP projects generally have one or more of the following characteristics:
 - They require little or no preliminary engineering.
 - They are standard maintenance repair contracts (for example: bridge, guardrail or concrete pavement repairs).

- They are standard incidental construction and/or improvement projects of limited scope.
 - The work being performed involves a singular function or specialty work (for example: bridge painting, pavement markings or pipe installation).
- The “No Plan” concept is generally used to produce the required contract documents.

Plan Development Process

- During the early stages of the preparation of the contract assembly for any SAAP or No Plan Project, a field review should be made by appropriate members of the District Environmental Section and the District Hydraulics Section staff, accompanied by members of the Residency staff, to determine what is needed on the project in order to comply with all applicable ESC and SWM Regulations.
- The Contract Administrator (CA) will prepare a preliminary Straight Line Sketch (SLS) (see attached example) and Form LD-439 (Drainage Information Sheet) and provide a copy of this information to the appropriate personnel in the District Hydraulics Section and the District Environmental Section. Even though project specifics may not be totally complete at the time, it is recommended that the SLS and the Form LD-439 be provided to the District Hydraulics Section and the District Environmental Section at the same time that the Form EQ-429 Project Early Notification is submitted or as soon thereafter as possible.
- The CA will coordinate with the appropriate personnel in District Hydraulics Section and the District Environmental Section to schedule a Field Review of the proposed project. Appropriate person(s) from the Hydraulics Section and the Environmental Section (including those representing the areas of ESC, SERP, and Permits) should attend the Field Review. Attendees from the Hydraulics Section and the Environmental Section shall discuss pertinent issues during the Field Review and provide any follow-up information to the CA as soon, thereafter, as possible.
- The following data should be made available to the participants for the Field Review:
 - A completed Form EQ-429 and Form LD-439.
 - A Vicinity Map – USGS Topographical Map and County Road Map showing the location and limits of the proposed project.
 - A Straight Line Sketch (SLS) of the project showing the project limits and the approximate location of proposed drainage items and erosion and sediment control items. Information in Form LD-438 “Guidelines for Development of Straight Line Sketches” should be followed in preparation of the SLS.

- If during the Field Review it is found that such items as stormwater management facilities, temporary sediment basins or temporary sediment traps are required, the District Hydraulics Section will determine and request the survey data necessary to perform the required engineering studies.
- After the Field Review, and upon the completion of the design of any required stormwater management facilities or sediment trapping facilities, the District Environmental Section and the District Hydraulics Section will provide the CA with comments, recommendations and any pertinent design information or details.
- The CA will revise the SLS to incorporate the recommendations and design details provided by the District Hydraulics Section and the District Environmental Section.
- After all required revisions have been made by the CA, the final SLS will be incorporated into the contract assembly. This copy of the SLS should be identified as the final version and copies should be provided to the District Environmental Section and to the District Hydraulics Section for their review to ensure that all comments and issues have been addressed. Thereafter, any significant changes to the project that may impact environmental or drainage issues will require resubmission of the SLS to the Environmental and/or Hydraulics Section for additional review and comment.
- The final version of the SLS and associated Narrative will serve as the ESC and SWM Plan for the project. During the construction phase of the project, a copy of the ESC/SWM Plan should be kept on the project site and in the project file at the Residency Office as documentation that all policies and procedures have been addressed with regard to SWM and ESC requirements of the project.
- See Appendix A of the VDOT Road Design Manual for additional information and examples of the erosion and sediment control details required for these types of construction projects.

PLAN DEVELOPMENT FOR STATE FORCE CONSTRUCTION PROJECTS

State Force Construction Projects include land-disturbing activities that are undertaken by state force equipment and/or hired equipment.

Residency personnel should contact the Residency Environmental Specialist or the District Environmental Section to review any State Force Construction Projects to determine if the proposed work is of a magnitude that would require stormwater management and/or erosion and sediment control measures. If it is determined that stormwater management and/or erosion and sediment control measures are needed, the same procedures outlined under the SAAP/No Plan Project Plan Development Process will be followed.

PLAN DEVELOPMENT FOR MINIMUM PLAN & STANDARD PLAN CONSTRUCTION PROJECTS

Definitions

- Minimum Plan projects are those that require a limited amount of survey information in order to perform the necessary engineering studies and to provide the information required to secure the necessary rights of way. The minimum amount of details needed to address environmental requirements and to construct the project are provided in a standard plan assembly format. See Appendix A of the VDOT Road Design Manual for additional information on the Minimum Plan concept.
- Standard Plan Projects are those that require complete survey information in order to perform the necessary detailed engineering studies and to develop a complete and detailed construction plan assembly.

PLAN DEVELOPMENT PROCESS

Single Phase Plan Concept

- The Single Phase ESC Plan concept may be used on simple construction projects where all of the erosion and sediment control measures can be clearly depicted on the construction plan sheet (e.g., rural secondary project, minor urban widening project, bridge and approach project, etc.)
- The ESC Plan shall address both those items requiring installation prior to the beginning of grubbing operations or the installation of major drainage structures and those items to be installed as grading operations and installation of minor drainage facilities progress.
- In addition to standard plan symbols, a narrative or additional notes may be used to clearly define the intent and purpose of the proposed erosion and sediment control measures and to define their installation sequencing. Some standard construction notes have been developed and are included as a part of the VDOT CADD Cell Library.
- Projects developed under the “Minimum Plan” concept must have an ESC Plan. See Appendix A of the Road Design Manual for additional information and examples of the erosion and sediment control details required for these types of construction projects.

Multiple Phase Plan Concept

- The Multiple Phase ESC Plan concept shall be used on construction projects where additional plan sheet(s) are needed in order to clearly depict the erosion and sediment

control measures required at the various stages of construction (e.g., rural multi-lane roadway projects, major urban roadway projects, roadway projects on new location, roadway projects through environmentally sensitive areas, etc.).

