14. SOIL EROSION AND SEDIMENTATION CONTROL

14.1. INTRODUCTION

Atlantic Resource Consultants (ARC) has been retained for the preparation of soil erosion and sediment control plans for a new aquaculture facility and the associated site improvements on a parcel of land at 285 Northport Avenue in the City of Belfast, Maine. The majority of the site is currently vacant and includes the former Belfast Water District intake and treatment building from Belfast Reservoir Number One, the former water supply source for the City of Belfast. The remainder of the site is largely undeveloped and consists of mature woodland and grass pasture. This site topography slopes in a generally southeasterly direction towards the reservoir and drains via several steep gullies. The majority of these drain into the reservoir, with the exception of the easternmost feature that drains, via a culvert under Route One directly to Penobscot Bay.

The project proposes development of the site to construct a land-based aquaculture facility that will include two large buildings, each consisting of three modules, two smaller Smolt Buildings, a Processing Building, a Central Utility Plant and several other smaller support services and utility buildings. Access roads, parking areas, utility services and stormwater BMPs will be constructed to serve the facility. The overall area of development at the site is approximately 38 acres.

The development will be constructed in two major phases, and these will be further divided into smaller sub-phases in order to effectively manage the construction process and minimize the soil erosion and sediment control risks associated with earthwork development projects of this scale.

A detailed soil erosion and sediment control plan has been developed to guide the management of major earthwork activities at the site. This plan includes a detailed breakdown of project phasing to minimize the exposure of erodible soils and to prevent significant sediment transport both within the site, and to downstream receiving waters. The project Soil Erosion and Sediment Control Plan is intended to be a live document and will be regularly reviewed and amended throughout the construction process to ensure the continued effectiveness of the Best Management Practices at the site, and the adequate protection of downstream resources.

14.2. EXISTING SITE CONDITIONS AND SOIL TYPES

The project site is located at 285 Northport Avenue in the City of Belfast, Maine. The current cover conditions at the site include the impervious paved, gravel and roof areas associated with the previous use. These are all adjacent to the Route One access driveway and encompass an area of approximately 3 acres that formed the Belfast Water District offices and equipment storage facility. The area of the site closest to Reservoir Number One is predominantly wooded, with some unmaintained woods roads providing informal trail access. The northern portion of the development site is currently grassed pasture and has been recently used as a hay field. The grassed area of the site is approximately 11 acres. The topography of the site slopes in a generally southwesterly direction towards the reservoir at an average gradient of between 2 and 3%. There are several steep gullies formed by drainageways that traverse the site. The westerly gullies drain to the reservoir, the easternmost drainageway discharges to a culvert under Route One, crossing the property to the south of the road, and discharging directly to the bay.

Predominant surface soil types at the site are identified as Boothbay and Swanville silt loams by the Natural Resource Conservation Service (NRCS) Web Soil Survey. The susceptibility of soils to erosion is

indicated on a relative "K" scale of values over a range of 0.02 to 0.69. The "K" value is frequently used with the universal soil loss equation. The higher values are indicative of the more erodible soils. The K values of the mapped soils at the project site are as follows:

Soil Name	Soil Description	K Value
Boothbay	Silt loam	0.37
Swanville	Silt loam	0.28

Based on a review of the K values, the onsite soils in the area exhibit low to moderately susceptible to erosion after the cover material is stripped.

A more detailed geotechnical investigation of the site has been undertaken by Ransom Consulting, Inc. The explorations generally found glaciomarine silt and clay deposits overlying glacial till and bedrock. A soft, compressible glaciomarine silt and clay deposit was identified and this is likely to consolidate under loading from proposed site fills and building foundations. The current development plan includes removal and off-site disposal of this problematic soil layer. The material will be replaced with imported Granular Borrow material to form a stable and competent subgrade for the proposed improvements.

Natural resource mapping on the site was undertaken in 2018 by Normandeau Associates as part of the site investigations for this project. The mapping identified a number of freshwater wetlands and streams at the site. The natural resources are described in detail in the wetland delineation report that accompanies this submission.

14.3. EXISTING EROSION PROBLEMS

No significant existing erosion problems have been identified at the project site.

14.4. CRITICAL AREAS

The critical areas of the site include the freshwater wetland resources downstream of the construction work area. There are also a number of streams on the project site that fall under the Natural Resource Protection Act jurisdiction. These streams are intermittent and have been designated with the prefix "S" as shown on Figure 14.1 on the following page. Non-jurisdictional drainages are designated with the prefix "D". Three streams extend off site and drain into the adjacent Reservoir One.

Following development of the site the lower reaches of these streams will have been cut off from the hydrological source which is primarily surface run off and groundwater discharge during seasonal high water tables.

To prevent these streams from drying up they will be fed by clean water from a series of foundation drains and bypass culverts that are intended to intercept groundwater from the site both during and post-construction. Riprap plunge pool outlets will be constructed at the discharge points of the new drains to dissipate flow velocities and allow non-erosive discharge to downstream receiving channels. The bypass culverts, foundation drains, and outlet locations are shown on the Soil Erosion and Sediment Control Phasing Plans (Sheets CE-111 to CE-118). In summary, the volume of water will be sufficient to maintain intermittent flows and the plunge pool outlet design will prevent erosion.

Critical resources downstream from the site include Belfast Reservoir Number One and Penobscot Bay.

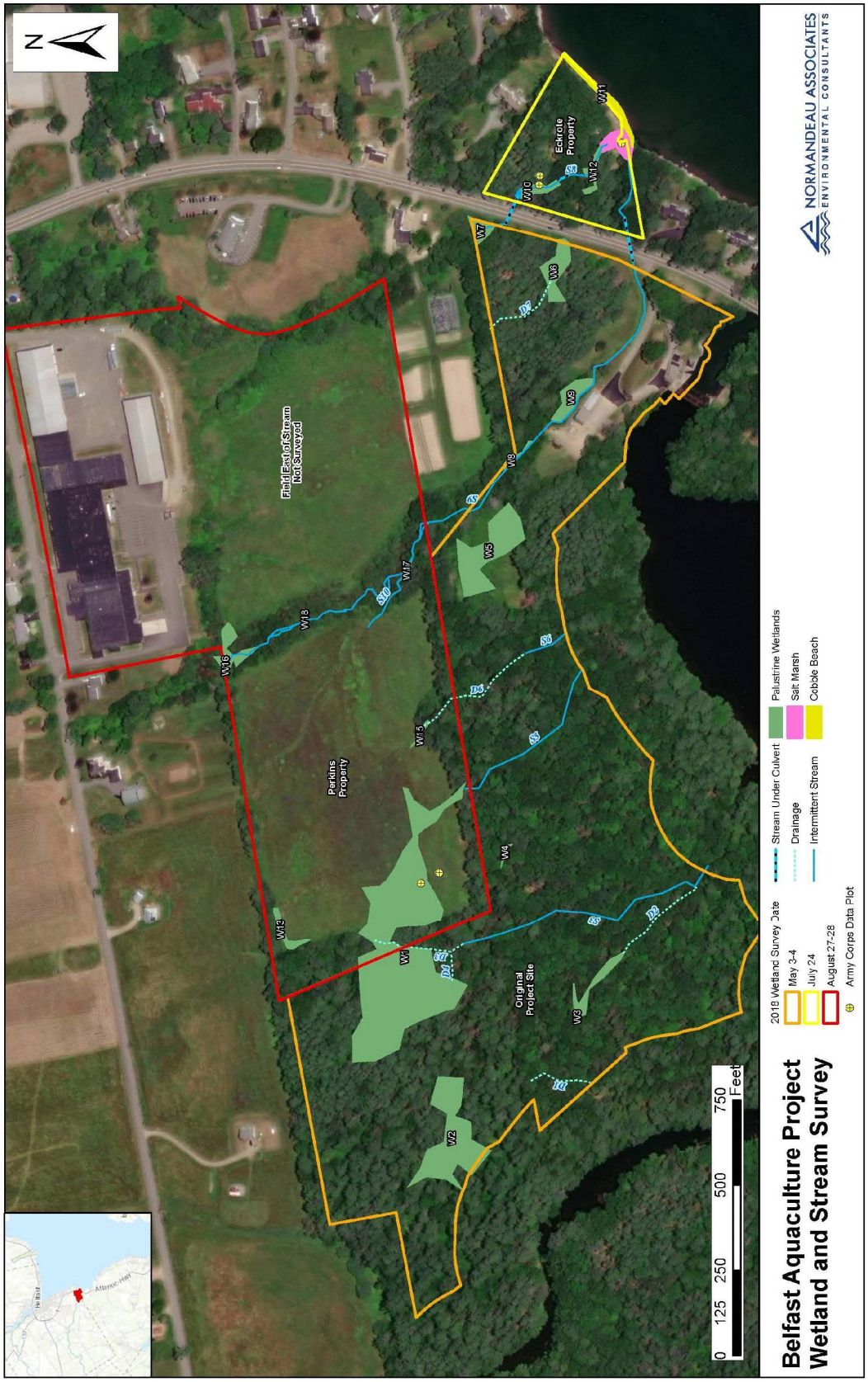
N
Belfast Aquaculture Project
Wetland and Stream Survey
NORMANDEAU ASSOCIATES
ENVIRONMENTAL CONSULTANTS
2018 Wetland Survey Date
May 3-4
July 24
August 27-28
Army Corps Data Plot
Palustrine Wetlands
Salt Marsh
Cobble Beach
Stream Under Culvert
Drainage
Intermittent Stream
0 125 250 500 750
Feet
Field East of Stream
Not Surveyed
Perkins
Property
Original
Project Site
Eckrote
Property
W1
W2
W3
W4
W5
W6
W7
W8
W9
W10
W11
W12
W13
W15
W16
W17
D1
D2
D3
D4
D5
S1
S2
S3
S4
S5

FIGURE 14.1

14.5. SOIL EROSION AND SEDIMENTATION CONTROL PLAN AIMS AND OBJECTIVES

The primary goals of the Soil Erosion and Sediment Control Plan for the project are to avoid and minimize the potential for soil erosion to the maximum extent practical, and to prevent sediment transport to downstream areas, receiving waters and natural resources. Measures will also be taken to ensure sediment is not tracked onto adjacent streets and that stockpiles of controlled imported construction materials are protected from potential contamination by native soils and other deleterious matter. In order to achieve these aims it will be essential to minimize exposure of native soil materials during construction and to install, observe and maintain a range of Best Management Practices.

