

EROSION & SEDIMENTATION CONTROL (E&S) NARRATIVE

FOR

KEYSTONE TRADE CENTER – AREA 3 DEVELOPMENT

Falls Township
Bucks County, Pennsylvania
G&A File No. 2020-07083-55

January 17, 2025
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Last Revised June 20, 2025

Prepared For:

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The Erosion and Sediment Control (E&S) Plans and Calculations, and the Post Construction Stormwater Management (PCSM) Plans and Calculations have been provided, planned, designed, and implemented to be consistent with one another. Please refer to the Post Construction Stormwater Management Plans and Calculations for the project, dated June 20, 2025.



GILMORE & ASSOCIATES, INC.
ENGINEERING & CONSULTING SERVICES

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EXECUTIVE SUMMARY

Keystone Trade Center - Area 3 Development is a redevelopment project in Falls Township, Bucks County, Pennsylvania located in the MPM – Materials Processing and Manufacturing Zoning District within the Keystone Industrial Port Complex (KIPC). The project is located on tax map parcel TMP 13-051-001 which has a gross project area of 858.88 acres. The limit of disturbance for *Area 3 Development* of the project shall be 232.55 acres. The proposed project for *Area 3 Development* involves the construction of one (1) 32,552 SF building (Ancillary Building 1), one (1) 33,576 SF building (Ancillary Building 2), one (1) 1,499 SF building (Ancillary Building 3), three (3) 217,454 SF warehouse buildings (Buildings C-E) and seven (7) 112,254 SF warehouse buildings (Buildings A, B, & F-J).

The Keystone Industrial Port Complex is located on the west bank of the Delaware River and encompasses about 2,800 acres. Industrial operations began in 1952 involving integrated steel making and finishing. Prior to 1952, the area was used for agricultural purposes. Industrial activities expanded through the early 1970's. Most steel making activities were shut down by 1991. Today the complex supports several independent industrial operations.

A soil management Plan entitled “Material Management Plan for Keystone Trade Center”, prepared by *Langan Engineering & Environmental Services, Inc.*, for *NP Falls Township Industrial, LLC*, dated 2/24/21, revised 11/22/22, was developed as a facility-wide approach for identifying, assessing, handling, properly staging and managing materials toward compliance with relevant and applicable federal, state and local requirements and recommended best practices for materials that are likely to be encountered during planned demolition and construction. This material management plan is incorporated into the Erosion & Sediment Control Plan, Post-Construction Stormwater Management Plan, and the Construction Documents for this project.

The management plan also contains the results of the environmental due diligence performed on the site including locations of testing, regulated substances encountered and their corresponding concentrations. Within the designated project boundary, soil exceedances of direct contact MSCs were discovered for two substances: vanadium and iron. No soil-to-groundwater MSCs were exceeded for a non-residential, non-use aquifer. The management plan includes a Site-specific Human Health Risk Assessment which concludes that there are no unacceptable cancer risks present. Mitigation of non-cancer risks from exposure to concentrations of constituents of potential concern during construction activities include the requirement of OSHA Level D personal protective equipment, dust control measures, implementing good hygiene practices, and the preparation of Site-specific Health and Safety Plans that comply with OSHA and other relevant and applicable rules, regulations and requirements for construction worker protection and safe work practices, for any contractor involved with material handling at the project site. In addition, and in accordance with the management plan, an environmental professional shall be required on-site during any earthwork activities within 100' of sample locations which demonstrated a risk assessment exceedance for thallium (as shown on the Plan), to ensure implementation of the soil handling procedures described in the management plan. These measures have been included in the PCSM Plan.

I. PROJECT DESCRIPTION

Introduction

Keystone Trade Center - Area 3 Development is a redevelopment project in Falls Township, Bucks County, Pennsylvania located in the MPM – Materials Processing and Manufacturing Zoning District within the Keystone Industrial Port Complex (KIPC). The project is located on tax map parcel TMP 13-051-001 which has a gross project area of 858.88 acres. The limit of disturbance for *Area 3 Development* of the project shall be 232.55 acres. The proposed project for *Area 3 Development* involves the construction of one (1) 32,552 SF building (Ancillary Building 1), one (1) 33,576 SF building (Ancillary Building 2), one (1) 1,499 SF building (Ancillary Building 3), three (3) 217,454 SF warehouse buildings (Buildings C-E) and seven (7) 112,254 SF warehouse buildings (Buildings A, B, & F-J).

S. Port Road shall be extended from Ben Fairless Drive to the existing S. Port Road on the west of the site. The site will have driveway access points on Ben Fairless Drive, Sorrells Boulevard, and S. Port Road. The project area will be bound by Sorrells Boulevard to the east, Ben Fairless Drive to the north, Sinter Road to the south, and S. Port Road to the west. See *Figure 1 - Location Map* and *Figure 2 – U.S.G.S. Quad Map (Trenton East, NJ/PA)*.

Existing land use for the subject parcel over the past 50 years is industrial. Present land use for the last 5 years is industrial. The proposed land use of this redevelopment project will be industrial.

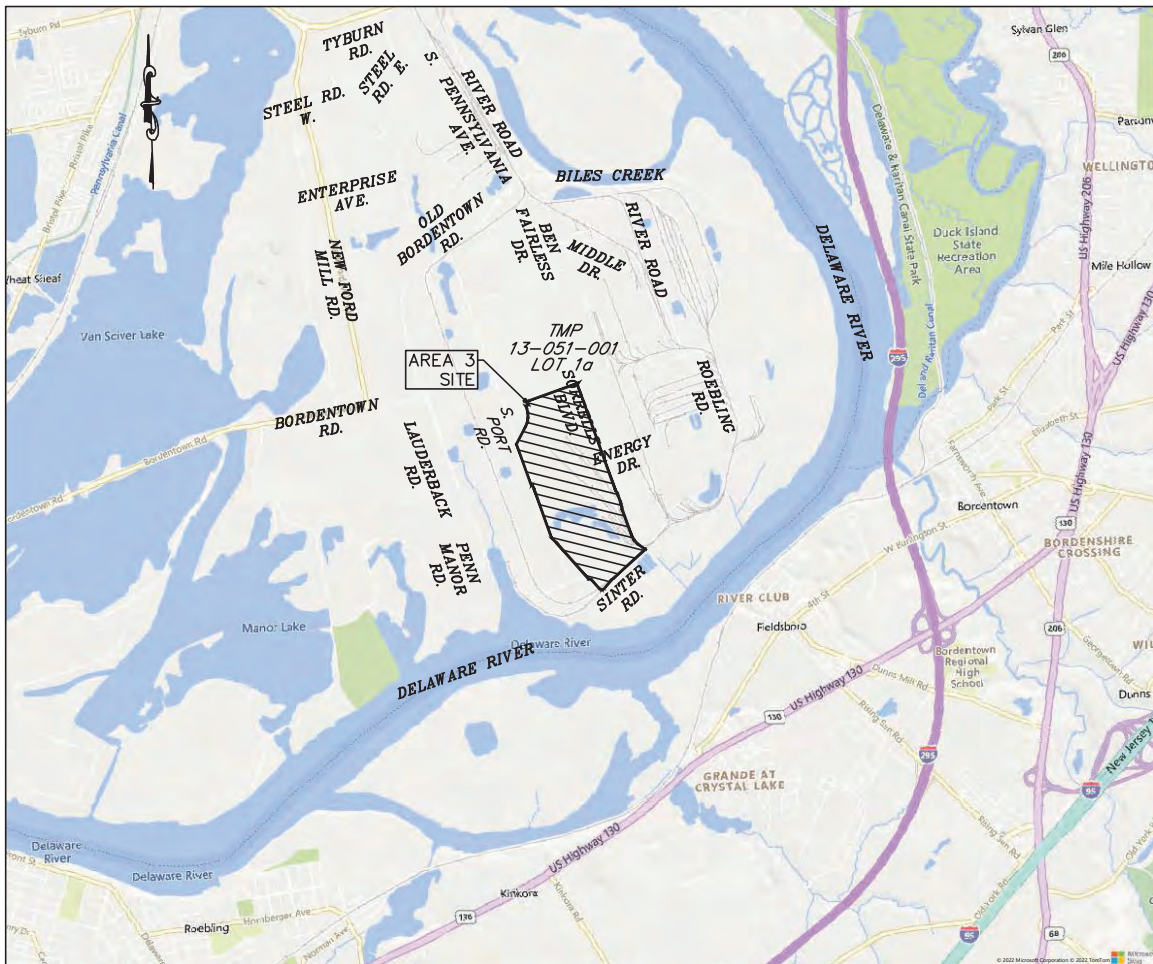
The Keystone Industrial Port Complex is located on the west bank of the Delaware River and encompasses approximately 2,800 acres. Industrial operations began in 1952 involving integrated steel making and finishing. Prior to 1952, the area was used for agricultural purposes. Industrial activities expanded through the early 1970's. Today the complex supports several independent industrial operations.

NPDES Permitting Information

Keystone Trade Center - Area 3 is being permitted in two stages: Area 3 Demo/Fill Part A.1 (NPDES Permit No. PAD090088) and Area 3 Development Part A.2. (NPDES Permit No. PAD090088 A-1):

- Part A.1 has a limit of disturbance/project site boundary of 201.53 acres and involves the demolition of existing site features and underground utilities, and importation of regulated fill soil material within this disturbance area. Due to the decrease of impervious area for this stage, PCSM BMPs and analysis area deferred to Part A.2. Disturbance of the existing Borrow Pit/RCRA SWMU area #3 (BP-3) is excluded from Part A.1 of the permit. **All demolition activities, fill importation, stabilization of the site, and removal of E&S BMPs shall occur in Part A.1 prior to commencement of activities in Part A.2.**
- Part A.2 is a Major Amendment to the NPDES permit of Part A.1 and has a project site boundary of 244.54 acres. Site improvements are illustrated in the section below. Disturbance/Filling of the existing Borrow Pit/RCRA SWMU area #3 (BP-3) is included in Part A.2 of the permit. An increase of 43.01 acres of disturbance is proposed for Part A.2 as compared to Part A.1. PCSM BMPs and analysis are included for this stage, as illustrated on the PCSM Plans and in this report.

FIGURE NO. 1



LOCATION MAP

NORTHPOINT AREA 3

FALLS TOWNSHIP, BUCKS COUNTY, PENNSYLVANIA

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JOB NO.:

2020-0708333

DATE:

12-09-2022

SCALE:

1"=5,000'



TRENTON EAST, NJ, PA
2019



TRENTON WEST, N.J. PA
2019

Custom Soil Resource Report Soil Map



- The Minor Amendment to Area 3 Development Part A.2 involves a limit of disturbance (+1.55 ac) and project site boundary (+2.16 ac) increase encompassing the construction of a railroad track and coal unloader facilities on the west side of S. Port Road. The proposed stormwater management approach remains the same, with additional disturbance being captured and conveyed to Wet Pond #15G, which drains to DP 001.
- Part A.3 is a Major Amendment to the NPDES permit of Part A.1 and has a project site boundary of 247.08 acres. Site improvements are illustrated in the section below. Disturbance/Filling of the existing Borrow Pit/RCRA SWMU area #3 (BP-3) is included in Part A.2 of the permit. An increase of 0.38 acres of disturbance is proposed for Part A.3 as compared to Part A.2. PCSM BMPs and analysis are included for this stage, as illustrated on the PCSM Plans and in this report.

Existing Topographical Features and Land Cover

The boundary and existing features depicted on the plans have been prepared based on: (1) plan entitled “Galvanized Minor Subdivision Plan” by *R.L. Showalter & Associates, Inc.* dated 08/17/2020, last revised 09/18/2020, and (2) plan entitled “ALTA/NSPS Land Title Survey Parcel Plan – Keystone Industrial Port Complex,” prepared for *NorthPoint Development, LLC*, dated 10/09/2020. The development area is flat for most of the site, with slopes ranging from nearly flat (0.0%) to 2.0%. There are areas of steep slopes associated with existing material stockpiles, stormwater swales, and borrow pits on-site.

The existing site contains two (2) points of interest. Drainage Point #1 (DP 001) consists of area on-site that generally drains from north-to-south toward an existing conveyance system (Canal No. 2). Canal No. 2 directly discharges into the Delaware River at the far southern portion of the KIPC site. Drainage Point #2 (DP 002) is located at the southwestern edge of the disturbance and contains impervious and existing lawn areas. The overall studied drainage area for *Area 3 Development* consists of buildings, asphalt access driveways and parking lots, concrete walkways, railway lines, and staging/operating areas for the current businesses located on the site. Large pervious meadow areas are located throughout the site, with woodland area contained to the southern corner of the development surrounding the existing borrow pits.

Soils

Soils information for the project area was obtained from the USDA NRCS Soil Survey of Bucks County, Pennsylvania, and is presented in *Figure 3*. The majority of the soil area within the development area is classified as Urban Land (UfuB), with the remaining areas consisting of Udorthents, Gravelly (Ua) and Water (W). No soil limitations are listed for these soil types. The geologic formation for the project area is Qt – Trenton Gravel (Gravelly Sand).

Improvements

The *Area 3 Development* proposed site improvements include: one (1) 32,552 SF building, one (1) 33,576 SF building, one (1) 1,499 SF building, three (3) 217,454 SF warehouse buildings and seven (7) 112,254 SF warehouse buildings for data centers. S. Port Road shall be extended from Ben Fairless Drive to the existing S. Port Road on the west of the site. The site will have driveway access points on Ben Fairless Drive, Sorrells Boulevard, and S. Port Road. One (1) proposed driveway will be installed for access to the site along Ben Fairless Drive, one (1) along Sorrells Boulevard, and one (1) along the re-aligned S. Port Road. Other improvements include: proposed asphalt parking areas, warehouse loading docks areas, concrete walkways, underground utilities, landscaping, lighting, and stormwater management facilities.

The Major Amendment to Area 3 Development Part A.3 involves a limit of disturbance (+0.38 ac) and project site boundary (+0.38 ac) increase encompassing the construction of a railroad track and coal unloader facilities on the west side of S. Port Road. The proposed stormwater management approach remains the same, with additional disturbance being captured and conveyed to Wet Pond #15G, which drains to DP 001.

E&S Planning and Design

The following measures are taken to minimize the extent and duration of earth disturbance:

- Access the site thru designated construction entrance(s).
- Sequence construction activities by limiting disturbances to a specific task such that each task is completed before the next task is initiated.

The following measures are taken to maximize protection of existing drainage features and vegetation:

- Access the site thru designated construction entrance(s) and earthwork only allowed within the limits of disturbances.

The following measures are taken to minimize soil compaction:

- Access the site thru designated construction entrance(s).
- Earthwork only allowed within the limits of disturbance.
- Use of treaded machinery where practical during earthmoving operations

The following measures are taken to prevent or minimize generation of increased storm water runoff:

- Provide planted bio-retention basins
- Provide soil amendment restoration BMP

Erosion & Sediment Control BMP Measures

There are several temporary and permanent measures that will be taken to prevent accelerated erosion and sedimentation due to construction activities. These measures have been designed in accordance with PADEP, Chapter 102: *Erosion and Sediment Pollution Control Program Manual* and include:

Waste Management - procedures and facilities to ensure that building materials and other construction site wastes are properly managed and disposed of to reduce potential for

pollution to surface and groundwaters as per 25 PA Code §102.4(b)(5)(vi)

Dewatering Work Areas - controlled methods for the removal of sediment from water removed from the work area prior to its release to receiving waters.

Pumped Water Filter Bag - a geotextile fabric device used to filter water pumped during dewatering operations from disturbed area to well-vegetated (grassy), stable, erosion-resistant areas.

Concrete Washout - facility designed to store wash water from concrete delivery vehicles to allow removal without permitting wash water to be released to receiving waters.

Dust Control (Irrigation) - practices that help reduce surface air movement of dust from disturbed soil surfaces.

Rock Construction Entrance - a stone pad that shall be placed at the entrances of the proposed site where large vehicles enter or exit for construction activities. RCE must be at least 50 feet in length and the width of the proposed entrance.

Compost Filter Sock - a filter fabric fence used to control runoff from small disturbed areas when it is in the form of sheet flow.

Rock Filter Outlet - a stone sediment barrier used to address problems due unanticipated concentrated runoff to other types of sediment barriers.

Inlet Protection - silt sack device inserted into type 'm' and type 'c' inlets during construction activities to prevent sediment runoff downstream.

Erosion Control Blankets - erosion prevention fabric or approved equal that protects drainage swales, berms, and basin embankments from accelerated erosion during construction activities.

Rip-Rap Apron Outlet Protection - permanent erosion prevention feature containing energy-dissipating rock sized according to the proposed stormwater flow rate.

Maintenance

Erosion control measures in this plan shall be maintained in accordance with the Maintenance Program for E&S Control Facilities. Inspections shall occur weekly, or more frequently if stated in the Maintenance Program, and after each measurable runoff event of 0.25 inches over 24 hours. Inspections, repairs and bookkeeping shall be in accordance with the Monitoring, Inspection and Reporting Requirements.

Maintenance Program for E&S Control Facilities

1. Waste Management:

- Building materials and other construction site wastes must be properly managed and disposed of in accordance with the recycling or disposal of materials guidelines. under no circumstances shall erosion and sediment control BMPs be used for temporary storage of demolition materials or construction wastes.
- Wherever heavy equipment will be used during construction of the cuts and fills or proposed buildings, a Pollution Prevention Contingency (PPC) plan shall be available on site. the permittee shall be responsible for preparing and implementing a PPC plan when storing, using or transporting materials including: fuels, chemicals, solvents, pesticides, fertilizers, lime, petrochemicals, waste water, wash water, core drilling waste water, cement, sanitary wastes, solid wastes, or hazardous materials onto, on, or from the project site during earth disturbance activities. the PPC shall be available upon request by the department or conservation district.
- All applicable federal, state and local laws and regulations shall be followed in the use, handling and disposal of potentially hazardous materials.

2. Dewatering Work Areas:

- Whenever site conditions require dewatering, pumped water shall be treated for sediment removal prior to discharging to a surface water. water pumped from disturbed areas shall not be directed to the basin or any erosion and sediment control bmp not specifically designed for this purpose.

3. Pumped Water Filter Bag:

- Filter bags may be used to filter sediment from dewatering operations as needed.
- The maximum pumping rate for any bag in use or proposed for use shall be available at the site at all times during pumping operations.
- Pumping rate shall be no greater than 750 gpm or 1/2 the maximum specified by the manufacturer, whichever is less.
- Pump discharge hose shall be inserted in the manner specified by the manufacturer and securely clamped.
- A suitable means of accessing the bag with machinery required for disposal purposes shall be provided.
- Bags shall be placed on straps to facilitate removal unless bags come with lifting straps already attached.
- Pump intakes shall be floating and screened.
- Spare bags shall be kept available for replacement of those that have failed or are filled.
- Bags shall be located in well-vegetated (grassy) areas, and discharge onto stable, erosion resistant areas. where this is not possible, a geotextile underlayment and flow path shall be provided.
- Bags shall not be placed on slopes greater than 5%. for slopes exceeding 5%, clean rock or other non-erodible, non-polluting material shall be placed under the bag to reduce the slope steepness.
- Bags may be placed on filter stone to increase discharge capacity.
- Compost filter sock shall be installed downstream of bags if located within 50 feet of receiving surface water or where grassy area is not available.
- Filter bags shall be inspected daily. if any problem is detected, pumping shall cease immediately and not resume until the problem is corrected.

4. Concrete Washout:

- A suitable washout facility shall be provided for the cleaning of chutes, mixers and hoppers of concrete delivery vehicles. under no circumstances shall wash water from these vehicles be allowed to enter any surface waters
- Temporary signage shall be provided to direct drivers to the locations of these facilities.
- Concrete washout facilities shall not be placed within 50 feet of storm drains, open ditches or surface waters. wherever possible, they shall be located on slopes not exceeding a 2% grade.
- Concrete washout facilities shall be inspected daily. Damaged or leaking washouts shall be deactivated and repaired replaced immediately.
- accumulated materials shall be removed when they reach 75% capacity or sooner if recommended by the manufacturer.
- plastic liners shall be replaced with each cleaning of the facility.

5. Dust Control (Irrigation):

- The contractor shall have available water trucks to control excessive dust and airborne debris.
- Water shall normally be applied a minimum 3 times per day unless weather conditions warrant more or less applications.

6. Rock Construction Entrance:
 - Inspect weekly and after each runoff event
 - Maintain thickness to the specified dimensions by adding rock as needed. A stockpile of rock shall be maintained on site for this purpose.
 - All sediment deposited on paved roadways shall be removed and returned to the construction site immediately.
 - If extensive amounts of sediment are being deposited on roadway, extend length of rock construction entrance by 50 feet increments until condition is alleviated or install wash rack. Sediment deposits shall not be washed or swept into roadway ditches, sewers, culverts or other drainage courses.
7. Compost Filter Sock:
 - Compost filter socks shall be inspected and maintained on a weekly basis and after each runoff event.
 - Accumulated sediment shall be removed when it reaches half the above ground height of the sock.
 - Damaged socks shall be repaired according to manufacturer's specifications or replaced within 24 hours of inspection.
 - Compost filter socks shall be replaced after 1 year of operation.
8. Rock Filter Outlet:
 - Rock filter outlets shall only be utilized if a perimeter control fails due to unexpected concentrated flow.
 - A stockpile of stone shall be maintained on site for installing or repairing rock filter outlets as needed.
 - Inspect weekly and after each runoff event.
 - Accumulated sediment shall be removed when it reaches 1/3 height of outlet.
9. Inlet Protection:
 - Inlet filter bags shall be inspected on a weekly basis and after each runoff event.
 - Needed repairs shall be initiated immediately after inspection.
 - Filter bags shall be cleaned and/or replaced when the bag is half full or when flow capacity has been reduced so as to cause flooding or bypassing of the inlet.
 - A supply of filter bags shall be maintained on site for replacements.
10. Erosion Control Blankets:
 - Blanketed areas shall be inspected weekly and after each runoff event until perennial vegetation is established to a minimum uniform 70% coverage throughout the blanketed area.
 - Damaged or displaced blankets shall be restored or replaced within 4 calendar days.
11. Rip Rap Aprons:
 - Aprons shall be inspected weekly and after each runoff event.
 - Displaced rip rap within the apron shall be replaced immediately.

12. Until the site is stabilized, all erosion and sediment control devices must be maintained properly. Maintenance must include inspections of all erosion and sediment controls after each runoff event and on a weekly basis. All preventative and remedial maintenance work, including clean out, repair, replacement, regrading, reseeding, remulching, and renetting must be performed immediately. If E&S control BMPs fail to perform as expected, replacement BMPs or modifications of installed measures will be required.
13. All areas of concentrated surface drainage shall be seeded and mulched, and protected with temporary turf reinforcement mat: North American Green C350 (or equal). If areas are to be sodded, turf reinforcement is not required.
14. After the storm conveyance system is constructed, monthly inspections for each device shall be made. An inspection of all facilities will be made after every storm to determine their resistance to driving rains and accumulated runoff.
15. Seeded areas that have washed away shall be filled and graded as necessary and then reseeded. A burlap or straw cover will be applied to retain the seed until it has a chance to root properly.
16. The above procedure shall be repeated after each sizable storm until no more signs of erosion are evident. At monthly intervals thereafter, inspections and necessary cleaning shall be completed. Trash that is removed from any of the control devices shall be disposed of at an approved disposal area. Silt that has accumulated shall be removed and allowed to dry and used as fill wherever required on the site.
17. Immediately upon discovering unforeseen circumstances posing the potential for accelerated erosion and/or sediment pollution, the contractor shall implement appropriate measures to address said circumstances and to prevent damage to adjacent properties. Appropriate materials shall be kept on hand to address such emergency conditions. Contractor shall notify local conservation district and/or the regional office of DEP regarding said condition and measures used to address same.
18. Immediately after earth disturbance activity has ceased for a period of 4 days or more, all areas shall be stabilized. During non-germinating periods, mulch shall be applied at specified rates. Disturbed areas that are not at finished grade and which will be redisturbed within one year shall be stabilized with temporary vegetation. Areas which are at finished grade or which will not be redisturbed within one year shall receive permanent stabilization. (see seeding and mulching schedule for details)
19. Sediment removed from E&S BMPs shall be disposed of in landscape areas outside of steep slopes, wetlands, floodplains, or drainage swales, and immediately stabilized, or placed in topsoil stockpiles.
20. Contractor shall maintain and make available to the Bucks County Conservation District complete, written inspection logs of the above noted inspection and maintenance.

Monitoring, Inspection and Reporting Requirements:

Visual Inspections

The Permittee / Co-Permittee(s) must ensure that visual site inspections are conducted weekly, and within 24 hours after each measurable runoff event throughout the duration of construction and until the receipt and acknowledgement of the Notice of Termination by the Department or authorized conservation district. The visual site inspections and reports shall be completed in a format provided by the Department, and conducted by qualified personnel, trained and experienced in erosion and sediment control, to ascertain that E&D BMPs and PCSM BMPs are properly constructed and maintained to effectively minimize pollution to the waters of the Commonwealth. A written report of each inspection shall be kept and include at a minimum:

1. A summary of site conditions, E&S BMP and PCSM BMP implementation and maintenance, and compliance actions; and
2. The date, time, name, and signature of the person conducting the inspection.

Noncompliance Reporting

Where E&S, PCSM or PPC BMPs are found to be inoperative or ineffective during an inspection, or any other time, the Permittee / Co-Permittee(s) shall, within 24 hours, contact the Department or authorized conservation district, by phone or personal contact, followed by the submission of a written report within 5 days of the initial contact. Noncompliance reports shall include the following information:

1. Any condition on the project site which may endanger public health, safety, or the environment, or involve incidents which cause or threaten pollution;
2. The period of noncompliance, including exact dates and times and/or anticipated time when the activity will return to compliance;
3. Steps being taken to reduce, eliminate, and prevent recurrence of the noncompliance; and
4. The date or schedule of dates, and identifying remedies for correcting noncompliance conditions.

Reduction, Loss, or Failure of the BMPs

Upon reduction, loss, or failure of the BMPs, the Permittee / Co-Permittee shall take immediate action to restore the BMPs or provide an alternative method of treatment. Such restored BMPs or alternative treatment shall be at least as effective as the original BMPs.

Termination of Coverage

Note: upon permanent stabilization of earth disturbance activities associated with construction activities that are authorized by this permit and when BMPs identified in the PCSM plan have been properly installed, the Permittee and/or Co-Permittee of the facility must submit a Notice of Termination (N.O.T.) Form that is signed in accordance with Part B, section 1.C, signatory requirements, of the permit. All letters certifying discharge termination are to be sent to the Department or authorized conservation district. The N.O.T. Must contain the following information: facility name, address, and location, operator name and address, permit number, identification and proof of acknowledgment from the person(s) who will be responsible for operation and maintenance of the PCSM BMPs in accordance with the approved PCSM Plan, and the reason for permit termination. Until the Permittee has received written acknowledgement of the N.O.T., the Permittee will remain responsible for operating and maintaining all E&S BMPs and PCSM BMPs on the project site and will be responsible for violations occurring on the project site.

Completion Certificate and Final Plans

Within 30 days after the completion of earth disturbance activities authorized by this permit, including the permanent stabilization of the site and proper installation of PCSM BMPs in accordance with the approved PCSM Plan, or upon submission of the N.O.T. If sooner, the Permittee shall file with the Department or authorized conservation district a statement signed by a licensed professional and by the Permittee certifying that work has been performed in accordance with the terms and conditions of the permit and the approved E&S and PCSM plans.

Erosion and Sediment Control Notes

General Erosion and Sediment Control Notes:

1. General site clearing, grubbing, and topsoil stripping shall not commence in any stage or phase of the project until the E&S measures specified in the sequence for that stage/phase have been installed and are functioning as intended.
2. Local roads are to remain free of sediment and construction vehicles and equipment.
3. Upon completion of an earth disturbance activity or any stage or phase of an activity, the site shall be immediately seeded, mulched, or otherwise protected from accelerated erosion and sedimentation as per seeding and mulching schedule.
4. Compost filter sock may be removed when the site is permanently stabilized. accumulated sediment may be spread at the site in areas not subject to erosion.
5. Before initiating any revisions to the approved erosion and sediment control plan, or revisions to other plans which may affect the effectiveness of the approved E&S control plan, the contractor shall receive approval of the revisions from the Bucks County Conservation District.
6. The contractor is advised to become familiar with the provisions of Appendix 64, 'Erosion Control Rules and Regulations,' Title 25, Part 1, Dept. of Environmental Protection, Subpart C-Protection of Natural Resources, Article III-Water Resources, Chapter 102-Erosion Control and with the "Erosion and Sediment Pollution Control Program Manual" by the Commonwealth of PA., Department of Environmental Protection, March 2012 or latest edition.
7. Technical advice for the implementation of this program may be obtained by contacting the Bucks County Conservation District at (215) 345-7577.
8. The following are additional E&S notes:
 - a. Existing trees and other existing vegetation will be disrupted as little as possible.
 - b. Grade all cut and fill slopes to 3 foot horizontal for every 1 foot vertical or flatter, and apply seeding and mulch. Areas with grades greater than 3:1 shall receive steep slope seed mix and permanent turf reinforcement mat: North American Green #C350 or equal.
 - c. Rip-rap will be applied to all areas where heavy concentrations of drainage are prevalent (greater than 3.5 cfs). This would be at culvert outlets, where water is in transition from an open channel into a culvert, or as specified.
 - d. Significant stands of trees, designated to remain, will be protected with fencing, see detail. install along the drip line of the tree branches.
 - e. Erosion control facilities must discharge into adequate storm sewers, natural waterways, or stable erosion-resistant areas.

- f. Concrete washout area shall be provided for cleaning of chutes, mixers, and hoppers of delivery vehicles. No wash water from these vehicles shall be allowed to enter any surface waters. Washout facilities shall not be located within 50 feet of storm drains, open ditches, infiltration facilities or surface waters.
- g. Any sediment or mud that is tracked onto the public roadway must be cleaned off immediately by brooming and/or shoveling to the satisfaction of the Township at the expense of the developer and/or responsible contractor. Use of a backhoe bucket to scrape roadway surface is prohibited. Where sand and/or sediment is causing slick or hazardous conditions, roadway surface shall be pressure washed to remove the condition. All sediment-laden water must be filtered in a manner satisfactory to the Bucks County Conservation District before entering storm sewers and/or drainage channels.
- h. No sediment or sediment-laden water must be allowed to leave the site/property without first being filtered to the satisfaction of Bucks County Conservation District. Any inlets which do not direct flow to a sediment basin must be protected with stone filter inlet protection.
- i. Absolutely no earthmoving, placement of fill material, or the entry of sediment-laden water must take place in wetlands. all wetlands shall be protected from encroachment with fencing.
- j. Rock filter outlets must be provided immediately where silt/super silt fencing has been undermined or overtopped.
- k. The sediment and erosion control measures shown on this plan have been prepared in accordance with requirements of the Bucks County Conservation District. Gilmore and Associates does not take any responsibility in observing and certifying the construction of these facilities unless requested specifically by the owner and/or contractor. Therefore, Gilmore and Associates does not accept any responsibility for damages as a result of improper construction and/or maintenance of facilities during construction.
- l. Accumulated sediments removed from any and all erosion and sediment control measures shall be disposed of in landscaped areas outside of steep slopes, wetlands, floodplains or drainage swales. Immediately stabilize replaced soils with seed & mulch or deposit in soil stockpiles and stabilize.
- m. The contractor shall remove from the site, recycle or dispose of all building material and wastes in accordance with DEP's solid waste management regulations, and/or any additional local, state or federal regulations. No building materials (used or unused) or waste materials shall be burned, buried, dumped or discharged at the site.