- In addition to standard plan symbols, a narrative or additional notes should be used to clearly define the intent and purpose of the proposed erosion and sediment control measures and to define their installation sequencing. Some standard construction notes have been developed and are included as a part of the VDOT CADD Cell Library.
- Some projects may be developed using the Multiple Phase concept on only those portions of the project that require greater detail and clarity than that provided by the Single Phase concept (e.g., construction in environmentally sensitive areas or major waterway areas, areas where plan clutter reduces the ability to clearly show the erosion and sediment control items, etc.).
- At a minimum, the ESC Plan should be developed in two phases:
 - Phase I for those items needed to be installed prior to the beginning of grubbing operations or the installation of major drainage structures.
 - Phase II for those items to be installed as grading operations and installation of minor drainage facilities progress.
- On most projects, the Phase I and the Phase II details (including associated narratives or notes) should each be depicted on a separate plan sheet following the applicable construction plan sheet (e.g., Construction Plan Sheet 5, Profile Sheet 5A, ESC Phase I Plan Sheet 5B, ESC Phase II Plan Sheet 5C).
- On some projects, the Phase I and Phase II details may be depicted on a single separate plan sheet following the applicable construction plan sheet (e.g., Construction Plan Sheet 5, Profile Sheet 5A, ESC Phase I & II Plan Sheet 5B).
- In general, when utilizing a separate plan sheet for both the Phase I and the Phase II details, erosion and sediment control items (including protective linings in permanent ditches and channel relocations) depicted on the Phase I Plan Sheet should not be duplicated on the Phase II Plan Sheet. Erosion and sediment control items depicted on the Phase I & II Plan Sheets should not be duplicated on the Construction Plan Sheet.
- The Phase I Plan Sheet shall, at a minimum, depict the following:
 - Existing contours.
 - Existing topography.
 - Proposed centerline, edges of pavement and construction limits.
Permanent drainage culverts, temporary diversion channels and permanent channel relocations (including any protective linings required) involving natural

drainage ways that would be constructed or installed prior to the start of grading operations.

- Temporary Sediment Basins (including grading contours, if applicable).
- Stormwater Management Basins (including grading contours, if applicable) that will be utilized as temporary sediment basins during the construction phase of the project.
- Diversion dikes, berm ditches and other perimeter ditches (including any required protective linings) that need to be installed prior to the start of grubbing or other earth moving operations.
- Temporary sediment traps, filter barriers, silt fences, rock check dams, turbidity curtains and any other perimeter controls that need to be installed prior to the start of grubbing or other earth moving operations.
- Any necessary construction notes or narratives.

The Phase II Plan Sheet shall, at a minimum, depict the following:

- Existing topography.
 - Proposed centerline, edges of pavement and construction limits.
 - Any permanent drainage culverts and channel relocations involving natural drainage ways installed under the Phase I Plan.
 - Temporary Sediment Basins and Stormwater Management Basins installed under the Phase I Plan.
 - All culverts, storm sewer pipe, drop inlets and associated drainage structures that will be installed as grading operations progress.
 - All required protective ditch linings (e.g., Standard EC-2 or EC-3, concrete, riprap, etc.), paved flumes and associated structures that will be installed as grading operations progress.
 - Temporary sediment traps, slope drains, filter barriers, silt fences, rock check dams, drop inlet silt traps, and any other erosion and sediment control measures needed to be installed as grading operations progress.
 - Any necessary construction notes or narratives.
- The following drainage items from the Phase I and II Plan Sheets shall be depicted on the Construction Plan Sheet:
 - Permanent drainage culverts, storm sewer systems, drop inlets and associated structures.
 - Permanent channel relocations involving natural waterways.
 - Permanent Stormwater Management Basins.
 - Rock Check Dams that will be left in place after construction to serve as a permanent stormwater management structure.

PLAN DETAILS

Symbols

- Standard symbols are to be used to depict erosion and sediment control items on the plans in accordance with General Note E-7 shown in the latest Location and Design Instructional and Informational Memorandum (D) 110 and in accordance with instructions in the VDOT CADD Manual.

Check Dams

- Rock Check Dams that are to function as a part of the permanent SWM Plan for the project should be designated on the plans as follows:
“Rock Check Dam Type (specify) - Permanent SWM Structure (to remain in place after project completion)”

Dewatering Basins

- Do not show specific locations on the plans.
- The description of the applicable drainage structure (or a separate description note when utilizing individual sheets to depict a phased ESC Plan) should note the need for a Dewatering Basin(s) and specify the number required.

Stabilized Construction Entrances

- The specific locations of Stabilized Construction Entrances will not be shown on the plans. A note should be included on the appropriate plan sheet(s) specifying the general location (station, lane, roadway, etc.) where it is anticipated that Stabilized Construction Entrances will be required.

Filter Cloth

- Where existing fence is available for the attachment of the Filter Cloth, the plans are to specify the following: “Filter Cloth Req’d. (Attach to Exist. Fence)”.

Slope Drains

- The specific locations of Slope Drains will not be shown on the plans. A note should be included on the appropriate plan sheet(s) specifying the general location (station to station, lane, roadway, etc.) and estimated quantity of Slope Drains and Erosion Control Stone Class 1, St’d. EC-1 required.

Temporary Diversion Channel

- When the location is shown on an individual phased ESC Plan Sheet, the description for the Temporary Diversion Channel should specify the width of the channel required and the class of lining required (A or B). Temporary Silt Fence along both sides of the Temporary Diversion Channel should be specified.