The primary methods included in the Soil Erosion and Sedimentation Control Plan to be implemented for this project are as follows:

- Construction Phasing - The major earthwork activities will be phased to minimize the area of potentially erodible native soils exposed at any given time. This will minimize the potential for soil erosion and runoff contamination during inclement weather conditions. It will also reduce the potential for sediment transport and result in manageable quantities of accumulation in treatment Best Management Practices. A detailed construction and Soil Erosion and Sediment Control Phasing Plan is included in **Attachment A**.
- Diversion of Run-on from Upstream Areas – Diversion measures will be installed at the beginning of construction to capture and divert surface runoff and groundwater around the work area, reducing the need for de-watering in excavation areas.
- Perimeter Controls – Perimeter sediment barriers will be installed downstream of all work areas to prevent the transport of sediment to receiving waters and natural resources. Stabilized construction entrances (wheel cleaning pads) will be installed at all site entrances to prevent tracking of sediments onto roadways.
- Temporary Cover Materials – The plan includes the installation of temporary cover materials in some areas to prevent erosion from occurring during construction.
- Rapid Stabilization of Excavated Areas – Cover materials including geotextile fabric and imported granular borrow will be placed over exposed native soils immediately after excavation and subgrade preparation to minimize the period of soil exposure.
- Stabilization of drainage outlets and channels to avoid rill and gully erosion.
- Inlet Protection – Silt sacks and coir logs will be installed to protect drainage inlets and conveyances from sediment contamination.
- On-site sediment barriers - On-site measures to capture sediment (hay bales, silt fence, etc.) before it is conveyed to sediment sumps.
- Temporary Sediment Basins and Sumps – Sediment capture and treatment BMPs will be installed to provide detention, storage and treatment of any sediment contaminated runoff generated at the site.
- Permanent Measures – Stormwater BMPs, conveyances and stable permanent cover materials will be installed to provide long-term protection of the site and receiving waters.

14.6. DESCRIPTION AND LOCATION OF LIMITS OF ALL PROPOSED EARTH MOVEMENTS

The proposed project will require major earth moving at the site. The area of proposed development will cover approximately forty acres of the site in total. Substantial cuts and fills will be required to achieve the final grades for the development. Removal of the problematic compressible silt and clay deposits from beneath the proposed improvements will require large volumes of excavation, material export and import of replacement Granular Borrow materials to the site prior to construction of site improvements.

This obviously has major implications on the scope of earthwork required to prepare the site and on materials handling, haulage and disposal. It also presents a significant opportunity to rapidly stabilize the site at an earlier than normal stage of construction. The removal of fine-grained, native soil materials followed by immediate cover of exposed areas with imported granular borrow will effectively limit the potential for soil erosion and mobilization of fine sediments. Large areas of the site will be quickly stabilized, providing a sound working surface for construction

Careful phasing of the project will allow these activities to occur simultaneously, limiting the area of the site that is "open" (i.e. disturbed and not stabilized) at any given time. This will have the additional benefit of increasing the efficiency of materials haulage. Trucks exporting unsuitable materials from the site will be available to convey imported granular material as part of a round trip operation.

14.7. SOIL EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICES

Construction Schedule

The primary and most proactive best management practice for soil erosion and sediment control at the site is careful planning and phasing of construction tasks. The major earthwork activities have been broken into manageable phases in order to efficiently accomplish the necessary work while minimizing the risks associated with exposure of native fine-grained soils. The installation of Best Management Practices is integrated into the individual phases to ensure that effective diversion, cover and perimeter control measures are in place to protect the work area, limit soil exposure times and prevent transport of sediment to downstream areas. Major earthwork phasing is described in the narrative and shown on the Earthwork and Soil Erosion and Sediment Control Phasing Plans included in **Attachment A**, and in the project plan set.

Temporary Erosion/Sedimentation Control Measures

As part of the site development, the Contractor will be obligated to implement the following erosion and sediment control devices. These devices shall be installed as indicated on the plans or as described within this report. For further reference on these devices, see the Maine Erosion and Sediment Control Best Management Practices (BMPs) Manual for Designers and Engineers, Maine DEP, October 2016.

1. Crushed stone stabilized construction entrances will be placed at any construction access points from adjacent streets, and at interior locations shown on the phasing plans. The locations of the construction entrances shown on the drawings should be considered illustrative and will need to be adjusted as appropriate and located at any area where there is the potential for tracking of mud and debris onto existing roads or streets. Stone stabilized construction entrances will require the stone to be removed and replaced, as it becomes covered or filled with mud and material tracked by vehicles exiting the site.
2. A Runoff Diversion Trench and upgradient silt fence barrier shall be installed at the northern side of the site prior to major earthmoving activities. The BMPs shall be installed in accordance with the details provided and are intended to divert surface runoff and groundwater around the construction area, minimizing the need for de-watering.
3. Bypass culverts will be installed in gullies and drainageways to intercept groundwater seeps, convey clean water through the construction area and maintain baseflow in downstream receiving channels.
4. Riprap plunge pool outlets shall be constructed at the end of bypass culverts and channels, to dissipate flow velocities and allow non-erosive discharge to downstream receiving channels.

5. Silt fence shall be installed down slope of any disturbed areas to trap runoff borne sediments. The silt fence shall be installed per the detail provided in the plan set and inspected immediately after each rainfall, and at least weekly in the absence of significant rainfall. The Contractor shall make repairs immediately if there are any signs of erosion or sedimentation below the fence line. If such erosion is observed, the Contractor shall take proactive action to identify the cause of the erosion and take action to avoid its reoccurrence. Proper placement of stakes and keying the bottom of the fabric into the ground is critical to the fence's effectiveness. If there are signs of undercutting at the center or the edges or impounding of large volumes of water behind the fence, the barrier shall be replaced with a stone check dam and measures taken to avoid the concentration of flows not intended to be directed to the silt fence. Wood chips from clearing can be used in front of the silt fence to provide an extra margin of safety and security for the silt fence. This practice is encouraged, provided the chips are removed when the fence is removed. Silt fencing with a maximum stake spacing of 6 feet should be used, unless the fence is supported by wire fence reinforcement of minimum 14 gauge and with a maximum mesh spacing of 6 inches, in which case stakes may be spaced a maximum of 10 feet apart. The bottom of the fence should be properly anchored a minimum of 6" per the plan detail and backfilled. Silt fence shall be installed along the downgradient side of construction work areas, with locations being adjusted along with the construction phasing areas. The Contractor may use erosion mix in place of single row silt fence barrier.
6. Twin rows of siltation fence with hay bales shall be installed at the foot of steep slopes and adjacent to protected natural resources (wetland areas).
7. Erosion Control Mix - Erosion control mix is a dense, processed mixture of intertwining shredded wood fragments and grit that will stabilize a site immediately without vegetation. This product may be used in place of silt fence to protect downstream areas not adjacent to natural resources. Erosion control mix consists primarily of organic material and may include: shredded bark, stump grindings, or partially composted wood products and shall be placed to form berms in accordance with the detail on the plan set. Care shall be taken to ensure berms are level and provide an even depth of protection throughout the length of the berm. The Contractor shall make repairs immediately if there are any signs of erosion or breaches in the berm, and supplement berms with additional material if settlement is observed.
8. Stone check dams, silt logs, or hay bale barriers will be installed at any evident concentrated flow discharge points during construction and earthwork operations.
9. All slopes steeper than 4:1 shall receive erosion control blankets, or temporary riprap stabilization. Where temporary riprap is used, slopes shall be stabilized with loam, seed and erosion control blanket, or sod when the riprap is removed for final stabilization. Slope stabilization fabric shall be a fully biodegradable double net, coir fiber blanket, anchored in accordance with manufacturers recommendations.
10. Areas of visible erosion and the temporary sediment sumps shall be stabilized with crushed stone. The size of the stone shall be determined by the Contractor's designated representative in consultation with the Owner.
11. Temporary sediment sumps and sediment basins will provide sedimentation control for stormwater runoff from disturbed areas during construction until stabilization has been achieved. The sides and floors of sediment basins shall be stabilized with geotextile fabric laid over prepared subgrade materials. Outlets shall be as shown on the construction drawings and shall include sand filters around all risers and outlet pipes.
12. Dirtbags™ will be required to be on site and available for construction dewatering. The Contractor will be required to provide four Dirtbags™ with one prepared for operation prior to commencing any trenching operations.

13. Silt logs may be used in areas where sheet flow drains off impervious surfaces to spread and filter the flow. Silt logs should be anchored in accordance with manufacturer recommendations.

Special Measures for Summer Construction

The summer period is generally optimum for construction in Maine, but it is also the period when intense short duration storms are most common, making denuded areas very susceptible to erosion. Dust control needs to be the most stringent, and the potential to establish vegetation is often restricted by moisture deficit in the summer. During these periods, the Contractor must:

1. Implement a program to apply dust control measures on a daily basis except those days where precipitation is sufficient to suppress dust formation. This program shall extend to and include adjacent streets.
2. Spray any mulches with water after anchoring to dampen the soil and encourage early growth. Spraying may be required several times. Temporary seed may be required until the late summer seeding season.
3. Cover stockpiles of fine-grained materials, or excavated soils which are susceptible to erosion. To protect from the intense, short-duration storms which are more prevalent in the summer months.
4. Take additional steps when needed, including watering, or covering excavated materials to control fugitive dust emissions to minimize reductions in visibility and the airborne disbursement of fine-grained soils. This is particularly important given the potential presence of soil contaminants, and the proximity of along the adjacent streets and properties.
5. These measures may also be required in the spring and fall during the drier periods of these seasons.

Permanent Erosion Control Measures

The following permanent erosion control measures have been designed as part of the Erosion/Sedimentation Control Plan:

1. The drainage conveyance systems have been designed to intercept and convey the 25-year storm.
2. All areas disturbed during construction, but not subject to other restoration (paving, riprap, etc.), will be loamed, limed, fertilized, mulched, and seeded. Fabric netting, anchored with staples, shall be placed over the mulch in areas where the finish grade slope is greater than 10 percent. Native topsoil shall be stockpiled and temporarily stabilized with seed and mulch and reused for final restoration when it is of sufficient quality.
3. Stormwater BMPs have been designed to capture, treat and discharge runoff from the developed areas of the site in a non-erosive manner to downstream receiving waters. Details of the Stormwater Management Plan are included in Section 12.
4. Catch basins shall be provided with sediment sumps for all outlet pipes that are 12” in diameter or greater or where winter sand use is contemplated. A sediment collection bag shall be installed in all basins.