Bucks County Conservation District E&S Standard Notes

1. Stockpile heights must not exceed 35 feet; stockpile slopes must not exceed 2:1.
2. The Operator/Responsible Person (O/RP) on site shall assure that the approved Erosion and Sediment Control Plan is properly and completely implemented.
3. Immediately upon discovering unforeseen circumstances posing the potential for accelerated erosion and/or sediment pollution, the O/RP shall implement appropriate best management practices (BMPs) to eliminate the potential for accelerated erosion and/or sediment pollution.
4. The O/RP shall assure that an Erosion and Sediment Control Plan has been prepared and approved by the Bucks County Conservation District and is being implemented and maintained for all soils and/or rock spoil and borrow areas regardless of their locations.
5. All pumping of sediment-laden water shall be through a sediment control BMP such as a pumped water filter bag discharging over an undisturbed area.
6. A copy of the approved Erosion and Sediment Control Plan must be available on the project site at all times.
7. Erosion and sediment BMPs must be constructed, stabilized and functional before site disturbance begins within the tributary areas of those BMPs.
8. After final site stabilization has been achieved, temporary erosion and sediment BMP controls must be removed. Areas disturbed during the removal of the BMPs must be stabilized immediately.
9. At least seven (7) days before starting any earth disturbance activity, the O/RP shall invite all contractors involved in that activity, the landowner, all appropriate municipal officials, the Erosion and Sediment Control Plan designer and the Bucks County Conservation District to a pre-construction meeting. Also, at least three days before starting any earth disturbance activity, all contractors involved in that activity shall notify the Pennsylvania One-Call System Inc. At 1-800-242- 1776 to determine any underground utilities locations.
10. Immediately after earth disturbance activity ceases, the O/RP shall stabilize any areas disturbed by the activity. During non-germinating periods, mulch must be applied at specified rates. Disturbed areas that are not finished grade and which will be re-disturbed within one year must be stabilized in accordance with temporary vegetative stabilization specifications.
11. Disturbed areas that are at a finished grade or which will not be re-disturbed within one year must be stabilized in accordance with permanent vegetative stabilization specifications.
12. An area shall be considered to have achieved final stabilization when it has a minimum uniform 70% vegetative or other permanent non-vegetative cover with a density sufficient to resist accelerated surface erosion and subsurface characteristics sufficient to resist sliding and other movements.
13. Upon the installation of temporary sediment basin riser(s), a qualified site representative shall conduct an immediate inspection of the riser(s), whereupon the Bucks County Conservation District shall be notified in writing that the riser is sealed (watertight).
14. At stream crossings, a 50-foot buffer shall be maintained. On buffers, clearings, sod disturbances and excavations, equipment traffic should be minimized. Activity such as stacking logs, burning cleared brush, discharged rainwater from trenches, welding pipe sections, refueling and maintaining equipment should be avoided within buffer zones.

15. Until a site is stabilized, all erosion and sediment BMPs must be maintained properly. Maintenance must include inspections of all erosion control BMPs after each runoff event and on a weekly basis. All preventative and remedial maintenance work, including cleanout, repair, replacement, re-grading, re-seeding, re-mulching and re0netting must be performed immediately. If erosion and sediment control BMPs fail to perform as expected, replacement BMPs, or modifications of those installed, will be required.
16. Sediment removed from BMPs shall be disposed of on-site in landscaped areas outside of steep slopes, wetlands, floodplains or drainage swales and immediately stabilized or placed in soil stockpiles and stabilized.
17. All building material and wastes must be removed from the site and recycled in accordance with DEP's Solid Waste Regulations (25 PA Code 260.1 et seq., 271.1 et seq., and 287.1 et seq.) and/or any additional local, state or federal regulations. No building materials (used or unused) or waste materials shall be burned, buried, dumped, or discharged at the site.

Geologic Formations or Soil Conditions

The known geologic formation Qt – Trenton Gravel Formation, has no known potential to cause pollution during earth disturbance activities. If any potential for pollution is identified, immediately connect the Falls Township Engineer and the Bucks County Conservation District to avoid, minimize, or mitigate any pollution.

Clean Fill Requirements

A SITE SPECIFIC MATERIAL MANAGEMENT PLAN HAS BEEN DEVELOPED FOR THE KEYSTONE INDUSTRIAL PORT COMPLEX WHICH INCLUDES THE SUBJECT PARCEL. REFER TO THE REPORT ENTITLED "MATERIAL MANAGEMENT PLAN FOR KEYSTONE TRADE CENTER", PREPARED BY LANGAN ENGINEERING AND ENVIRONMENTAL SERVICES, INC. FOR NP FALLS TOWNSHIP INDUSTRIAL, LLC, DATED FEBRUARY 24, 2021, REVISED JULY 27, 2021. ALL FILL ORIGINATING FROM THE KEYSTONE INDUSTRIAL PORT COMPLEX SHALL MEET THE CRITERIA OF THIS MATERIAL MANAGEMENT PLAN. SHOULD FILL MATERIAL NEED TO BE IMPORTED FROM OUTSIDE THE KEYSTONE INDUSTRIAL PORT COMPLEX, IT SHALL COMPLY WITH THE MARCH 2021 MATERIAL ACCEPTANCE PLAN PREPARED BY T&M ASSOCIATES AND SHALL MEET THE CRITERIA OF CLEAN FILL AS DEFINED BY THE PADEP. (NOTE THAT THE MATERIAL ACCEPTANCE PLAN GOVERNS IMPORT OF FILL MATERIAL, NOT ON-SITE MANAGEMENT.) THE RESPONSIBILITY FOR PERFORMING ENVIRONMENTAL DUE DILIGENCE AND DETERMINATION OF CLEAN FILL WILL REST WITH THE CONTRACTOR.

WITH THE EXCEPTION OF SITES ENROLLED IN DEP'S LAND RECYCLING AND ENVIRONMENTAL REMEDIATION STANDARDS ACT (ACT 2) PROGRAM AND SITES WITH DEP WASTE MANAGEMENT GENERAL PERMIT (WMGR096) APPROVAL TO USE REGULATED FILL, ALL FILL MATERIAL EXCAVATED AND USED ON-SITE, IMPORTED TO THE SITE, AND EXPORTED FROM THE SITE, MUST MEET THE DEFINITION OF CLEAN FILL, AS DEFINED IN DEP'S MANAGEMENT OF FILL POLICY. REGULATED FILL USED ON ACT 2 SITES MUST COMPLY WITH THE STANDARDS ESTABLISHED BY THE ACT 2 PROGRAM. REGULATED FILL USED OUTSIDE OF ACT 2 SITES MUST COMPLY WITH DEP WASTE MANAGEMENT GENERAL PERMIT WMGR096. NOTE THAT THIS EXCEPTION APPLIES TO THE ENTIRE DEVELOPMENT SITE AS ALL AREAS HAVE BEEN APPROVED UNDER THE LAND RECYCLING PROGRAM AND/OR ARE OTHERWISE ENROLLED IN THE PROGRAM.

IF THE RESULTS OF SAMPLING PERFORMED ON GROUNDWATER ENCOUNTERED DURING EARTH DISTURBANCE ACTIVITIES DEMONSTRATE THAT THE GROUNDWATER IS CONTAMINATED BY ONE OR MORE POLLUTANTS AT CONCENTRATIONS EXCEEDING WATER QUALITY CRITERIA CONTAINED IN 25 PA. CODE CHAPTER 93, THAT WERE NOT PREVIOUSLY DISCLOSED TO DEP/CCD, THE PERMITTEE SHALL NOTIFY DEP/CCD BY PHONE WITHIN 24 HOURS OF RECEIVING THE SAMPLING RESULTS. CONTAMINATED GROUNDWATER MAY NOT BE PUMPED OR OTHERWISE DIVERTED TO SURFACE WATERS UNLESS SPECIFICALLY AUTHORIZED BY THE DEP CLEAN WATER PROGRAM.

CLEAN FILL IS DEFINED AS: UNCONTAMINATED, NON-WATER SOLUBLE, NON-DECOMPOSABLE, INERT, SOLID MATERIAL. THE TERM INCLUDES SOIL, ROCK, STONE, DREDGED MATERIAL, USED ASPHALT, AND BRICK, BLOCK OR CONCRETE FROM CONSTRUCTION AND DEMOLITION ACTIVITIES THAT IS SEPARATE FROM OTHER WASTE AND IS RECOGNIZABLE AS SUCH. THE TERM DOES NOT INCLUDE MATERIALS PLACED IN OR ON THE WATERS OF THE COMMONWEALTH UNLESS OTHERWISE AUTHORIZED. (THE TERM "USED ASPHALT" DOES NOT INCLUDE MILLED ASPHALT OR ASPHALT THAT HAS BEEN PROCESSED FOR RE-USE).

CLEAN FILL AFFECTED BY A SPILL OR RELEASE OF A REGULATED SUBSTANCE: FILL MATERIALS AFFECTED BY A SPILL OR RELEASE OF A REGULATED SUBSTANCE STILL QUALIFIES AS CLEAN FILL PROVIDED THE TESTING REVEALS THAT THE FILL MATERIAL CONTAINS CONCENTRATIONS OF REGULATED SUBSTANCES THAT ARE BELOW THE RESIDENTIAL LIMITS AS NOTED IN TABLES FP-1A AND FP-1B FOUND IN THE PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL PROTECTION'S POLICY "MANAGEMENT OF FILL."

ANY PERSON PLACING CLEAN FILL THAT HAS BEEN AFFECTED BY A SPILL OR RELEASE OF A REGULATED SUBSTANCE MUST USE FORM FP-001 TO CERTIFY THE ORIGIN OF THE FILL MATERIAL AND THE RESULTS OF THE ANALYTICAL TESTING TO QUALIFY THE MATERIAL AS CLEAN FILL. FORM FP-001 MUST BE RETAINED BY THE OWNER OF THE PROPERTY RECEIVING THE FILL.

THE PERMITTEE SHALL CONDUCT ENVIRONMENTAL DUE DILIGENCE TO VERIFY THAT FILL EXCAVATED ON-SITE THAT IS USED TO ESTABLISH FINAL GRADE, FILL IMPORTED TO THE PROJECT SITE, AND FILL EXPORTED FROM THE PROJECT SITE IS CONSIDERED CLEAN FILL IF DUE DILIGENCE RESULTS IN EVIDENCE OF A RELEASE, AS DEFINED IN DEP'S MANAGEMENT OF FILL POLICY (285-2182-773), THAT HAS AFFECTED THE FILL MATERIAL. THE PERMITTEE SHALL TEST THE MATERIAL TO DETERMINE WHETHER THE MATERIAL QUALIFIES AS CLEAN FILL, AND FORM FP-001 (CERTIFICATION OF CLEAN FILL) MUST BE COMPLETED, RETAINED BY THE PERMITTEE OR THE PROPERTY OWNER ON-SITE, AND BE MADE AVAILABLE TO DEP UPON REQUEST.

ENVIRONMENTAL DUE DILIGENCE: THE LANDOWNER/APPLICANT MUST PERFORM ENVIRONMENTAL DUE DILIGENCE TO DETERMINE IF THE FILL MATERIALS ASSOCIATED WITH THE PROJECT QUALIFY AS CLEAN FILL. ENVIRONMENTAL DUE DILIGENCE IS DEFINED AS INVESTIGATIVE TECHNIQUES, INCLUDING, BUT NOT LIMITED TO, VISUAL PROPERTY INSPECTIONS, ELECTRONIC DATA BASE SEARCHES, REVIEW OF PROPERTY OWNERSHIP, REVIEW OF PROPERTY USE HISTORY, SANBORN MAPS, ENVIRONMENTAL QUESTIONNAIRES, TRANSACTION SCREENS, ANALYTICAL TESTING, ENVIRONMENTAL ASSESSMENTS OR AUDITS. ANALYTICAL TESTING IS NOT A REQUIRED PART OF DUE DILIGENCE UNLESS VISUAL INSPECTION AND/OR REVIEW OF THE PAST LAND USE OF THE PROPERTY INDICATES THAT THE FILL MAY HAVE BEEN SUBJECTED TO A SPILL OR RELEASE OF REGULATED SUBSTANCE. IF THE FILL MAY HAVE BEEN AFFECTED BY A SPILL OR RELEASE OF A REGULATED SUBSTANCE, IT MUST BE TESTED TO DETERMINE IF IT QUALIFIES AS CLEAN FILL. TESTING SHOULD BE PERFORMED IN ACCORDANCE WITH APPENDIX A OF THE PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL PROTECTION'S POLICY "MANAGEMENT OF FILL."

IN THE EVENT THAT FILL EXCAVATED ON-SITE THAT IS USED TO ESTABLISH FINAL GRADE, FILL IMPORTED TO THE PROJECT SITE, OR FILL EXPORTED FROM THE PROJECT SITE IS FOUND TO BE REGULATED FILL DURING THE TERM OF PERMIT COVERAGE, WHERE THE UTILIZATION OF THE REGULATED FILL WILL REQUIRE A PERMIT FROM DEP'S WASTE MANAGEMENT PROGRAM, EARTH DISTURBANCE ACTIVITIES SHALL CEASE UNTIL SUCH TIME THAT THE PERMITTEE OBTAINS ALL NECESSARY PERMITS OR APPROVALS FROM DEP, INCLUDING NEW NPDES PERMIT COVERAGE.

IF THE PERMITTEE ENCOUNTERS GROUNDWATER DURING EXCAVATION THAT THE PERMITTEE KNOWS OR HAS REASON TO BELIEVE IS CONTAMINATED BY ONE OR MORE POLLUTANTS AT CONCENTRATIONS EXCEEDING WATER QUALITY CRITERIA CONTAINED IN 25 PA. CODE CHAPTER 93, THE PERMITTEE SHALL NOTIFY DEP IN ACCORDANCE WITH PART A BLD OF THIS PERMIT. CONTAMINATED GROUNDWATER MAY NOT BE PUMPED OR OTHERWISE DIVERTED TO SURFACE WATERS UNLESS SPECIFICALLY AUTHORIZED BY DEP.

FILL MATERIAL THAT DOES NOT QUALIFY AS CLEAN FILL IS REGULATED FILL. REGULATED FILL IS WASTE AND MUST BE MANAGED IN ACCORDANCE WITH THE PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL PROTECTION'S MUNICIPAL OR RESIDUAL WASTE REGULATIONS BASED ON 25 PA. CODE CHAPTER 287 RESIDUAL WASTE MANAGEMENT OR CHAPTER 271 MUNICIPAL WASTE MANAGEMENT, WHICHEVER IS APPLICABLE. THESE REGULATIONS ARE AVAILABLE ON-LINE AT WWW.PACODE.COM.

Recycling or Disposal of Materials

1. The operator shall remove from the site, recycle, or dispose of all building materials and waste in accordance with the Department's Solid Waste Management regulations at 25 Pa. Code 260.1 et seq., 271.1 et seq., and 287.1 et seq. The contractor shall not illegally bury, dump, or discharge any building material or wastes at the site.
2. Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain on the property, demolished or excavated materials shall be removed from the site. Materials slated for removal from the site shall be disposed of in accordance with any and all applicable municipal or other governmental agency current regulations. Debris shall not be permitted to accumulate on the job-site. Dust and dirt shall be held to a minimum during demolition, by wetting down, as required. On site burning of materials will not be permitted. At the completion of work, the entire area involved will be clean and left in a neat condition, free of rubbish. Recycling or disposal of materials associated with or from this project site shall be undertaken in accordance with Pennsylvania Department of Environmental Protection rules and regulations.
3. Sediment removed from control facilities as a part of regular maintenance shall be disposed of upslope of the control facility.

Seeding & Mulching Schedule

1. Site preparation, stabilization and maintenance shall be performed in accordance with Penn State University's "The Agronomy Guide" and PennDOT Form 408 Specifications' most recent addition.

Temporary Seeding Specification Formula E - Annual Rye Grass

Permanent Seeding Specification Formula B -

50% Kentucky Bluegrass mixture

30% Pennlawn Red Fescue

20% Perennial Ryegrass mixture

Steep Slope Seeding Specification Formula W -

70% Tall Fescue

20% Birdsfoot Trefoil mixture

10% Redtop

Seeding rate for the above mixtures:

10 lbs/1,000 sy for Temporary Seeding

21 lbs/1,000 sy for Permanent Seeding

11 lbs/1,000 sy for Steep Slope Seeding (see note 5)

2. Hay or straw mulch shall be applied at the rates of at least 3.0 tons per acre. Straw mulch shall be applied in long strands, not chopped or finely broken. Slopes of 3:1 shall be anchored with mulch control netting.

3. Pulverized agricultural limestone and commercial fertilizer shall be applied to all disturbed areas which are to be seeded except for temporary seed areas are the following rates:
Pulverized agricultural limestone - 90 lbs/1,000 sf
10-20-20 analysis comm. fertilizer - 20 lbs/1,000 sf

Note: Application of lime and fertilizer for temporary seeding is unnecessary and only serves to contribute to an overabundance of nutrient pollution in the watershed.

4. Permanent seeding shall take place from march 15 to June 1 or from August 1 to October 15. If completed at in other seasons, areas shall receive temporary seeding and 3.0 tons per acre mulch.
5. Steep slope areas, considered slopes greater than 3:1, shall be protected from erosion by one of the following methods. Manufacturer's recommendations shall be followed for particular method and specific site conditions.

Flexible Growth Medium: Shall be hydraulically applied combination of seed, mulch, and erosion protection material similar to "Flexterra" by ACF or equal by other manufacturer.

Erosion Control Matting: Shall be temporary matting similar to C350 by North American Green or equal by other manufacturer.

Potential Thermal Impacts

All runoff from impervious areas is directed to the bio-retention basins designed to contain the volume generated by the 1.2-in/2-hr storm and release this volume slowly over several days in a manner that replicates native infiltration and promotes evapotranspiration. Thermal impacts from the impervious surfaces within this site will be mitigated through these processes.

Existing/Proposed Riparian Forest Buffers

There are no areas of High Quality (HQ) or Exceptional Value (EV) watersheds on the property site, nor does any area of the property flow to an HQ or EV watershed. Therefore, riparian buffer, riparian forest buffer, or equivalency demonstration are not required nor applicable as part of this project.

Antidegradation Analysis

There are no areas of High Quality (HQ) or Exceptional Value (EV) watersheds on the property site, nor does any area of the property flow to an HQ or EV watershed. Therefore, antidegradation analysis is not applicable to this project.

E&S and PCSM Plan Consistency

The Erosion and Sediment Control Plan and the Post Construction Stormwater Management Plan have been provided separately; however, they have been planned, designed, and implemented to be consistent with one another. The Post Construction Stormwater Management Plan is provided as part of the PCSM report and the Erosion and Sediment Control Plan has been provided as part of a separate E&S Control report.

II. SEQUENCE OF CONSTRUCTION

SEQUENCE OF CONSTRUCTION: KTC AREA 3 OVERALL

1. ALL WORK PERFORMED UNDER THE AREA 3 DEMO/FILL PART A.1 PORTION OF THE NPDES PERMIT (NPDES PERMIT NO. PAD09088) SHALL BE COMPLETED PRIOR TO COMMENCEMENT OF ACTIVITIES IN THE SEQUENCE FOR AREA 3 DEVELOPMENT PART A.2 (NPDES PERMIT NO. PAD09088 A-1).
2. BORROW PIT/RCRA SWMU #3 (BP-3) IS NOT INCLUDED AS PART OF THE AREA 3 DEMO/FILL PART A.1 DISTURBANCE. SPECIAL CARE SHALL BE TAKEN IN THE AREA OF THE BORROW PIT ON-SITE TO PREVENT DISTURBANCE OR IMPACT OF THIS AREA. THE COMPOST SOCK AND ANY OTHER E&S BMPs IN THE AREA OF BP-3 SHALL BE KEPT IN GOOD CONDITION AND PROPER FUNCTIONALITY AT ALL TIMES. REPLACEMENT BMPs SHALL BE PROVIDED IMMEDIATELY IF FUNCTIONALITY IS COMPROMISED.
3. ONLY WHEN THE ENTIRE UPSTREAM AREA IS FULLY STABILIZED TO THE APPROVAL OF BCCD SHALL THE E&S BMPs SURROUNDING BP-3 BE REMOVED.
4. ALL REMAINING E&S BMPs INSTALLED FOR THE AREA 3 DEMO/FILL PORTION OF THE PROJECT SHALL BE REMOVED UPON COMPLETION OF WORK AND STABILIZATION OF SITE, INCLUDING: LIMIT OF DISTURBANCE STAKING, COMPOST FILTER SOCKS, ROCK CONSTRUCTION ENTRANCES, TOPSOIL/IMPACTED MATERIALS STOCKPILES, TREE PROTECTION FENCING, ETC.
5. ONCE ALL PERMITTED ACTIVITIES AND SITE STABILIZATION OCCURS FOR THE AREA 3 DEMO/FILL PART A.1 PORTION OF THE NPDES PERMIT, THEN CONTRACTOR SHALL PROCEED TO THE AREA 3 LAND DEVELOPMENT PART A.2 AS LISTED ON THIS SHEET.
6. THE KEYSTONE TRADE CENTER (KTC) AREA OF CONSTRUCTION MAY FOLLOW THE INDIVIDUAL LOT SEQUENCES OF CONSTRUCTION (FOR BUILDINGS 7, 8, 9, AND 10), OR MAY FOLLOW A COMBINATION OF THE INDIVIDUAL LOT SEQUENCES, AS DIFFERENT BUILDINGS AND AREAS ARE PREPARED OR READY FOR CONSTRUCTION ACTIVITIES. THE STORMWATER MANAGEMENT FACILITIES AND SYSTEMS HAVE BEEN DESIGNED SO BUILDINGS 7 AND 9 ARE INTERCONNECTED AND SEPARATE FROM THE STORMWATER MANAGEMENT FACILITIES AND SYSTEMS FOR BUILDINGS 8 AND 10. THE STORMWATER MANAGEMENT FACILITIES AND SYSTEMS HAVE BEEN DESIGNED SO BUILDINGS 8 AND 10 ARE INTERCONNECTED AND SEPARATE FROM THE STORMWATER MANAGEMENT FACILITIES AND SYSTEMS FOR BUILDINGS 7 AND 9. THE PROPOSED POTABLE WATER AND PROPOSED SERVICE WATER EXTENSIONS ARE TO BE INSTALLED WITH SOUTH PORT ROAD EXTENSION CONSTRUCTION.
7. ALL EARTH DISTURBANCE ACTIVITIES SHALL PROCEED IN ACCORDANCE WITH THE SPECIFIC BUILDING SEQUENCING. EACH STAGE SHALL BE COMPLETED AND IMMEDIATELY STABILIZED BEFORE ANY FOLLOWING STAGE IS INITIATED, UNLESS NOTED OTHERWISE. CLEARING, GRUBBING, AND TOPSOIL STRIPPING SHALL BE LIMITED ONLY TO THOSE AREAS DESCRIBED IN EACH STAGE. ANY DEVIATION FROM THE FOLLOWING SEQUENCE MUST BE APPROVED IN WRITING FROM BUCKS COUNTY CONSERVATION DISTRICT AND PADEP. NOTE: CESSATION OF CONSTRUCTION ACTIVITIES FOR 4 DAYS OR LONGER REQUIRES TEMPORARY STABILIZATION.
8. AT LEAST 7 DAYS PRIOR TO START OF WORK OR EARTH DISTURBANCE ACTIVITIES, A PRE-CONSTRUCTION MEETING SHALL BE HELD INCLUDING THE OWNER, SITE CONTRACTOR, TOWNSHIP ENGINEER, BUCKS COUNTY CONSERVATION DISTRICT, AND A LICENSED PROFESSIONAL.
9. AT LEAST 3 DAYS PRIOR TO STARTING ANY EARTH DISTURBANCE ACTIVITIES, OR EXPANDING INTO AN AREA PREVIOUSLY UNMARKED, THE PENNSYLVANIA ONE CALL SYSTEM, INC. SHALL BE NOTIFIED AT 1-800-242-1776 FOR THE LOCATION OF EXISTING UNDERGROUND UTILITIES.
10. SITE IS CONTAMINATED AND THE WORK PERFORMED ON CONTAMINATED AREAS WAS AUTHORIZED OR WILL BE AUTHORIZED UNDER THE PADEP ACT 2-LAND RECYCLING PROGRAM. THE SITE CONTAINS REGULATED SOILS. AREA 3 INCLUDE PORTIONS OF ACT 2 LOTS 11, 12, 13, 23, 26, E, & G. ALL LOTS, EXCEPT FOR 23 AND 26, HAVE APPROVED ACT 2 FINAL REPORTS FOR SOIL. FOR SOIL ON LOTS 23 AND 26, REMEDIAL INVESTIGATIONS HAVE BEEN COMPLETED AND DRAFT FINAL REPORTS HAVE BEEN PREPARED. FUTURE EARTH DISTURBANCES WILL BE GUIDED BY THE MATERIAL MANAGEMENT PLAN PREPARED BY LANGAN ENGINEERING, DATED FEBRUARY 24, 2021, REVISED JULY 27, 2021. SOILS WILL BE MANAGED CONSISTENT WITH THAT PLAN IN A MANNER TO ENSURE THAT DUE CARE IS TAKEN TO NOT INADVERTENTLY CHANGE OR ALTER EXPOSURE PATTERNS UPON WHICH ANY ACT 2 REMEDIATION WAS BASED.
11. WORK PERFORMED ON CONTAMINATED AREAS WAS AUTHORIZED OR WILL BE AUTHORIZED UNDER THE PADEP ACT 2 LAND RECYCLING PROGRAM WITH APPROVED FINAL REPORTS DEMONSTRATING ATTAINMENT OF ACT 2 STANDARDS. ANY FUTURE WORK OR DISTURBANCE TO THIS AREA SHOULD BE APPROVED BY THE SAME PROGRAM PRIOR TO COMMENCING.
12. CONTRACTOR TO REFERENCE THE E&S NOTES FOR REGULATED SOILS ON E&S SHEET ##.
13. A MINIMUM OF OSHA LEVEL D PERSONAL PROTECTIVE EQUIPMENT (PPE) SHALL BE REQUIRED FOR ALL WORKERS OR SITE PERSONNEL WITH THE POTENTIAL TO COME IN CONTACT WITH SITE SOILS AND/OR GROUNDWATER.
14. CONTRACTORS INVOLVED WITH MATERIAL HANDLING SHALL PREPARE A SITE-SPECIFIC HEALTH AND SAFETY PLAN, IN ACCORDANCE WITH THE MATERIAL MANAGEMENT PLAN, AND COMPLIES WITH OSHA AND OTHER RELEVANT AND APPLICABLE RULES, REGULATIONS, AND REQUIREMENTS FOR CONSTRUCTION WORKER PROTECTION AND SAFE WORK PRACTICES.
15. IMMEDIATELY UPON DISCOVERING UNFORESEEN CIRCUMSTANCES POSING THE POTENTIAL FOR ACCELERATED EROSION AND/OR SEDIMENT POLLUTION, THE OPERATOR SHALL IMPLEMENT APPROPRIATE BEST MANAGEMENT PRACTICES TO MINIMIZE THE POTENTIAL FOR ACCELERATED EROSION AND SEDIMENT POLLUTION AND NOTIFY THE BUCKS COUNTY CONSERVATION DISTRICT AND/OR THE REGIONAL OFFICE OF THE DEPARTMENT.
16. IMMEDIATELY AFTER EARTH DISTURBANCE ACTIVITIES CEASE IN ANY AREA OR SUBAREA, THE OPERATOR SHALL STABILIZE ALL DISTURBED AREAS. DURING NON-GERMINATING MONTHS, MULCH OR PROTECTIVE BLANKETING SHALL BE APPLIED AS DESCRIBED IN THE PLAN. AREAS NOT AT FINISHED GRADE, WHICH WILL BE REACTIVATED WITHIN 1 YEAR, MAY BE STABILIZED IN ACCORDANCE WITH THE TEMPORARY STABILIZATION SPECIFICATIONS. THOSE AREAS WHICH WILL NOT BE REACTIVATED WITHIN 1 YEAR SHALL BE STABILIZED IN ACCORDANCE WITH THE PERMANENT STABILIZATION SPECIFICATIONS.
17. UNTIL THE SITE IS STABILIZED, ALL EROSION AND SEDIMENTATION CONTROL BMPs MUST BE MAINTAINED PROPERLY. RESPONSIBILITY FOR IMPLEMENTING AND MAINTAINING EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE DESIGNATED FOR EACH BUILDING CONSTRUCTION AREA. MAINTENANCE MUST INCLUDE INSPECTIONS OF ALL EROSION AND SEDIMENT CONTROL BMPs AFTER EACH RUNOFF EVENT AND ON A WEEKLY BASIS, TO ENSURE THAT THEY ARE IN PLACE, STABLE, AND FUNCTIONING PROPERLY. ALL PREVENTATIVE AND REMEDIAL MAINTENANCE WORK, INCLUDING CLEAN OUT, REPAIR, REPLACEMENT, RE-GRADING, RESEEDING, RE-MULCHING, AND RE-NETTING MUST BE PERFORMED IMMEDIATELY, TO RESTORE THE CONTROL MEASURE TO THE ORIGINAL DESIGN. IF EROSION AND SEDIMENT CONTROL BMPs FAIL TO PERFORM AS EXPECTED, REPLACEMENT BPS, OR MODIFICATION OF THOSE INSTALLED WILL BE REQUIRED.
18. ALL PUMPING OF SEDIMENT LADEN WATER SHALL BE THROUGH A SEDIMENT CONTROL BMP, SUCH AS A PUMPED WATER FILTER BAG OR EQUIVALENT SEDIMENT REMOVAL FACILITY, OR UNDISTURBED VEGETATED AREAS.

SEQUENCE OF CONSTRUCTION: KTC AREA 3 PHASE 1

1. INSTALL ROCK CONSTRUCTION ENTRANCES WHERE INDICATED ON PLANS. INSTALL TREE PROTECTION FENCING WHERE INDICATED ON THE PLANS.
2. STAKE OUT LIMIT OF DISTURBANCE AS SHOWN ON THE PLANS. INSTALL COMPOST FILTER SOCK AS SHOWN ON THE PLANS.
3. REFER TO CONSTRUCTION SEQUENCE AS NOTED IN DEMO/FILL PHASE, PERMIT NO. PAD090088.
4. STRIP AND STOCKPILE TOPSOIL WHERE INDICATED ON THE PLANS.
5. ROUGH GRADE PHASE 1 CONSTRUCTION AREA AS DELINEATED ON THE PLANS. EXCAVATE BIO-RETENTION MRC BASINS 12A, 12B, AND 14, WET POND/RETENTION BASINS 12C, 12D, 13A, 13B AND 13C, AND CANAL 2 EXTENSION AREAS 1, 2, AND 3, AND INSTALL TEMPORARY SEDIMENT BASINS WHERE SHOWN ON PLANS. INSTALL OUTLET STRUCTURES, OUTLET PIPES, EMBANKMENTS, SPILLWAYS, AND ALL TEMPORARY SEDIMENT TRAP STRUCTURES. INSTALL ORANGE CONSTRUCTION FENCE AROUND SEDIMENT BASINS WHERE SHOWN ON THE PLANS TO PREVENT COMPACTION DURING CONSTRUCTION ACTIVITIES. IMMEDIATELY STABILIZE SEDIMENT BASINS AND CANAL EXTENSIONS WITH SEED AND MULCH.
6. THE FOLLOWING ITEMS MAY COMMENCE:
 - 6.1. BEGIN INSTALLATION OF PROPOSED BUILDINGS A, B& C, WATER TREATMENT BUILDINGS AND EQUIPMENT, AND ANCILLARY BUILDINGS 1-3 FOUNDATIONS.
 - 6.2. BEGIN INSTALLATION OF STORM SEWER AND STRUCTURES AS NOTED ON THE PHASE 1 E&S PLANS (SHEETS C030.01 – C030.08) IN A DOWNSTREAM-TO-UPSTREAM MANNER. INSTALL INLET PROTECTION ON INLETS AS THEY ARE INSTALLED IN THIS STAGE.
 - 6.3. BEGIN INSTALLATION OF 12" CRUSHED CONCRETE (OR EQUIVALENT) TO SUBGRADE ELEVATION FOR BUILDING PAD ACCESS/STAGING AREAS AS SHOWN ON THE PLANS TO PREVENT ACCELERATED EROSION ON-SITE.
 - 6.4. BEGIN INSTALLATION OF PROPOSED WAREHOUSE BUILDINGS A, B & C, WATER TREATMENT BUILDING, AND ANCILLARY BUILDINGS 1-3 ABOVE FOUNDATION.
 - 6.5. BEGIN INSTALLATION OF PROPOSED NATURAL GAS PAD AND PROPOSED SUBSTATION.
 - 6.6. BEGIN INSTALLATION OF REMAINING SITE UTILITIES, CONNECT WATER, SANITARY, AND ALL OTHER PROPOSED UTILITIES TO BUILDING, AND CONNECT TO EXISTING INFRASTRUCTURE. INSTALL ROOF LEADERS AND CONNECT TO PROPOSED STORMWATER MANAGEMENT FACILITIES.
7. FINAL GRADE THE PAVEMENT AREAS INCLUDING SOUTH PORT ROAD, DRIVEWAYS, LOADING DOCKS, PARKING AREAS, INSTALL CURBS AND SIDEWALKS WHERE SHOWN, AND STONE AND BINDER COURSES.
8. CONTRACTOR SHALL CONTACT THE BUCKS COUNTY CONSERVATION DISTRICT (BCCD) THREE (3) DAYS PRIOR TO FINAL STORMWATER BASIN STABILIZATION FOR THE PURPOSES OF INSPECTION OF SAID STABILIZATION.
9. **CRITICAL STAGE:** INSTALL PROPOSED SOIL AMENDMENTS AND LANDSCAPE RESTORATION (TREES) AS SHOWN ON THE PLANS. CARE SHALL BE TAKEN NOT TO COMPACT THE AREAS WHERE SOILS AMENDMENTS ARE INSTALLED. **A LICENSED PROFESSIONAL OR DESIGNEE SHALL BE PRESENT ON THE PROJECT SITE DURING INSTALLATION OF THESE BMPs.**
10. AS LAWN AREAS ARE BROUGHT TO GRADE, THEY SHALL BE SCARIFIED TO A MINIMUM DEPTH OF 5-12" THEN PROVIDED WITH A MINIMUM 8" OF TOPSOIL AND SEEDED IMMEDIATELY. ALL VEGETATED AREAS SHALL BE STABILIZED WITH VEGETATION AND MULCH AS SOON AS POSSIBLE.
 - a. ALL 3:1 SLOPES OF MORE THAN 6' VERTICAL HEIGHT SHALL BE PROVIDED WITH EROSION CONTROL MATTING IN ACCORDANCE WITH PLANS AND DETAILS 'N.A.G. SLOPE INSTALLATION'.
 - b. ALL SWALES AND AREAS OF CONCENTRATED DISCHARGE SHALL BE PROVIDED WITH EROSION CONTROL MATTING IN ACCORDANCE WITH PLANS AND DETAILS 'N.A.G. SLOPE INSTALLATION'.
16. FINAL GRADE SITE, SPREAD TOPSOIL WHERE APPROPRIATE, AND STABILIZE IMMEDIATELY.
17. **CRITICAL STAGE:** INSTALL WATER QUALITY FILTERS INSERTS IN PROPOSED INLETS AS SHOWN ON PLANS. **A LICENSED PROFESSIONAL OR DESIGNEE SHALL BE PRESENT ON THE PROJECT SITE DURING INSTALLATION OF THESE BMPs.**
18. AFTER THE SITE HAS BEEN STABILIZED WITH THE APPROVAL OF THE CONSERVATION DISTRICT, ALL TEMPORARY E&S CONTROLS SHALL BE REMOVED.
19. ALL ACCUMULATED SEDIMENTS SHALL BE DISPOSED OF IN APPROVED UPLAND AREAS.
20. STABILIZATION SHALL BE CONSIDERED THE PLACEMENT OF BASE COURSE IN PAVED AREAS OR BY 75% OR MORE VEGETATION, UNIFORM COVERAGE, IN LAWN AREAS OR BY OTHER PERMANENT MEANS WITH A DENSITY SUFFICIENT TO RESIST ACCELERATED SURFACE EROSION AND SUBSURFACE CHARACTERISTICS SUFFICIENT TO RESIST SLIDING AND OTHER MOVEMENTS.
21. AFTER COMPLETING ALL PUNCH LIST ITEMS TO THE SATISFACTION OF THE TOWNSHIP ENGINEER, INSTALL WEARING COURSE, STRIPING, ADA CURB RAMPS, AND SIGNAGE.