- When the location is shown on the Construction plan sheet, the description for the Temporary Diversion Channel should be included in the description for the applicable drainage structure. The following information should be included in the drainage description:

Temporary Diversion Channel Req'd. Width = (specify)
(specify) cu. yds. (m³) Temporary Diversion Channel Excavation
(specify) sq. yds. (m²) Temporary Diversion Channel Lining, Class (specify)
(specify) ft. (m) Temporary Silt Fence Req'd.

- The plan description calls attention to the need for a Temporary Diversion Channel and defines the width of the channel and the class of lining required.
- The Hydraulics Engineer should be liberal when estimating the length of Temporary Diversion Channel required in order to avoid significant cost overruns during construction.
- The Contractor, with approval of the District Environmental Monitor, will have the latitude to field locate the Temporary Diversion Channel where needed to best fit his planned construction sequencing. The Contractor is paid for the actual quantity of excavation and quantity of lining installed.
- Sufficient right of way and/or temporary/permanent easement should be provided in order to allow the contractor the latitude to locate the Temporary Diversion Channel on either side of the proposed structure. Location of wingwalls or other appurtenances that protrude beyond the neat lines of the culvert's barrel shall be considered when locating the Temporary Diversion Channel and establishing the required R/W or Easement.

General Notes

- See the latest Location and Design Instructional and Informational Memorandum (D) 110 for the applicable Erosion and Sediment Control Notes that are to be included on the General Notes Sheet of the plans.

MAINTENANCE

- Accumulated sediment shall, at a minimum, be removed from erosion and sediment control facilities as follows:
 - Sediment Traps & Basins - When the wet storage volume has been reduced by approximately 50%.
 - Temporary Silt Fence or Filter Barrier – When it retains sediment up to ½ of its height.

- Rock Check Dams – When the storage capacity behind the dam has been reduced by approximately 50%.
 - Dewatering Basins – When the excavated volume has been reduced by approximately 50%.
 - All other erosion and sediment control facilities – When the capacity, height or depth has been reduced by approximately 50%.
-

BASIS OF PAYMENT

Siltation Control Excavation

- All silt removal and sediment cleanout from erosion and sediment control items will be measured and paid for as “cubic yards (m³) of Siltation Control Excavation”.

Rock Check Dams

- To be measured and paid for per each for the type specified.

Temporary Filter Barrier and Silt Fence

- To be measured and paid for in linear feet (m).

Temporary Sediment Basins and Sediment Traps

- Excavation for Temporary Sediment Basins or Sediment Traps will be measured and paid for as “cubic yards (m³) Temporary Sediment Basin Excavation.” If additional fill material is needed for dams or berms, it will be measured and paid for as “cubic yards (m³) of either Regular Excavation, Borrow Excavation or Embankment”.

Dewatering Basins

- To be measured and paid for per each.

Drop Inlet Silt Traps

- To be measured and paid for per each for the type specified.

Temporary Diversion Dike

- Will not be measured for payment, but the cost shall be included in the price bid for other appropriate items.

Stabilized Construction Entrance

- Will not be measured for payment but the cost shall be included in the price bid for other appropriate items.

Slope Drains

- To be measured and paid for per each regardless of size or length.

Brush Silt Barriers

- Will not be measured for payment but the cost shall be included in the price bid for other appropriate items.

Geotextile Fabric

- When attached to brush barriers or an existing fence, payment will be made for square yards (m^2) of Geotextile Fabric.

Turbidity Curtains

- To be measured and paid for in linear feet (m) of the type specified, measured from edge of curtain to edge of curtain along the support cable.

Temporary Diversion Channel

- To be measured and paid for in cubic yards (m^3) Temporary Diversion Channel Excavation and square yards (m^2) Temporary Diversion Channel Lining for the Class specified.

QUANTITY ESTIMATES

Summary Sheet

- All estimated quantities for erosion and sediment control items are to be summarized on the Erosion Control Summary Sheet (Imperial Insertable Sheet Number A5 or Metric Insertable Number MA5).
- Estimated quantities are to be shown for each phase of the ESC Plan.

Rock Check Dams

- Summarize a quantity of 4.74 cubic yards ($3.6 m^3$) of Siltation Control Excavation for each Rock Check Dam Type I specified. This should allow for two cleanouts.
- Summarize a quantity for 0.32 cubic yards ($0.2 m^3$) of Siltation Control Excavation for each Rock Check Dam Type II specified. This should allow for two cleanouts.

Temporary Filter Barrier

- The estimated quantity depicted on the plans is to be increased by a percentage factor of 100% and the adjusted quantity shown on the Erosion Control Summary Sheet.
- Summarize a quantity for cubic yards (m^3) of Siltation Control Excavation as follows:

Metric - 0.25 m^3 of Siltation Control Excavation for each meter of Temporary Filter Barrier summarized on the Erosion Control Summary Sheet.

Imperial - 0.17 Cubic yards of Siltation Control Excavation for each linear foot of Temporary Filter Barrier summarized on the Erosion Control Summary Sheet.

Temporary Silt Fence

- Summarize a quantity for cubic yards (m^3) of Siltation Control Excavation as follows:

Metric - 0.25 m^3 of Siltation Control Excavation for each meter of Temporary Silt Fence specified.

Imperial - 0.17 Cubic yards of Siltation Control Excavation for each linear foot of Temporary Silt Fence specified.

Brush Silt Barrier

- The estimated linear feet (m) is to be shown on the Erosion Control Summary Sheet.

Temporary Sediment Basins and Traps

- Summarize the cubic yards (m^3) of Temporary Sediment Basin Excavation on the Erosion Control Summary Sheet. If Borrow or Embankment is needed, it is to be included in roadway totals on the Grading Diagram and Summary Sheet.
- The Grading Diagram is to reflect how the cubic yards (m^3) of Temporary Sediment Basin Excavation and cubic yards (m^3) of Embankment is to be distributed.
- Temporary Sediment Basin control structure (riser pipe) – Summarize pay item as linear feet (meters) of Temporary Sediment Riser Pipe (size) on the Erosion Control Summary Sheet.