Timing and Sequence of Erosion/Sedimentation Control Measures

The following general construction sequence shall be followed to ensure the effectiveness of soil erosion and sediment control measures. The detailed phasing plan and narrative should be referred to for the delineation of individual construction phases and descriptions of the associated BMPs and work methods. It is anticipated that project earthwork progress and phasing will be reviewed throughout the project as part of the overall construction schedule management for the project. Therefore, the following is intended for outline guidance only.

1. Install construction entrances.
2. Install safety and construction fence to secure the site for clearing and mobilization.

3. Install perimeter siltation fence and erosion control barriers. Particular attention shall be paid to areas upstream of protected natural resources and in the vicinity of the streams at the project site. Signs shall be erected periodically along these perimeter barriers indicating that the downstream areas are off limits to all construction activities.
4. Install diversion BMPs and stabilized outlet plunge pools to convey water from upstream areas around the project site.
5. Install temporary sediment basins and sumps as shown on the project plans and details.
6. Construct activities on the site to optimize the handling of materials and restrict the denuded areas to the time stipulated, as described in the project phasing plan.
7. Install granular borrow and pavement gravel materials to raise the site to the design subgrade elevation.
8. Construct stabilized pads for foundation and building construction.
9. Maintain erosion controls and stabilized areas throughout the construction period.
10. Install binder pavement.
11. Landscape (loam and seed).
12. Install surface pavements.
13. Install striping, signage, and miscellaneous site improvements.
14. Review the site improvements, identify punch list items and required revisions.
15. Remove any temporary erosion control measures.

The Contractor must maintain an accurate set of record drawings indicating the date when an area is first denuded, the date of temporary stabilization, and the date of final stabilization. On October 1 of any calendar year, the Contractor shall submit a detailed plan for stabilizing the site for the winter and a description of what activities are planned during the winter.

14.8. PERMIT REQUIREMENTS

This project will require review and approval by Federal, State and Local Regulatory Authorities. Permit approvals from these bodies may include specific conditions related to soil erosion and sediment control in addition to the standards described below. The Owner and Contractor will be responsible for review of, and adherence to any and all specific permit conditions applicable to the project, and these will become part of the Contract Documents for the project.

The scale and nature of the project will require coverage under the Maine Pollutant Discharge Elimination System (MPDES) General Permit - Construction Activity. The following procedures will be required to meet the minimum regulatory standards associated with this permit:

Preconstruction Conference

Prior to any construction at the site, representatives of the Contractor, the Project Engineer, the Owner, Regulatory Agency Representatives and the City of Belfast City Engineer shall meet to discuss the scheduling of the site construction and the designation of the responsible parties for implementing the plan. The Contractor shall be responsible for scheduling the meeting. Prior to the meeting, the Contractor will prepare a detailed schedule and a marked-up site plan indicating areas and components of the work and key dates showing date of disturbance and completion of the work. The Contractor shall conduct a meeting with employees and sub-contractors to review the erosion control plan, the construction techniques which will be employed to implement the plan and provide a list of attendees and items discussed at the meeting to the Owner. Three copies of the schedule, the Contractor's meeting minutes, and marked-up site plan shall be provided to the Owner.

Inspection of Soil Erosion and Sediment Control Measures

The CM shall prepare a list and designate by name, address and telephone number all individuals who will be responsible for implementation, inspection, and maintenance of all erosion control measures identified within this section and as contained in the Erosion and Sedimentation Control Plan of the contract drawings. Specific responsibilities of the inspector(s) will include:

- Execution of the Contractor/Subcontractor Certification contained in **Attachment C** by any and all parties responsible for erosion control measures on the site.
- A weekly certification stating compliance, any deviations, and corrective measures necessary to comply with the erosion control requirements of this section shall be prepared and signed by the inspector(s).

Inspection of the project work site shall include:

1. Identification of proper erosion control measure installation in accordance with the erosion control detail sheet or as specified in this section.
2. Determine whether each erosion control measure is properly operating. If not, identify damage to the control device and determine remedial measures.
3. Identify areas which appear vulnerable to erosion and determine additional erosion control measures which should be used to improve conditions.
4. Inspect areas of recent seeding to determine percent catch of grass. A minimum catch of 90 percent is required prior to removal of erosion control measures.
5. All erosion controls shall be removed within 30 days of permanent stabilization except for mulch and netting not detrimental to the project. Removals shall include but not be limited to all silt fence, hay bales, inlet protection, and stone check dams.
6. Accumulated silt/sediment should be removed when the depth of sediment reaches 50 percent of the barrier height. Accumulated silt/sediment should be removed from behind silt fencing when the depth of the sediment reaches 6 inches.
7. Silt sacks should be removed and replaced at least every three months and at any time where the weekly inspection reveals that siltation has significantly retarded the rate of flow through the silt sack.
8. If inspection of the site indicates a change should be made to the erosion control plan, to either improve effectiveness or correct a site-specific deficiency, the inspector shall immediately implement the corrective measure and notify the Owner of the change.

A summary of standard Erosion Control Inspections is given in the table below. It is anticipated that inspection and maintenance tasks will be adapted throughout the project to reflect field conditions and construction progress:

EROSION AND SEDIMENT CONTROL MEASURES AND ACTIVITY	INSPECTION FREQUENCY		
	Weekly	**Before & After a Storm**	**After Construction**
SEDIMENT BARRIERS			
Sediment barriers are installed prior to soil disturbances	X	X	
Silt fences are keyed in and tight	X	X	
Barriers are repaired and replaced as necessary	X	X	
Barriers are removed when the site is stabilized - Silt fence should be cut at the ground surface			X
TEMPORARY STABILIZATION			
Areas are stabilized if idle for 14 days or more	X	X	

EROSION AND SEDIMENT CONTROL MEASURES AND ACTIVITY	INSPECTION FREQUENCY		
	Weekly	Before & After a Storm	After Construction
Daily stabilization within 100 ft of a natural resource	X	X	
MULCH			
Seed and mulch within 7 days of final grading. Ground is not visible	X	X	
Erosion control mix is 4-6 inch thick	X	X	
Erosion control blankets or hay mulch are anchored	X	X	
VEGETATION			
Vegetation provides 90% soil cover	X		X
Loam or soil amendment were provided	X		X
New seeded areas are mulched and protected from vehicle, foot traffic and runoff	X	X	X
Areas that will remain unworked for more than 1 year are vegetated with grass	X		
SLOPES AND EMBANKMENTS			
Final graded slopes and embankments are stabilized	X	X	X
Diversions are provided for areas with rill erosion	X	X	X
Areas steeper than 2:1 are riprapped	X		
Stones are angular, durable and various in size	X		
Riprap is underlain with a gravel layer or filter fabric	X		
STORMWATER CHANNELS AND CULVERTS			
Ditches and swales are permanently stabilized– channels that will be riprapped have been over-excavated	X	X	X
Ditches are clear of obstructions, accumulated sediments or debris	X	X	X
Ditch lining/bottoms are free of erosion	X	X	X
Check dams are spaced correctly to slow flow velocity	X		
Underlying filter fabric or gravel is not visible	X	X	X
Culvert aprons and plunge pools are sized for expected flows volume and velocity	X		
Stones are angular, durable and various in size	X		
Culverts are sized to avoid upgradient flooding	X	X	
Culvert protection extends to the maximum flow elevation within the ditch	X	X	X
Culvert is embedded, not hanging	X	X	X
CATCH BASIN SYSTEMS			
Catch basins are built properly	X		
Accumulated sediments and debris are removed from sump, grate and collection area		X	X
Floating debris and floating oils are removed from trap			X
ROADWAYS AND PARKING SURFACES			
The gravel pad at the construction entrance is clear from sediments	X	X	
Roads are crowned		X	X
Cross drainage (culvert) is provided	X		
False ditches (from winter sand) are graded		X	X
BUFFERS			
Buffers are free of erosion or concentrated flows		X	X

EROSION AND SEDIMENT CONTROL MEASURES AND ACTIVITY	INSPECTION FREQUENCY		
	Weekly	Before & After a Storm	After Construction
The downgradient of spreaders and turnouts is stable		X	X
Level spreaders are on the contour			X
The number of spreaders and ditch turnouts is adequate for flow distribution		X	X
Any sediment accumulation is removed from within spreader or turnouts		X	X
STORMWATER BASINS AND TRAPS			
Embankments are free of settlement, slope erosion, internal piping, and downstream swamping		X	X
All flow control structure or orifices are operational and clear of debris or sediments		X	X
Any pre-treatment structure that collects sediment or hydrocarbons is clean or maintained		X	X
Vegetated filters and infiltration basins have adequate grass growth			X
Any impoundment or forebay is free of sediment		X	X
WINTER CONSTRUCTION (November 1st-April15th)			
Final graded areas are mulched daily at twice the normal rate with hay, and anchor (not on snow)	Daily		
A double row of sediment barrier is provided for all areas within 100 ft of a sensitive resource (use erosion control mix on frozen ground)	Daily		
Newly constructed ditches are riprapped	Daily		
Slopes greater than 8% are covered with an erosion control blanket or a 4-inch layer of erosion control mix	Daily		
HOUSEKEEPING PUNCH LIST			
All disturbed areas are permanently stabilized, and plantings are established (grass seeds have germinated with 90% vegetative cover)			X
All trash, sediments, debris or any solid waste have been removed from stormwater channels, catch basins, detention structures, discharge points, etc.			X
All ESC devices have been removed: (silt fence and posts, diversions and sediment structures, etc.)			X
All deliverables (certifications, survey information, as-built plans, reports, notice of termination (NOT), etc.) in accordance with all permit requirements have been submitted to town, Maine DEP, association, owner, etc.			X

Maintenance of Soil Erosion and Sediment Control Measures

The following general maintenance requirements shall apply to the installed erosion control BMPs. Additional maintenance may be required based on field conditions, or at the recommendation of the Project Engineer, Third Party Inspector, Owners Representative, or regulatory authorities:

1. Stabilized Construction Entrances - Stone stabilized construction entrances will require the stone to be removed and replaced, as it becomes covered or filled with mud and material tracked by vehicles exiting the site.
2. The surface of the Runoff Diversion Trench shall be inspected on a weekly basis and cleared of any accumulating surface debris that could reduce the capacity of the BMP to divert surface

water. The outlets should be inspected to ensure that groundwater flows are being adequately conveyed around the construction area.