SEQUENCE OF CONSTRUCTION: KTC AREA 3 PHASE 2

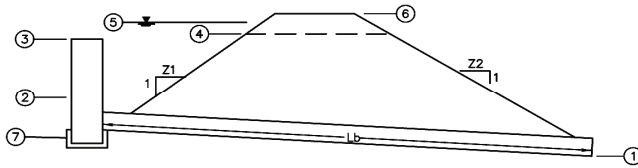
1. INSTALL ROCK CONSTRUCTION ENTRANCES WHERE INDICATED ON PLANS. INSTALL TREE PROTECTION FENCING WHERE INDICATED ON THE PLANS.
2. STRIP AND STOCKPILE TOPSOIL WHERE INDICATED ON THE PLANS.
3. EXCAVATE DRY EXTENDED BASINS 15A AND 15B, WET POND/RETENTION BASINS 15C, AND 15D, AND INSTALL TEMPORARY SEDIMENT BASINS WHERE SHOWN ON PLANS. INSTALL OUTLET STRUCTURES, OUTLET PIPES, EMBANKMENTS, SPILLWAYS, AND ALL TEMPORARY SEDIMENT TRAP STRUCTURES. INSTALL ORANGE CONSTRUCTION FENCE AROUND SEDIMENT BASINS WHERE SHOWN ON THE PLANS TO PREVENT COMPACTION DURING CONSTRUCTION ACTIVITIES. IMMEDIATELY STABILIZE SEDIMENT BASINS AND CANAL EXTENSIONS WITH SEED AND MULCH.
4. THE FOLLOWING ITEMS MAY COMMENCE:
 - 4.1. BEGIN INSTALLATION OF PROPOSED BUILDINGS D TO J FOUNDATIONS.
 - 4.2. BEGIN INSTALLATION OF STORM SEWER AND STRUCTURES AS NOTED ON THE PHASE 2 E&S PLANS (SHEETS C030.01 – C030.08) IN A DOWNSTREAM-TO-UPSTREAM MANNER. INSTALL INLET PROTECTION ON INLETS AS THEY ARE INSTALLED IN THIS STAGE.
 - 4.3. BEGIN INSTALLATION OF 12" CRUSHED CONCRETE (OR EQUIVALENT) TO SUBGRADE ELEVATION FOR BUILDING PAD ACCESS/STAGING AREAS AS SHOWN ON THE PLANS TO PREVENT ACCELERATED EROSION ON-SITE.
 - 4.4. BEGIN INSTALLATION OF PROPOSED BUILDINGS D TO J ABOVE FOUNDATION.
 - 4.5. BEGIN INSTALLATION OF REMAINING SITE UTILITIES, CONNECT WATER, SANITARY, AND ALL OTHER PROPOSED UTILITIES TO BUILDING, AND CONNECT TO EXISTING INFRASTRUCTURE. INSTALL ROOF LEADERS AND CONNECT TO PROPOSED STORMWATER MANAGEMENT FACILITIES.
5. FINAL GRADE THE PAVEMENT AREAS INCLUDING DRIVEWAYS, LOADING DOCKS, PARKING AREAS, INSTALL CURBS AND SIDEWALKS WHERE SHOWN, AND STONE AND BINDER COURSES.
6. **CRITICAL STAGE:** CONVERT SEDIMENT BASINS TO FINAL GRADE SURFACE DRY EXTENDED DETENTION BASINS, BIO-RETENTION BASINS, AND WET POND/RETENTION BASINS. REMOVE SEDIMENT AND EXCAVATE TO FINISHED BOTTOM OF BASIN ELEVATIONS. INSTALL UNDERDRAINS AND AMENDED SOILS AS DESIGNED IN THE MRC BASINS. ADD SOIL MIXTURE PER DETAIL AND SPECIFICATIONS. INSTALL ORANGE CONSTRUCTION FENCE AROUND THE BASINS WHERE SHOWN ON THE PLANS TO PREVENT COMPACTION DURING CONSTRUCTION ACTIVITIES. **A LICENSED PROFESSIONAL OR DESIGNEE SHALL BE PRESENT ON THE PROJECT SITE DURING INSTALLATION OF THESE BMPs.**
7. CONTRACTOR SHALL CONTACT THE BUCKS COUNTY CONSERVATION DISTRICT (BCCD) THREE (3) DAYS PRIOR TO FINAL STORMWATER BASIN STABILIZATION FOR THE PURPOSES OF INSPECTION OF SAID STABILIZATION.
8. **CRITICAL STAGE:** INSTALL PROPOSED LANDSCAPE RESTORATION (TREES) AS SHOWN ON THE PLANS. **A LICENSED PROFESSIONAL OR DESIGNEE SHALL BE PRESENT ON THE PROJECT SITE DURING INSTALLATION OF THESE BMPs.**
9. AS LAWN AREAS ARE BROUGHT TO GRADE, THEY SHALL BE SCARIFIED TO A MINIMUM DEPTH OF 5-12" THEN PROVIDED WITH A MINIMUM 8" OF TOPSOIL AND SEEDED IMMEDIATELY. ALL VEGETATED AREAS SHALL BE STABILIZED WITH VEGETATION AND MULCH AS SOON AS POSSIBLE.
 - a. ALL 3:1 SLOPES OF MORE THAN 6' VERTICAL HEIGHT SHALL BE PROVIDED WITH EROSION CONTROL MATTING IN ACCORDANCE WITH PLANS AND DETAILS "N.A.G. SLOPE INSTALLATION".
 - b. ALL SWALES AND AREAS OF CONCENTRATED DISCHARGE SHALL BE PROVIDED WITH EROSION CONTROL MATTING IN ACCORDANCE WITH PLANS AND DETAILS "N.A.G. SLOPE INSTALLATION".
13. FINAL GRADE SITE, SPREAD TOPSOIL WHERE APPROPRIATE, AND STABILIZE IMMEDIATELY.
14. **CRITICAL STAGE:** INSTALL PROPOSED SOIL AMENDMENTS AND LANDSCAPE RESTORATION (TREES) AS SHOWN ON THE PLANS. CARE SHALL BE TAKEN NOT TO COMPACT THE AREAS WHERE SOILS AMENDMENTS ARE INSTALLED. **A LICENSED PROFESSIONAL OR DESIGNEE SHALL BE PRESENT ON THE PROJECT SITE DURING INSTALLATION OF THESE BMPs.**
15. AFTER THE SITE HAS BEEN STABILIZED WITH THE APPROVAL OF THE CONSERVATION DISTRICT, ALL TEMPORARY E&S CONTROLS SHALL BE REMOVED.
16. ALL ACCUMULATED SEDIMENTS SHALL BE DISPOSED OF IN APPROVED UPLAND AREAS.
17. STABILIZATION SHALL BE CONSIDERED THE PLACEMENT OF BASE COURSE IN PAVED AREAS OR BY 75% OR MORE VEGETATION, UNIFORM COVERAGE, IN LAWN AREAS OR BY OTHER PERMANENT MEANS WITH A DENSITY SUFFICIENT TO RESIST ACCELERATED SURFACE EROSION AND SUBSURFACE CHARACTERISTICS SUFFICIENT TO RESIST SLIDING AND OTHER MOVEMENTS.
18. AFTER COMPLETING ALL PUNCH LIST ITEMS TO THE SATISFACTION OF THE TOWNSHIP ENGINEER, INSTALL WEARING COURSE, STRIPING, ADA CURB RAMPS, AND SIGNAGE.
19. SUBMIT THE NOTICE OF TERMINATION (N.O.T.) ALONG WITH SIGNED RECORD DOCUMENT AS REQUIRED TO CLOSE OUT THE NPDES PERMIT.

Conclusion

Through efficient dust control, maintenance of erosion control BMPs, and adherence to the sequence of construction, it is not anticipated that special erosion control measures will be warranted at this project site. Following all erosion control and prevention procedures, there are no anticipated issues that will occur during the construction phase, transition from construction to permanent stabilization, or during post-construction.

III. EROSION & SEDIMENT CONTROL CALCULATIONS

Sediment Basin Dimensions / Elevations



Basin Number		Basins 12A-12B	Basins 12C-12D	=Requirements!F 8	Basin 14	Basins 15A- 15B	Basins 15C-15D
1	Discharge pipe elevation	10.00	6.00	6.00	10.00	10.00	8.00
2	Top of Sediment Storage Zone (@ Sd)	14.00	9.00	9.00	14.00	14.00	9.00
3	Top of Dewatering Zone / Crest of Principal Spillway (@ St)	15.00	10.51	10.76	15.00	16.08	10.00
4	Emergency Spillway Crest elevation (minimum 0.5' above elevation 3)	16.75	16.25	16.25	16.75	16.75	16.00
5	2 cfs/acre elevation	15.36	10.74	11.27	60.04	93.52	113.54
6	Top of Embankment elevation (minimum 2.0' above elevation 5)	18.00	18.00	18.00	18.00	18.00	18.00
7	Bottom Elevation	13.00	8.00	8.00	13.00	13.00	8.00
Average bottom width (ft)*		1,150	290	170	1,772	2,500	1,010
Average bottom length (ft)*		80	90	70	76	20	200
Embankment top width (ft, 8' minimum)		10	10	10	10	10	10
Riser Diameter / type (15" minimum)		(1) 36" CMP	(1) 48" CMP	(1) 48" CMP	(1) 48" CMP	(1) 36" CMP	(1) 48" CMP
Barrel Diameter / type (12" minimum)		(1) 36" RCP	(1) 48" RCP	(1) 48" RCP	(1) 48" RCP	(1) 36" RCP	(1) 48" RCP
Lb, Barrel length (ft)		83	313	0	0	91	117
Emergency Spillway width (ft)		20	24	0	0	20	24
Emergency Spillway side-slopes		N/A	N/A	N/A	N/A	N/A	N/A

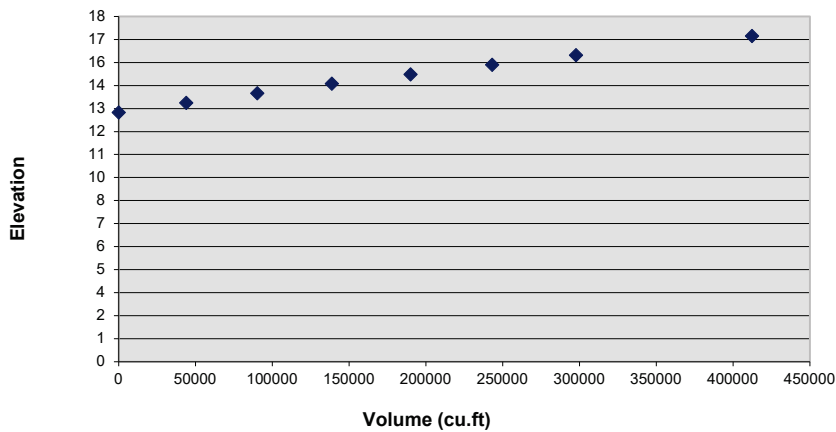
* See design plans for basin configuration.

** permanent outlet structure with skimmer device connected to 5" low-flow orifice.

Sediment Basin 12A-B: Stage-Storage Calculations

Elevation (ft)	Area (sq.ft.)	Avg Area (sq.ft.)	d Elevation (ft)	Storage Volume (cu.ft.)		
				Incremental	Total	(ac-ft)
13.00	86,265				0	0.000
		88,243	0.50	44,122		
13.50	90,236				44,122	1.013
		92,214	0.50	46,107		
14.00	94,207				90,229	2.071
		96,957	0.50	48,478		
14.50	99,733				138,707	3.184
		102,484	0.50	51,242		
15.00	105,259				189,949	4.361
		106,547	0.50	53,274		
15.50	107,841				243,223	5.584
		109,129	0.50	54,564		
16.00	110,422				297,787	6.836
		114,535	1.00	114,535		
17.00	118,697				412,321	9.466
		122,866	1.00	122,866		
18.00	127,083				535,188	12.286

Stage - Storage Curve



Emergency Spillway:

Invert Elevation: 16.75
Length (ft): 20.00
Depth of Flow (ft): 1.250

$$Q = 2.63 * \text{Length} * (\text{depth})^{1.5}$$

Req'd Q100 (cfs): 36.28 = 2*A - OS Discharge
Provided Q (cfs): 73.51
Top of Berm Elevation: 18.00

Sediment Basin 12A-B: Principal Spillway Capacity

Barrel D: 36 Riser D: 36 Barrel L: 83
 Discharge Elev: 10.00

Elevation	Principal Spillway Discharge							
	Weir Flow		Orifice Flow		Pipe Flow		Total	
	Head (ft)	Q (cfs)	Head (ft)	Q (cfs)	Head (ft)	Q (cfs)	Discharge	
14.00	0.00	0.000					0.00	0.00
14.50	0.50	0.445					0.45	0.45
15.00	1.00	1.075	0.000	0.00	5.00	118.74	1.08	1.08
15.50	1.50	1.401	0.500	48.13	5.50	124.53	49.53	49.53
16.00	2.00	1.662	1.000	68.07	6.00	130.07	69.73	69.73
17.00	3.00	2.087	2.000	96.27	7.00	140.49	98.35	98.35
18.00	4.00	2.438	3.000	117.90	8.00	150.19	120.34	120.34

All holes are to be 2.00" diameter, uniformly spaced horizontally and vertically.

Row 1 3 holes Row 3 holes Row 5 holes
 Row 2 3 holes Row 4 holes Row 6 holes

Elevation	Riser Discharge: Orifice Row Elevation						Total Discharge (cfs)
	Row 1 14.00	Row 2 14.50	Row 3	Row 4	Row 5	Row 6	
14.00	0.000						0.000
14.50	0.445	0.000					0.445
15.00	0.630	0.445					1.075
15.50	0.772	0.630					1.401
16.00	0.891	0.772					1.662
17.00	1.091	0.996					2.087
18.00	1.260	1.179					2.438

Sediment Basin 12A-B: Dewatering Time

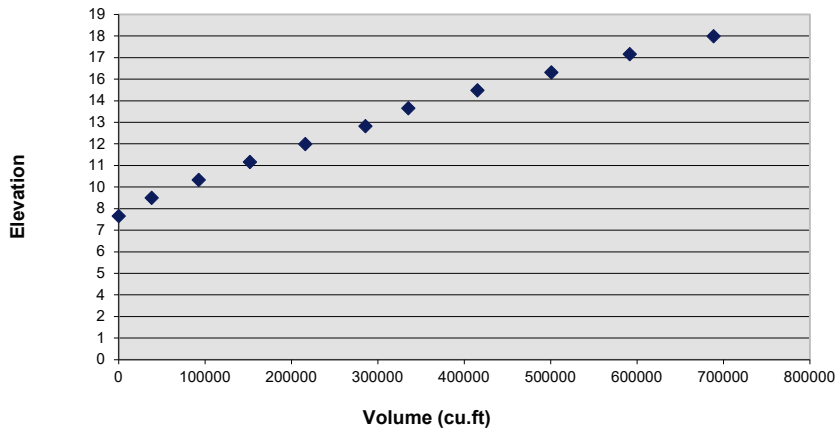
Elevation (ft)	Storage Volume (cu.ft)	d Storage Volume (cu.ft)	Discharge (cfs)	Average Discharge (cfs)	Time (hrs)	Accum. Time (hrs)
15.36	228,651		36.28			0.00
		38,702		18.678	0.58	
15.00	189,949		1.08			0.58
		51,242		0.760	18.72	
14.50	138,707		0.45			19.29
		48,478		0.223	60.46	
14.00	90,229		0.00			79.76
					Days	3.32

(HQ & EV) watersheds. In other watersheds, the basin settling volume may be reduced per the Department's "Erosion and Sediment Pollution Control Program Manual," No. 363-2134-008

Sediment Basin 12C-D: Stage-Storage Calculations

Elevation (ft)	Area (sq.ft.)	Avg Area (sq.ft.)	d Elevation (ft)	Storage Volume (cu.ft.)		
				Incremental	Total	(ac-ft)
8.00	26,205				0	0.000
		38,353	1.00	38,353		
9.00	51,956				38,353	0.880
		54,350	1.00	54,350		
10.00	56,779				92,703	2.128
		59,234	1.00	59,234		
11.00	61,723				151,937	3.488
		64,239	1.00	64,239		
12.00	66,789				216,176	4.963
		69,367	1.00	69,367		
13.00	71,977				285,543	6.555
		49,750	1.00	49,750		
14.00	77,274				335,293	7.697
		79,963	1.00	79,963		
15.00	82,683				415,256	9.533
		85,428	1.00	85,428		
16.00	88,203				500,685	11.494
		91,004	1.00	91,004		
17.00	93,834				591,689	13.583
		96,697	1.00	96,697		
18.00	99,589				688,386	15.803

Stage - Storage Curve



Emergency Spillway:

Invert Elevation: 16.25
Length (ft): 24.00
Depth of Flow (ft): 1.750

$$Q = 2.63 * \text{Length} * (\text{depth})^{1.5}$$

Req'd Q100 (cfs): 40.92 = 2*A - OS Discharge
Provided Q (cfs): 146.12
Top of Berm Elevation: 18.00

Sediment Basin 12C-D: Principal Spillway Capacity

Barrel D:

48

Riser D:

48

Barrel L:

313

Discharge Elev: 6.00

Elevation	Principal Spillway Discharge						
	Weir Flow		Orifice Flow		Pipe Flow		Total
	Head (ft)	Q (cfs)	Head (ft)	Q (cfs)	Head (ft)	Q (cfs)	Discharge
9.00	0.00	0.000					0.00
10.00	1.00	0.630					0.63
10.51	1.51	1.222	0.000	0.00	4.51	125.34	1.22
11.00	2.00	1.521	0.493	84.93	5.00	132.01	86.45
12.00	3.00	1.982	1.493	147.84	6.00	144.61	144.61
13.00	4.00	2.351	2.493	191.05	7.00	156.19	156.19
14.00	5.00	2.669	3.493	226.16	8.00	166.98	166.98
14.50	5.50	2.814	3.993	241.80	8.50	172.12	172.12
15.00	6.00	2.952	4.493	256.50	9.00	177.11	177.11
15.50	6.50	3.083	4.993	270.39	9.50	181.96	181.96
16.00	7.00	3.210	5.493	283.61	10.00	186.69	186.69
17.00	8.00	3.449	6.493	308.35	11.00	195.80	195.80
18.00	9.00	3.672	7.493	331.25	12.00	204.51	204.51

All holes are to be 2.0" diameter, uniformly spaced horizontally and vertically.

Row 1 3 holes

Row 3 3 holes

Row 5 3 holes

Row 2 3 holes

Row 4 3 holes

Row 6 3 holes

Elevation	Riser Discharge: Orifice Row Elevation						Total Discharge (cfs)
	Row 1 9.05	Row 2 10.00	Row 3	Row 4	Row 5	Row 6	
9.00	0.000						0.000
10.00	0.630	0.000					0.630
10.51	0.773	0.449					1.222
11.00	0.891	0.630					1.521
12.00	1.091	0.891					1.982
13.00	1.260	1.091					2.351
14.00	1.409	1.260					2.669
14.50	1.477	1.336					2.814
15.00	1.543	1.409					2.952
15.50	1.606	1.477					3.083
16.00	1.667	1.543					3.210
17.00	1.782	1.667					3.449
18.00	1.890	1.782					3.672

Sediment Basin 12C-D: Dewatering Time

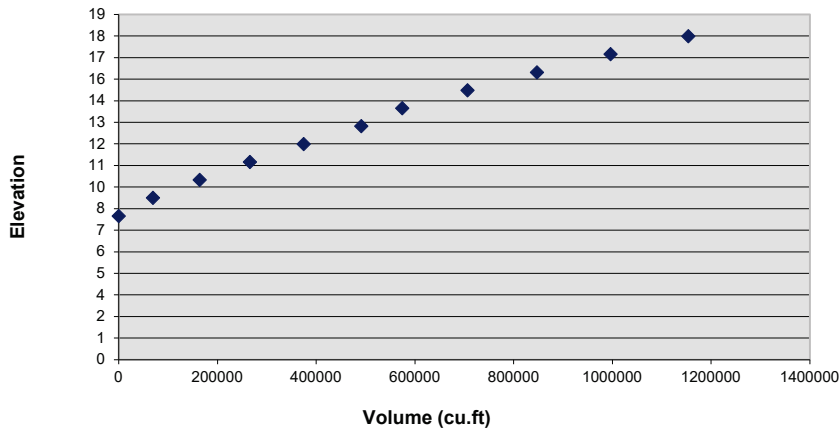
Elevation (ft)	Storage Volume (cu.ft)	d Storage Volume (cu.ft)	Discharge (cfs)	Average Discharge (cfs)	Time (hrs)	Accum. Time (hrs)
10.74	136,350		40.92			0.00
		43,647		40.920	0.30	
10.00	92,703		0.63			0.30
		54,350		0.315	47.93	
9.05	38,353		0.00			48.23
					Days	2.01

(HQ & EV) watersheds. In other watersheds, the basin settling volume may be reduced per the Department's "Erosion and Sediment Pollution Control Program Manual," No. 363-2134-008

Sediment Basin 13A-C: Stage-Storage Calculations

Elevation (ft)	Area (sq.ft.)	Avg Area (sq.ft.)	d Elevation (ft)	Storage Volume (cu.ft.)		
				Incremental	Total	(ac-ft)
8.00	50,618				0	0.000
		69,625	1.00	69,625		
9.00	90,555				69,625	1.598
		94,394	1.00	94,394		
10.00	98,285				164,019	3.765
		101,853	1.00	101,853		
11.00	105,464				265,872	6.104
		109,140	1.00	109,140		
12.00	112,858				375,013	8.609
		116,641	1.00	116,641		
13.00	120,466				491,654	11.287
		82,919	1.00	82,919		
14.00	128,292				574,573	13.190
		132,292	1.00	132,292		
15.00	136,332				706,865	16.227
		140,440	1.00	140,440		
16.00	144,588				847,305	19.451
		148,803	1.00	148,803		
17.00	153,058				996,108	22.867
		157,381	1.00	157,381		
18.00	161,743				1,153,488	26.480

Stage - Storage Curve



Emergency Spillway:

Invert Elevation: 16.25
Length (ft): 24.00
Depth of Flow (ft): 1.750

$$Q = 2.63 * \text{Length} * (\text{depth})^{1.5}$$

Req'd Q100 (cfs): 40.92 = 2*A - OS Discharge
Provided Q (cfs): 146.12
Top of Berm Elevation: 18.00

Sediment Basin 13A-B: Principal Spillway Capacity

Barrel D: 48 Riser D: 48 Barrel L: 313
 Discharge Elev: 6.00

Elevation	Principal Spillway Discharge						
	Weir Flow		Orifice Flow		Pipe Flow		Total
	Head (ft)	Q (cfs)	Head (ft)	Q (cfs)	Head (ft)	Q (cfs)	Discharge
9.00	0.00	0.000					0.00
10.00	1.00	0.630					0.63
10.76	1.76	1.387	0.000	0.00	4.76	128.85	1.39
11.00	2.00	1.521	0.236	58.83	5.00	132.01	60.35
12.00	3.00	1.982	1.236	134.56	6.00	144.61	136.54
13.00	4.00	2.351	2.236	180.97	7.00	156.19	156.19
14.00	5.00	2.669	3.236	217.70	8.00	166.98	166.98
14.50	5.50	2.814	3.736	233.91	8.50	172.12	172.12
15.00	6.00	2.952	4.236	249.07	9.00	177.11	177.11
15.50	6.50	3.083	4.736	263.36	9.50	181.96	181.96
16.00	7.00	3.210	5.236	276.92	10.00	186.69	186.69
17.00	8.00	3.449	6.236	302.20	11.00	195.80	195.80
18.00	9.00	3.672	7.236	325.53	12.00	204.51	204.51

All holes are to be 2.0" diameter, uniformly spaced horizontally and vertically.

Row 1 3 holes Row 3 holes Row 5 holes
 Row 2 3 holes Row 4 holes Row 6 holes

Elevation	Riser Discharge: Orifice Row Elevation						Total Discharge (cfs)
	Row 1 9.05	Row 2 10.00	Row 3	Row 4	Row 5	Row 6	
9.00	0.000						0.000
10.00	0.630	0.000					0.630
10.76	0.837	0.551					1.387
11.00	0.891	0.630					1.521
12.00	1.091	0.891					1.982
13.00	1.260	1.091					2.351
14.00	1.409	1.260					2.669
14.50	1.477	1.336					2.814
15.00	1.543	1.409					2.952
15.50	1.606	1.477					3.083
16.00	1.667	1.543					3.210
17.00	1.782	1.667					3.449
18.00	1.890	1.782					3.672

Sediment Basin 13A-C: Dewatering Time

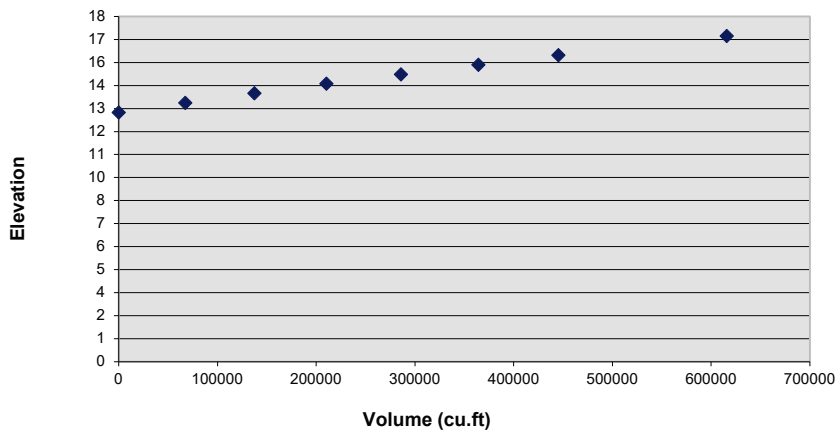
Elevation (ft)	Storage Volume (cu.ft)	d Storage Volume (cu.ft)	Discharge (cfs)	Average Discharge (cfs)	Time (hrs)	Accum. Time (hrs)
11.27	294,879		80.60			0.00
		29,006		80.600	0.10	
11.00	265,872		60.35			0.10
		101,853		30.491	0.93	
10.00	164,019		0.63			1.03
		94,394		0.315	83.24	
9.00	69,625		0.00			84.27
					Days	3.51

(HQ & EV) watersheds. In other watersheds, the basin settling volume may be reduced per the Department's "Erosion and Sediment Pollution Control Program Manual," No. 363-2134-008

Sediment Basin 14: Stage-Storage Calculations

Elevation (ft)	Area (sq.ft.)	Avg Area (sq.ft.)	d Elevation (ft)	Storage Volume (cu.ft.)		
				Incremental	Total	(ac-ft)
13.00	131,957				0	0.000
		134,685	0.50	67,343		
13.50	137,432				67,343	1.546
		140,161	0.50	70,080		
14.00	142,907				137,423	3.155
		145,650	0.50	72,825		
14.50	148,411				210,248	4.827
		151,154	0.50	75,577		
15.00	153,914				285,825	6.562
		156,672	0.50	78,336		
15.50	159,446				364,161	8.360
		162,203	0.50	81,102		
16.00	164,977				445,262	10.222
		170,507	1.00	170,507		
17.00	176,097				615,769	14.136
		181,656	1.00	181,656		
18.00	187,273				797,426	18.306

Stage - Storage Curve



Emergency Spillway:

Invert Elevation: 16.75
Length (ft): 20.00
Depth of Flow (ft): 1.250

$$Q = 2.63 * \text{Length} * (\text{depth})^{1.5}$$

Req'd Q100 (cfs): 93.52 = 2*A - OS Discharge
Provided Q (cfs): 73.51
Top of Berm Elevation: 18.00

Sediment Basin 14: Principal Spillway Capacity

Barrel D: 36 Riser D: 36 Barrel L: 91
Discharge Elev: 10.00

Elevation	Principal Spillway Discharge							
	Weir Flow		Orifice Flow		Pipe Flow		Total	
	Head (ft)	Q (cfs)	Head (ft)	Q (cfs)	Head (ft)	Q (cfs)	Discharge	
14.00	0.00	0.000					0.00	0.00
14.50	0.50	0.445					0.45	0.45
15.00	1.00	1.260	0.000	0.00	5.00	115.65	1.26	1.26
15.50	1.50	1.543	0.500	48.13	5.50	121.29	49.68	49.68
16.00	2.00	1.782	1.000	68.07	6.00	126.68	69.85	69.85
17.00	3.00	2.182	2.000	96.27	7.00	136.83	98.45	98.45
18.00	4.00	2.520	3.000	117.90	8.00	146.28	120.42	120.42

All holes are to be 2.0" diameter, uniformly spaced horizontally and vertically.