- Any culvert pipe necessary for a temporary sediment basin shall be included with other applicable pipe on the Drainage Summary Sheet.
- Summarize a quantity for cubic yards (m^3) of Siltation Control Excavation that is equal to 50% of the total volume (wet storage volume plus dry storage volume) of the basin or trap. This will allow for two cleanouts.

Dewatering Basin

- The number of Dewatering Basins specified for each applicable site shall consider any potential phased construction of the proposed drainage structure. At a minimum, the following number of dewatering Basins shall be specified:
 - One Dewatering Basin for each pipe(s) or major structure that has a combined hydraulic opening of 12.6 square feet ($1.17 m^2$) (48" (1200 mm) diameter pipe or equivalent) or greater including bridges 20' (6 m) or less in length.
 - Two Dewatering Basins for each bridge over 20' (6 m) in length.
- Summarize a quantity of 4 cubic yards ($4 m^3$) of Siltation Control Excavation for each Dewatering Basin specified, based on a minimum Dewatering Basin size of 6' x 6' x 3' (2 m x 2 m x 1 m). This will allow for two cleanouts.

Drop Inlet Silt Trap

- Type A
 - Summarize a quantity of 15 cubic yards ($11.5 m^3$) of Siltation Control Excavation for each Drop Inlet Silt Trap Type A specified at St'd DI-5, DI-7A,7B and DI-12,12A,12B,12C Drop Inlet locations. This should allow for two cleanouts.
 - Summarize a quantity of 5 cubic yards ($3.8 m^3$) of Siltation Control Excavation for each Drop Inlet Silt Trap Type A specified at Standard DI-1 and DI-7 Drop Inlet locations. This should allow for two cleanouts.
- Type B
 - Summarize a quantity of 5 cubic yards ($3.8 m^3$) of Siltation Control Excavation for each Drop Inlet Silt Trap Type B specified at curb drop inlet locations. This should allow for two cleanouts.

Stabilized Construction Entrance

- The estimated number of Stabilized Construction Entrances is to be shown on the Erosion Control Summary Sheet.

Slope Drains

- Summarize the estimated number of Slope Drains and the quantity of Erosion Control Stone Class 1, St'd. EC-1 on the Erosion Control Summary Sheet.
- The number of Slope Drains required is to be estimated as follows:
 - One Slope Drain for each 250 linear feet (75 m), or portion thereof, for fills 8 feet (2.4 m) in height or greater, for each roadway baseline; e.g., 200' (60 m) of fill = 1 Slope Drain; 580' (175 m) of fill = 3 Slope Drains.

Erosion Control Mulch

- Summarize a quantity on the Erosion Control Summary Sheet when recommended by the Environmental Division.
- This material is estimated at the rate of 50 square yards per 100 feet (135 m² per 100 meters) of roadway alignment.

Turbidity Curtain

- Summarize as linear feet (meters) of Turbidity Curtain for the type specified (Pervious or Impervious) on the Erosion Control Summary Sheet.

Temporary Diversion Channel

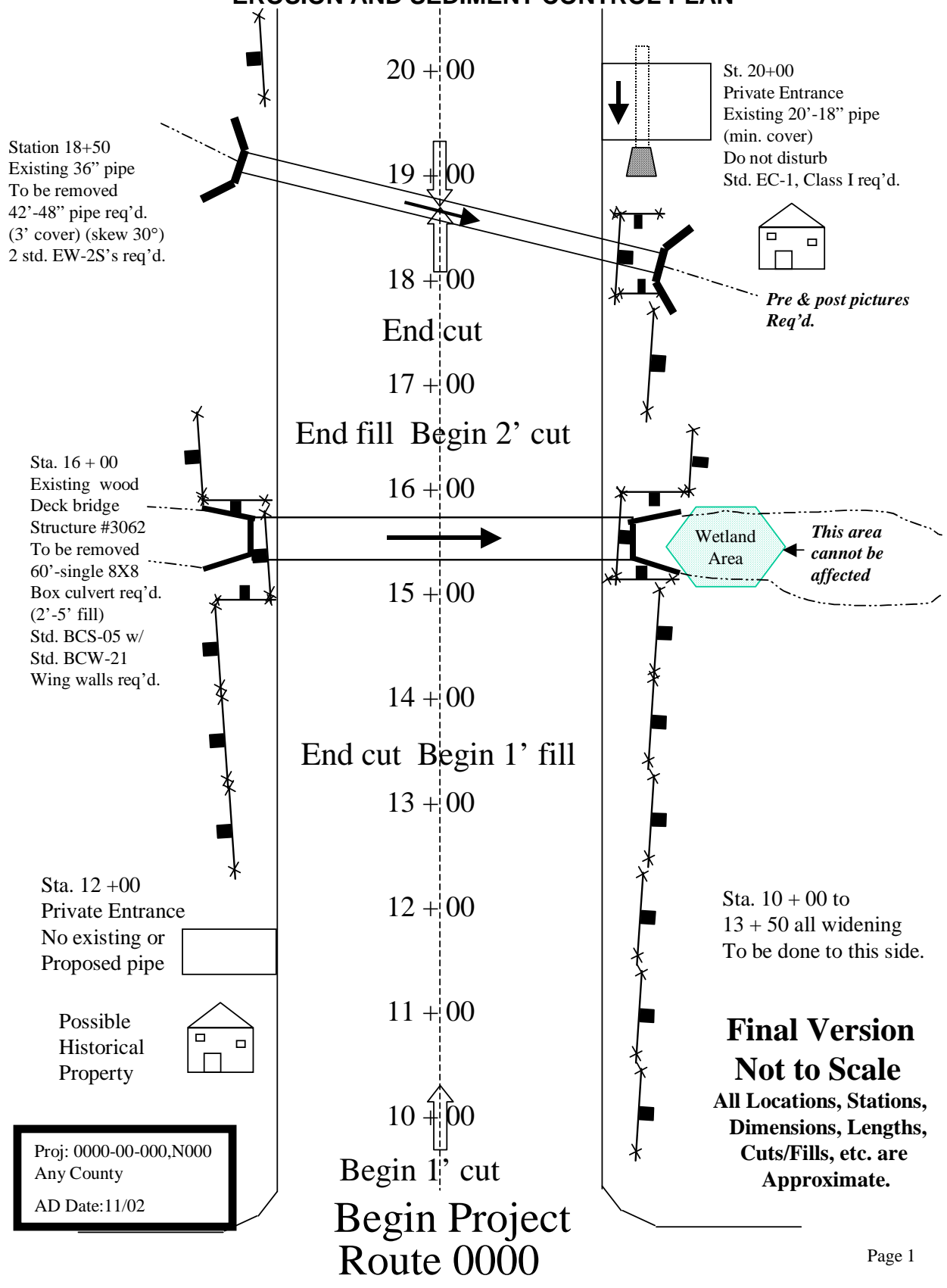
- An estimated quantity of Temporary Diversion Channel Excavation and Temporary Diversion Channel Lining for the Class specified (A or B) is to be shown on the Erosion Control Summary Sheet.
- Silt fence along both sides of channel is to be measured and paid for separately and summarized on the Erosion Control Summary Sheet.
- The Hydraulics Engineer shall estimate the cubic yards (m³) of temporary Diversion Channel Excavation and the square yards (m²) of Temporary Diversion Channel Lining based on the estimated width and depth of the channel using Table 1.