3. The upgradient (diversion) silt fence barrier shall be repaired or replaced immediately if any breaches are found, or there are signs of undercutting. Sediment and debris shall be removed from the upstream side of the barrier periodically. The downstream ends of the barrier should be checked for any erosion caused by concentrated flows running along the barrier. These areas should be repaired immediately with stone check dams to prevent further damage.
4. Inlets and outlets of bypass culverts shall be cleared of accumulating debris and any signs of erosion shall be repaired immediately with riprap.
5. Riprap plunge pool outlets shall be cleared of debris and monitored for sediment accumulation. If sediment reaches a depth of six inches, it shall be removed, and the plunge pool repaired or re-constructed.
6. Silt Fence Barriers - The Contractor shall make repairs immediately if there are any signs of erosion or sedimentation below the fence line. If such erosion is observed, the Contractor shall take proactive action to identify the cause of the erosion and take action to avoid its reoccurrence. If there are signs of undercutting at the center or the edges or impounding of large volumes of water behind the fence, the barrier shall be replaced with a stone check dam and measures taken to avoid the concentration of flows not intended to be directed to the silt fence.
7. Silt Fence Haybale Barriers – The Contractor shall maintain the silt fence as described above. Should the central haybale barrier deteriorate, or show signs of contamination, the material shall be removed and replaced.
8. Erosion Control Mix – The Contractor shall maintain erosion control berms to ensure they remain level and continue to provide an even depth of protection throughout the length of the berm. The Contractor shall make repairs immediately if there are any signs of erosion or breaches in the berm, and supplement berms with additional material if settlement is observed.
9. Stone check dams, silt logs, or hay bale barriers installed at concentrated flow discharge points shall be inspected and cleared of accumulated debris periodically. If sediment accumulation is observed, this shall be removed when it reaches a depth of not more than six inches.
10. Slopes stabilized with erosion control blankets, or temporary riprap stabilization shall be inspected and repaired if any signs of rill erosion or stone displacement are observed. Sloughing of slopes or evidence of slip, rotational or base failure shall be reported immediately to the project engineer for design of remedial actions.
11. Any open graded areas of visible erosion and the temporary sediment sumps shall be stabilized with crushed stone. The size of the stone shall be determined by the contractor's designated representative in consultation with the Owner.
12. Temporary sediment sumps and sediment basins shall be inspected on a weekly basis. Routine maintenance shall include the removal of debris around inlets and outlets, repair of any uneven areas on basin berms, repair of any observed rill erosion in embankments and replacement of bench and outlet control filter material when slow drainage is observed.
13. Anchoring of silt logs shall be checked on a weekly basis. These shall be removed and replaced when clogged with sediment.
14. Mulched areas shall be repaired when ground is visible through the mulch layer. Anchoring of erosion control blankets and hay mulch shall be repaired is any evidence of separation is observed.
15. Vegetated areas shall be over-seeded and stabilized where 90% cover is not achieved.

Reporting Requirements

In addition to the weekly certifications, the inspector(s) shall maintain written reports recording construction activities on site which include:

1. Dates when major grading activities occur in a particular areas of the site.
2. Dates when major construction activities cease in a particular area, either temporarily or permanently.
3. Dates when an area is stabilized.
4. Inspection of the project work site on a weekly basis and after each significant rainfall event (0.25 inch or more within any consecutive 24-hour period) during construction until permanent erosion control measures have been properly installed and the site has been stabilized.
5. A log (report) must be kept summarizing the scope of the inspection, name(s) and qualifications of the personnel making the inspection, the date(s) of the inspection, and major observations relating to operation of erosion and sedimentation controls and pollution prevention measures. Major observations must include BMPs that need maintenance, BMPs that failed to operate as designed or proved inadequate for a particular location, and location(s) where additional BMPs are needed. For each BMP requiring maintenance, BMP needing replacement, and location needing additional BMPs, note in the log the corrective action taken and when it was taken.

Record Keeping

1. All certifications, inspection forms, and written reports prepared by the inspector(s) shall be filed with the Owner, and the Permit File contained on the project site, and available for inspection and review upon request. All written certifications, inspection forms, and written reports must be filed within one (1) week of the inspection date.
2. Inspections Reports and Logs must be made accessible to regulatory agency staff and a copy must be provided upon request.
3. Copies of all reports must be kept on file and available upon request for a period of at least three years from the completion of permanent stabilization.

14.9. CONSTRUCTION PROCUREMENT AND ADMINISTRATION

The project will be constructed by a Construction Manager under contract to the Owner/Applicant. The Construction Manager will submit a detailed schedule for the completion of the work, broken into specific tasks, with anticipated milestones and completion dates, at the start of construction. The project schedule will be reviewed at regular bi-weekly project meetings, with updates and amendments to be recorded in the project file.

The work will be conducted in sections which will limit the amount of exposed area to those areas in which work is expected to be undertaken during the next 30 days. Exposed areas will be covered and stabilized as rapidly as practical. All areas will be permanently stabilized within 7 days of final grading and temporarily stabilized within 7 days of initial disturbance or before a predicted storm event of over ½" of rain. The area of denuded, non-stabilized construction shall be limited to the minimum area practicable. An area shall be considered to be denuded until the subbase gravel is installed in parking areas, or the areas of future loam and seed have been loamed, seeded, and mulched, or stabilized with erosion control blanket.

The Contractor must maintain an accurate set of record drawings indicating the date when an area is first denuded, the date of temporary stabilization, and the date of final stabilization. On October 1 of any calendar year, the Contractor shall submit a detailed plan for stabilizing the site for the winter and a description of what activities are planned during the winter.

The Contractor must install any added measures which may be necessary to control erosion/sedimentation and fugitive dust emissions from the site, with adjustments made dependent upon forecasted and actual site and weather conditions.

The Contractor has sole responsibility for complying with the erosion/sediment control report, including control of fugitive dust, and shall be responsible for any monetary penalties resulting from failure to comply with these standards.

Once construction has been completed, long-term maintenance of the stormwater management system will the responsibility of the applicant. Operations & Maintenance items with a list of maintenance requirements and frequency are listed at the end of Section 12 of the Maine DEP Permit Application.

Attachments

Attachment A – Soil Erosion and Sediment Control Phasing Plans and Narrative
Attachment B – Temporary Sediment Basin Sizing Calculations
Attachment C - Sample Erosion Control Compliance Certification and Inspection Forms

ATTACHMENT A

Major Earthwork Phasing Narrative & Soil Erosion and Sediment Control Phasing Plans

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PHASING OF MAJOR EARTHWORK ACTIVITIES

The following is intended to convey the phased progression of major earthwork activities from stripping and grubbing of areas of new development to stabilization of prepared subgrades. In the case of the building pads, subgrade will be formed in compacted Granular Borrow material that will be imported to replace the unsuitable native clay soils beneath the future structures. The roadways providing access to and from construction areas will be paved. Riprap stone will be used to provide temporary and permanent stabilization to slopes and storm drain outlets. The remaining laydown areas and pads will be brought to subgrade in stable granular gravel and crushed stone materials.

It should be noted that subgrade stabilization in the areas described below will not conclude the site/civil works in these areas. Subsequent earth moving activities will include foundation construction, building pad preparation, roadway and stormwater BMP construction, and final hardscaping and landscaping throughout the development area. However, all of these subsequent activities will take place on a stable, prepared granular surface. From the perspective of soil erosion and sediment control, the site will be considered stable once the excavation and exposure of native soils has been completed and stable cover material has been installed across the site.

The major earthwork activities will be divided into several phases to carefully manage the risk associated with exposure of native soils and to minimize the potential for soil erosion and sediment transport. The phases of work are described below and shown on the accompanying drawings.

SITE CLEARING

1. Site Layout -Upon receipt of all permit approvals and after holding pre-construction meetings with regulatory authorities and other stakeholders, the Phase 1 area of the project and tree clearing limits will be defined using stakes and fencing.
2. Site Clearing – Once the clearing limits have been established, clearly marked and approved by the Owner, the Phase 1 area will be cleared of major trees and vegetation. The clearing for Phase 1 may be undertaken in phases, as opposed to at one time, in order to minimize the cleared area to that needed for the next phase of construction.
3. A stabilized construction entrance will be installed at the end of the existing paved driveway to provide wheel cleaning for traffic exiting the site during this phase, and a stable, gravel laydown pad will be constructed on the existing cleared area at the edge of the woodland. Access to the interior of the site will be via existing woods roads. Additional stabilized haul roads will be established throughout the Phase 1 area as the work progresses, and perimeter erosion controls will be established as access becomes available to areas that have been logged.

PHASE 1A – SITE MOBILIZATION

1. Runoff Diversions – Prior to any grubbing or major earthwork, diversion BMPs will be installed around the upslope perimeter of the site. This will include silt fence barriers to direct surface runoff entering the site around the work area. A diversion trench will be constructed along the upper perimeter of the site to intercept additional surface water and groundwater at the upstream side of the project site. Underdrain piping will convey the intercepted flow around the work area before discharging, via outlet plunge pools to existing natural drainageways. Bypass culverts will also be installed in interior drainage channels that will be impacted during the initial work phases. These

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are designed to intercept internal surface water runoff and groundwater flow and divert it around the work area before draining, via stabilized outlet plunge pools into existing channels. The underdrain pipes in the diversion trenches and the bypass culverts installed in the drainage channels will remain in place at the end of construction. These will drain on-site groundwater to the headwaters of the natural drainageways that will remain in place after construction of the facility, providing baseflow to maintain these resources. Temporary access roads will be constructed to facilitate installation of the diversion BMPs and outlet plunge pools.

2. Establishment of site access, laydown area, offices and storage -
    a. Perimeter erosion controls will be installed in all downstream Phase 1A areas where these are not already installed during the tree clearing operations prior to any further work at the site.
    b. The major site improvement work will start with the establishment of a stable access road into the work area. The road will be constructed along the line of the permanent driveway and extend to the site office area before heading west through the site to the Phase 1 Building area.
    c. The site laydown area will be established in the southeast corner of the main site and will have an area of approximately 80,000sf. The area will be stripped and grubbed, graded and covered with a woven geotextile fabric. Panel drains will be places on the geotextile fabric to ensure that the area remains dry and stable. Granular Borrow will then be added to stabilize the area and bring it to grade.
    d. The site office and storage area is located at the northeast corner of the main site and has an area of approximately 15,000sf. Once the main laydown area is stabilized, this area will be stripped and grubbed, graded and covered with a woven geotextile and brought to grade in the same manner as the laydown area.
3. Installation of stabilized construction accesses for further phases of work – Two further stabilized construction accesses will be constructed at the entries to the work area at the west end of Phase 1A. These will protect the completed work area from tracked sediments originating from the Phase 1B work.
4. Phase 1A will also include the preparation of the building pad at the new Water and Wastewater Treatment Plant located towards the site entrance. A temporary crossing will be constructed over the intermittent stream to allow access to this area of the site without disturbing the existing channel. Construction of the permanent crossing will be undertaken in the low flow summer period between July 1st and September 1st. The drainage channel will be maintained through the crossing during construction of the arch culvert abutments. Sheet piling, or other stabilization measures will be used to confine the work area and protect the edges of the channel. Riprap stone scour protection will be installed at the edges of the channel to protect the structure from erosion. Construction of headwalls, wing walls and backfill material will then proceed after the arch structure is installed.
5. Pad preparation for the WTP/WWTP will require excavation of the existing topsoil and overburden materials and the construction of a stabilized working pad to allow access for construction equipment to work on the new building. The stabilized pad area at this location is approximately 35,000sf.