Row 1 3 holes Row 3 5 holes Row 5 5 holes
Row 2 3 holes Row 4 5 holes Row 6 5 holes

Elevation	Riser Discharge: Orifice Row Elevation						Total Discharge (cfs)
	Row 1 14.00	Row 2 14.50	Row 3	Row 4	Row 5	Row 6	
14.00	0.000						0.000
14.50	0.445	0.000					0.445
15.00	0.630	0.630					1.260
15.50	0.772	0.772					1.543
16.00	0.891	0.891					1.782
17.00	1.091	1.091					2.182
18.00	1.260	1.260					2.520

Sediment Basin 14: Dewatering Time

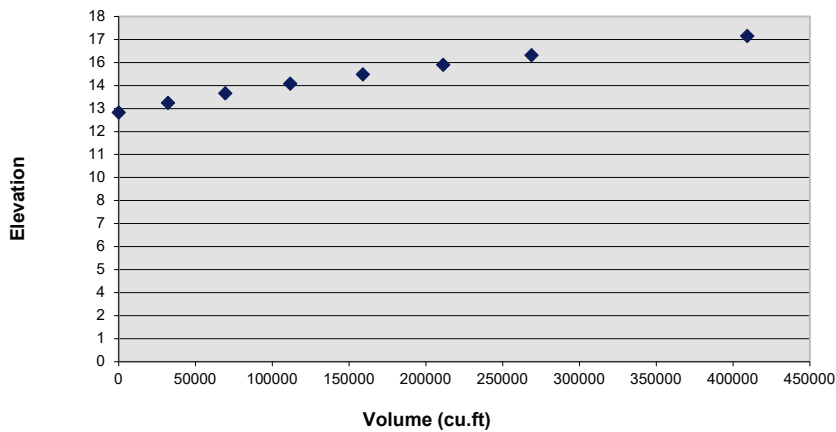
Elevation (ft)	Storage Volume (cu.ft)	d Storage Volume (cu.ft)	Discharge (cfs)	Average Discharge (cfs)	Time (hrs)	Accum. Time (hrs)
15.76	405,821		60.04			0.00
		41,661		60.040	0.19	
15.50	364,161		49.68			0.19
		78,336		25.468	0.85	
15.00	285,825		1.26			1.05
		75,577		0.853	24.62	
14.50	210,248		0.45			25.67
		72,825		0.223	90.83	
14.00	137,423		0.00			116.49
					Days	4.85

(HQ & EV) watersheds. In other watersheds, the basin settling volume may be reduced per the Department's "Erosion and Sediment Pollution Control Program Manual," No. 363-2134-008

Sediment Basin 15A-B: Stage-Storage Calculations

Elevation (ft)	Area (sq.ft.)	Avg Area (sq.ft.)	d Elevation (ft)	Storage Volume (cu.ft.)		
				Incremental	Total	(ac-ft)
13.00	59,439				0	0.000
		64,378	0.50	32,189		
13.50	69,448				32,189	0.739
		74,396	0.50	37,198		
14.00	79,456				69,387	1.593
		84,464	0.50	42,232		
14.50	89,574				111,619	2.562
		94,587	0.50	47,294		
15.00	99,691				158,913	3.648
		104,778	0.50	52,389		
15.50	109,948				211,302	4.851
		115,038	0.50	57,519		
16.00	120,205				268,821	6.171
		140,420	1.00	140,420		
17.00	161,657				409,241	9.395
		166,836	1.00	166,836		
18.00	172,070				576,077	13.225

Stage - Storage Curve



Emergency Spillway:

Invert Elevation: 16.75
Length (ft): 20.00
Depth of Flow (ft): 1.250

$$Q = 2.63 * \text{Length} * (\text{depth})^{1.5}$$

Req'd Q100 (cfs): 36.28 = 2*A - OS Discharge
Provided Q (cfs): 73.51
Top of Berm Elevation: 18.00

Sediment Basin 15A-B: Principal Spillway Capacity

Barrel D: 36 Riser D: 36 Barrel L: 83
 Discharge Elev: 10.00

Elevation	Principal Spillway Discharge							
	Weir Flow		Orifice Flow		Pipe Flow		Total	
	Head (ft)	Q (cfs)	Head (ft)	Q (cfs)	Head (ft)	Q (cfs)	Discharge	
14.00	0.00	0.000					0.00	0.00
14.50	0.50	0.445					0.45	0.45
15.00	1.00	1.075	0.000	0.00	5.00	118.74	1.08	1.08
15.50	1.50	1.401	0.500	48.13	5.50	124.53	49.53	49.53
16.00	2.00	1.662	1.000	68.07	6.00	130.07	69.73	69.73
17.00	3.00	2.087	2.000	96.27	7.00	140.49	98.35	98.35
18.00	4.00	2.438	3.000	117.90	8.00	150.19	120.34	120.34

All holes are to be 2.00" diameter, uniformly spaced horizontally and vertically.

Row 1 3 holes Row 3 holes Row 5 holes
 Row 2 3 holes Row 4 holes Row 6 holes

Elevation	Riser Discharge: Orifice Row Elevation						Total Discharge (cfs)
	Row 1 14.00	Row 2 14.50	Row 3	Row 4	Row 5	Row 6	
14.00	0.000						0.000
14.50	0.445	0.000					0.445
15.00	0.630	0.445					1.075
15.50	0.772	0.630					1.401
16.00	0.891	0.772					1.662
17.00	1.091	0.996					2.087
18.00	1.260	1.179					2.438

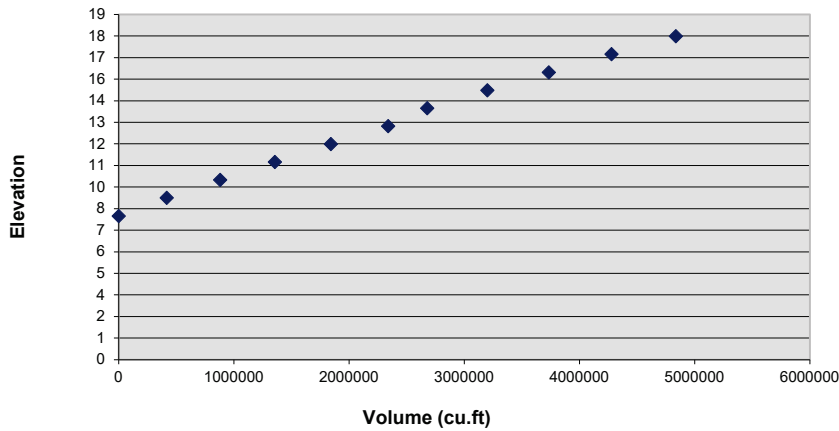
Sediment Basin 15A-B: Dewatering Time

Elevation (ft)	Storage Volume (cu.ft)	d Storage Volume (cu.ft)	Discharge (cfs)	Average Discharge (cfs)	Time (hrs)	Accum. Time (hrs)
16.78	372,568		93.52			0.00
		-36,672		65.670	-0.16	
17.00	409,241		98.35			-0.16
		140,420		84.043	0.46	
16.00	268,821		69.73			0.31
		57,519		35.404	0.45	
15.00	211,302		1.08			0.76
		99,682		0.760	36.41	
14.50	111,619		0.45			37.17
		42,232		0.223	52.67	
14.00	69,387		0.00			89.84
					Days	3.74

Sediment Basin 15C-D: Stage-Storage Calculations

Elevation (ft)	Area (sq.ft.)	Avg Area (sq.ft.)	d Elevation (ft)	Storage Volume (cu.ft.)		
				Incremental	Total	(ac-ft)
8.00	379,820				0	0.000
		418,035	1.00	418,035		
9.00	457,452				418,035	9.597
		463,112	1.00	463,112		
10.00	468,795				881,147	20.228
		474,518	1.00	474,518		
11.00	480,264				1,355,665	31.122
		486,048	1.00	486,048		
12.00	491,856				1,841,713	42.280
		497,703	1.00	497,703		
13.00	503,573				2,339,416	53.706
		339,663	1.00	339,663		
14.00	515,415				2,679,079	61.503
		521,386	1.00	521,386		
15.00	527,380				3,200,465	73.473
		533,414	1.00	533,414		
16.00	539,471				3,733,879	85.718
		545,567	1.00	545,567		
17.00	551,686				4,279,446	98.243
		557,857	1.00	557,857		
18.00	564,051				4,837,303	111.049

Stage - Storage Curve



Emergency Spillway:

Invert Elevation: 16.00
Length (ft): 24.00
Depth of Flow (ft): 2.000

$$Q = 2.63 * \text{Length} * (\text{depth})^{1.5}$$

Req'd Q100 (cfs): 113.54 = 2*A - OS Discharge
Provided Q (cfs): 178.53
Top of Berm Elevation: 18.00

Sediment Basin 15C-D: Principal Spillway Capacity

Barrel D:

48

Riser D:

48

Barrel L:

117

Discharge Elev: 8.00

Elevation	Principal Spillway Discharge						
	Weir Flow		Orifice Flow		Pipe Flow		Total
	Head (ft)	Q (cfs)	Head (ft)	Q (cfs)	Head (ft)	Q (cfs)	Discharge
9.00	0.00	0.000					0.00
10.00	1.00	1.680	0.000	0.00	2.00	120.37	1.68
11.00	2.00	4.056	1.000	121.01	3.00	147.42	125.07
12.00	3.00	5.285	2.000	171.14	4.00	170.23	170.23
13.00	4.00	6.269	3.000	209.60	5.00	190.32	190.32
13.50	4.50	1.680	3.500	226.40	5.50	199.61	199.61
14.00	5.00	7.116	4.000	242.03	6.00	208.48	208.48
14.50	5.50	7.503	4.500	256.71	6.50	217.00	217.00
15.00	6.00	7.871	5.000	270.59	7.00	225.19	225.19
15.50	6.50	8.223	5.500	283.80	7.50	233.09	233.09
16.00	7.00	8.559	6.000	296.42	8.00	240.74	240.74
17.00	8.00	9.196	7.000	320.17	9.00	255.34	255.34
18.00	9.00	9.791	8.000	342.28	10.00	269.15	269.15

All holes are to be 2.0" diameter, uniformly spaced horizontally and vertically.

Row 1 8 holes Row 3 holes Row 5 holes
Row 2 8 holes Row 4 holes Row 6 holes

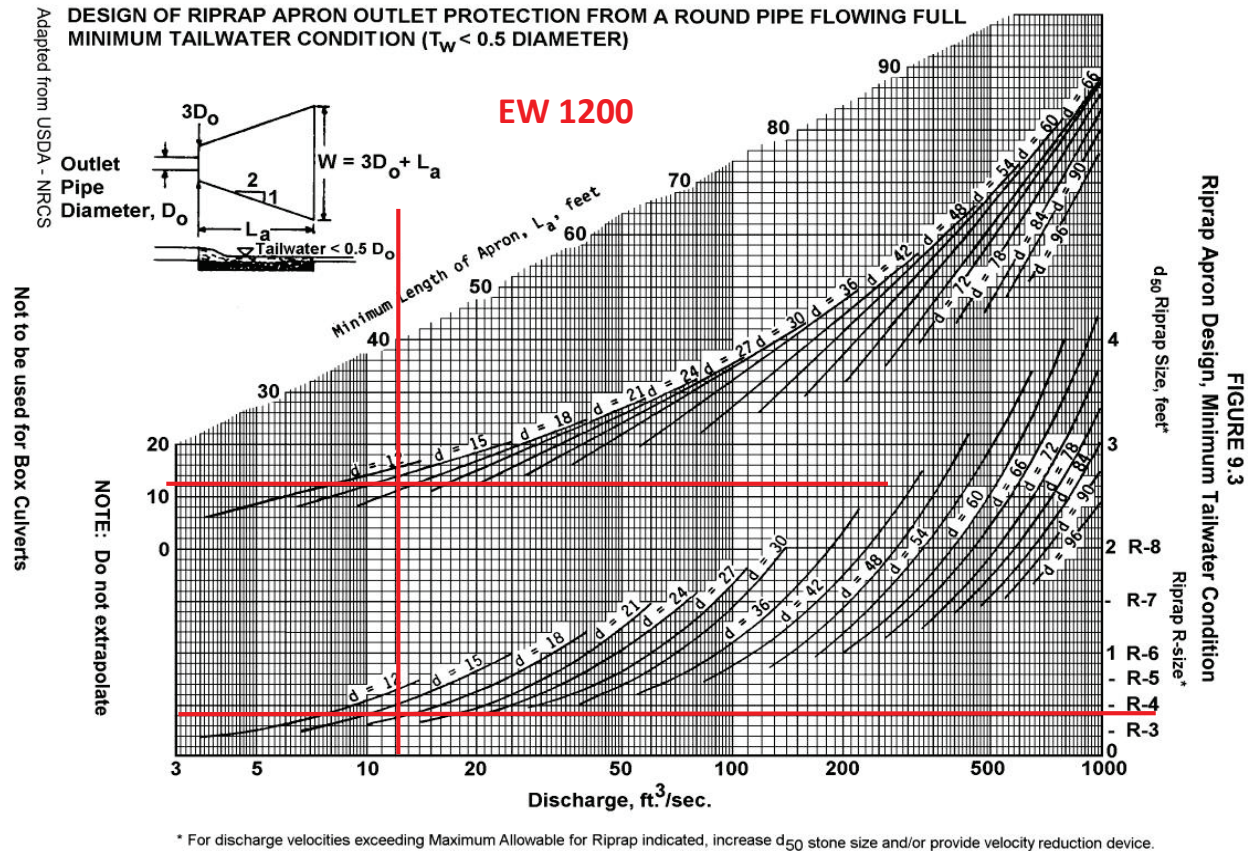
Elevation	Riser Discharge: Orifice Row Elevation						Total Discharge (cfs)
	Row 1 9.00	Row 2 10.00	Row 3	Row 4	Row 5	Row 6	
9.00	0.000						0.000
10.00	1.680	0.000					1.680
11.00	2.376	1.680					4.056
12.00	2.910	2.376					5.285
13.00	3.360	2.910					6.269
10.00	1.680	0.000					1.680
14.00	3.756	3.360					7.116
14.50	3.940	3.564					7.503
15.00	4.115	3.756					7.871
15.50	4.283	3.940					8.223
16.00	4.445	4.115					8.559
17.00	4.751	4.445					9.196
18.00	5.040	4.751					9.791

Sediment Basin 15C-D: Dewatering Time

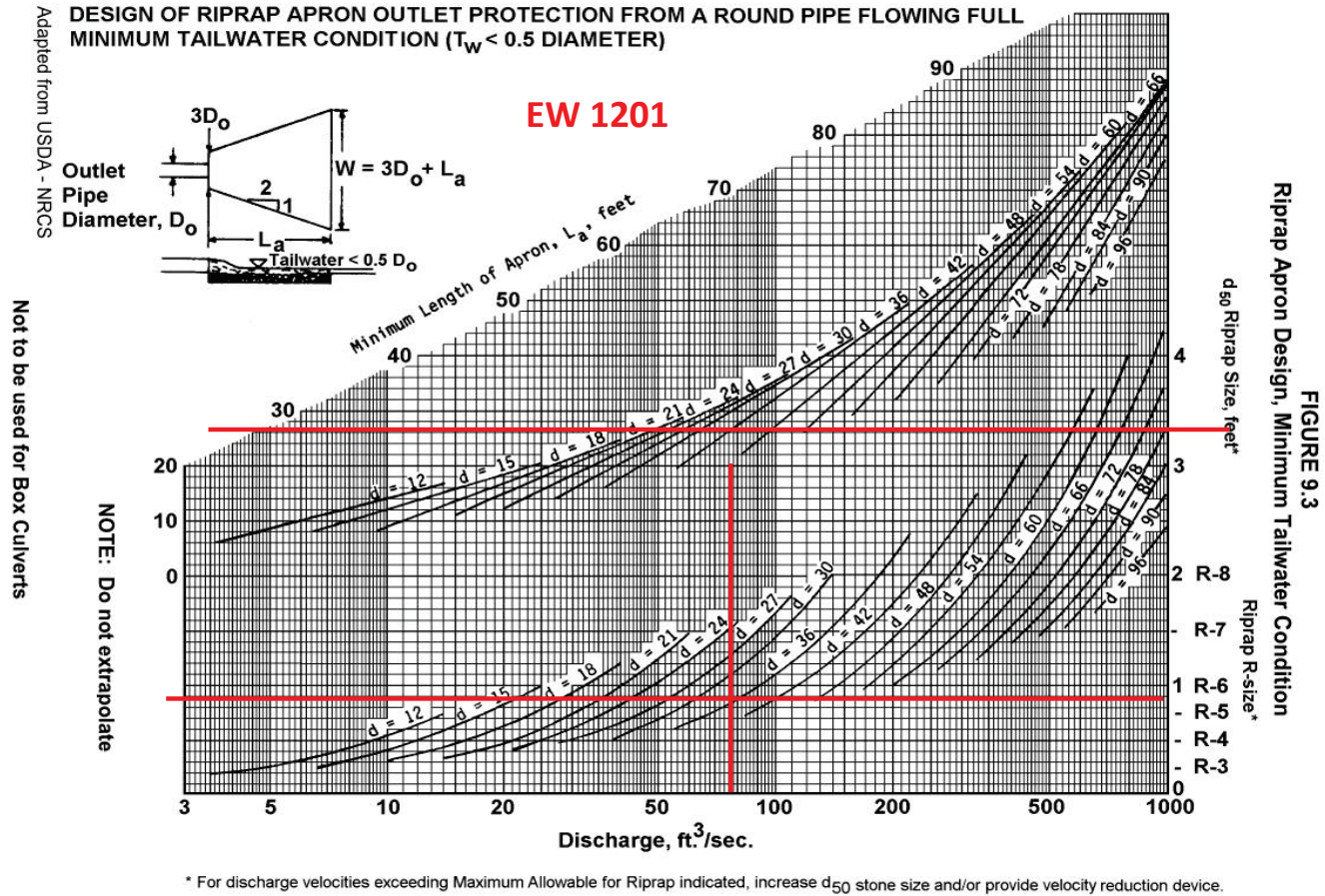
Elevation (ft)	Storage Volume (cu.ft)	d Storage Volume (cu.ft)	Discharge (cfs)	Average Discharge (cfs)	Time (hrs)	Accum. Time (hrs)
10.91	1,311,327		113.54			0.00
		430,180		113.540	1.05	1.05
10.00	881,147		1.68			
		463,112		0.840	153.16	154.21
9.00	418,035		0.00			
					Days	6.43

(HQ & EV) watersheds. In other watersheds, the basin settling volume may be reduced per the Department's "Erosion and Sediment Pollution Control Program Manual," No. 363-2134-008

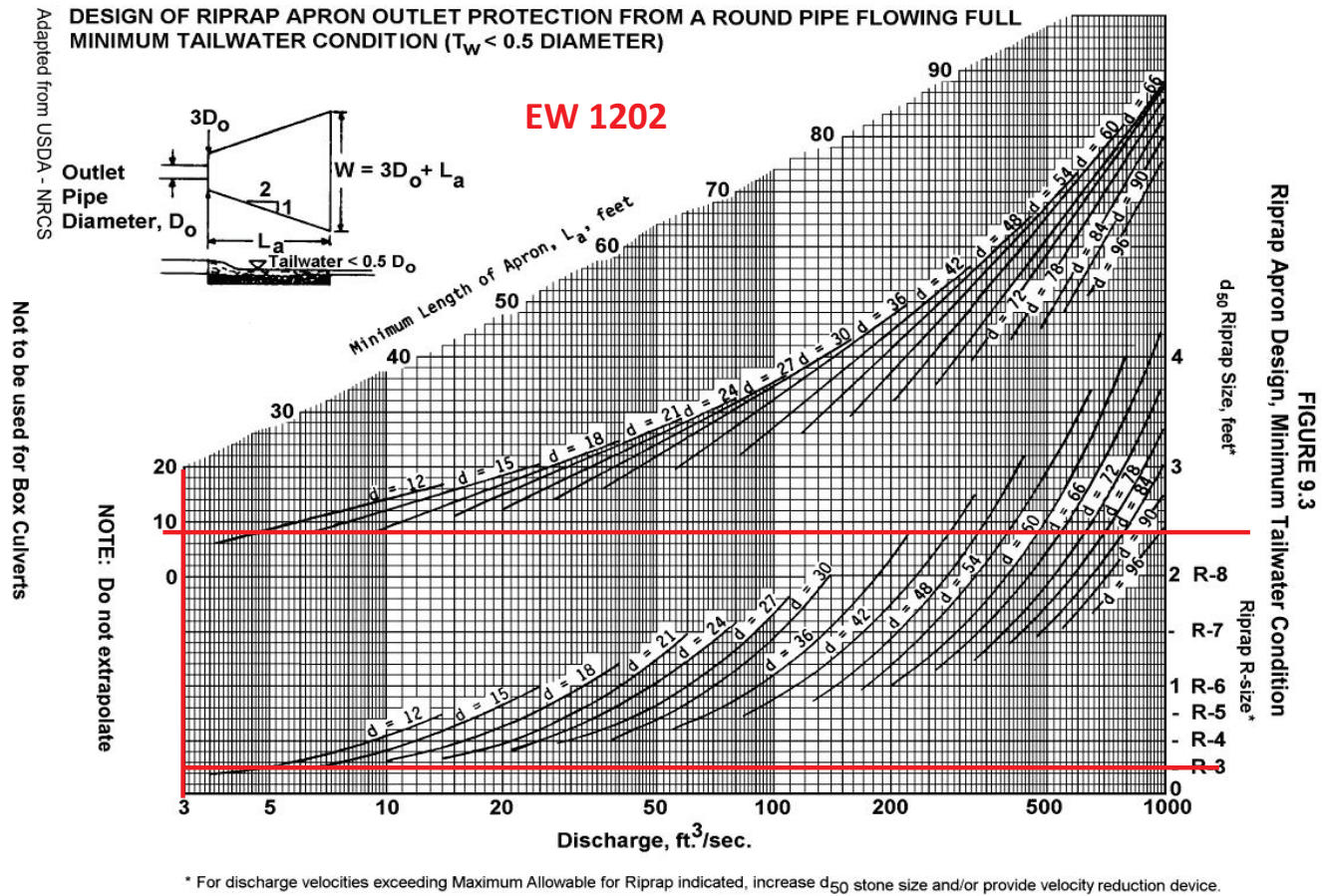
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LOCATION:	Falls Township, Bucks County, Pennsylvania
PREPARED BY:	DATE: 6/17/2025
CHECKED BY:	DATE:



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PROJECT NAME: North Point Phase 3

LOCATION: Falls Township, Bucks County, Pennsylvania

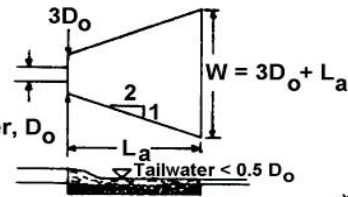
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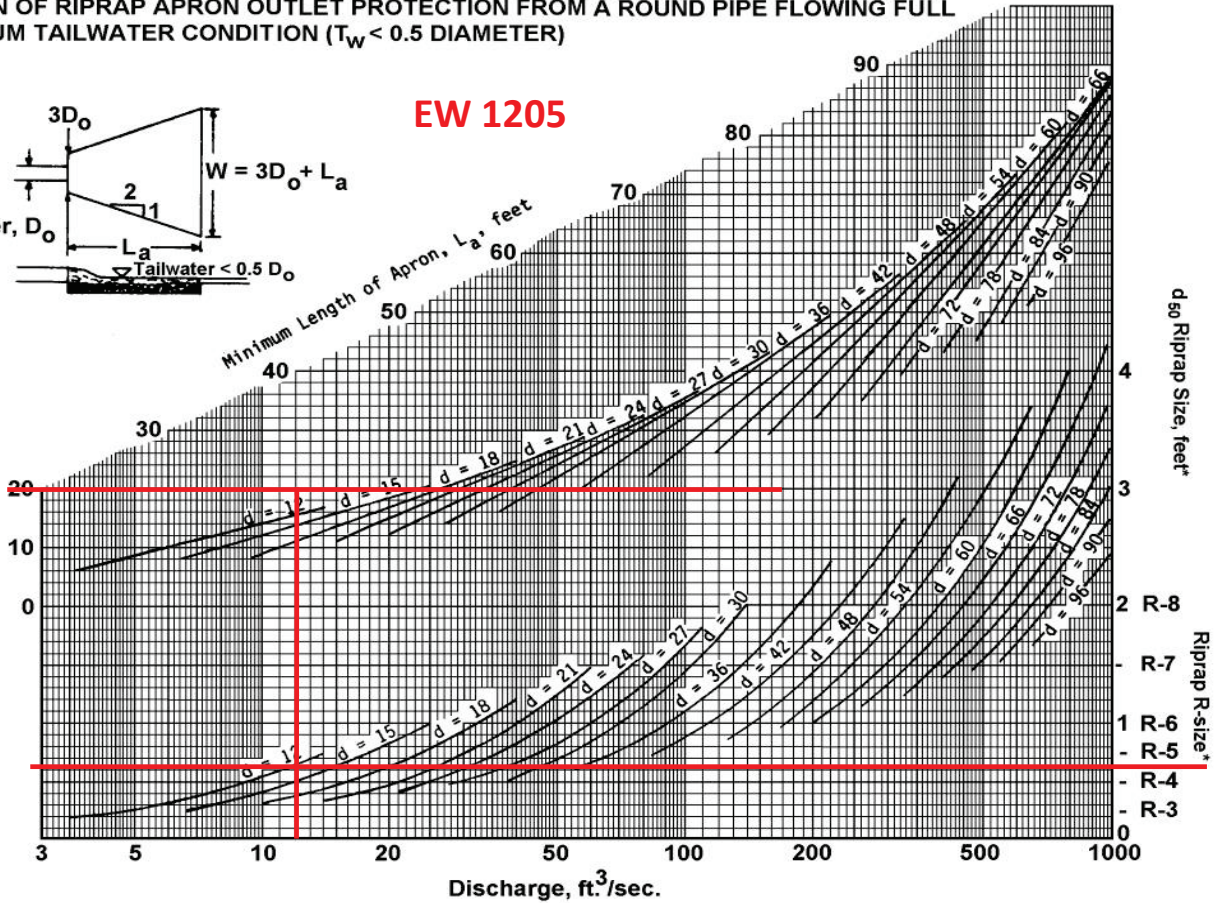
Adapted from USDA - NRCS

DESIGN OF RIPRAP APRON OUTLET PROTECTION FROM A ROUND PIPE FLOWING FULL
MINIMUM TAILWATER CONDITION ($T_w < 0.5 D_o$)

EW 1205



NOTE: Do not extrapolate

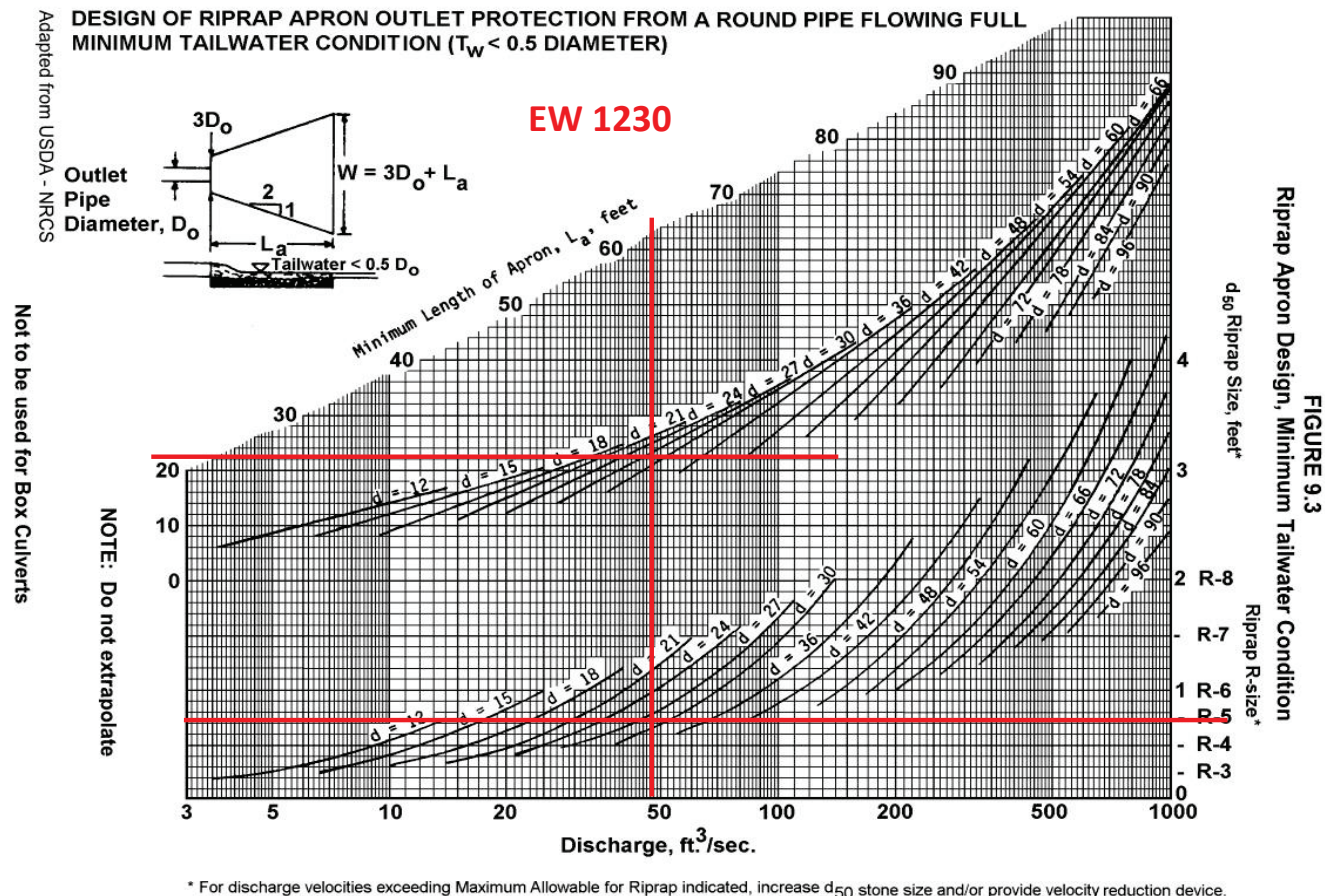


* For discharge velocities exceeding Maximum Allowable for Riprap indicated, increase d_{50} stone size and/or provide velocity reduction device.