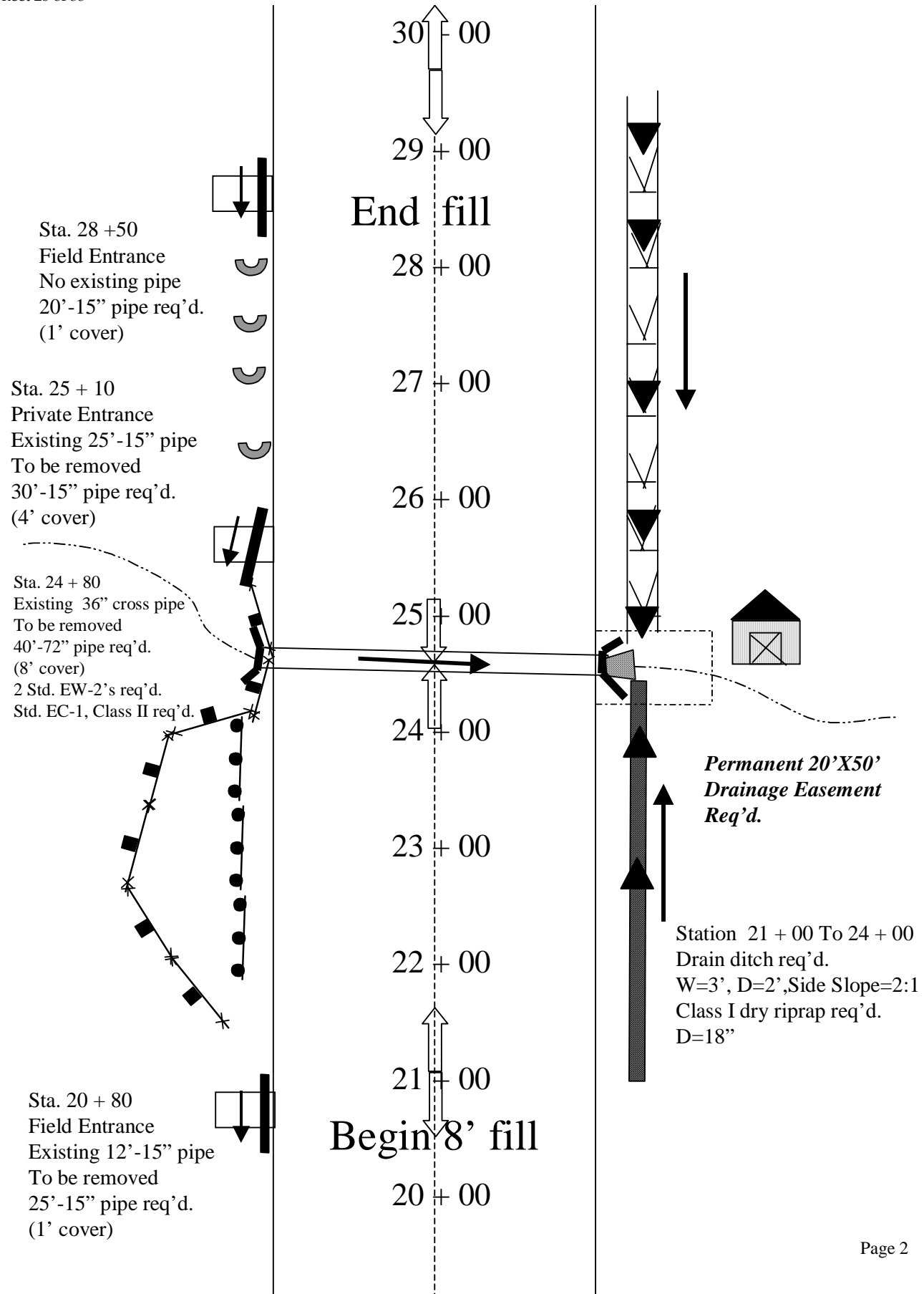
**TABLE 1 - TEMPORARY DIVERSION CHANNELS (IMPERIAL)
S.Y. LINING / C.Y. EXCAVATION (PER LIN. FT.)**