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PHASE 1B – CONSTRUCTION PHASE 1 – CENTRAL CORRIDOR WEST

1. Construction of Temporary Sediment Basins and Stabilized Outlets – The first phase of new construction will begin with the installation of temporary sediment basins at the locations of new stormwater BMPs at the west end of the Phase 1 construction area and along the southern perimeter of the work area. These are designed to receive runoff from exposed areas of the site and filter the water through sand bedding and underdrain backfill before allowing it to discharge to established downstream drainageways. These BMPs will be installed and stabilized prior to exposure of the upstream contributing work areas.
6. Additional bypass culverts will also be installed in interior drainage channels that will be impacted during the Phase 1B work. These are designed to intercept surface water runoff and groundwater flow around the work area and will discharge into stabilized outlet plunge pools before draining into existing natural drainage channels. These bypass culverts will remain in place after construction of the facility, providing groundwater baseflow to maintain these resources.
2. Construction of Phase 1B Access Roads – Access roads will be extended from the stabilized construction entrances installed in Phase 1A to the western work area. Temporary stabilized roads will be constructed and modified as work progresses from west to east. The roads will be completed once the building area is brought to subgrade elevation.
3. Construction of the new facility will require the excavation and removal of a significant layer of unsuitable compressible clay materials that have been identified beneath the building footprints. This material extends to an elevation of approximately 54 feet in this area of the site. This material is not suitable for re-use and will be excavated for disposal off site. As soon as subgrade elevations are established a layer of woven geotextile will be placed on the prepared subgrade and imported Granular Borrow will be placed in compacted lifts to the design subgrade.
    a. Excavation of unsuitable material and the stabilization with Granular Borrow will proceed from west to east starting in the area of the new Smolt Building. The western area will be stabilized and filled as the excavation proceeds to the east, minimizing the area of open exposed soils to less than 80,000sf at any given time.
    b. Edge drains will be installed at the foot of the excavation as it progresses. These will effectively drain the granular fill material to ensure that the surface of the construction area remains dry and stable. The underdrains will discharge, via a stabilized riprap outlet plunge pool to the downstream receiving channel.
    c. Foundation and building construction will commence at the western end of the site as the earthwork moves eastward. The establishment of stabilized subgrades for Phase 1B will end at the eastern end of the new Smolt Buildings. switch yard, just north of the laydown area.

PHASE 1C – CONSTRUCTION PHASE 1 - CENTRAL CORRIDOR EAST

1. Construction of Phase 1C will start once Phase 1B has been brought to subgrade with stable granular material.
2. Construction of Phase 1C Access Roads – Access roads will be constructed between the Smolt Buildings and Oxygen storage area. The roads will be completed once the building area is brought to subgrade elevation and will allow access around the eastern edge of the Smolt Buildings.
3. The Phase 1C Building pad preparation will start at the Oxygen Storage Area and proceed west to east across the site. As described in Phase 1B, above construction of new buildings will require the

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excavation and removal of a significant layer of unsuitable compressible clay materials. This material extends to an elevation of approximately 54 feet in this area of the site. This material is not suitable for re-use and will be excavated for disposal off site. As soon as subgrade elevations are established a layer of woven geotextile will be placed on the prepared subgrade and imported Granular Borrow will be placed in compacted lifts to the design subgrade.

a. Excavation of unsuitable material and the stabilization with Granular Borrow will proceed from west to east starting in the area of the new Smolt Building. The western area will be stabilized and filled as the excavation proceeds to the east, minimizing the area of open exposed soils to less than 80,000sf at any given time.
b. Edge drains will be installed at the foot of the excavation as it progresses. These will effectively drain the granular fill material to ensure that the surface of the construction area remains dry and stable. The underdrains will discharge, via a stabilized riprap outlet plunge pool to the downstream receiving channel.
c. Foundation and building construction will commence at the western end of the site as the earthwork moves eastward. The establishment of stabilized subgrades for Phase 1C will end at the eastern end of the new Switch Yard, just north of the laydown area.

PHASE 1D – CONSTRUCTION PHASE 1 - MODULE 1-3 AREA WEST

1. Construction of Phase 1D will start once Phase 1C has been brought to subgrade with stable granular material.
2. Construction of Phase 1D Access Roads – Access roads will be constructed around the western end of the Phase 1 Module Building, and along the northern side of the building, proceeding from west to east. The roads will be completed once the building area is brought to subgrade elevation and will allow access around the perimeter of the Module 1 Building.
3. Phase 1D building pad construction will proceed in a similar manner to the Central Corridor work, from west to east in the area of the new Grow Module Buildings. Similar to Phase 1B and 1C, this area of new construction will require the excavation and removal of a significant layer of unsuitable compressible clay materials that have been identified beneath the building footprints. This material extends to an elevation of approximately 54 feet in this area of the site. This material is not suitable for re-use and will be excavated for disposal off site. As soon as subgrade elevations are established a layer of woven geotextile will be placed on the prepared subgrade and imported Granular Borrow will be placed in compacted lifts to the design subgrade.
    a. Excavation of unsuitable material and the stabilization with Granular Borrow will proceed from west to east starting in the area of the Module 1. The western area will be stabilized and filled as the excavation proceeds to the east, minimizing the area of open exposed soils to less than 80,000sf at any given time.
    b. Edge drains will be installed at the foot of the excavation as it progresses. These will effectively drain the granular fill material to ensure that the surface of the construction area remains dry and stable. The underdrains will connect to the previously installed diversion culvert, which drains, via a stabilized riprap outlet plunge pool to the downstream receiving channel.
    c. Foundation and building construction will commence at the western end of the site as the earthwork moves eastward. The establishment of stabilized subgrades for Phase 1D will end approximately half way along the Phase 1 Grow Module Building.

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PHASE 1E – CONSTRUCTION PHASE 1 - MODULE 1-3 AREA EAST

1. Construction of Phase 1E will start once Phase 1D has been brought to subgrade with stable granular material.
2. Construction of Phase 1E Access Roads – Access roads will be constructed around the remainder of the northern side of the Phase 1 Module Building, proceeding from west to east. The roads will be completed once the building area is brought to subgrade elevation and will allow access around the entire perimeter of the Module 1 Building.
3. Phase 1E building pad construction will proceed in a similar manner to the previous work at the site. The unsuitable clay material extends to an elevation of approximately 54 feet in this area of the site. This material is not suitable for re-use and will be excavated for disposal off site. As soon as subgrade elevations are established a layer of woven geotextile will be placed on the prepared subgrade and imported Granular Borrow will be placed in compacted lifts to the design subgrade.
    a. Excavation of unsuitable material and the stabilization with Granular Borrow will proceed from west to east starting at the end of the Phase 1D area. The western area will be stabilized and filled as the excavation proceeds to the east, minimizing the area of open exposed soils to less than 80,000sf at any given time.
    b. Edge drains will be installed at the foot of the excavation as it progresses. These will effectively drain the granular fill material to ensure that the surface of the construction area remains dry and stable. The underdrains will connect to the previously installed diversion culvert, which drains, via a stabilized riprap outlet plunge pool to the downstream receiving channel.
    c. Foundation and building construction will commence at the western end of the Phase 1E area as the earthwork moves eastward. The establishment of stabilized subgrades for Phase 1E will end at the eastern end of the Phase 1 Grow Module Building.

PHASE 1 FINISH

1. Upon completion of the major earthwork activities associated with Phase 1 of the project, the interior finishes and landscaping will be installed. It is anticipated that this work will progress with the completion of the remaining building work, so that installed finishes are not damaged by any ongoing construction.
2. Once the final finishes and landscaping is installed and the Phase 1 area of the site is permanently stabilized, the temporary erosion control measures, including perimeter controls will be removed. Portions of the perimeter controls downstream of the Phase 2 work area will remain in place pending the start of that phase of work.
3. Temporary sediment basins will be removed and permanent stormwater BMPs will be installed as construction progresses and the upstream contributing areas are stabilized.

PHASE 2 SITE CLEARING

1. Construction of Phase 2 will start once Phase 1 construction is complete and the site has been completely stabilized.
2. Site Layout - After holding the required Phase 2 pre-construction meetings, the Phase 2 area of the project and tree clearing limits will be defined using stakes and fencing.
3. Site Clearing – Once the clearing limits have been established, clearly marked and approved by the Owner, the Phase 2 area will be cleared of major trees and vegetation.

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4. A stabilized construction entrance will be installed at the intersection of the main driveway with the southern roadway leading to the Phase 2 area, to provide wheel cleaning for traffic exiting the site during this phase. Access to the interior of the site will be via existing woods roads. Additional stabilized haul roads will be established throughout the Phase 2 area as the work progresses.
5. Perimeter Erosion Controls – The Phase 2 perimeter erosion controls will be installed at the downstream side of the site as the clearing progresses. This will connect to the previously installed Phase 1 perimeter controls, where these remain.