Not to be used for Box Culverts

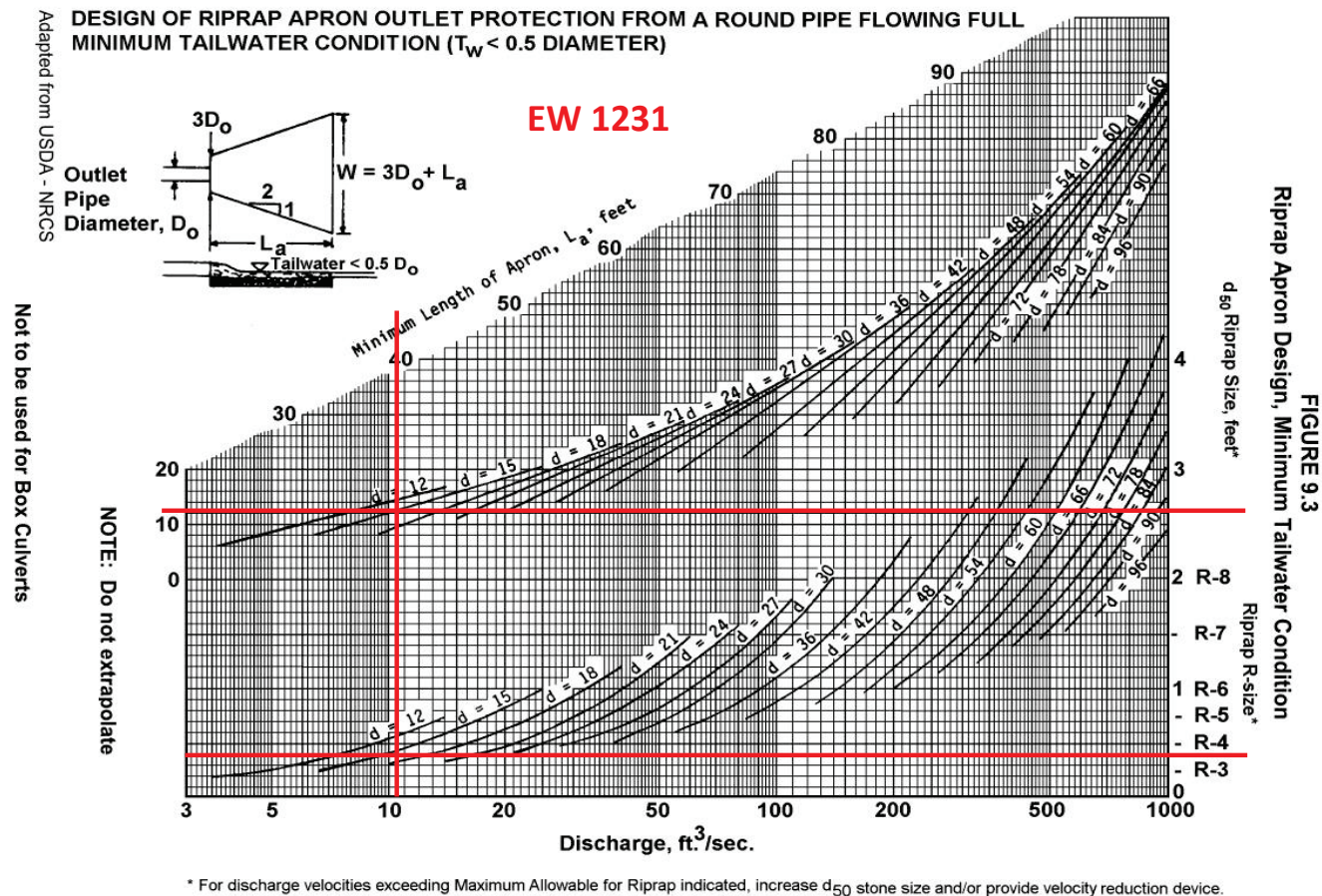
FIGURE 9.3
Riprap Apron Design, Minimum Tailwater Condition

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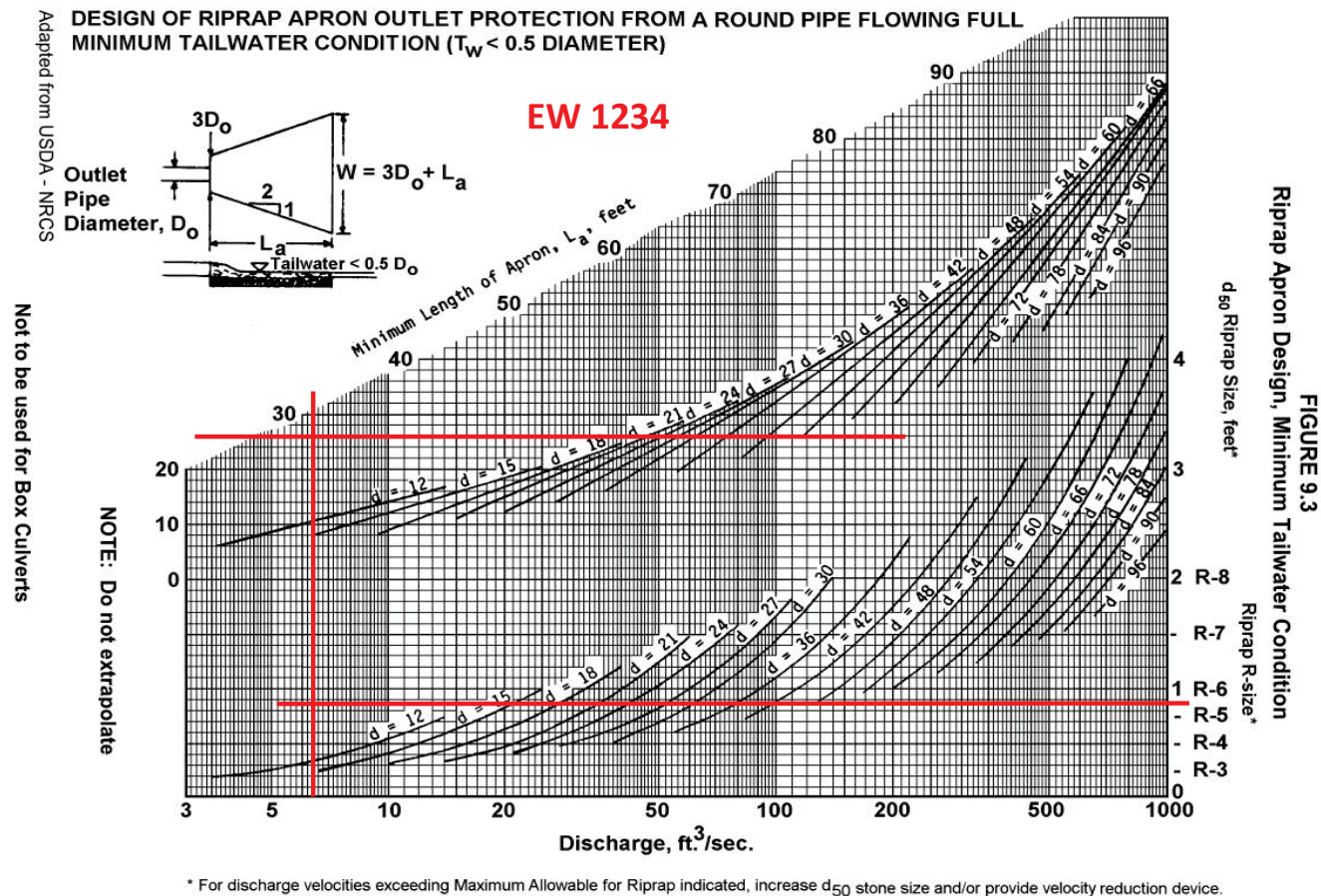
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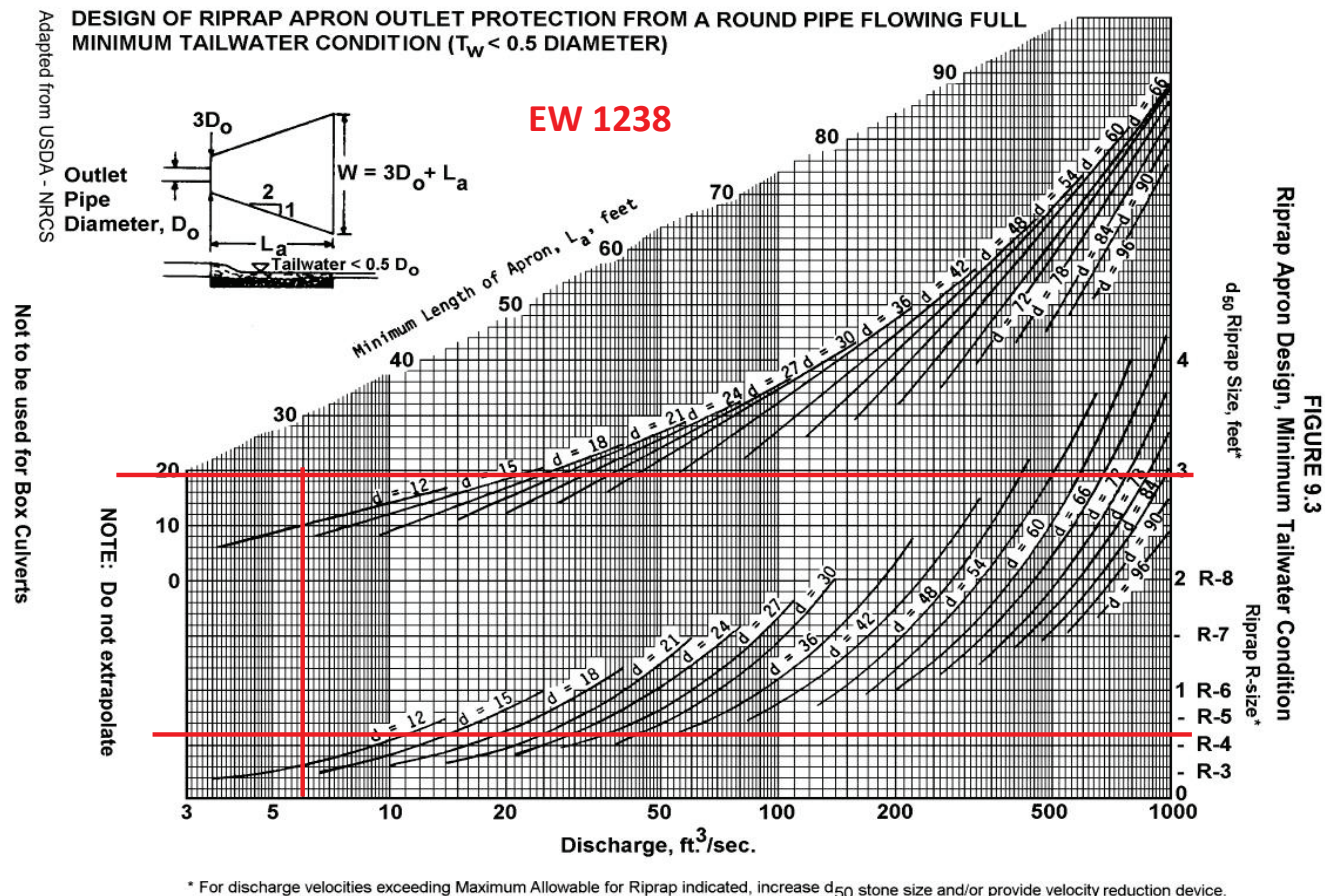


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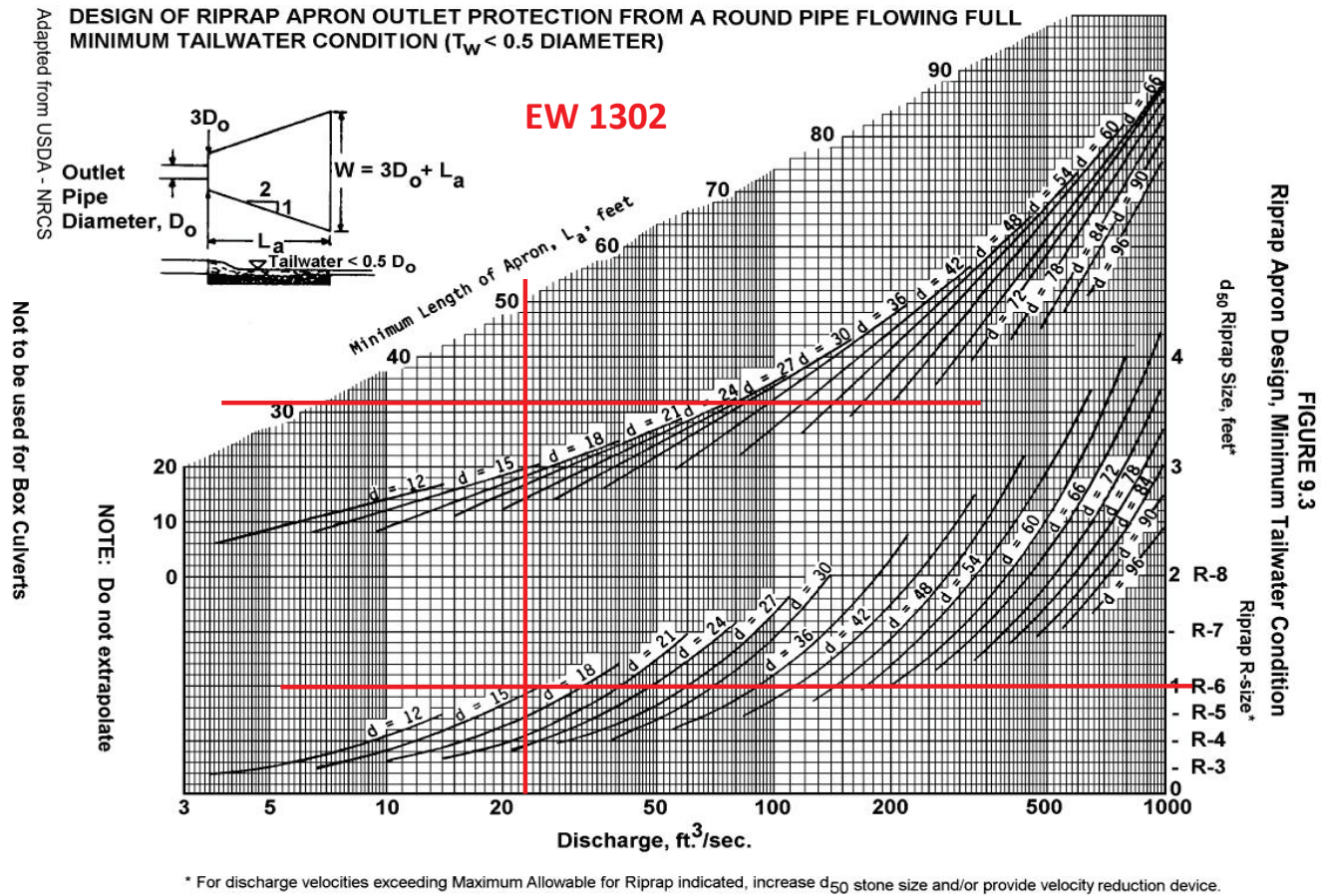


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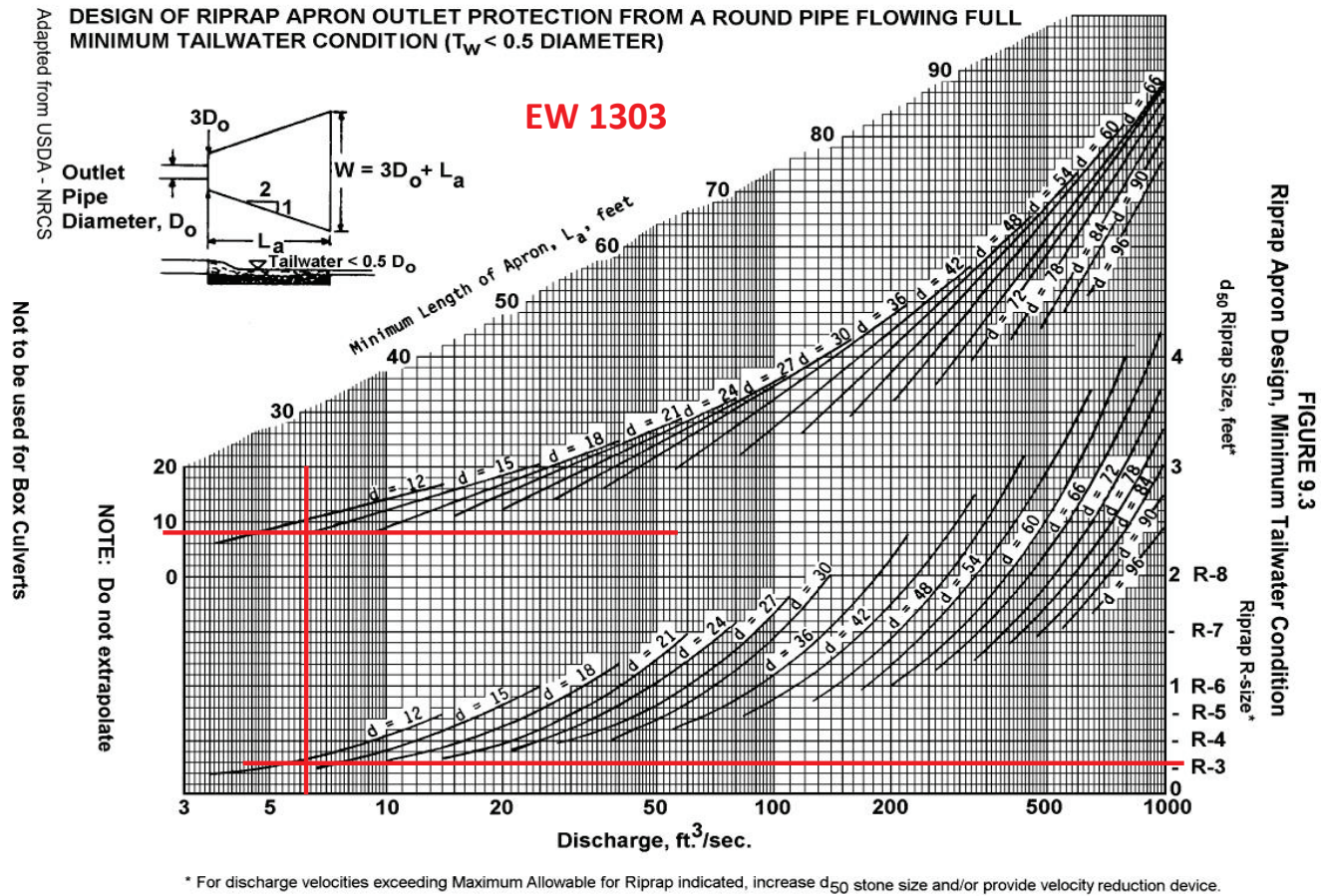


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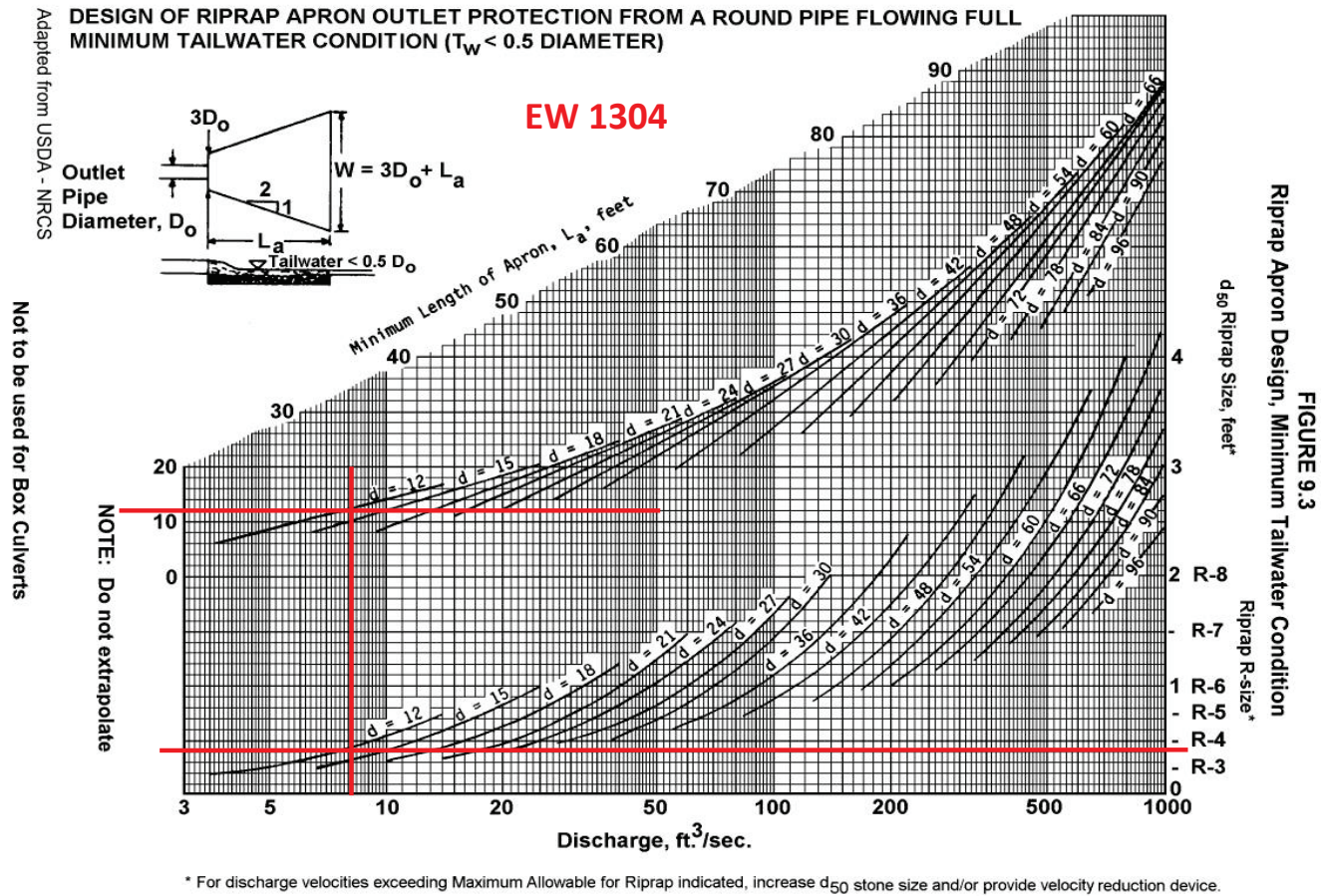
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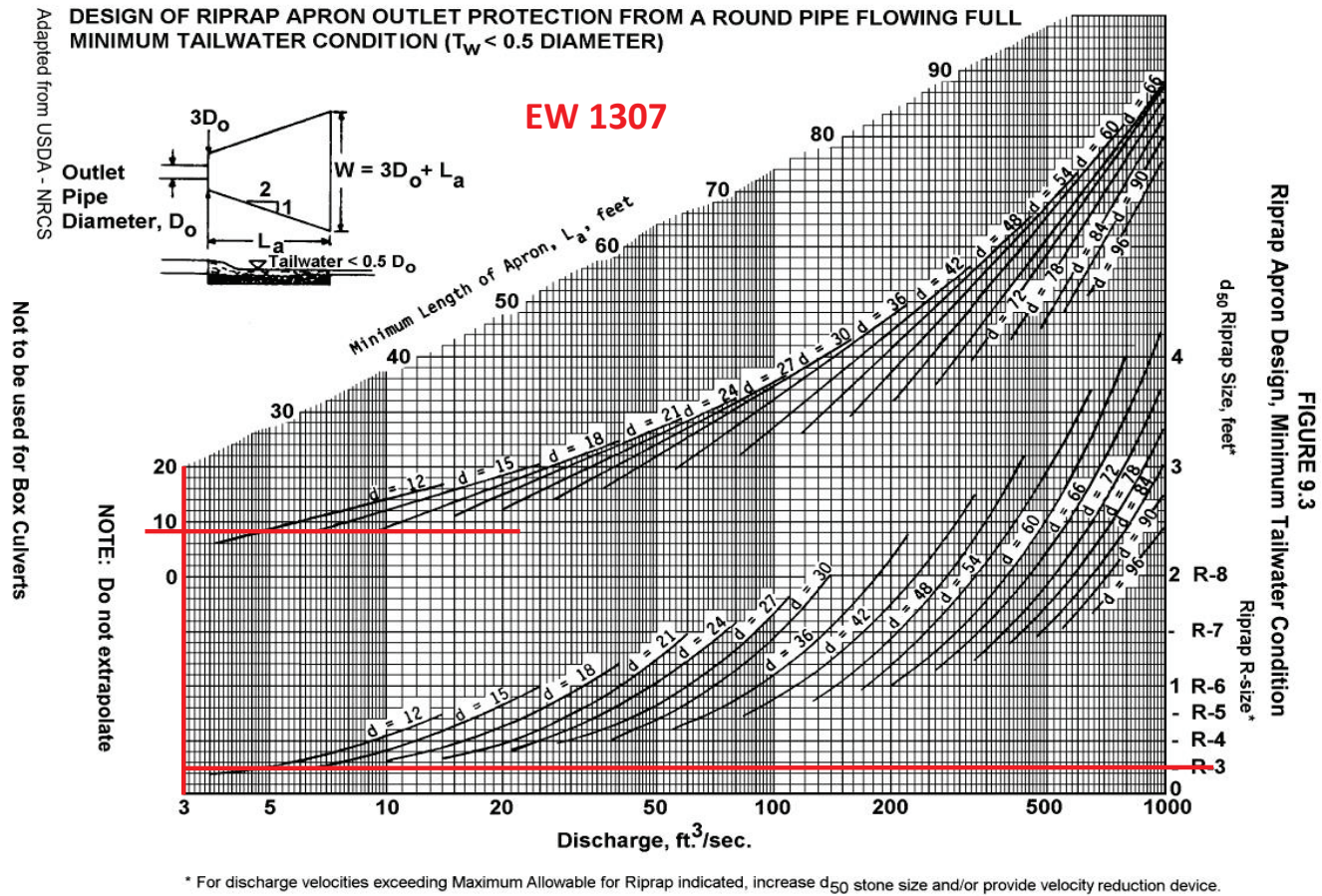
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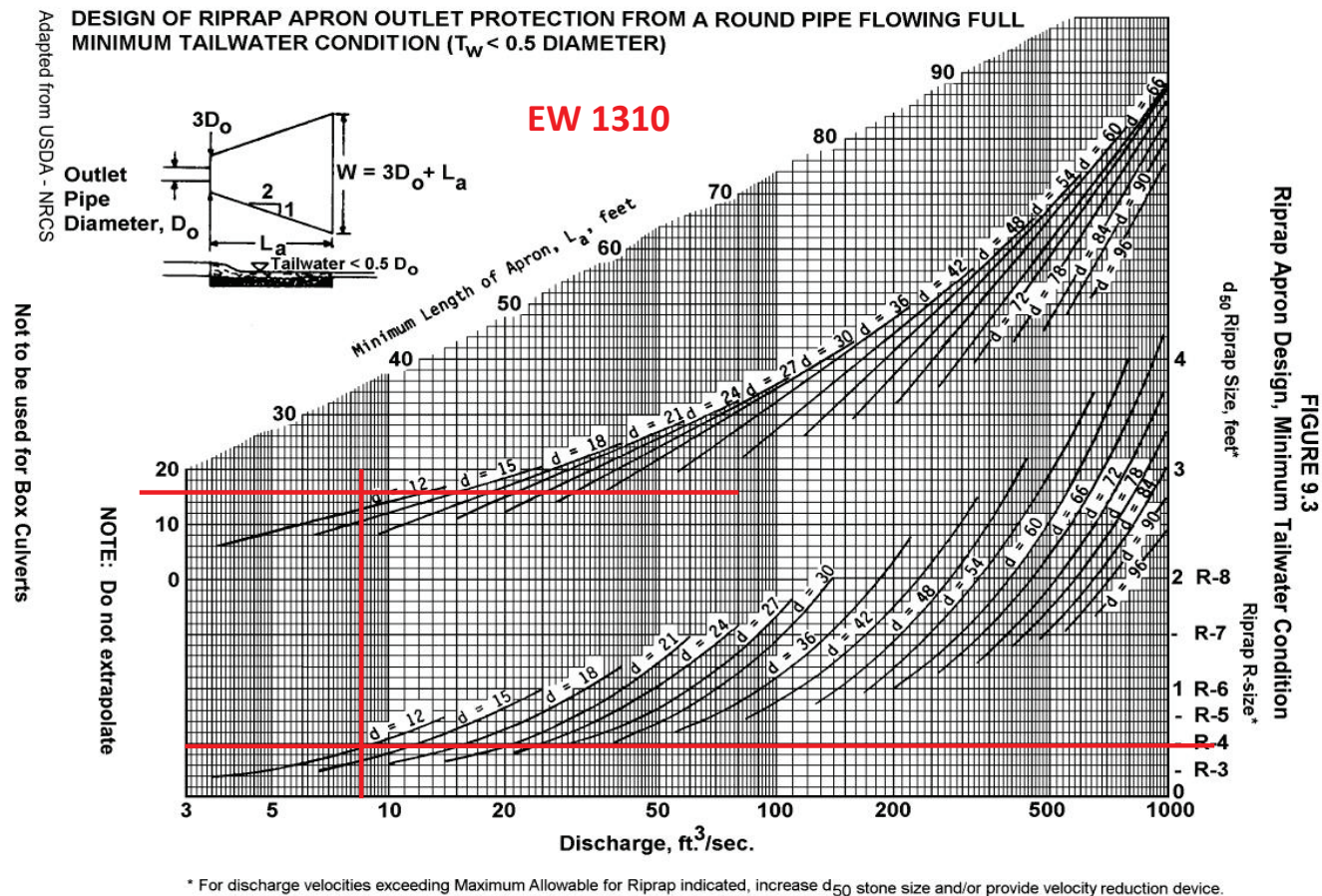
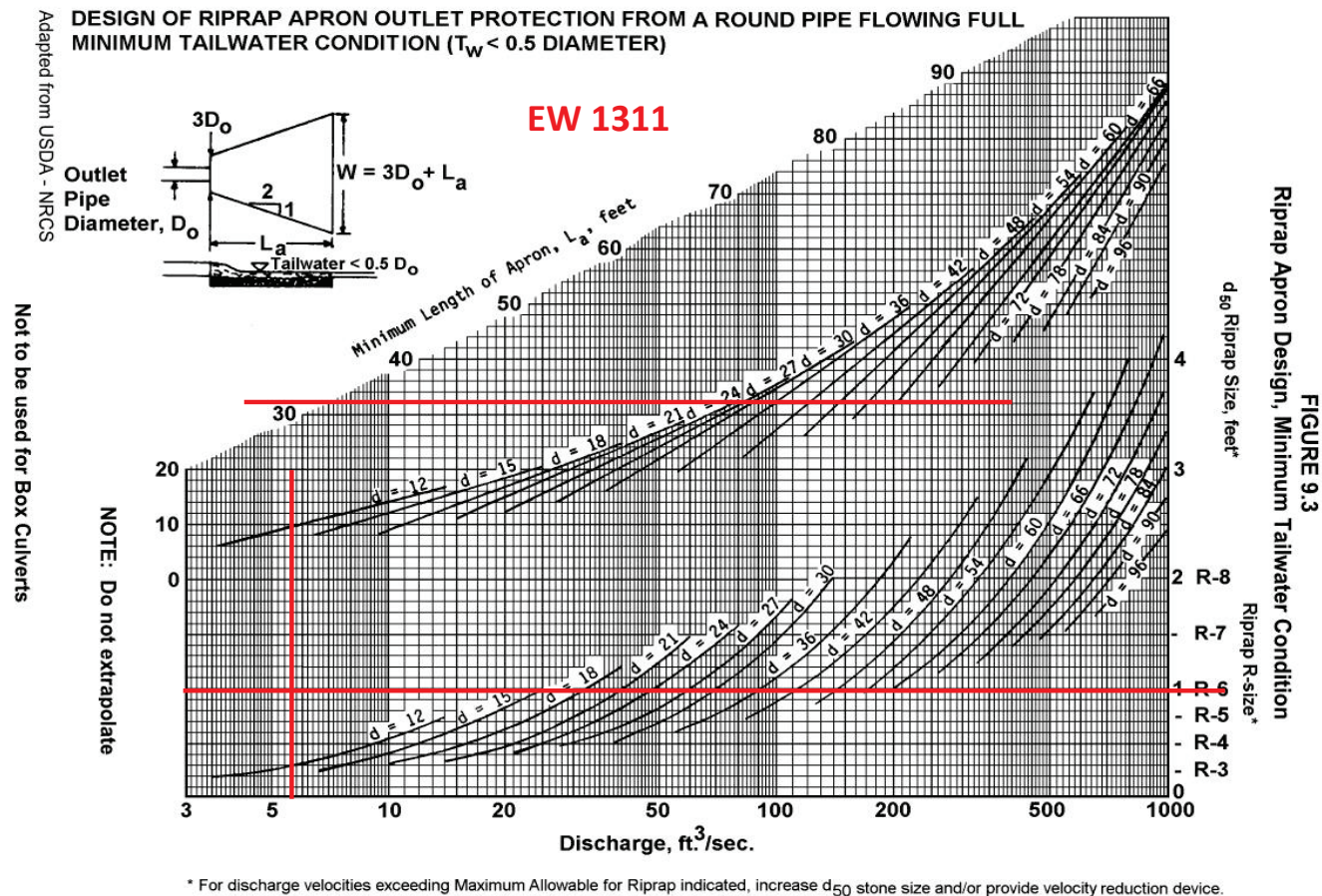
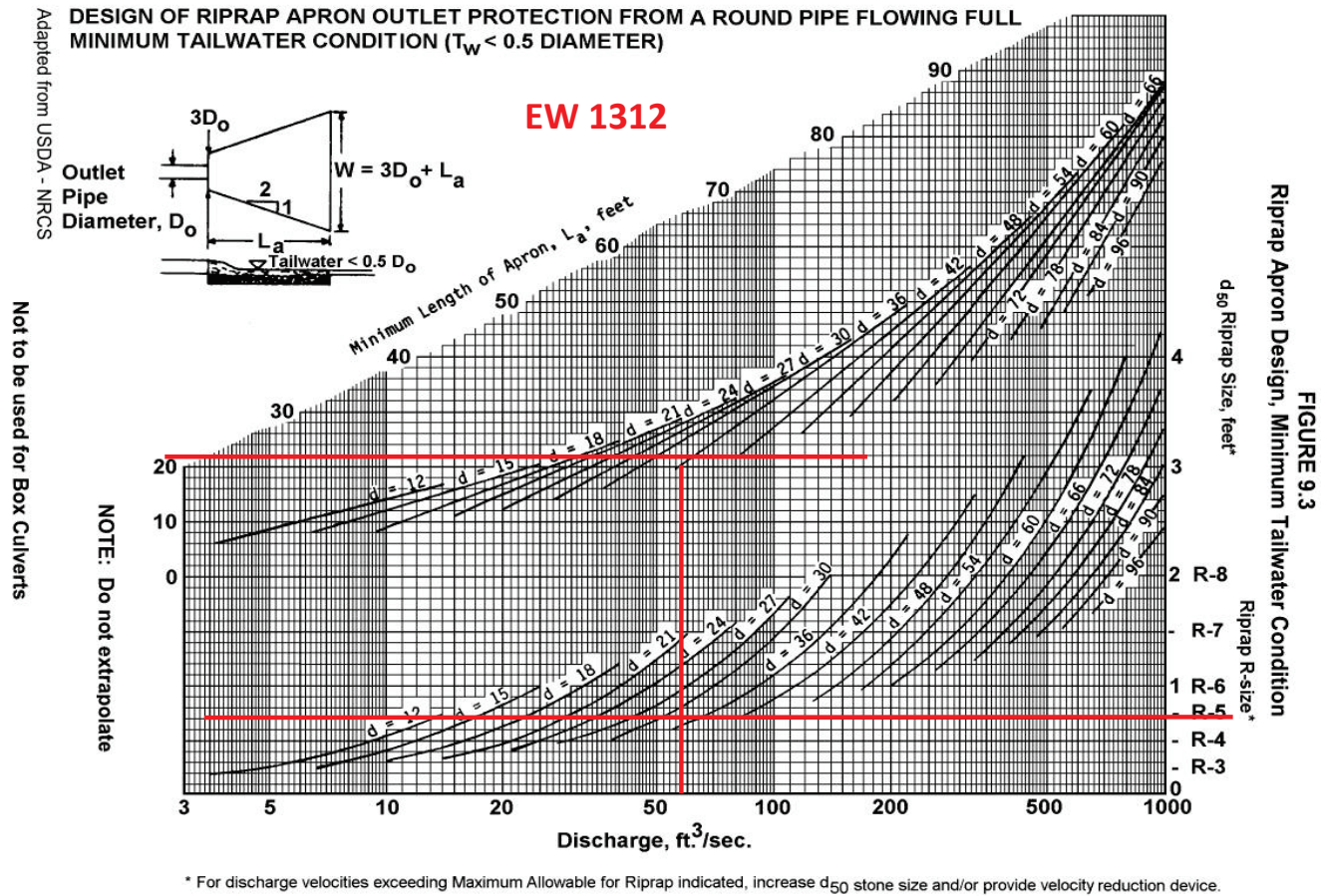