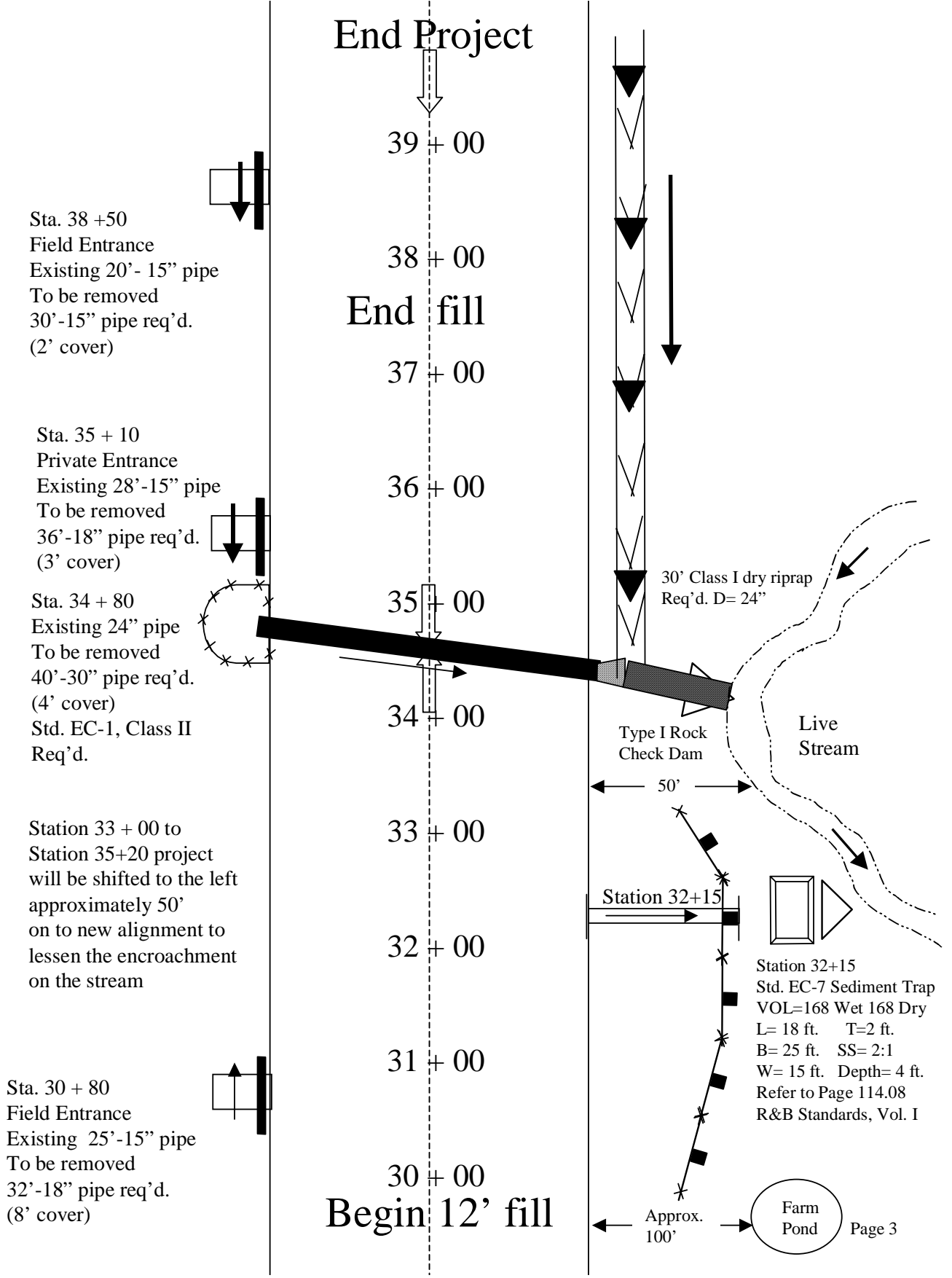
		3' WIDTH	4' WIDTH	5' WIDTH	6' WIDTH	7' WIDTH	8' WIDTH	9' WIDTH	10' WIDTH
1' DEPTH	S.Y.	0.83	0.94	1.10	1.20	1.30	1.40	1.50	1.60
1' DEPTH	C.Y.	0.19	0.22	0.26	0.30	0.33	0.37	0.41	0.44
2' DEPTH	S.Y.	1.32	1.44	1.54	1.66	1.77	1.88	1.98	2.10
2' DEPTH	C.Y.	0.52	0.59	0.67	0.74	0.81	0.89	0.96	1.04
3' DEPTH	S.Y.	1.82	1.94	2.05	2.16	2.27	2.38	2.49	2.60
3' DEPTH	C.Y.	1.00	1.11	1.22	1.33	1.44	1.56	1.67	1.78
4' DEPTH	S.Y.	2.32	2.43	2.54	2.66	2.77	2.88	2.99	3.10
4' DEPTH	C.Y.	1.63	1.78	1.93	2.07	2.22	2.37	2.52	2.67
5' DEPTH	S.Y.	2.82	2.93	3.04	3.16	3.27	3.38	3.48	3.60
5' DEPTH	C.Y.	2.41	2.59	2.78	2.96	3.15	3.33	3.52	3.70
6' DEPTH	S.Y.	3.31	3.43	3.53	3.64	3.76	3.87	3.98	4.09
6' DEPTH	C.Y.	3.33	3.56	3.78	4.00	4.22	4.44	4.67	4.89
7' DEPTH	S.Y.	3.81	3.92	4.03	4.14	4.26	4.39	4.48	4.59
7' DEPTH	C.Y.	4.41	4.67	4.93	5.19	5.44	5.70	5.96	6.22
8' DEPTH	S.Y.	4.31	4.42	4.53	4.64	4.76	4.87	4.98	5.09
8' DEPTH	C.Y.	5.63	5.93	6.22	6.52	6.81	7.11	7.41	7.70
9' DEPTH	S.Y.	4.81	4.92	5.03	5.14	5.25	5.36	5.47	5.58
9' DEPTH	C.Y.	7.00	7.33	7.67	8.00	8.33	8.67	9.00	9.33
10' DEPTH	S.Y.	5.30	5.41	5.52	5.64	5.75	5.86	5.97	6.08
10' DEPTH	C.Y.	8.52	8.89	9.26	9.63	10.00	10.37	10.74	11.11