PHASE 2A – CONSTRUCTION PHASE 2 - MODULE 4-6 AREA WEST

1. Construction of Phase 2A will start once the phase 2 clearing is complete and access is available to the work area.
2. Bypass Culverts – New riprap stone outlet plunge pools will be constructed in the natural drainageways immediately downstream of the Phase 2 work area. The phase 1 plunge pools will be removed and the bypass culverts installed in the drainageways during the first phase of the project will be extended through the Phase 2 construction area to outlet to the newly installed underdrains.
3. Temporary Sediment Basin – Sediment basin 4 will be installed prior to exposure of the upstream contributing work areas. This is designed to receive runoff from exposed areas of the site and filter the water through sand bedding and underdrain backfill before allowing it to discharge to established downstream drainageways.
4. Construction of Phase 2 Access Roads – Access roads will be constructed around the western end and southern side of the Phase 2 Module Building, proceeding from west to east. The roads will be completed once the building area is brought to subgrade elevation and will allow access around the perimeter of the Module 2 Building.
5. Phase 2A building pad construction will proceed in a similar manner to the Central Corridor work, from west to east in the area of the new Grow Module Buildings. Similar to previous phases of construction, the areas of new construction will require the excavation and removal of a significant layer of unsuitable compressible clay materials that have been identified beneath the building footprints. This material extends to an elevation of approximately 43 feet in this area of the site. This material is not suitable for re-use and will be excavated for disposal off site. As soon as subgrade elevations are established a layer of woven geotextile will be placed on the prepared subgrade and imported Granular Borrow will be placed in compacted lifts to the design subgrade.
    a. Excavation of unsuitable material and the stabilization with Granular Borrow will proceed from west to east starting in the area of the Module 4 and proceeding into Module 5. The western area will be stabilized and filled as the excavation proceeds to the east, minimizing the area of open exposed soils to less than 80,000sf at any given time.
6. Foundation and building construction will commence at the western end of the site as the earthwork moves eastward. The establishment of stabilized subgrades for Phase 2A will end approximately half way along the Phase 2 Grow Module Building.

PHASE 2B – CONSTRUCTION PHASE 2 - MODULE 4-6 AREA EAST

1. Construction of Phase 2B will start once Phase 2A construction is complete and stabilized.
2. Building pad preparation for the southern module buildings will proceed eastwards from the end of Phase 2A, and across the site that was temporarily stabilized as a construction laydown area.

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As soon as subgrade elevations are established a layer of woven geotextile will be placed on the prepared subgrade and imported Granular Borrow will be placed in compacted lifts to the design subgrade.

   a. Excavation of unsuitable material and the stabilization with Granular Borrow will proceed from west to east starting in the area of the Module 5 and proceeding into Module 6. The western area will be stabilized and filled as the excavation proceeds to the east, minimizing the area of open exposed soils to less than 80,000sf at any given time.

3. Foundation and building construction will commence at the western end of the site as the earthwork moves eastward. The establishment of stabilized subgrades for Phase 2B will end at the eastern end of the Phase 2 Grow Module Building, and will complete the major earthwork activities associated with the construction of the facility. Once the site is fully stabilized, the perimeter erosion control BMPs will be removed and the surrounding areas will be permanently stabilized.

PHASE 2 FINISH

1. Upon completion of the major earthwork activities associated with Phase 2 of the project, the interior finishes and landscaping will be installed. It is anticipated that this work will progress with the completion of the remaining building work, so that installed finishes are not damaged by any ongoing construction.
2. Once the final finishes and landscaping is installed and the site is permanently stabilized, the temporary erosion control measures, including perimeter controls will be removed.
3. The final temporary sediment basin will be removed and permanent stormwater system will be installed as construction progresses and the upstream contributing areas are stabilized.
4. Stormwater BMPs and other critical elements of the site infrastructure will be maintained by the Owner in accordance with local, State and federal standards and permit conditions.

NORDIC AQUAFARMS SOIL EROSION AND SEDIMENT CONTROL PHASING SUMMARY

PHASE	PRIMARY TASKS	PREMANENTLY STABILIZED AREA - START OF PHASE	TOTAL WORK AREA	MAXIMUM OPEN AREA -GRUBBED AND NOT STABILIZED	SESC BMPS	AREA OF NEW ROADS	AREA OF NEW PADS	OTHER STABILIZED AREAS	PERMANENTLY STABILIZED AREA - END OF PHASE	ANTICIPATED TIMELINE
PHASE 1 CLEARING	Site Layout - Layout Phase 1 Limits of Work and tree clearing limits Installation of Stabilized Access Installation of Perimeter Erosion Controls Site Clearing – Logging and Clearing of Vegetation	**22,000**	**795,000**	**0**	Stabilized Construction Entrances Stabilized Haul Roads Stabilized Laydown Area Temporary Stream Crossing	**0**	**0**	**0**	**26,000**	**2-4 weeks**
PHASE 1A	Installation of Additional Perimeter Erosion Controls Construction of Runoff Diversions and Bypass Culverts Establishment of site access, laydown area, offices and storage -	**26,000**	**610,000**	**80,000**	Stabilized Cosntruction Entrances Silt Fence Silt fence/haybale barrier Erosion berms Temporary riprap slope stabilization Diversion trench Outlet plunge pools Bypass culverts Stabilized gravel pads	**51,000**	**130,000**	**60,000**	**267,000**	**6-8 weeks**
PHASE 1B	Construction of Temporary Sediment Basins and Stabilized Outlets Construction of Phase 1B Access Roads Excavation of unsuitable soils and subgrade preparation Pad and foundation preparation -Smolt Building	**267,000**	**408,600**	**80,000**	Temporary sediment basins Bench drain outlets Diversion trench Bypass culverts Building pad stabilization	**260,600**	**104,200**	**60,000**	**691,800**	**8-10 weeks**
PHASE 1C	Construction of Phase 1C Access Roads Excavation of unsuitable soils and subgrade preparation - Pad and foundation prep. - Oxygen Storage, Process, CUP, Switch Yard	**691,800**	**143,600**	**80,000**	Building pad stabilization	**0**	**108,000**	**30,000**	**829,800**	**4-6 weeks**
PHASE 1D	Construction of Phase 1D Access Roads Excavation of unsuitable soils and subgrade preparation - Pad and foundation preparation - Phase 1 Module Buildings West	**829,800**	**199,200**	**80,000**	Building pad stabilization	**26,200**	**150,000**	**15,000**	**1,021,000**	**5-6 weeks**
PHASE 1E	Construction of Phase 1E Access Roads Excavation of unsuitable soils and subgrade preparation - Pad and foundation preparation - Phase 1 Module Buildings East	**1,021,000**	**214,500**	**80,000**	Building pad stabilization	**18,500**	**180,000**	**15,000**	**1,234,500**	**5-6 weeks**
PHASE 1 FINISH	Landscaping, hardscaping and finish surface work in interior areas of Phase 1 work area, filling of temporary ponds, final stormwater BMPs	**1,234,500**	**160,000**	**0**	None	**0**	**0**	**85,000**	**1,319,500**	**4-6 weeks**
PHASE 2 CLEARING	Site Layout - Layout Phase 2 Limits of Work and tree clearing limits Installation of Perimeter Erosion Controls Connect Perimeter Erosion Controls to remaining Phase 1 BMPs Site Clearing – Logging and Clearing of Vegetation	**1,319,500**	**290,000**	**0**	Silt fence/haybale barrier Stabilized Haul Roads Stabilized Laydown Area (in place)	**0**	**0**	**0**	**1,319,500**	**2-4 weeks**
PHASE 2A	Construction of Phase 2A Access Roads Pad and foundation preparation - Phase 2 Module Buildings West	**1,319,500**	**220,000**	**80,000**	Temporary sediment basin Building pad stabilization Bypass culverts	**44,000**	**161,000**	**15,000**	**1,539,500**	**5-6 weeks**
PHASE 2B	Construction of Phase 2B Access Roads Pad and foundation preparation - Phase 2 Module Buildings East	**1,539,500**	**195,500**	**80,000**	Building pad stabilization	**0**	**90,000**	**25,000**	**1,654,500**	**5-6 weeks**

NOTE: AREAS ASSOCIATED WITH EACH PHASE ARE APPROXIMATE AND INTENDED TO GIVE AN OVERVIEW OF THE CONSTRUCTION PHASING

TREE CLEARING MAY BE PHASED TO MINIMIZED DISTURBED AREA TO THAT REQUIRED FOR CONSTRUCTION

PHASE 1 LIMITS OF WORK 1,464,230SF +/-

CONSTRUCT GRAVEL PAD ON EXISTING CLEARED AREA FOR LAYDOWN/ LOG STORAGE

INSTALL TEMPORARY ACCESS BRIDGE OVER STREAM CHANNEL - SEE PERMIT CONDITIONS FOR RESTRICTIONS ON WORKING ION THIS AREA

PHASE 1 CLEARING AREA

PHASE 1 CLEARING AREA 795,000SF +/-

CONSTRUCT NEW GRAVEL ACCESS ROAD TO LAYDOWN AREA

INSTALL STABILIZED CONSTRUCTION ENTRANCE AT END OF EXISTING PAVEMENT

EXISTING WOODS ROADS TO BE USED FOR CLEARING ACCESS

REV	DESCRIPTION	DATE
0	NRPA-PRINT FOR NAF REVIEW	4-29-19

NRPA-PRINT FOR NAF REVIEW
4-29-19
CURRENT ISSUE STATUS:

TRUE NORTH:

STATE OF MAINE
ANDREW D. JOHNSTON
NO. 9994
4/29/19
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285 NORTHPORT AVENUE