FIGURE 9.3
Riprap Apron Design, Minimum Tailwater Condition

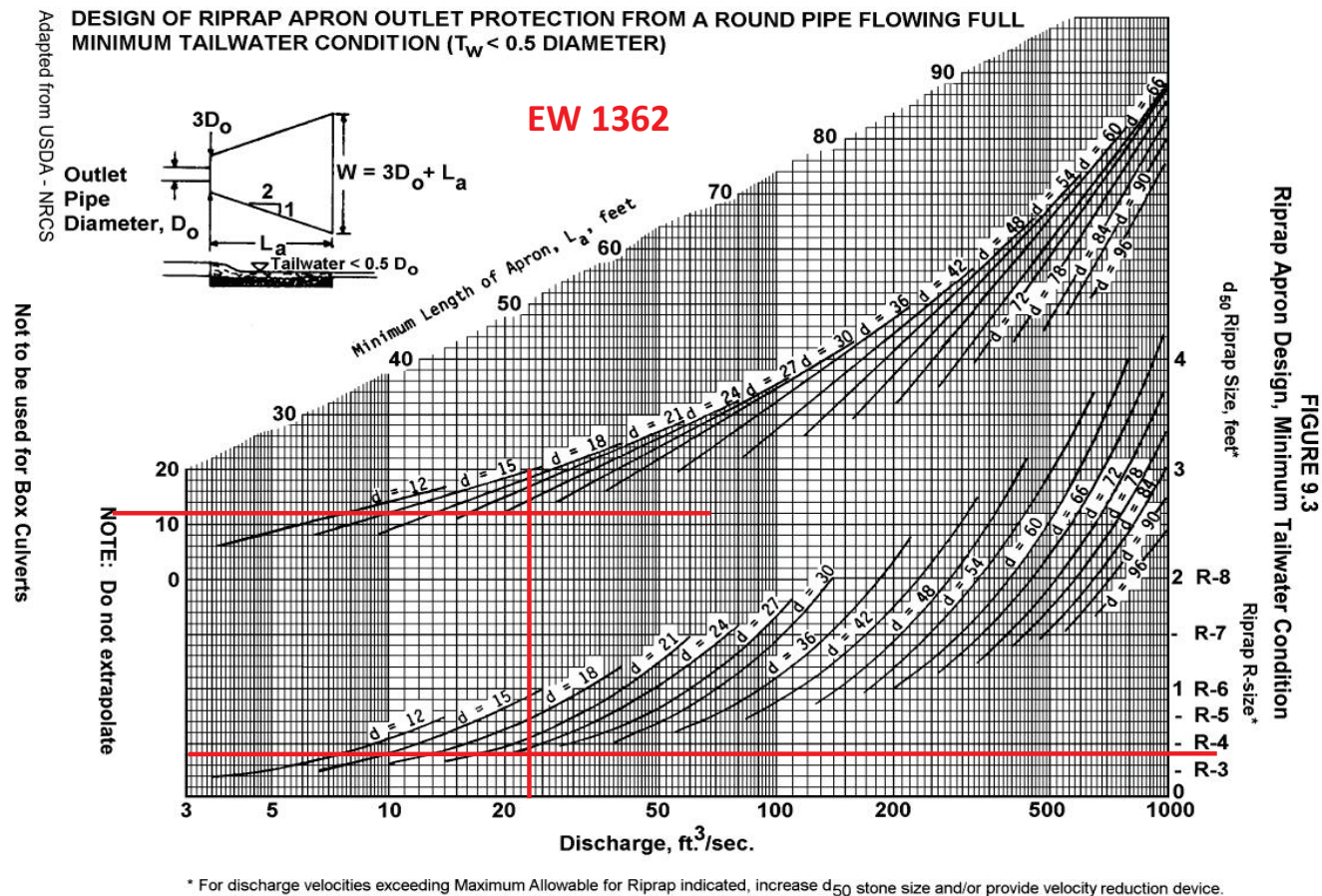
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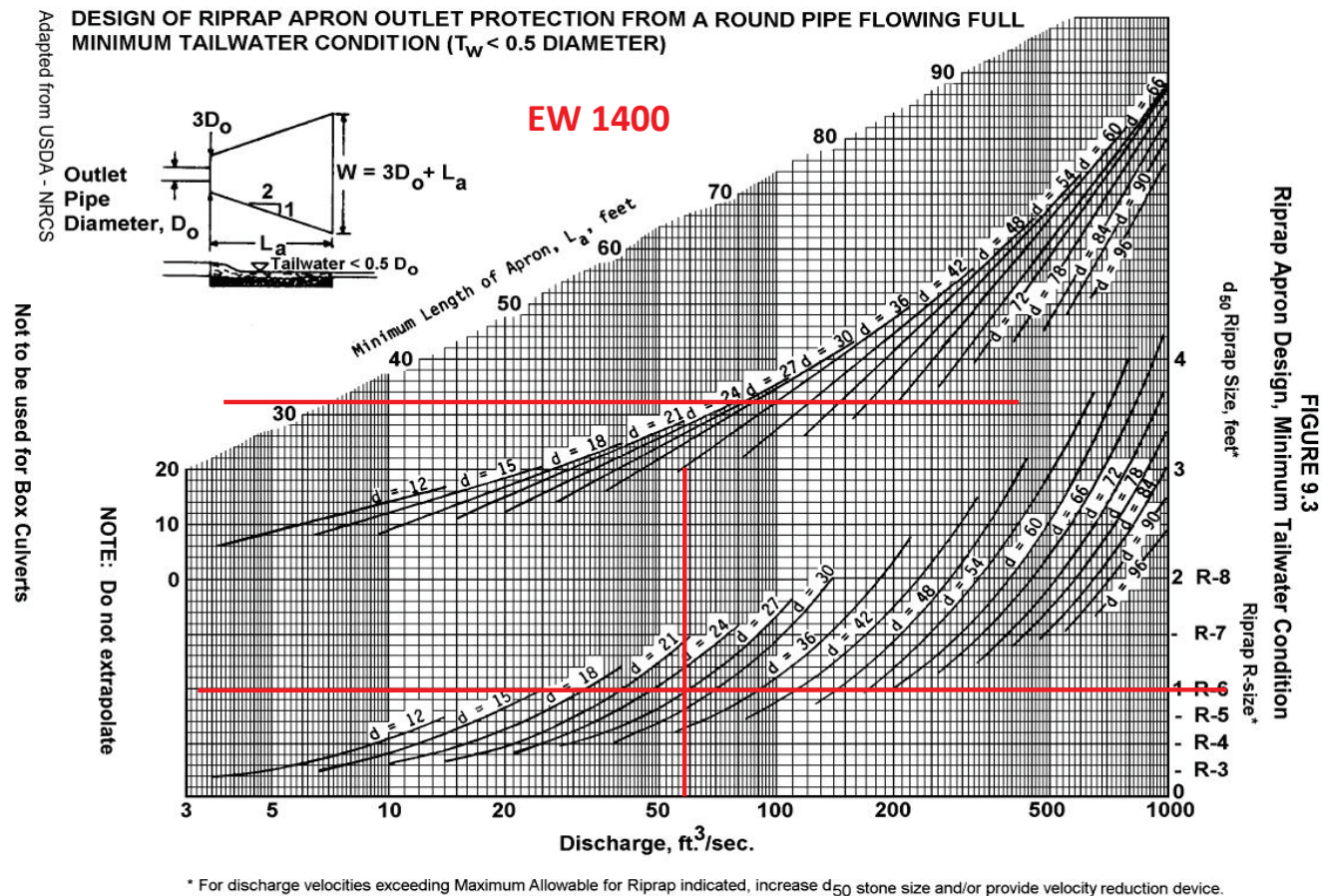


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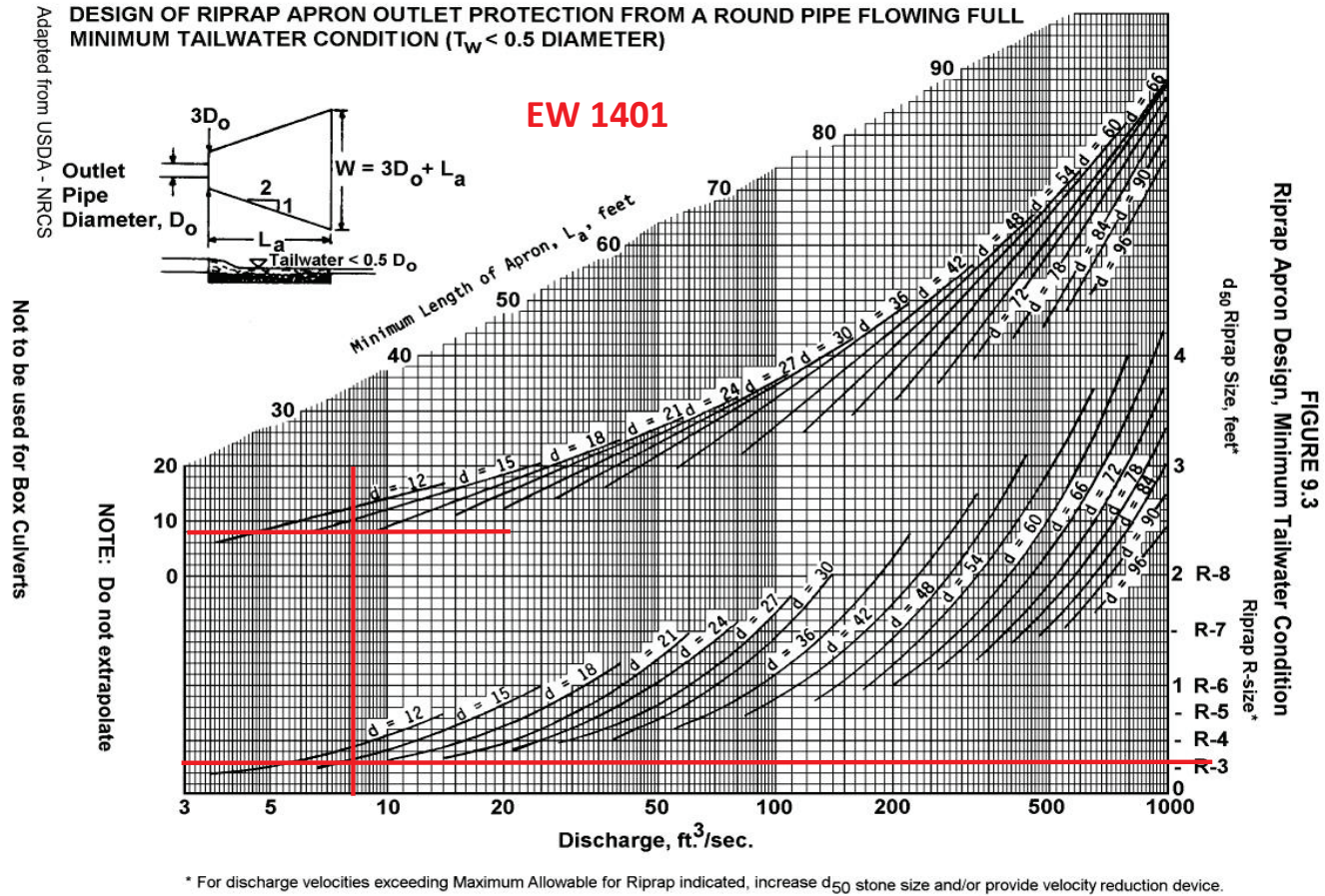
* For discharge velocities exceeding Maximum Allowable for Riprap indicated, increase d_{50} stone size and/or provide velocity reduction device.

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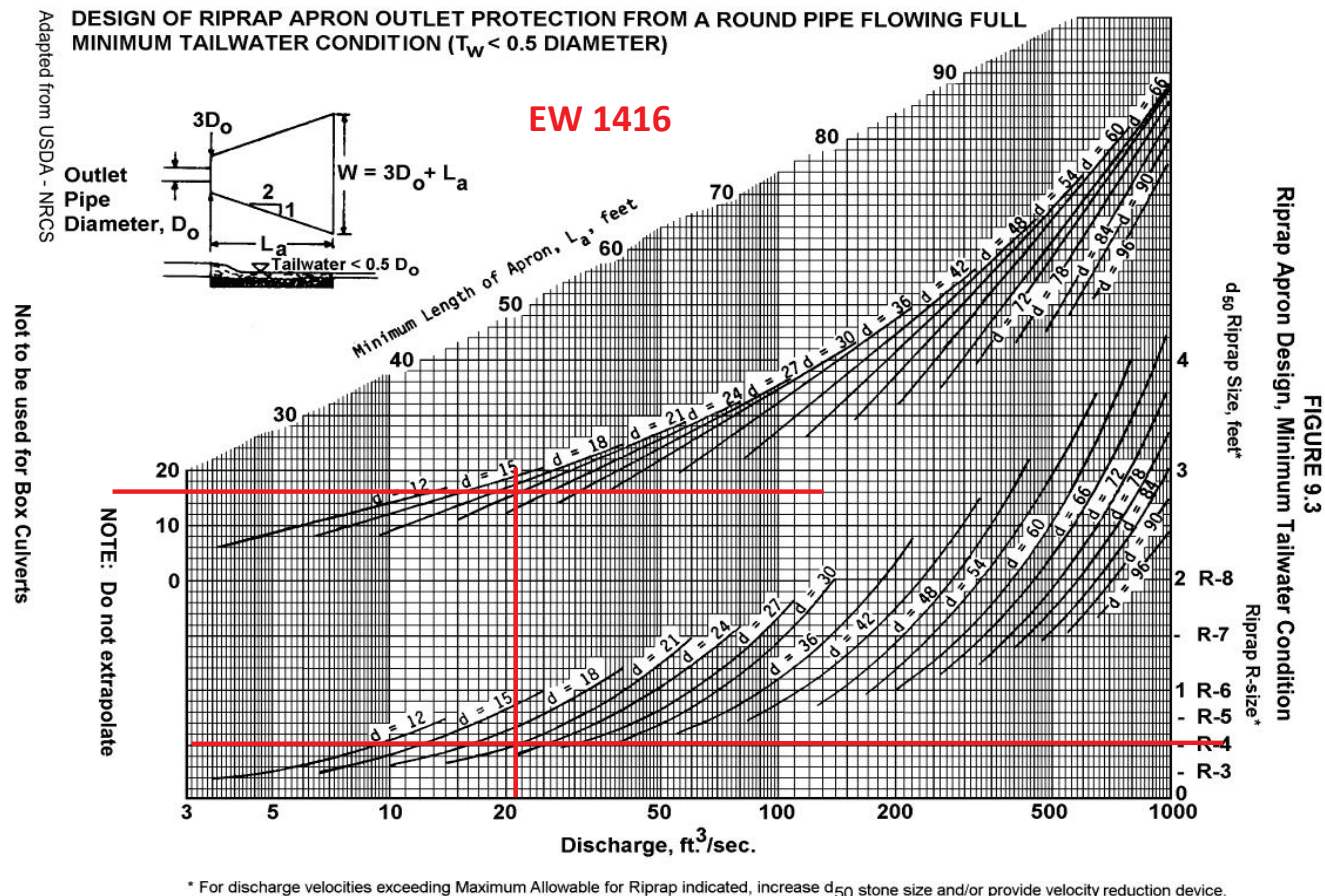


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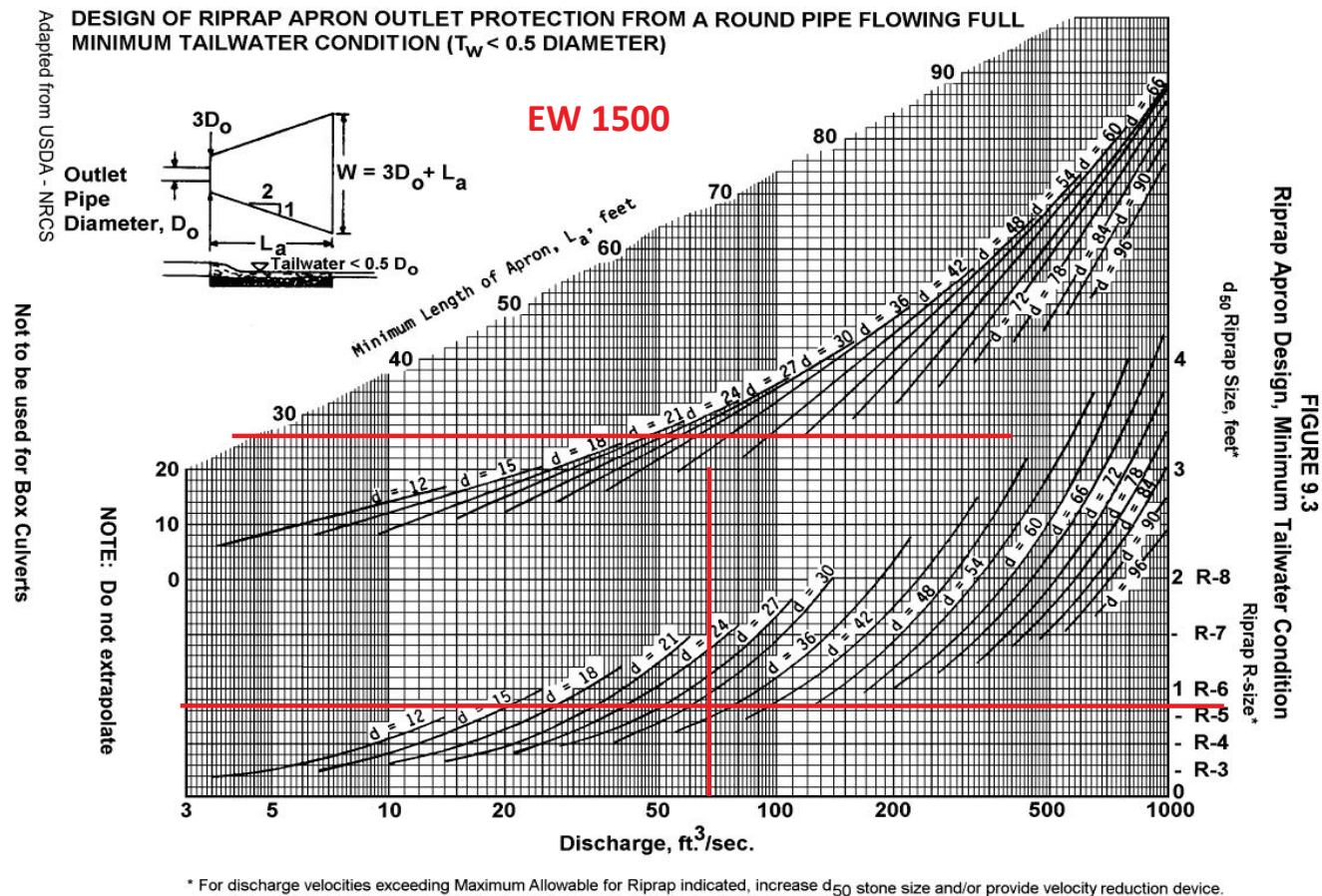
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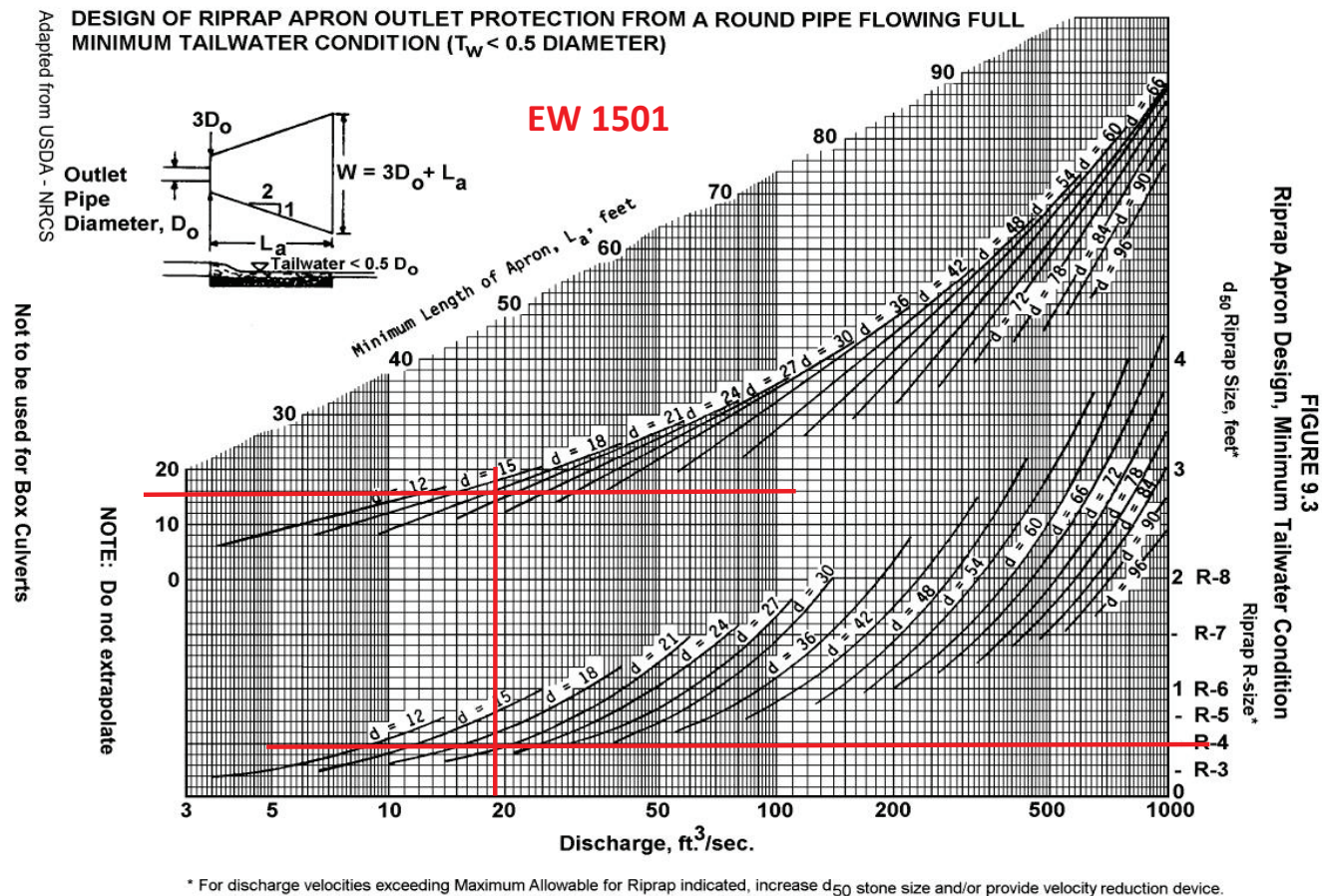
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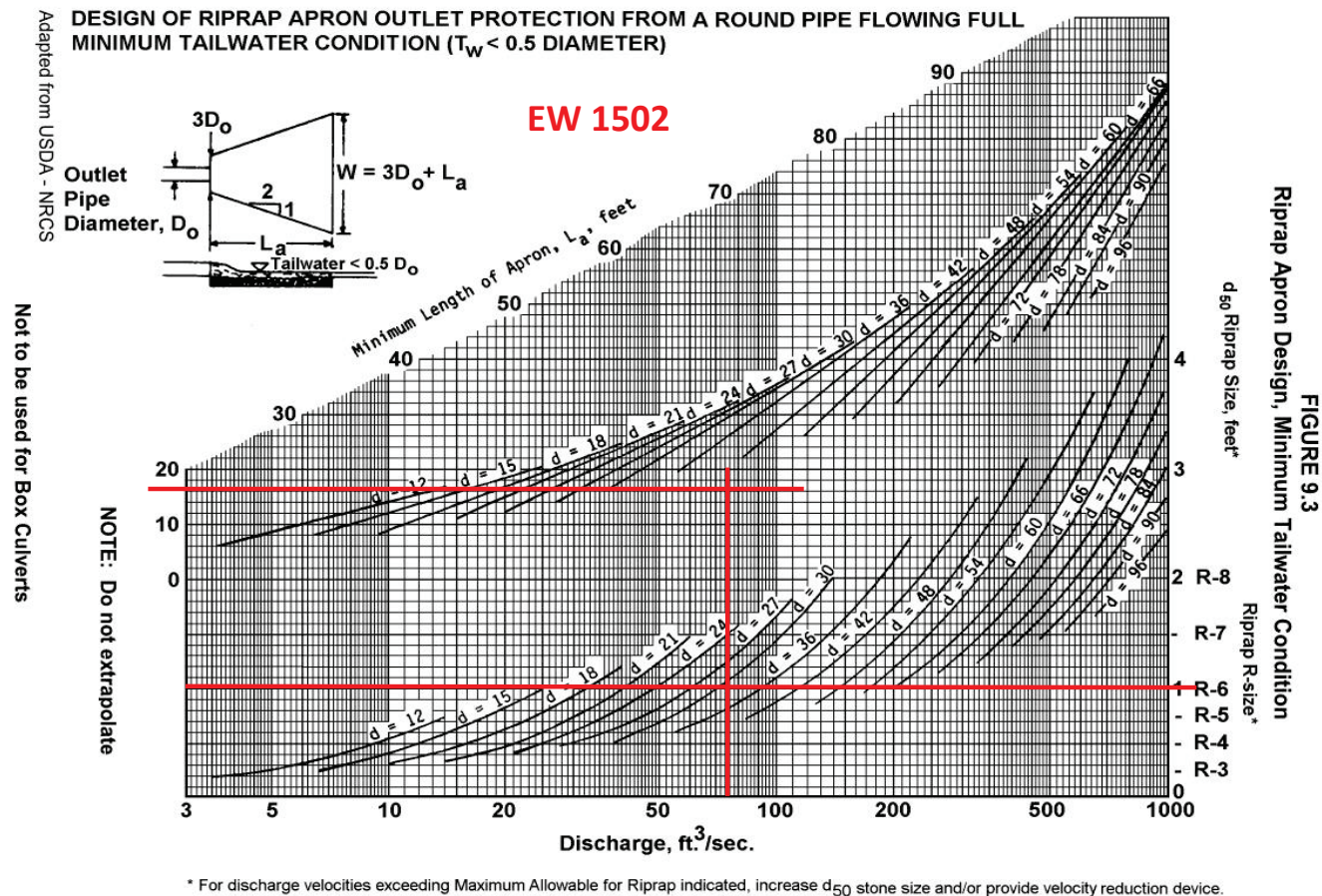
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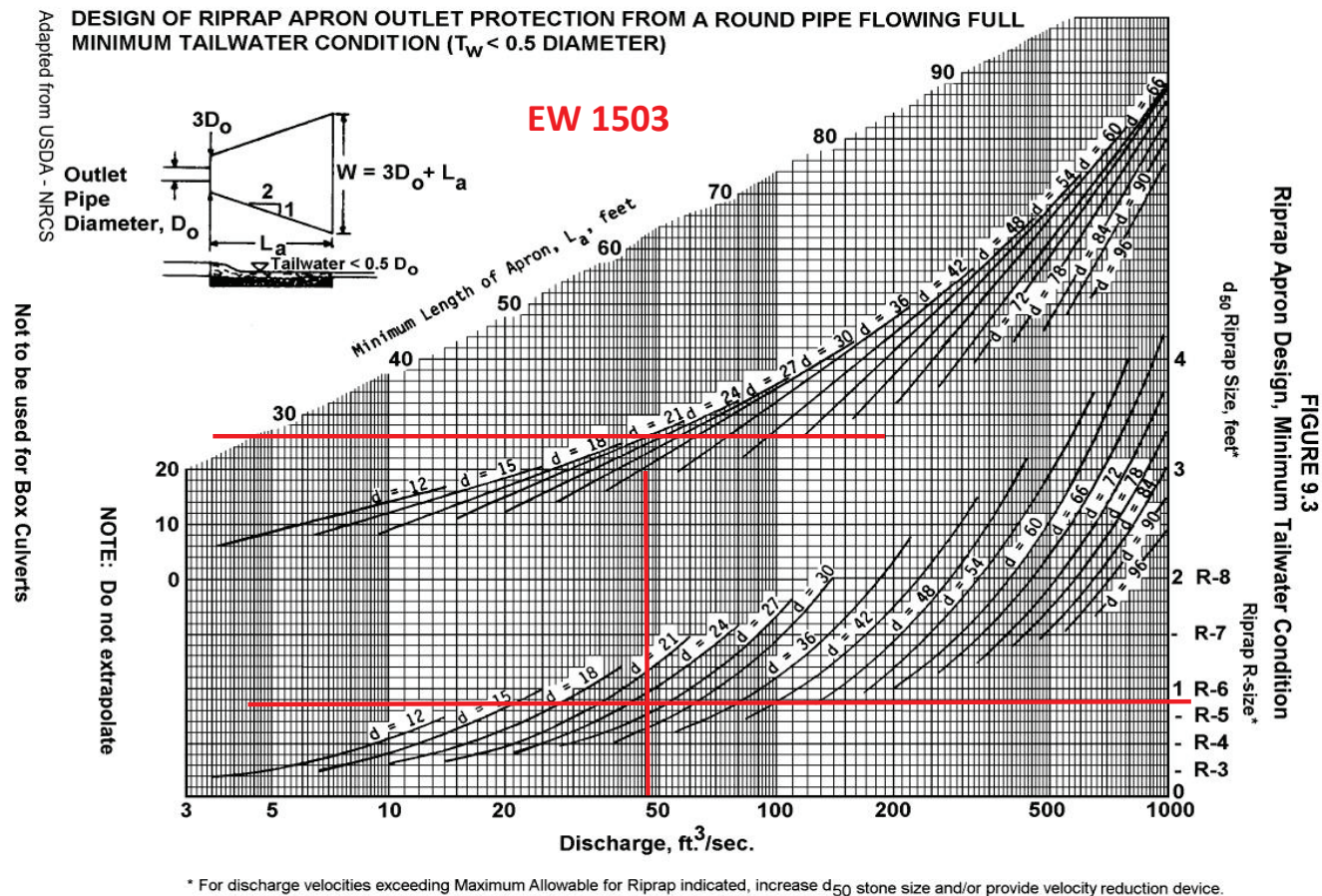