TABLE 1 - TEMPORARY DIVERSION CHANNELS (METRIC)						
M ² LINING / M ³ EXCAVATION (PER METER)						
		1.00 m WIDTH	1.50 m WIDTH	2.00 m WIDTH	2.50 m WIDTH	3.00 m WIDTH
0.30mDepth	m ²	2.34	2.84	3.34	3.84	4.34
0.30mDepth	m ³	0.48	0.63	0.78	0.93	1.08
0.60mDepth	m ²	3.68	4.18	4.68	5.18	5.68
0.60mDepth	m ³	1.32	1.62	1.92	2.22	2.52
0.90mDepth	m ²	5.02	5.52	6.02	6.52	7.02
0.90mDepth	m ³	2.52	2.97	3.42	3.87	4.32
1.20mDepth	m ²	6.37	6.87	7.37	7.87	8.37
1.20mDepth	m ³	4.08	4.68	5.28	5.88	6.48
1.50mDepth	m ²	7.71	8.21	8.71	9.21	9.71
1.50mDepth	m ³	6.00	6.75	7.50	8.25	9.00
1.80mDepth	m ²	9.05	9.55	10.05	10.55	11.05
1.80mDepth	m ³	8.28	9.18	10.08	10.98	11.88
2.10mDepth	m ²	10.39	10.89	11.39	11.89	12.39
2.10mDepth	m ³	10.92	11.97	13.02	14.07	15.12
2.40mDepth	m ²	11.73	12.23	12.73	13.23	13.73
2.40mDepth	m ³	13.92	15.12	16.32	17.52	18.72
2.70mDepth	m ²	13.07	13.57	14.07	14.57	15.07
2.70mDepth	m ³	17.28	18.63	19.98	21.33	22.68
3.00mDepth	m ²	14.42	14.92	15.42	15.92	16.42
3.00mDepth	m ³	21.00	22.50	24.00	25.50	27.00

**EXAMPLE
 NO PLAN PROJECT
 EROSION AND SEDIMENT CONTROL PLAN**

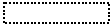



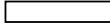

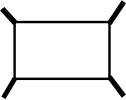

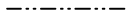
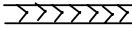


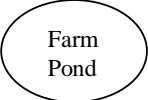
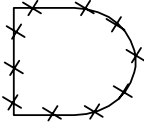






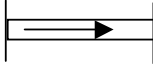






KEY

0000-00-000,N000

	Pipe – Existing		Type II rock check dam
	Pipe – 42” or smaller		Type I rock check dam
	Pipe – 48” or larger		Filter check dam
	Box Culvert		Silt Fence
	Stream or edge of water		EC-2
	Guardrail		EC-3, Type B
	Pond		Inlet protection
	Potential wetland area		EC-1 Outlet protection
	House/dwelling		Dry riprap
	Barn		Sediment trap
			Temporary slope drain

NOTE:

- A temporary diversion channel may be required for work in live streams. Must be reviewed and approved by Environmental. (R&B Standard 113.01)
- All E&S controls need to be removed within 30 days after project is stabilized. (MS 18)
- All referenced standards and E&S controls should conform to the latest edition of the VDOT Road & Bridge Standards.
- Refer to contract documents for all quantities. (e.g.: minor structure excavation, bedding, backfill, etc.)
- For additional guidance on E&S controls, refer to I & IM LD-01(D)11.22.
- Dewatering devices may be required at live stream pipe installations.
- All disturbed areas will be stabilized with seed and mulch in accordance with the Roadside Development Sheet.

FOR THE CURRENT VERSION OF THIS FORM SEE THE VDOT EXTRANET SITE:
<http://www.extranet.vdot.state.va.us/forms/>

LD-438 Rev. 2-8-02

Page 1 of 2

**GUIDELINES FOR DEVELOPMENT
OF EROSION & SEDIMENT CONTROL (E&S)
AND STORMWATER MANAGEMENT (SWM) PLANS
FOR PROJECTS
WITH STRAIGHT LINE SKETCHES**

(When each item is satisfied or completed,
the corresponding box should be marked with an **X** or **✓**)

- Recommend a maximum of 1000 linear feet of roadway on each 8 ½ x 11 sheet. (Exceptions may be made and will be determined on a case-by-case basis depending on size and scope of project.)
- Site-specific E&S measures should be shown. E&S measures that will be installed consistently throughout the project or for a particular area may be addressed through a note or symbol. For example, "From station ___ to station ___, check dams will be placed every ___ feet" or "Silt Fence Inlet Protection will be installed for all pipe inlets".
- As noted in Instructional & Informational Memorandum LD-01(D) 110.13, sheet 14 of 15, uniform symbols should be used to depict E&S items in the Straight-Line Sketch. These symbols will be provided to the Contract Administrator in digital format.
- ▶ Show the following:
 - The location of any live streams, intermittent or dry channels, wetlands, or ponds to be **IMPACTED BY** the project. This includes pipe or bridge replacements, stream relocations, channel clean outs, etc.
 - The location of any live streams, intermittent or dry channels, wetlands, or ponds **IMMEDIATELY ADJACENT TO** the project. Even though these areas will not be affected or impacted by the project, they must be clearly identified and adequately protected from potential erosion and sediment damage.
 - The location of all existing and proposed culverts and bridges. Identify size (diameter, length, and skew) of new culverts and details of new bridge structures. Provide details on any proposed channel relocations and/or Temporary Detours within project limits associated with culvert placement or bridge construction. (NOTE: The Environmental Section will identify the type of permit needed during the Field Review, or shortly afterward. Be aware that if pipe lengths are increased or other adjustments are made after the Permit Determination has been done, a permit modification *may* be required.)
 - Identify any drainage structures to be left undisturbed.
 - The location of any proposed alignment changes. Specify the location of any areas of new alignment (shifting significantly off of the footprint of the old road). Identify these alignment changes on a Topographical Map.
 - The approximate location and heights of cuts and/or fills throughout the project.