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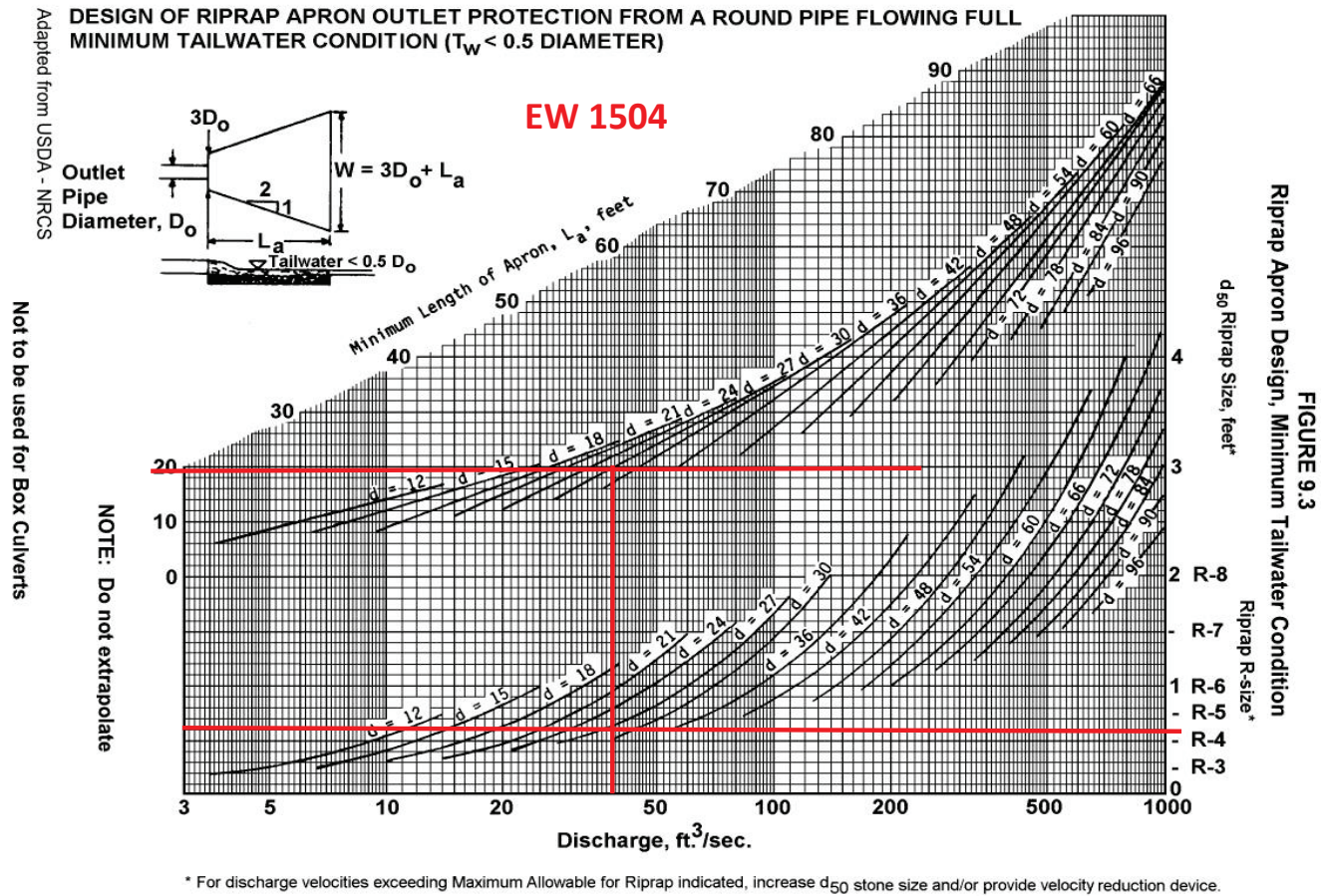
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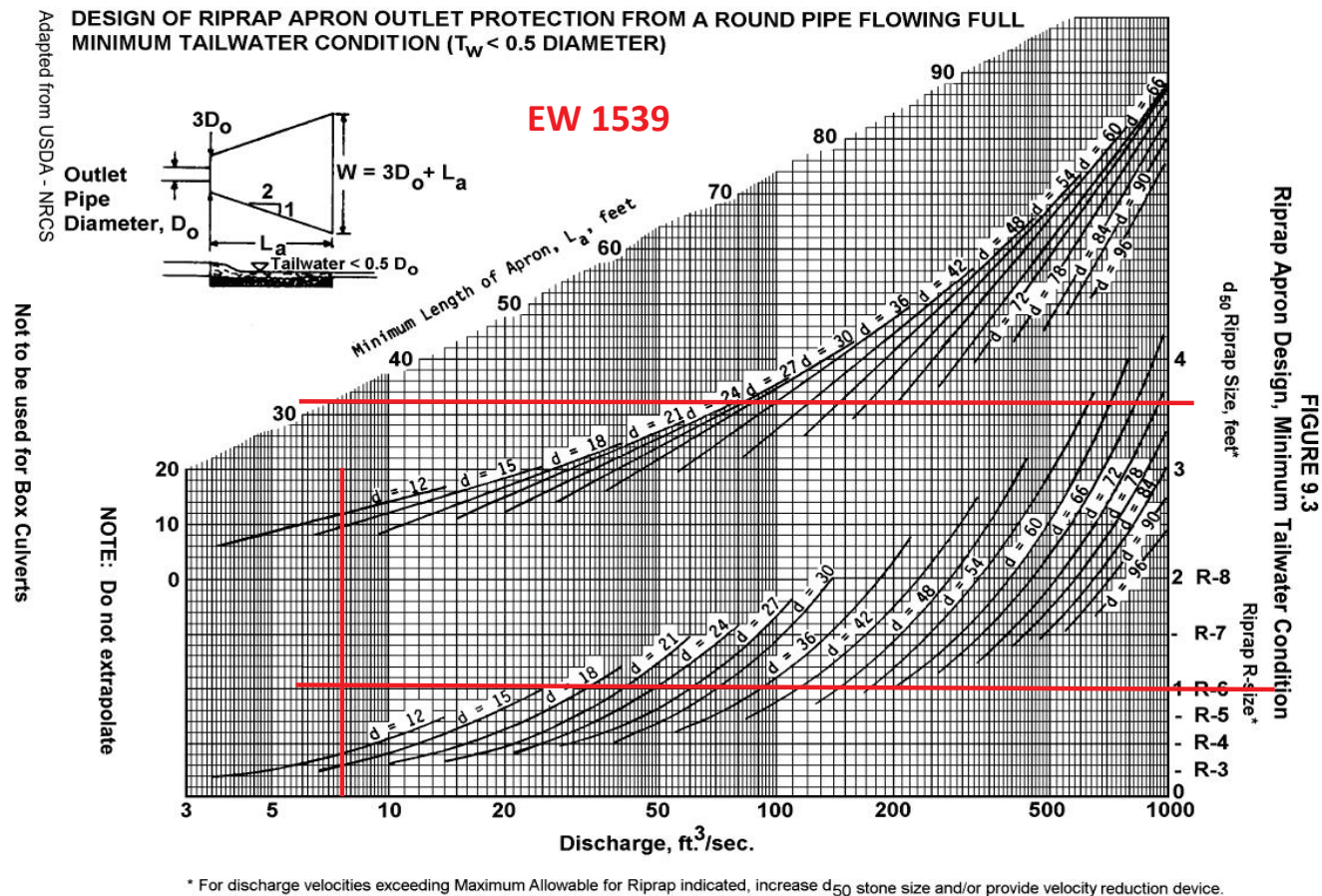


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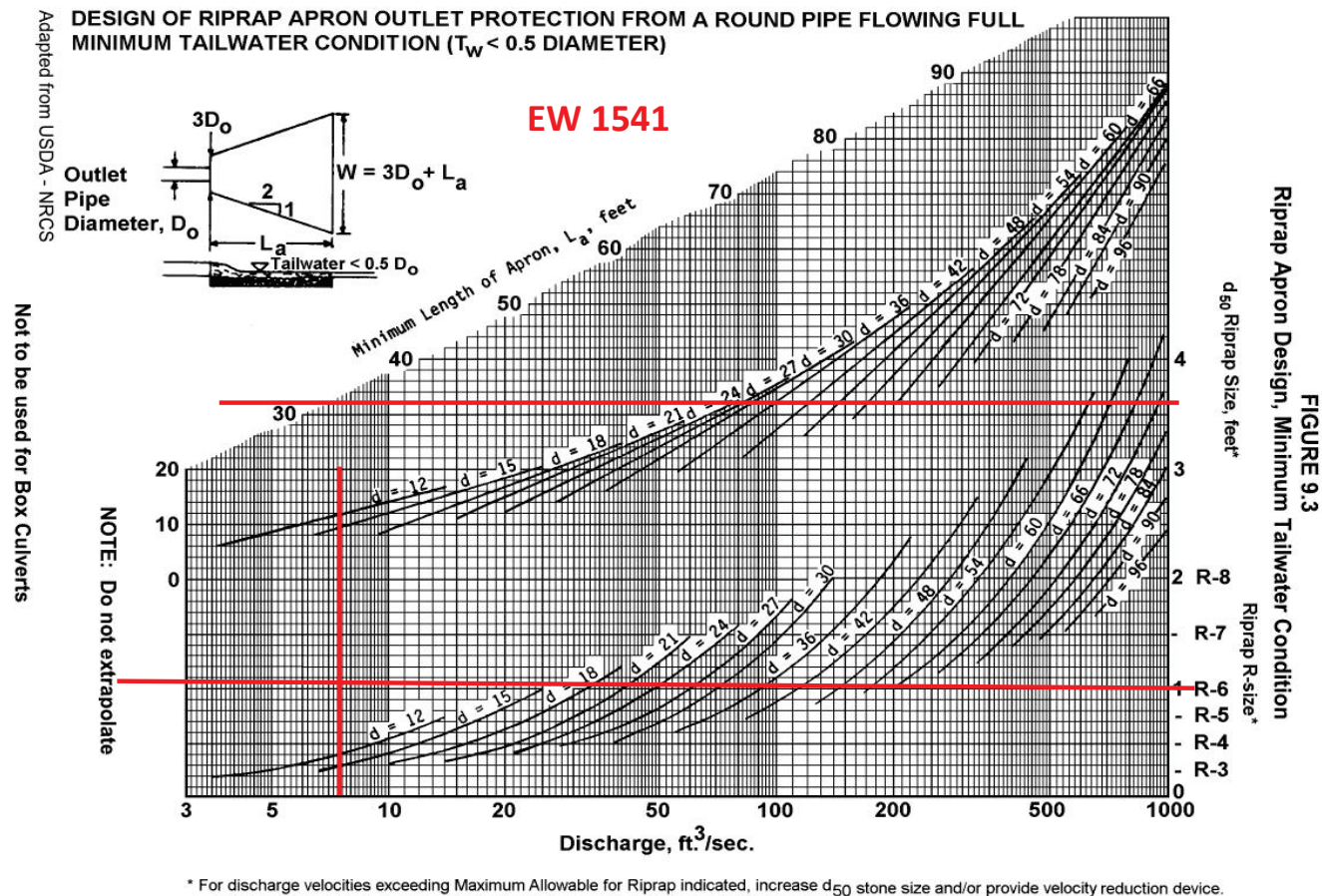


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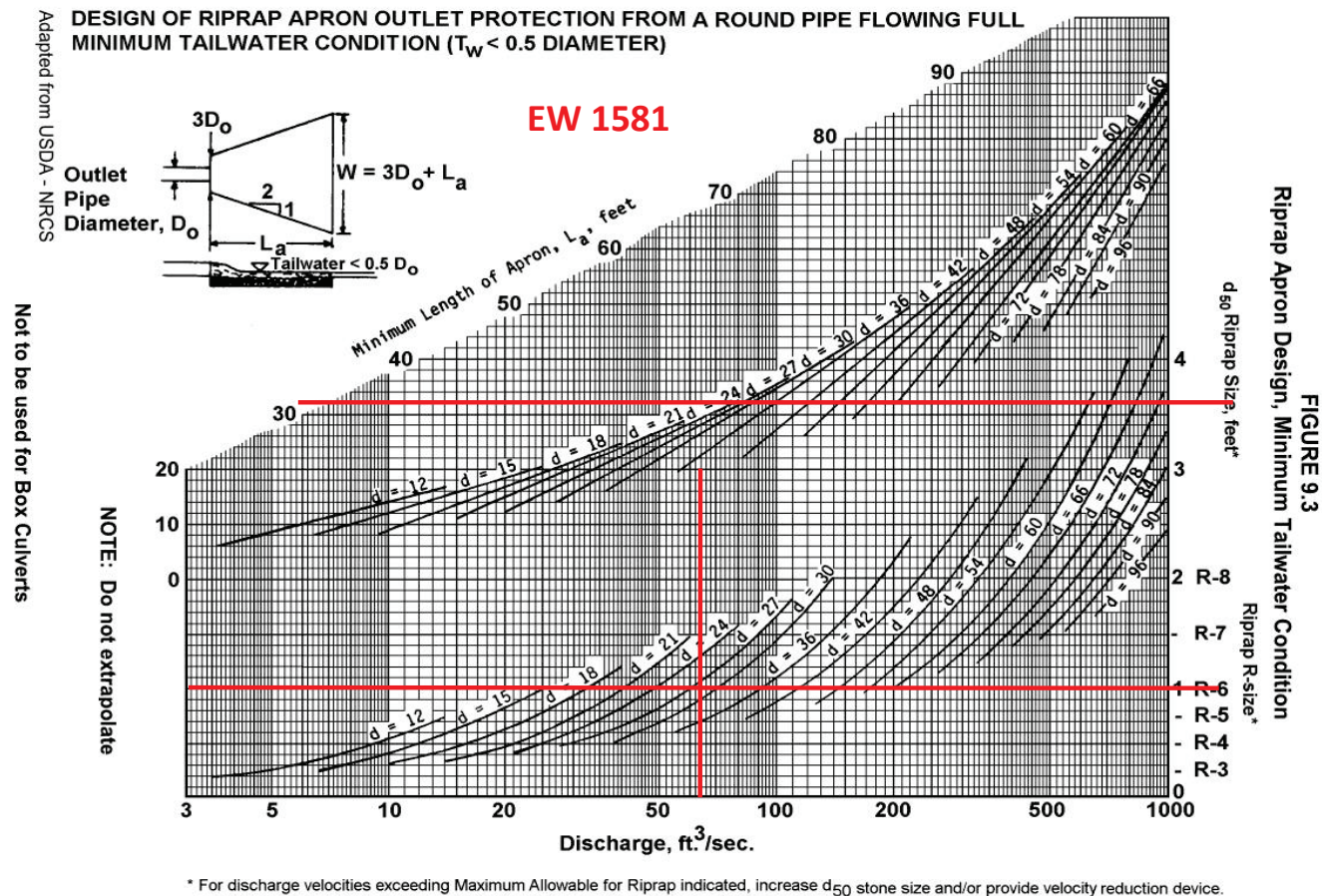


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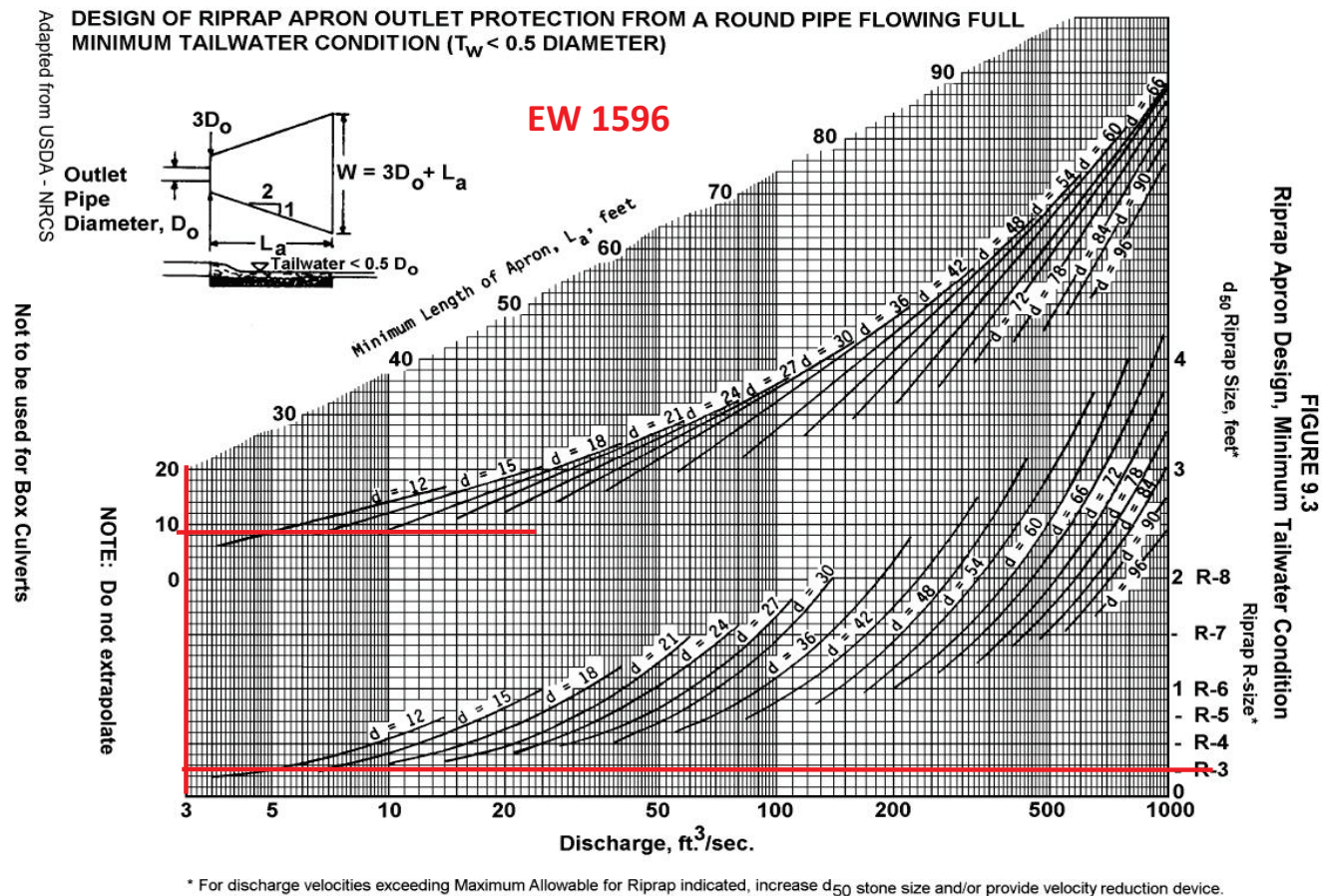


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PREPARED BY:	DATE: 6/17/2025
CHECKED BY:	DATE:

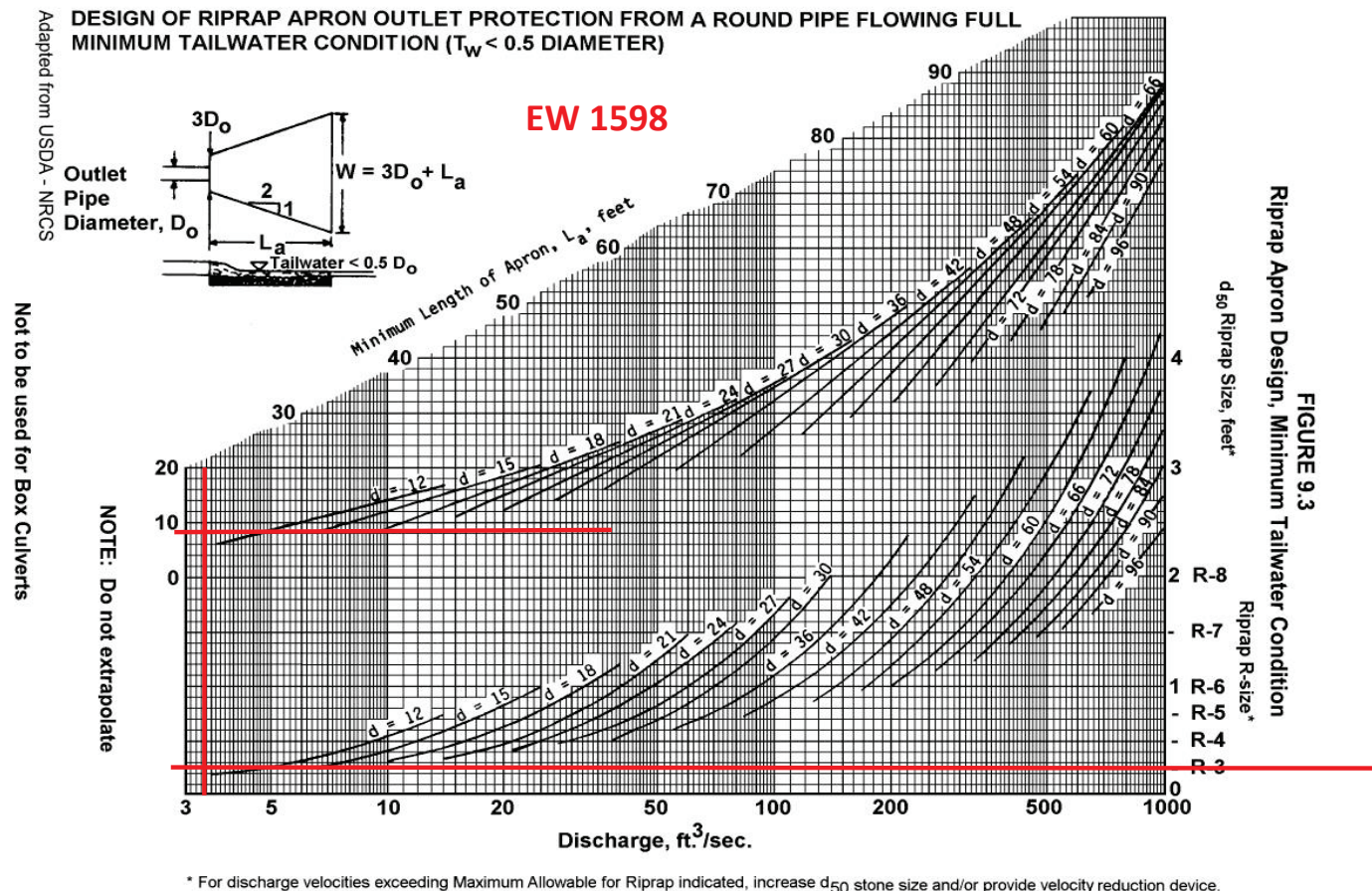


* For discharge velocities exceeding Maximum Allowable for Riprap indicated, increase d_{50} stone size and/or provide velocity reduction device.

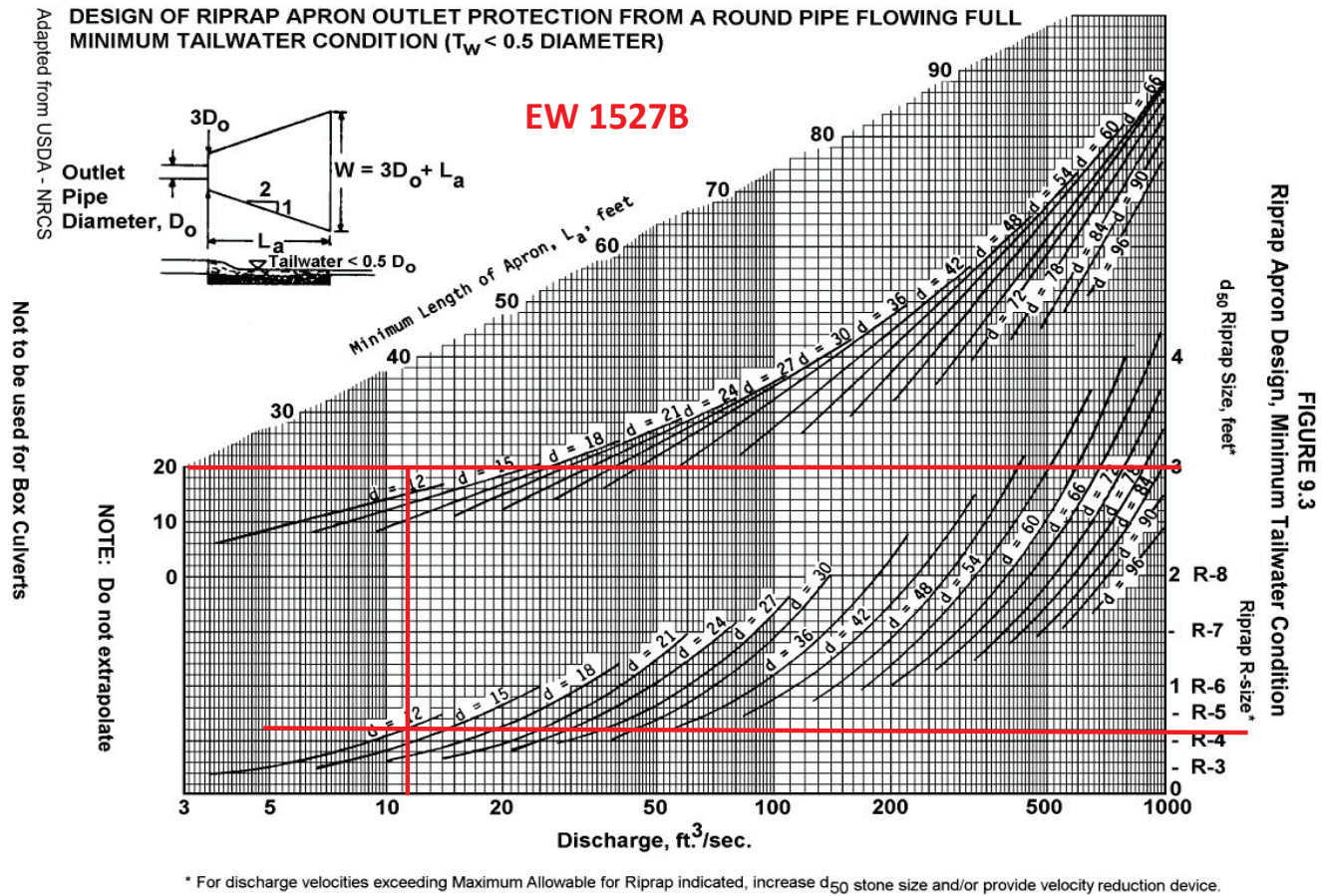
PROJECT NAME:	North Point Phase 3
LOCATION:	Falls Township, Bucks County, Pennsylvania
PREPARED BY:	DATE: 6/17/2025
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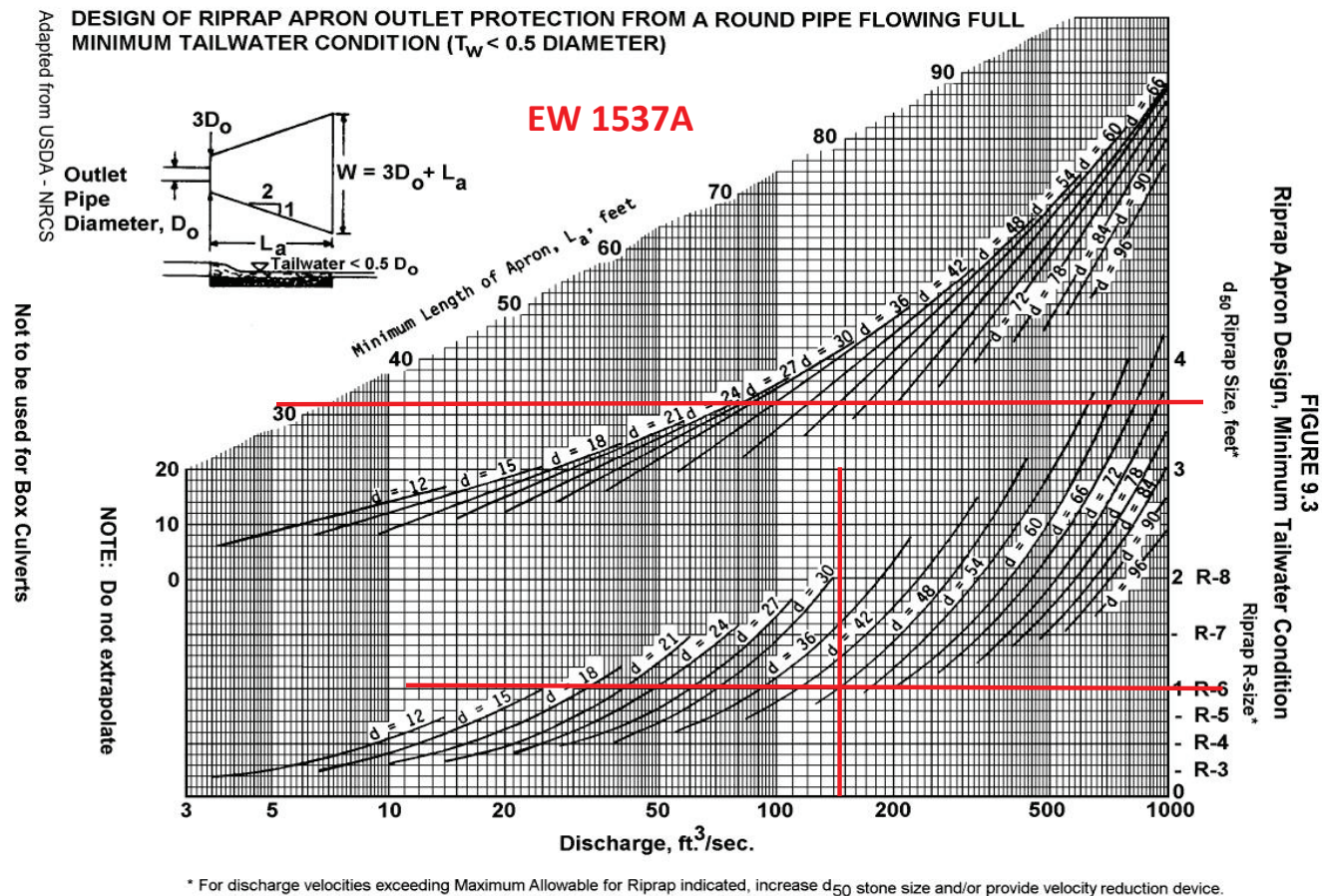
PROJECT NAME:	North Point Phase 3
LOCATION:	Falls Township, Bucks County, Pennsylvania
PREPARED BY:	DATE: 6/17/2025
CHECKED BY:	DATE:



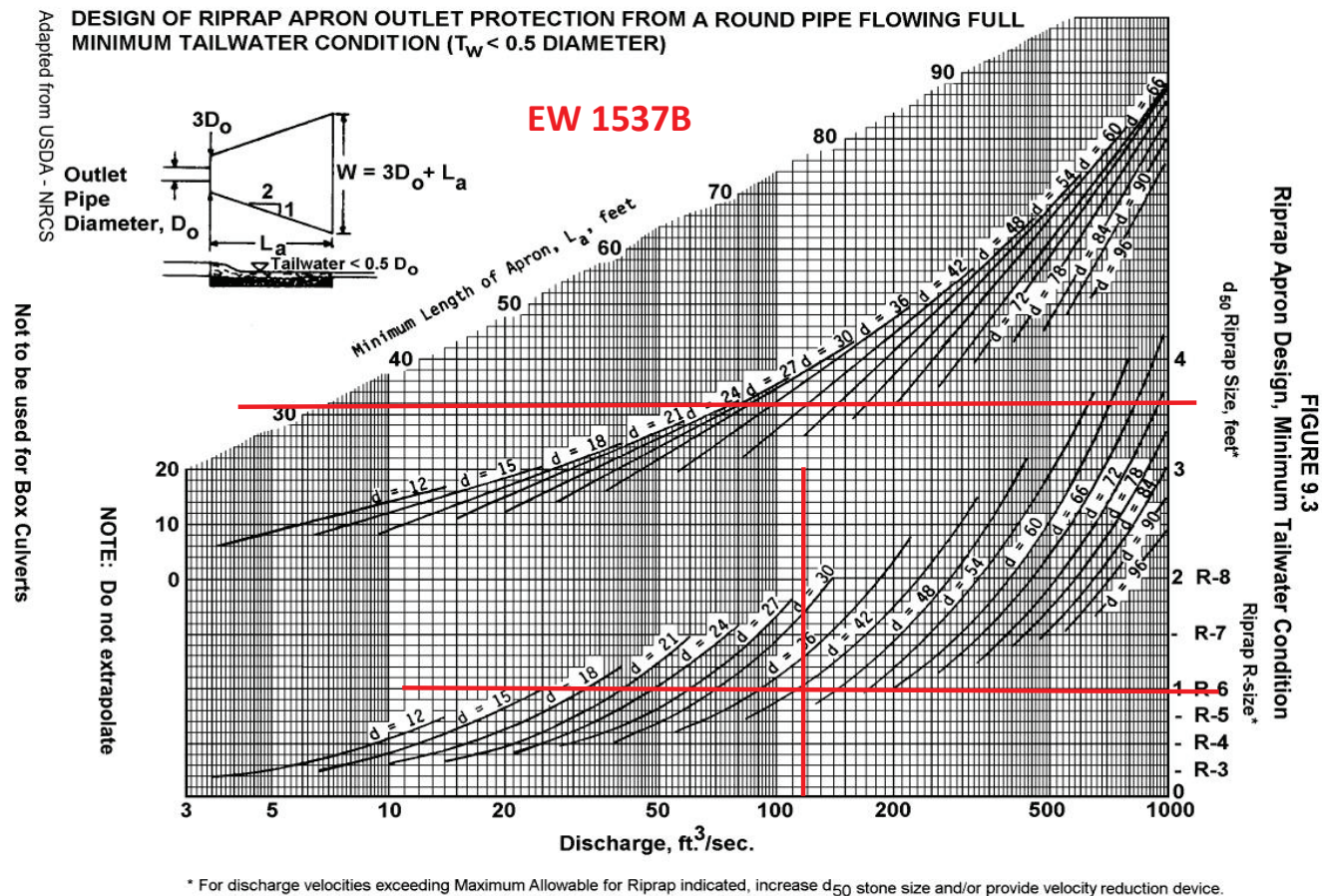
PROJECT NAME:	North Point Phase 3
LOCATION:	Falls Township, Bucks County, Pennsylvania
PREPARED BY:	DATE: 6/17/2025
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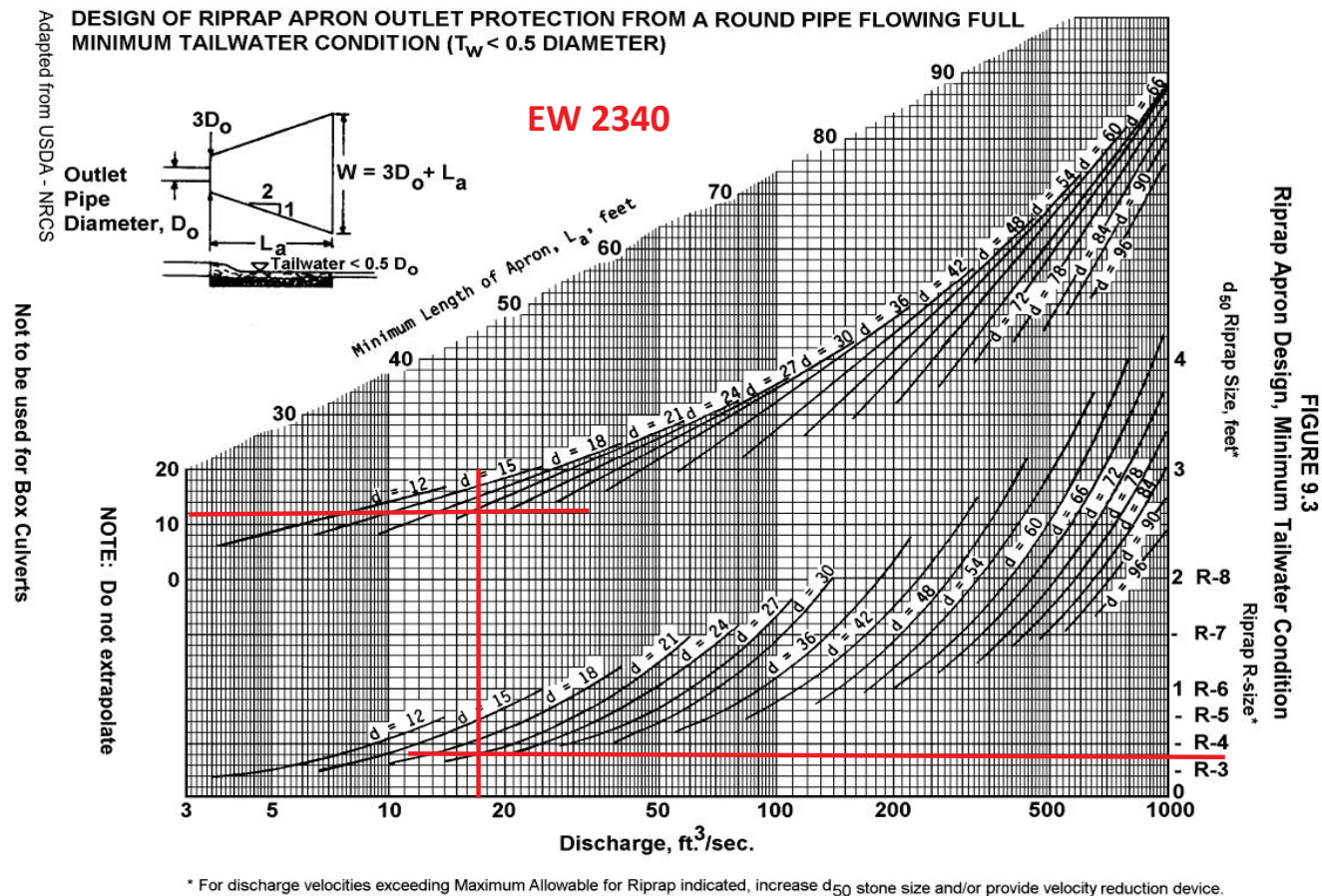
PROJECT NAME:	North Point Phase 3
LOCATION:	Falls Township, Bucks County, Pennsylvania
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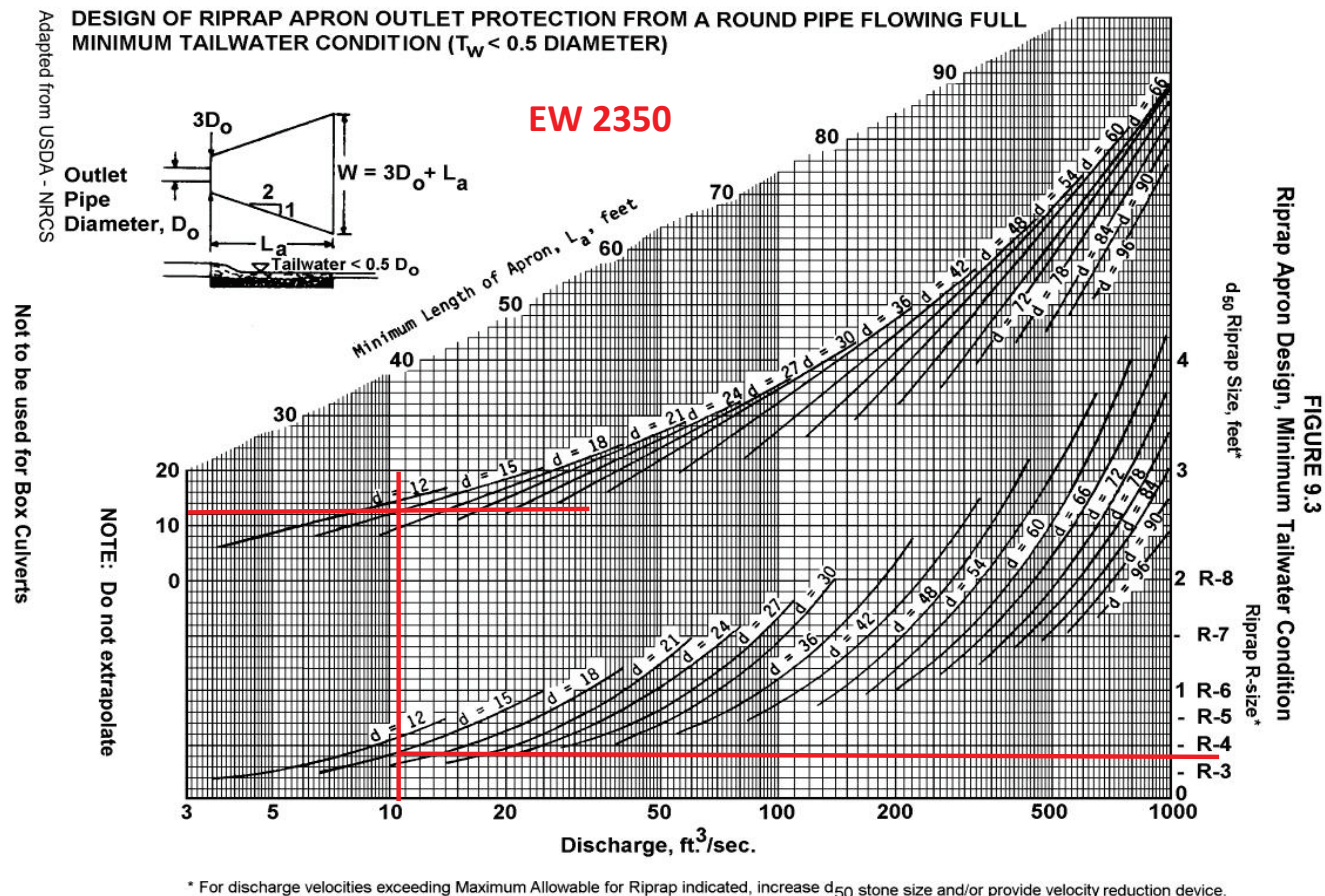
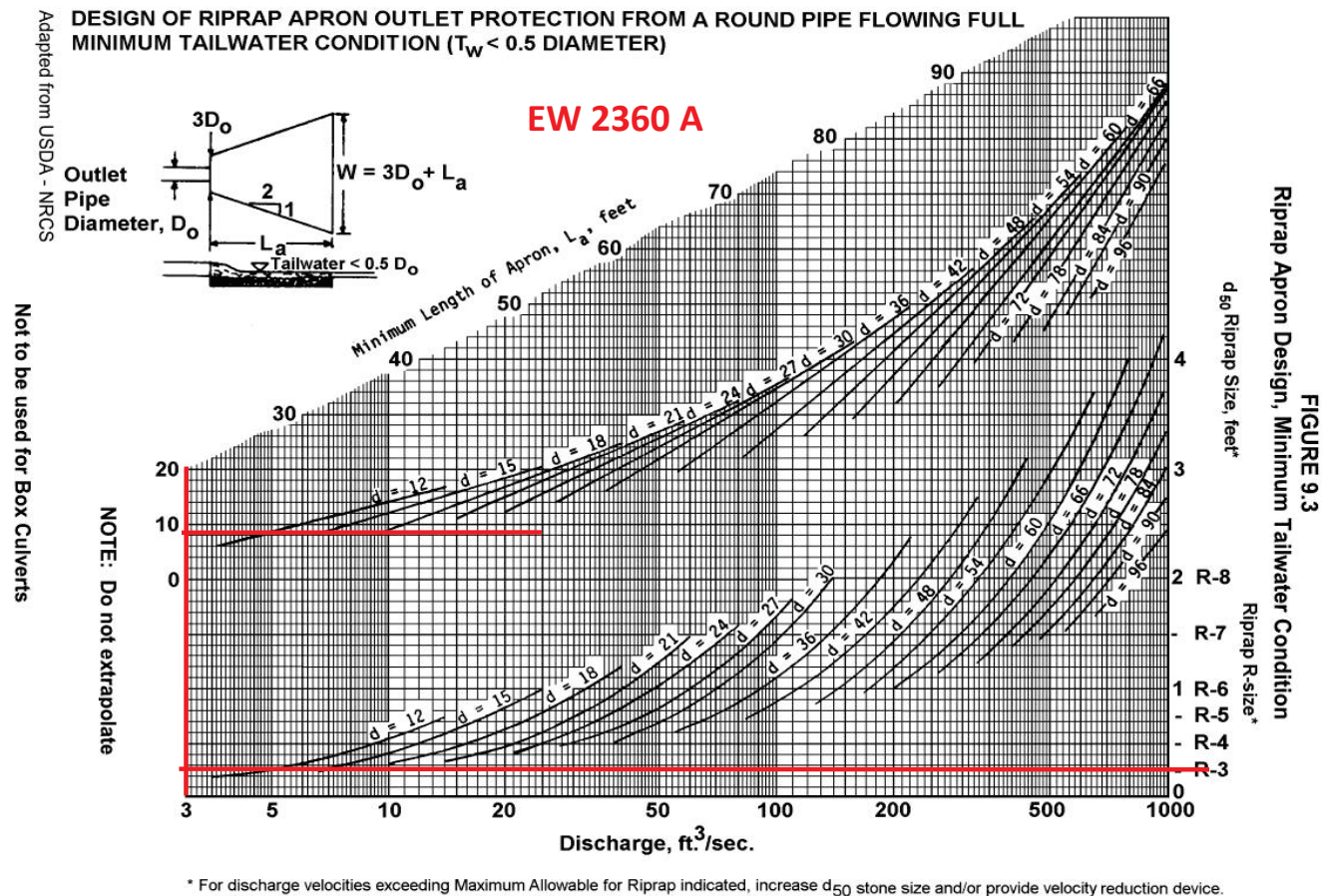
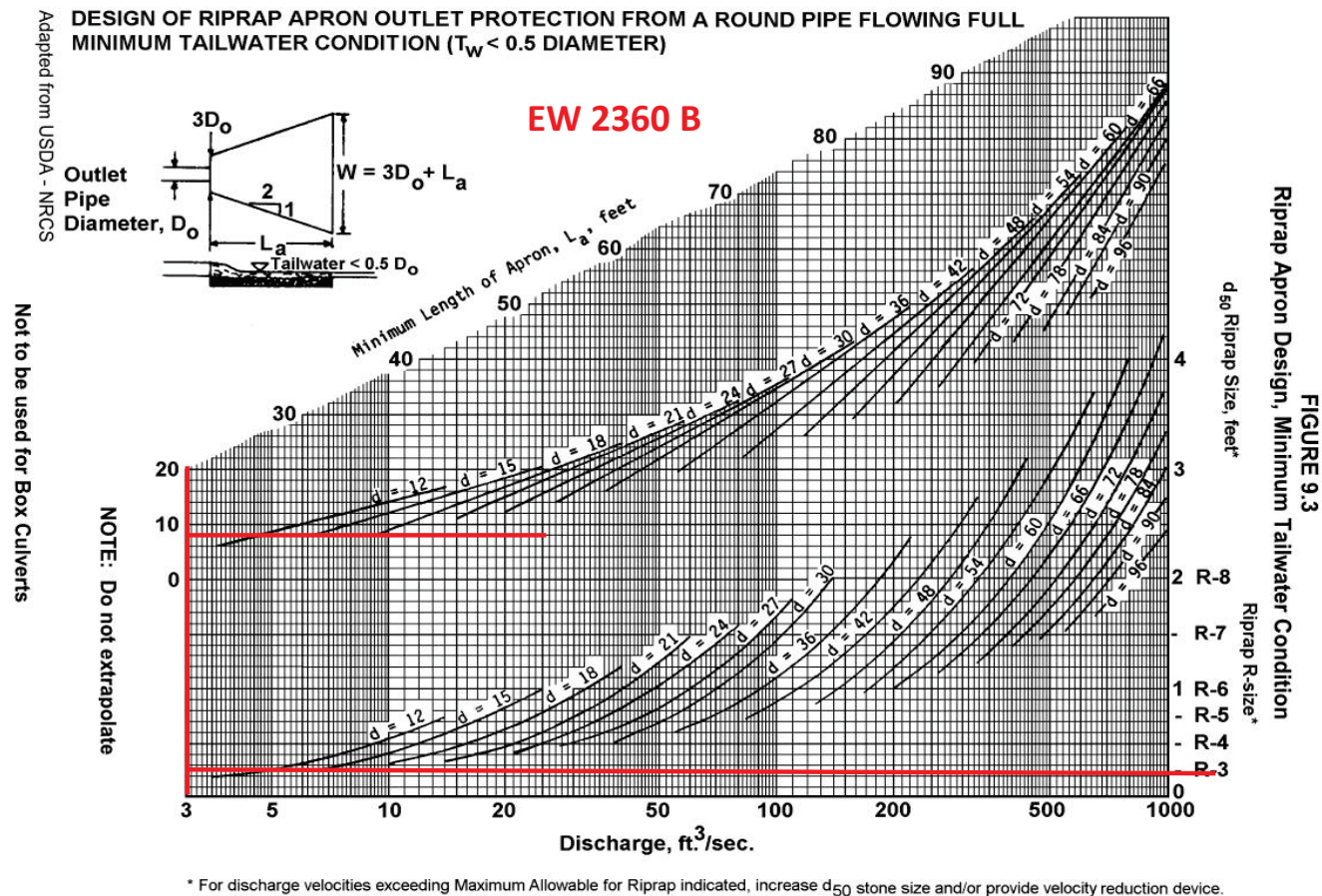


FIGURE 9.3
Riprap Apron Design, Minimum Tailwater Condition

PROJECT NAME:	North Point Phase 3
LOCATION:	Falls Township, Bucks County, Pennsylvania
PREPARED BY:	DATE: 6/17/2025
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PROJECT NAME:	North Point Phase 3
LOCATION:	Falls Township, Bucks County, Pennsylvania
PREPARED BY:	DATE: 6/17/2025
CHECKED BY:	DATE:



STANDARD WORKSHEET
Rip-Rap Apron Outlet Protection

PROJECT NAME:	NorthPoint Phase 3 - East	
LOCATION:	Falls Township	Bucks County
PREPARED BY:	TAS	DATE: 6/17/2025
CHECKED BY:		DATE:

METHODOLOGY:

Utilize PA D.E.P. *Erosion and Sediment Control Manual* to construct a Rock Apron at culvert, endwall, headwall or channel outfalls. First, tailwater condition must be determined (minimum or maximum). Second, with a known discharge, determine D50 rock size and length of apron "La". Third, determine the width and thickness of the apron. Lastly, ensure the permissible velocity of the rock size chosen is not exceeded by the velocity of the discharge entering the apron.

Equations Utilized:

Minimum Tailwater Condition: $W2 = 3do + La$
 Maximum Tailwater Condition: $W2 = 3do + 0.4La$
 Blanket Thickness: $T = 1.5 \cdot D_{max}$
 Discharge (Q) and Velocity (V) - obtained from the 100 Year Storm
 do = pipe diameter
 $Width\ 1$ = initial width of apron at end of structure
 $Width\ 2$ = terminal width of apron, W2

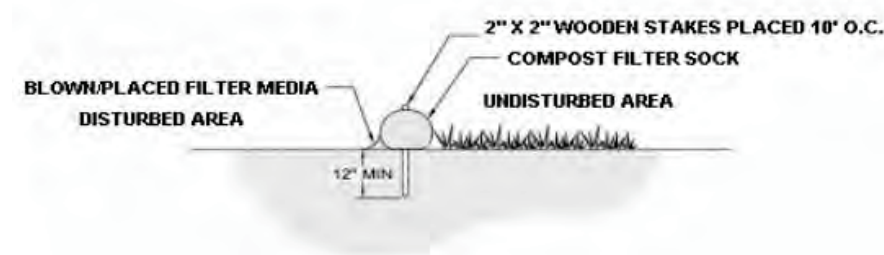
STRUCTURE DATA							RIP-RAP DATA			APRON DATA		
EW #	PIPE DIA.	Tailwtr Cond.	Mngs "n"	Pipe Slope	Q	V	D50	ROCK	Rock T	La	W at pipe	W at tailwtr
(in)	MIN/MAX			(%)	(cfs)	(fps)	(in.)	SIZE	(in.)	(ft)	(ft)	(ft)
Column1	Column2	Column3	Column4	Column5	Column6	Column7	Column8	Column9	Column10	Column11	Column12	Column13
1200	24	MIN	0.09	3.35	12.23	4.89	6	R-4	18	12	6	18
1201	48	MIN	0.09	2.27	73.28	9.29	12	R-6	36	26	12	38
1202	15	MIN	0.09	7.64	2.55	3.06	6	R-4	18	8	3.75	11.75
1205	36	MIN	0.09	2.31	12.20	1.78	9	R-5	27	20	9	29
1230	42	MIN	0.09	0.53	48.50	5.04	12	R-6	36	22	10.5	32.5
1231	24	MIN	0.09	7.91	10.26	7.28	6	R-4	18	12	6	18
1234	48	MIN	0.09	2.08	6.37	4.05	12	R-6	36	26	12	38
1238	36	MIN	0.09	4.18	30.73	5.66	9	R-5	27	20	9	29
1302	60	MIN	0.09	1.13	23.14	1.18	12	R-6	36	32	15	47
1303	18	MIN	0.09	1.78	6.78	5.02	6	R-4	18	8	4.5	12.5
1304	24	MIN	0.09	1.93	8.35	7.34	6	R-4	18	12	6	18
1307	15	MIN	0.09	11.48	1.20	6.32	6	R-4	18	8	3.75	11.75
1310	30	MIN	0.09	0.53	8.76	1.79	6	R-4	18	16	7.5	23.5
1311	60	MIN	0.09	0.83	6.30	4.80	12	R-6	36	32	15	47
1312	42	MIN	0.09	0.50	58.24	7.19	9	R-5	27	22	10.5	32.5
1362	24	MIN	0.09	3.67	23.10	7.72	6	R-4	18	12	6	18
1400	60	MIN	0.09	0.35	54.83	6.15	12	R-6	36	32	15	47
1401	15	MIN	0.09	7.14	8.25	6.91	6	R-4	18	8	3.75	11.75
1416	30	MIN	0.09	1.95	21.22	5.44	6	R-4	18	16	7.5	23.5
1500	48	MIN	0.09	0.43	64.73	6.65	12	R-6	36	26	12	38
1501	30	MIN	0.09	1.97	18.99	9.08	6	R-4	18	16	7.5	23.5
1502	60	MIN	0.09	0.50	78.08	6.35	12	R-6	36	32	15	47
1503	48	MIN	0.09	0.36	48.36	5.66	12	R-6	36	26	12	38
1504	36	MIN	0.09	0.79	39.74	5.62	9	R-5	27	20	9	29
1539	60	MIN	0.09	1.77	7.70	2.28	12	R-6	36	32	15	47
1541	60	MIN	0.09	5.24	7.70	2.28	12	R-6	36	32	15	47
1581	60	MIN	0.09	0.35	64.22	5.82	12	R-6	36	32	15	47
1596	15	MIN	0.09	4.73	0.68	1.64	6	R-4	18	8	3.75	11.75
1598	15	MIN	0.09	5.61	3.26	2.66	6	R-4	18	8	3.75	11.75
1527B	36	MIN	0.09	2.22	11.51	3.73	12	R-6	36	20	9	29
1537A	60	MIN	0.09	1.00	148.50	14.13	12	R-6	36	32	15	47
1537B	60	MIN	0.09	1.00	118.96	6.05	12	R-6	36	32	15	47

Note: Rock size selected has been increased from the suggested size based upon the (V) water velocity parameter energy.
 Dissipator shall be hand placed and dimensions adjusted to conform to the existing roadside conveyance.
 Stone larger than R-4 shall have stone filter blanket installed prior to the rip-rap in lieu of non-woven geotextile. Filter stone shall meet the following requirements:

Rip-rap Filter Blanket Requirements					
Gradation	depth	stone #	max.	d50	min.
R-5	6"	AASHTO #3	2"	1 1/2"	3/8"
R-6	8"	AASHTO #1	3 1/2"	2 1/2"	1/2"
R-7	10"	AASHTO #1	3 1/2"	2 1/2"	1/2"
R-8	12"	AASHTO #1	3 1/2"	2 1/2"	1/2"

	R-3	R-4	R-5	R-6	R-7	R-8
Vmax	6.5	9	11.5	13	14.5	17
D50	3	6	9	12	15	18

PROJECT NAME:	NorthPoint Area 3		
LOCATION:	Falls Township, Bucks County, Pennsylvania		
PREPARED BY:	TAS	DATE:	6/17/2025
CHECKED BY:		DATE:	



Sock #	Dia. (in)	Location (See E&S Plan)	Slope Percent %	Slope Length Above Barrier (ft)
CFS#1	12	South of Sediment Basin #15A	2.0%	30
CFS#2	12	Surrounding Sediment Basin #15B	2.0%	120
CFS#3	12	Surrounding Sediment Basin #15C	5.0%	35
CFS#4	18	Surrounding Sediment Basin #15D	2.5%	412
CFS#5	18	Surrounding Sediment Basin #14	2.5%	483
CFS#6	12	Surrounding Sediment Basin #12A	5.0%	40
CFS#7	12	Surrounding Sediment Basin #12B	5.0%	40
CFS#8	12	Surrounding Sediment Basin #12C	5.0%	40
CFS#9	12	Surrounding Sediment basin #12D	5.0%	40
CFS#10	12	Surrounding Canal 2 Extension Area 3	5.0%	42
CFS#11	12	Surrounding Canal 2 Extension Area 2	10.0%	47
CFS#12	12	Surrounding Canal 2 Extension Area 1	5.0%	45
CFS#13	12	Surrounding Sediment basin #13C	5.0%	85
CFS#14	12	Surrounding Sediment basin #13B	5.0%	80
CFS#15	12	Surrounding Sediment Basin #13A	2.0%	60
CFS#16	12	North of Sediment Basin #15A	2.0%	30
CFS#17	32	Surrounding Topsoil Stockpile West of Building C	33.3%	110
CFS#18	32	Surrounding Topsoil stockpile South of Building A	33.3%	110
CFS#19	32	Surrounding Topsoil Stockpile North of Building F	33.3%	110
CFS#20	32	Surrounding stockpile in between Building G & H	33.3%	110
CFS#21	32	West Surrounding Topsoil Stockpile in between D & E	33.3%	110
CFS#22	32	East Surrounding Topsoil Stockpile in between D & E	33.3%	110
CFS#23	32	Surrounding Topsoil Stockpile North of Building I	33.3%	110
CFS#24	32	Surrounding Topsoil stockpile East of Gas Pad	33.3%	110
CFS#25	32	Surrounding Topsoil Stockpile in between I & J	33.3%	110
CFS#26	32	Surrounding Topsoil Stockpile North of Sed Basin #13C	33.3%	110
CFS#27	32	Surrounding Topsoil Stockpile Canal ext. 2 & 3	33.3%	110
CFS#28	12	Surrounding Trench Drain South of Ancillary Building 2	2.0%	30
CFS#29	12	Surrounding Trench Drain North of Ancillary Building 2	2.0%	30
CFS#30	12	Surrounding Trench Drain South of Building A	2.0%	30
CFS#31	12	Surrounding Trench Drain South of Building B	2.0%	30
CFS#32	12	Surrounding Trench Drain North of Building C	2.0%	30
CFS#33	12	Surrounding Trench Drain South of Building D	2.0%	30
CFS#34	12	Surrounding Trench Drain North of Building E	2.0%	30
CFS#35	12	Surrounding Trench Drain West of Building F	2.0%	30
CFS#36	12	Surrounding Trench Drain East of Building G	2.0%	30
CFS#37	12	Surrounding Trench Drain West of Building H	2.0%	30
CFS#38	12	Surrounding Trench Drain East of Building I	2.0%	30
CFS#39	12	Surrounding Trench Drain West of Building J	2.0%	30
CFS#40	32	Surrounding Topsoil Stockpile West of Building F	33.3%	110
CFS#41	32	Surrounding Topsoil Stockpile West of Building J	33.3%	110



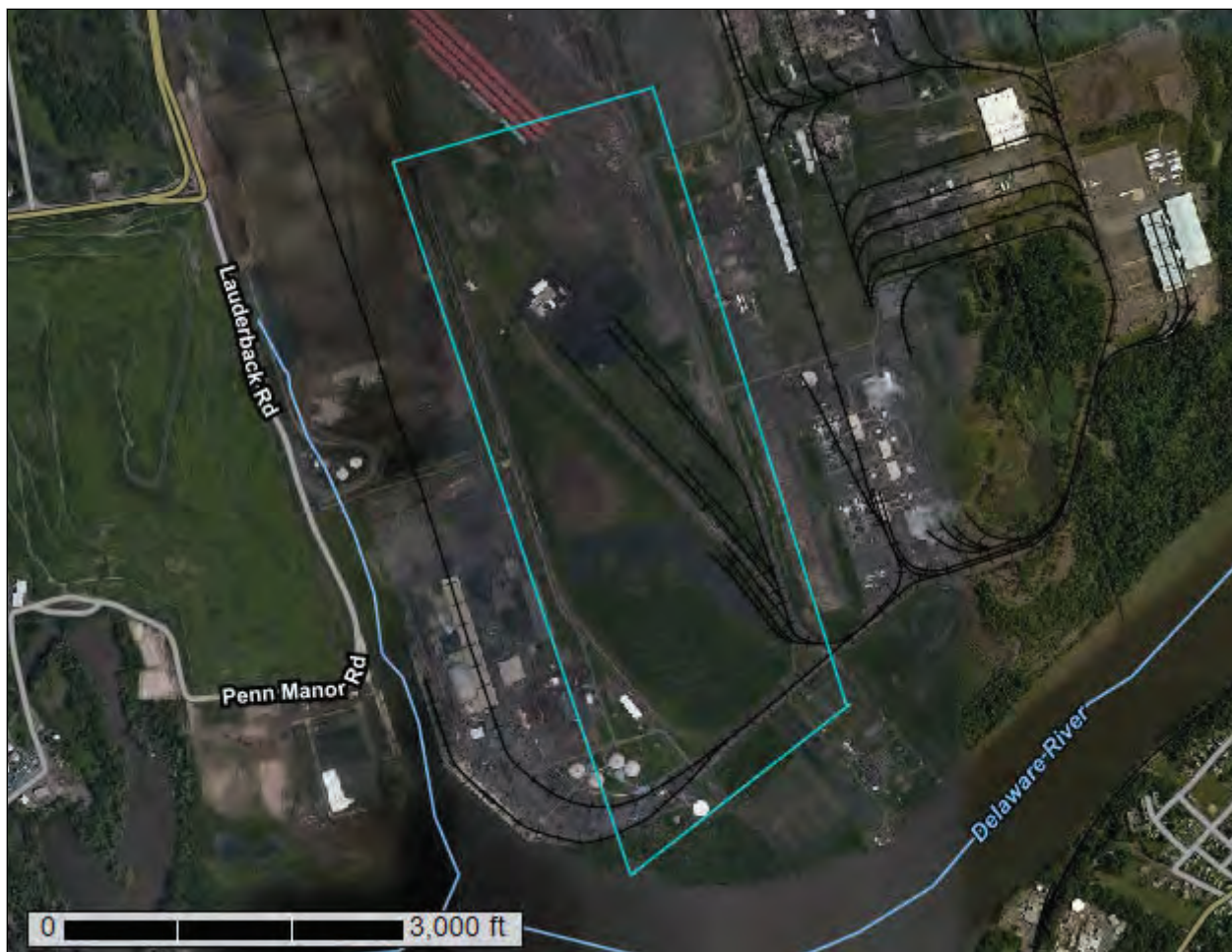
United States
Department of
Agriculture

NRCS

Natural
Resources
Conservation
Service

A product of the National
Cooperative Soil Survey,
a joint effort of the United
States Department of
Agriculture and other
Federal agencies, State
agencies including the
Agricultural Experiment
Stations, and local
participants

Custom Soil Resource Report for **Bucks County, Pennsylvania**



Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

Custom Soil Resource Report

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report Soil Map



Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
MW	Miscellaneous water	3.6	1.1%
Ua	Udorthents, gravelly	85.0	25.6%
UfuB	Urban land, 0 to 8 percent slopes	234.0	70.4%
W	Water	9.8	2.9%
Totals for Area of Interest		332.4	100.0%

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The

delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Bucks County, Pennsylvania

MW—Miscellaneous water

Map Unit Setting

National map unit symbol: 1j3ml
Mean annual precipitation: 36 to 46 inches
Mean annual air temperature: 46 to 56 degrees F
Frost-free period: 135 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition

Water, mlra non-potable: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Water, Mlra Non-potable

Interpretive groups

Land capability classification (irrigated): None specified
Forage suitability group: Unnamed (G071XY0NENE)
Other vegetative classification: Unnamed (G071XY0NENE)
Hydric soil rating: Unranked

Ua—Udorthents, gravelly

Map Unit Setting

National map unit symbol: 17sj
Elevation: 0 to 600 feet
Mean annual precipitation: 35 to 50 inches
Mean annual air temperature: 45 to 57 degrees F
Frost-free period: 110 to 210 days
Farmland classification: Not prime farmland

Map Unit Composition

Udorthents, gravelly, and similar soils: 90 percent
Minor components: 4 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents, Gravelly

Setting

Landform: Flats

Typical profile

A - 0 to 3 inches: gravelly coarse sand
C - 3 to 50 inches: very gravelly coarse sand
2C - 50 to 62 inches: extremely cobbly coarse sand

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: 72 to 99 inches to paralithic bedrock

Custom Soil Resource Report

Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: About 30 to 72 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Mattapex

Percent of map unit: 1 percent
Landform: Terraces—outwash or marine
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Matapeake

Percent of map unit: 1 percent
Landform: Hillslopes
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Delaware

Percent of map unit: 1 percent
Landform: Terraces
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Tread
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Hydric soil rating: No

Othello

Percent of map unit: 1 percent
Landform: Terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

UfuB—Urban land, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: 17sq

Elevation: 800 to 1,500 feet

Mean annual precipitation: 36 to 46 inches

Mean annual air temperature: 41 to 62 degrees F

Frost-free period: 130 to 170 days

Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 90 percent

Minor components: 10 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

Parent material: Pavement, buildings and other artificially covered areas human transported material

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8s

Hydric soil rating: No

Minor Components

Udorthents, unstable fill

Percent of map unit: 10 percent

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: No

W—Water

Map Unit Setting

National map unit symbol: 17th

Mean annual precipitation: 36 to 50 inches

Mean annual air temperature: 46 to 59 degrees F

Frost-free period: 120 to 214 days

Farmland classification: Not prime farmland

Map Unit Composition

Water: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Water

Setting

Parent material: Rivers streams ponds

Properties and qualities

Runoff class: Negligible

Frequency of ponding: Frequent

Soil Information for All Uses

Soil Reports

The Soil Reports section includes various formatted tabular and narrative reports (tables) containing data for each selected soil map unit and each component of each unit. No aggregation of data has occurred as is done in reports in the Soil Properties and Qualities and Suitabilities and Limitations sections.

The reports contain soil interpretive information as well as basic soil properties and qualities. A description of each report (table) is included.

Water Features

This folder contains tabular reports that present soil hydrology information. The reports (tables) include all selected map units and components for each map unit. Water Features include ponding frequency, flooding frequency, and depth to water table.

Hydrologic Soil Group and Surface Runoff (Custom Soils Report)

This table gives estimates of various soil water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Custom Soil Resource Report

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas.

Surface runoff refers to the loss of water from an area by flow over the land surface. Surface runoff classes are based on slope, climate, and vegetative cover. The concept indicates relative runoff for very specific conditions. It is assumed that the surface of the soil is bare and that the retention of surface water resulting from irregularities in the ground surface is minimal. The classes are negligible, very low, low, medium, high, and very high.

Report—Hydrologic Soil Group and Surface Runoff (Custom Soils Report)

Absence of an entry indicates that the data were not estimated. The dash indicates no documented presence.

Hydrologic Soil Group and Surface Runoff—Bucks County, Pennsylvania			
Map symbol and soil name	Pct. of map unit	Surface Runoff	Hydrologic Soil Group
MW—Miscellaneous water			
Water, mlra non-potable	100	— —	
Ua—Udorthents, gravelly			
Udorthents, gravelly	90	Very low	B
UfuB—Urban land, 0 to 8 percent slopes			
Urban land	90	High	—
W—Water			
Water	100	Negligible	—

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Custom Soil Resource Report

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