- Specific size or gradation of erosion control treatment (for example, EC-1 Class I Dry Riprap, #1 Aggregate, etc.)
- Show direction of flow arrows for pipes, ditches, streams, etc.
- The approximate location of the discharge of any roadside ditches and cross-pipes. Indicate condition of receiving channel/swale, noting any visible erosion, flood-prone areas, etc. (Photographs of receiving channels are recommended. Documentation should be kept in the Residency's Project File.) Show any existing and proposed drainage easements. (NOTE: Dedicated drainage "easements" may be needed. This need should be determined at the Field Review.)
- The approximate location and size of any **known** borrow or disposal areas.
- Identify any buildings to be demolished, so that necessary asbestos inspection can be scheduled.

- ▶ The following information is required when requesting drainage replacement structures:
 - Specific location of study site on County Road Map or USGS Topographical Map
 - Size of existing drainage structure
 - Height of **existing** cover at study site
 - Proposed** height of fill at study site
 - Comment on existing flooding problems and frequency of flooding
 - Note whether or not there are existing dwellings, buildings, etc. upstream that could be flooded
 - Note whether or not the study site is a live stream
 - Note if existing drainage structure is a premature pipe failure
 - Proposed pipe skew
 - Show flow arrows for pipes
 - In accordance with Instructional and Informational (I&I) Memorandum Number LD-01(D) 223, an End Treatment will be required on culverts regardless of highway classification as noted:
 - All culverts conveying a live stream
 - All culverts with a diameter of 48" or greater
 - All culverts with arch or elliptical configuration and 48" or greater equivalent or accumulated end areas, in the case of multiple lines

*** Please see the referenced memorandum for types of end treatments*
 - In accordance with I&I Memorandum Number LD-01(D) 121.14, a minimum 60" culvert is required for fills (not cover over pipe) that are greater than 20'. The 60" size is needed in high fills for inspection during and after construction and to facilitate future relining of the culvert where the open cut method is not usually a feasible option.
- ▶ For reference purposes, it is suggested that the Contract Administrator be familiar with the following I&I Memoranda:
 - Allowable Pipe Criteria for Culverts – LD-01(D) 121.14
 - Underdrains – LD-01 (D) 130.8
 - Drainage Instructions – LD-01(D) 223
 - Pipe Bedding and Backfill – LD-01 (D) 225
 - General Notes – LD-01 (D) 110.13

FOR THE CURRENT VERSION OF THIS FORM SEE THE VDOT EXTRANET SITE:
<http://www.extranet.vdot.state.va.us/forms/>

LD-439 (2-02-02)
2

DRAINAGE INFORMATION SHEET

Page 1 of

PPMS #
Route #
County

Date

Scheduled Advertisement Date _____

Contract Administrator _____

Project #
Limits:
From:
To:

Type of Facility
Type of Financing _____
Project Length
State Forces or Contract _____

Description of work _____

Geometrics:

	Existing	Proposed		Existing	Proposed
No. of Lanes	_____	_____	Lane width	_____	_____
Cut Shoulder Width	_____	_____	Fill Shoulder Width	_____	_____
Ditch Width	_____	_____	R/W Width	_____	_____
Fill Slopes	_____	_____	Cut Slopes	_____	_____
Surface Treatment	_____	_____			

Are there existing Bridges or Live Streams? _____

Are there sections to be realigned? _____

Are there areas where the grade will be changed? _____

Utilities within project limits _____

Overall condition of existing Drainage Structures _____

Existing Erosion or Siltation Problems _____

History of flooding problems _____

Are Temporary detours required within project limits during Construction? _____

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DRAINAGE INFORMATION SHEET

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(Please provide the following information for Drainage structures with
 36" or larger openings – Existing or Proposed.)

Location/Station:	Drainage Information	
	Existing	Proposed
Size/Diameter		
Type		
Length		
Cover Height		
Skew		
Live Stream? (Yes/No)	Yes	
Flooding Problems? (Yes/No)	Yes	
Existing dwellings or buildings in the immediate vicinity? (Yes/No)	Yes	

Location/Station:	Drainage Information	
	Existing	Proposed
Size/Diameter		
Type		
Length		
Cover Height		
Skew		
Live Stream? (Yes/No)	Yes	
Flooding Problems? (Yes/No)	Yes	
Existing dwellings or buildings in the immediate vicinity? (Yes/No)	Yes	

Location/Station:	Drainage Information	
	Existing	Proposed
Size/Diameter		
Type		
Length		
Cover Height		
Skew		
Live Stream? (Yes/No)	Yes	
Flooding Problems? (Yes/No)	Yes	
Existing dwellings or buildings in the immediate vicinity? (Yes/No)	Yes	

Location/Station:	Drainage Information	
	Existing	Proposed
Size/Diameter		
Type		
Length		
Cover Height		
Skew		
Live Stream? (Yes/No)	Yes	
Flooding Problems? (Yes/No)	Yes	
Existing dwellings or buildings in the immediate vicinity? (Yes/No)	Yes	

Additional Sheets may be added if necessary.