BELFAST, MAINE

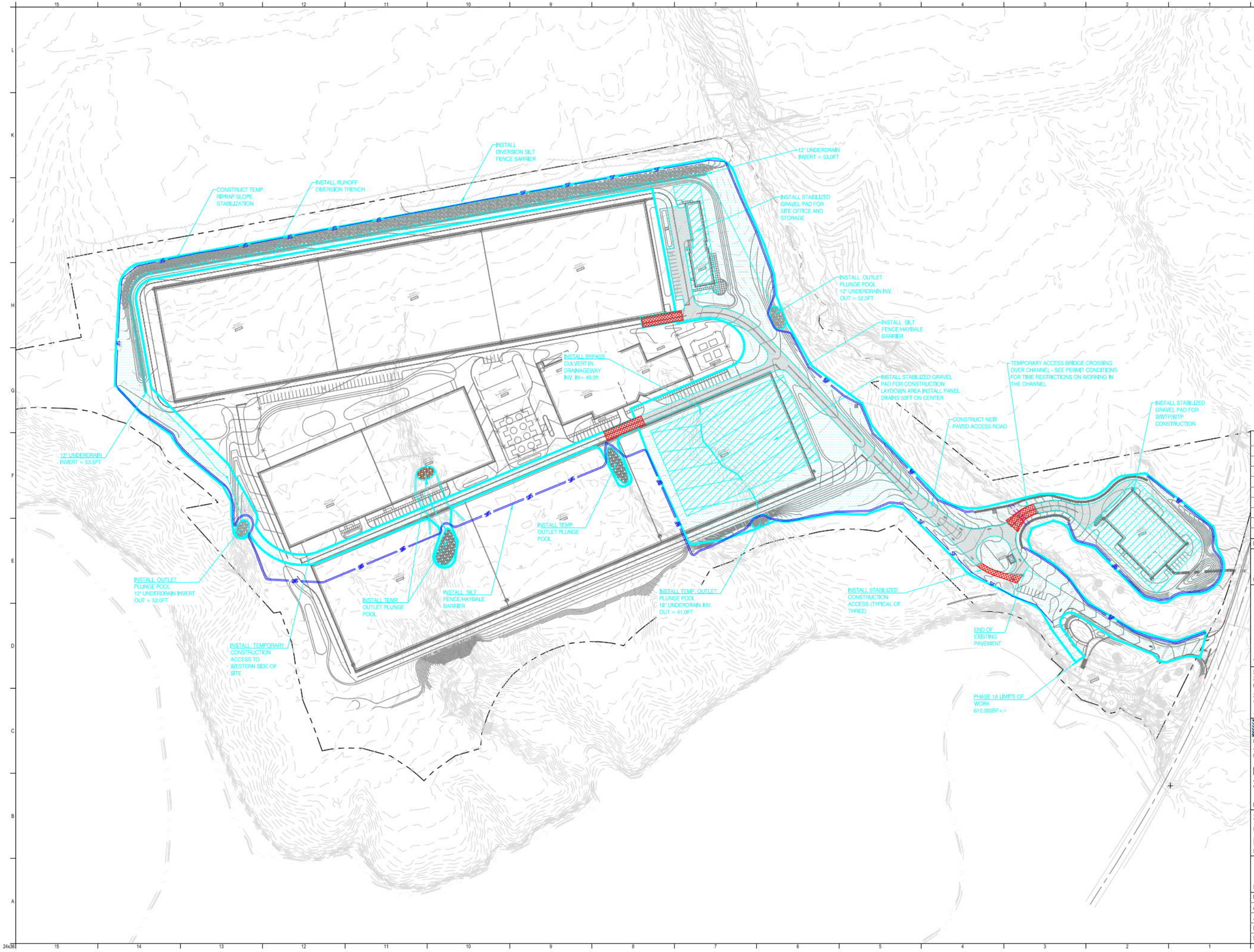
SOIL EROSION & SEDIMENT CONTROL PHASING PLAN -1
PHASE 1 SITE CLEARING
SHEET TITLE:

0 50' 100' 200' 300'
SCALE: AS SHOWN

PROJECT MANAGER:	ADB	PROJECT NO:	18076
A/E OF RECORD:			
JOB CAPTAIN:	SP		
DRAWN BY:	AJ		
SMRT FILE:	CE110-18076	SHEET No.	CE110

NOT FOR CONSTRUCTION

24x36



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NORDIC AQUAFARMS
285 NORTHPORT AVENUE

BELFAST, MAINE

SOIL EROSION & SEDIMENT CONTROL PHASING PLAN -2 PHASE 1A

SHEET TITLE:

0 50' 100' 200' 300'

SCALE: AS SHOWN

PROJECT MANAGER:	ADB	PROJECT NO:	18076
A/E OF RECORD:			
JOB CAPTAIN:	SP		
DRAWN BY:	AJ		
SMRT FILE:	CE111-18076	SHEET No.	CE111

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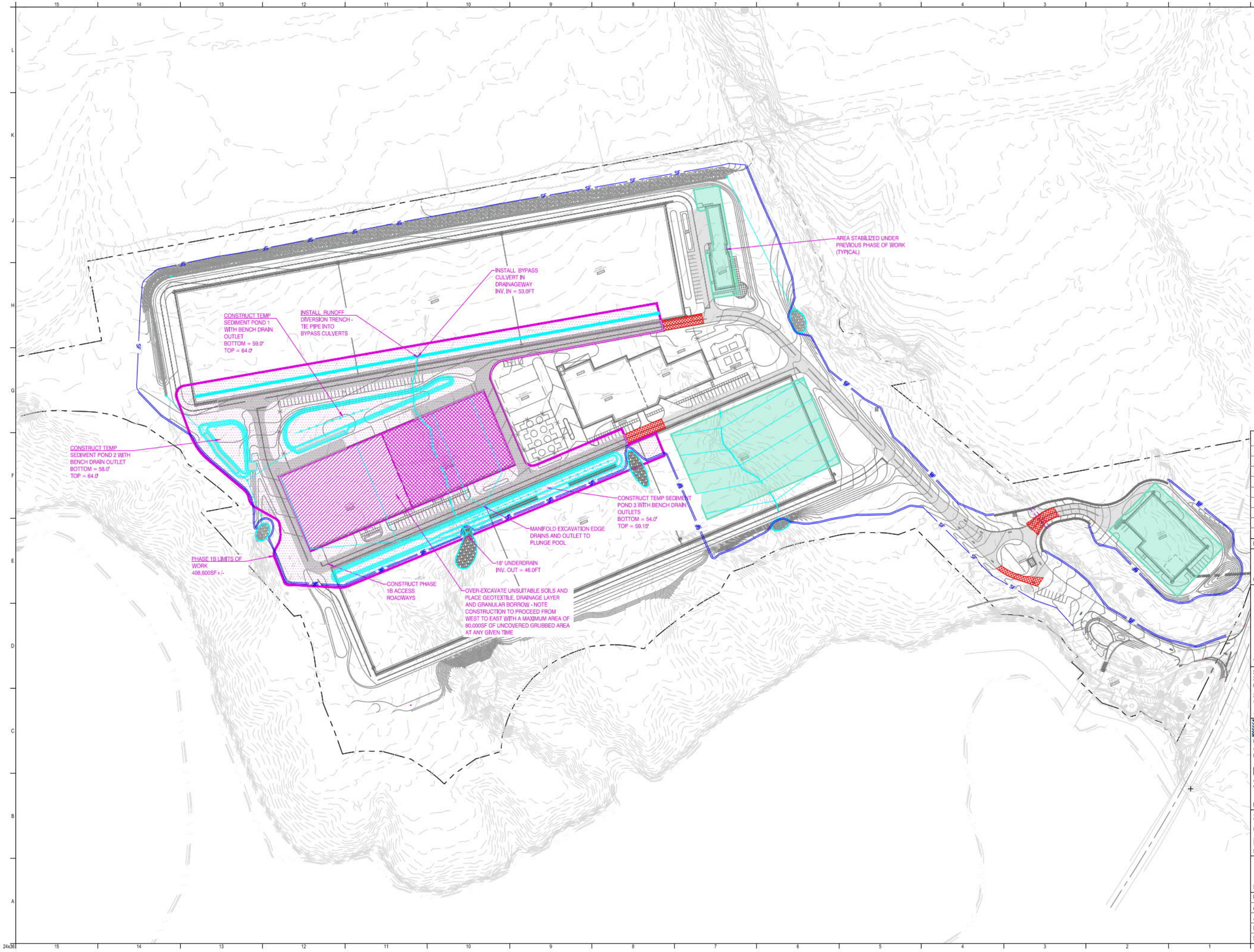

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BELFAST, MAINE

SOIL EROSION & SEDIMENT CONTROL PHASING PLAN -3 PHASE 1B

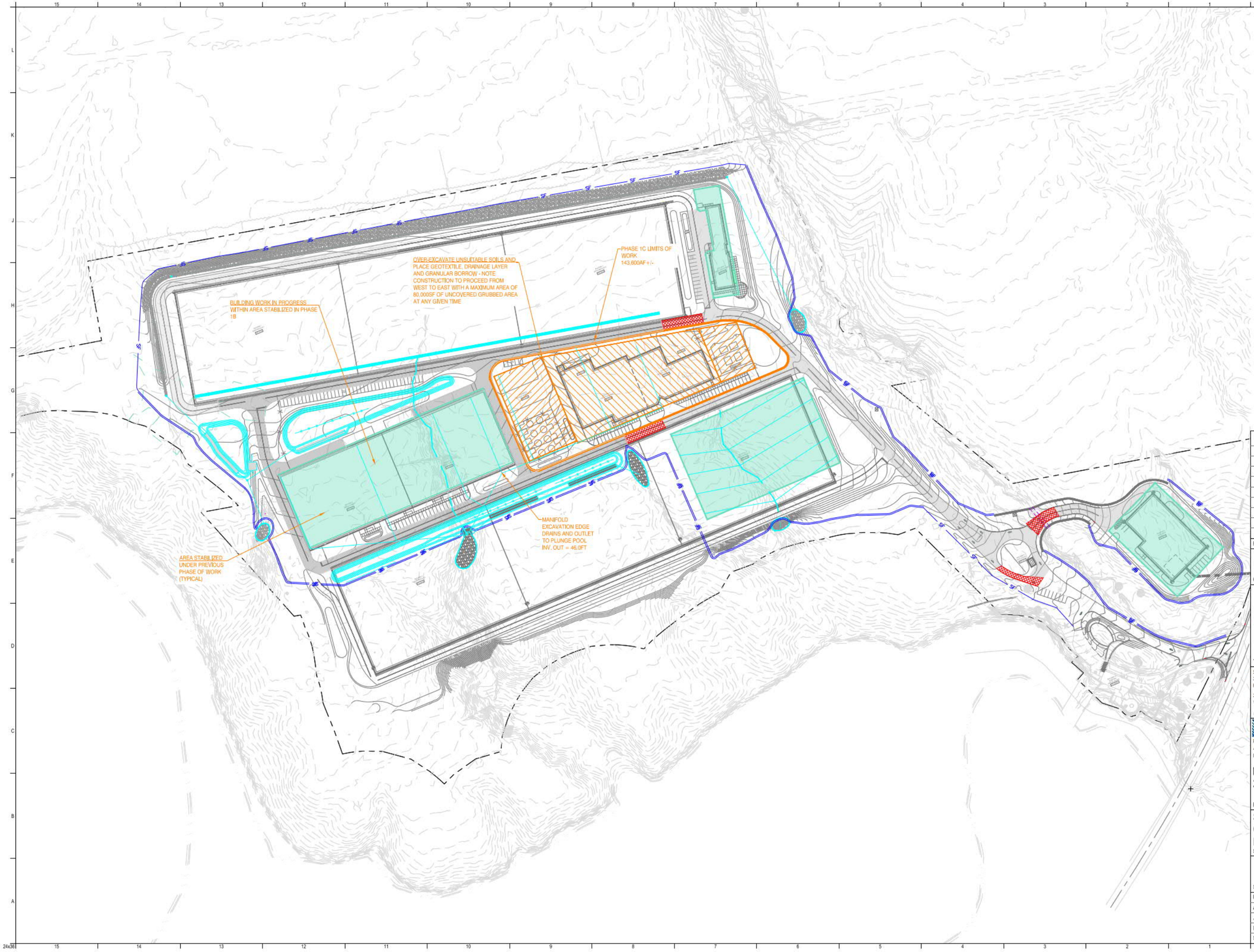
SHEET TITLE:

0 50' 100' 200' 300'

SCALE: AS SHOWN

PROJECT MANAGER:	ADB	PROJECT NO:	18076
A/E OF RECORD:			
JOB CAPTAIN:	SP		
DRAWN BY:	AJ		
SMRT FILE:	CE112-18076	SHEET No.	CE112

NOT FOR CONSTRUCTION



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NORDIC AQUAFARMS
285 NORTHPORT AVENUE

BELFAST, MAINE

SOIL EROSION & SEDIMENT CONTROL PHASING PLAN -4
PHASE 1C
SHEET TITLE:

0 50' 100' 200' 300'

SCALE: AS SHOWN

PROJECT MANAGER:	ADB	PROJECT NO:	18076
A/E OF RECORD:			
JOB CAPTAIN:	SP		
DRAWN BY:	AJ		
SMRT FILE:	CE113-18076	SHEET No.	CE113

NOT FOR CONSTRUCTION

24x36

CONSTRUCT PHASE 1D ACCESS ROADWAYS

PHASE 1D WORK AREA 199,200SF +/-

OVER-EXCAVATE UNSUITABLE SOILS AND PLACE GEOTEXTILE, DRAINAGE LAYER AND GRANULAR BORROW - NOTE: CONSTRUCTION TO PROCEED FROM WEST TO EAST WITH A MAXIMUM ARE OF 80,000SF OF UNCOVERED GRUBBED AREA AT ANY GIVEN TIME

BUILDING WORK CONNUES IN PHASE 1B AND PHASE 1C AREAS

TIE EXCAVATION EDGE DRAINS INTO DIVERSION TRENCH DRAIN

AREA STABILIZED UNDER PREVIOUS PHASE OF WORK (TYPICAL)

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BELFAST, MAINE

SOIL EROSION & SEDIMENT CONTROL PHASING PLAN -5
PHASE 1D
SHEET TITLE:

0 50' 100' 200' 300'
SCALE: AS SHOWN

PROJECT MANAGER:	ADB	PROJECT NO:	18076
A/E OF RECORD:			
JOB CAPTAIN:	SP		CE114
DRAWN BY:	AJ		
SMRT FILE:	CE114-18076	SHEET No.	

NOT FOR CONSTRUCTION

INSTALL SILT FENCE ALONG DOWNSTREAM SIDE OF NEW FORCE MAIN TRENCH

INSTALL SILT SACKS IN CATCH BASINS ALONG NEW FORCE MAIN ROUTE

INSTALL SILT FENCE ALONG DOWNSTREAM SIDE OF NEW FORCE MAIN TRENCH

CONSTRUCT TEMPORARY STREAM DIVERSION FOR FORCE MAIN CONSTRUCTION - SEE DETAIL G1 SHEET CE-502

CONSTRUCT PHASE 1E ROADWAYS

OVER-EXCAVATE UNSUITABLE SOILS AND PLACE GEOTEXTILE, DRAINAGE LAYER AND GRANULAR BORROW - NOTE: CONSTRUCTION TO PROCEED FROM WEST TO EAST WITH A MAXIMUM AREA OF 80,000SF OF UNCOVERED GRUBBED AREA AT ANY GIVEN TIME

AT END OF PHASE 1E: RESTORE RIPRPA SLOPE. ADD LOAM, SEED AND STABILIZE SLOPE

PHASE 1E WORK AREA 214,500SF +/-

BUILDING WORK CONTINUES IN PHASE 1B, PHASE 1C AND PHASE 1D AREAS

TIE EXCAVATION EDGE DRAINS INTO DIVERSION TRENCH DRAIN

PHASE 1 PERIMETER EROSION CONTROLS TO BE REMOVED UPON PERMANENT STABILIZATION OF UPSTREAM AREAS

AREA STABILIZED UNDER PREVIOUS PHASE OF WORK (TYPICAL)

PHASE 1 PERIMETER EROSION CONTROLS TO BE REMOVED UPON PERMANENT STABILIZATION OF UPSTREAM AREAS

THIS SECTION OF PHASE 1 PERIMETER EROSION CONTROLS TO REMAIN IN PLACE FOR PHASE 2 CONSTRUCTION

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285 NORTHPORT AVENUE

BELFAST, MAINE

SOIL EROSION & SEDIMENT CONTROL PHASING PLAN -6
PHASE 1E
SHEET TITLE:

0 50' 100' 200' 300'

SCALE: AS SHOWN

PROJECT MANAGER:	ADB	PROJECT NO:	18076
A/E OF RECORD:			
JOB CAPTAIN:	SP	SHEET No.	CE115
DRAWN BY:	AJ		
SMRT FILE:	CE115-18076		

NOT FOR CONSTRUCTION

INSTALL PHASE 2 STABILIZED CONSTRUCTION ACCESS

CONNECT NEW PHASE 2 SILT FENCE/HAYBALE BARRIER TO PHASE 1 BARRIER AT THIS LOCATION

PHASE 2 CLEARING AREA 290,000SF +/-

INSTALL PHASE 2 SILT FENCE HAYBALE BARRIER AT LIMITS OF DISTURBANCE AS CLEARING PROGRESSES

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285 NORTHPORT AVENUE

BELFAST, MAINE

SOIL EROSION & SEDIMENT CONTROL PHASING PLAN -7
PHASE 2 SITE CLEARING

SHEET TITLE:

0 50' 100' 200' 300'

SCALE: AS SHOWN

PROJECT MANAGER:	ADB	PROJECT NO:	18076
A/E OF RECORD:			
JOB CAPTAIN:	SP	CE116	
DRAWN BY:	AJ		
SMRT FILE:	CE516-18076	SHEET No.	

NOT FOR CONSTRUCTION

REMOVE PHASE 1 OUTLET PLUNGE POOL - INSTALL NEW BYPASS CULVERT IN DRAINAGEWAY - CONNECT TO EXISTING PHASE 1 BYPASS CULVERT UPSTREAM INV. = 46.0FT

REMOVE PHASE 1 OUTLET PLUNGE POOL - INSTALL NEW BYPASS CULVERT IN DRAINAGEWAY - CONNECT TO EXISTING PHASE 1 OUTLET CULVERT UPSTREAM INV. = 53.0FT

PHASE 2 STABILIZED CONSTRUCTION ACCESS

REMOVE PHASE 1 TEMP SEDIMENT BASINS AND INSTALL PERMANENT STORMWATER SYSTEM

INSTALL TEMP. OUTLET PLUNGE POOL 18" INV. OUT = 43.0FT

INSTALL EXCAVATION EDGE DRAINS AND OUTLET TO PLUNGE POOL INV. OUT = 40.0FT

INSTALL TEMP. OUTLET PLUNGE POOL 18" INV. OUT = 40.0FT

CONSTRUCT TEMP SEDIMENT POND 4 WITH BENCH DRAIN OUTLETS BOTTOM = 45.0' TOP = 50.0'

PHASE 2A WORK AREA 220,000SF+/-

CONSTRUCT PHASE 1B ACCESS ROADWAYS

OVER-EXCAVATE UNSUITABLE SOILS AND PLACE GEOTEXTILE, DRAINAGE LAYER AND GRANULAR BORROW - NOTE CONSTRUCTION TO PROCEED FROM WEST TO EAST WITH A MAXIMUM AREA OF 80,000SF OF UNCOVERED GRUBBED AREA AT ANY GIVEN TIME

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BELFAST, MAINE

SOIL EROSION & SEDIMENT CONTROL PHASING PLAN -8
PHASE 2A
SHEET TITLE:

0 50' 100' 200' 300'
SCALE: AS SHOWN

PROJECT MANAGER:	ADB	PROJECT NO:	18076
A/E OF RECORD:			
JOB CAPTAIN:	SP		
DRAWN BY:	AJ		
SMRT FILE:	CE117-18076	SHEET No.	CE117

NOT FOR CONSTRUCTION

24x36

PHASE 2B WORK AREA
195,500SF+/-

CONSTRUCTION LAYDOWN AREA TO BE RE-CONFIGURED AND MINIMIZED AS FINAL BUILDING ELEMENTS ARE COMPLETED

REMOVE GRAVEL LAYDOWN AREA AND FINAL GRADE AND LANDSCAPE AREA

REMOVE STABILIZED CONSTRUCTION ACCESS AND PERIMETER EROSION CONTROLS ONCE SITE IS FULLY STABILIZED.

INSTALL PERMANENT RIPRAP SLOPE PROTECTION ON GRADED SLOPE

INSTALL EXCAVATION EDGE DRAINS AND OUTLET TO PLUNGE POOL
INV. OUT = 43.0FT

OVER-EXCAVATE UNSUITABLE SOILS AND PLACE GEOTEXTILE, DRAINAGE LAYER AND GRANULAR BORROW - NOTE CONSTRUCTION TO PROCEED FROM WEST TO EAST WITH A MAXIMUM AREA OF 80,000SF OF UNCOVERED GRUBBED AREA AT ANY GIVEN TIME

AT END OF MAJOR EARTHWORK, AND ONCE THE SITE IS STABILIZED, REMOVE TEMP. SEDIMENT BASIN 4 AND INSTALL PERMANENT STORMWATER SYSTEM

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NORDIC AQUAFARMS
285 NORTHPORT AVENUE
BELFAST, MAINE

SOIL EROSION & SEDIMENT CONTROL PHASING PLAN -9
PHASE 2B
SHEET TITLE:

0 50' 100' 200' 300'
SCALE: AS SHOWN

PROJECT MANAGER:	ADB	PROJECT NO:	18076
A/E OF RECORD:			
JOB CAPTAIN:	SP		CE118
DRAWN BY:	AJ		
SMRT FILE:	CE118-18076	SHEET No.	

NOT FOR CONSTRUCTION

ATTACHMENT B

Temporary Sediment Basin Sizing Calculations

NORDIC AQUAFARMS PROJECT
BELFAST, MAINE

TEMPORARY SEDIMENT BASIN SIZING CALCULATIONS

Introduction

Four temporary sediment basins have been designed to capture and treat runoff from construction areas where native soil materials will be exposed during earthwork activities. In each case, the basins have been sized to operate under the "worst case" scenario as viewed from a soil erosion and sediment control perspective. Site construction activities will be carefully phased to minimize the potential for soil erosion and sediment transport.

The project will require the excavation and removal of a large quantity of unsuitable silt and clay material from beneath the proposed building footprints. Native soils will be excavated from these areas, the subgrade materials will be covered with a geotextile fabric and the excavation will be backfilled with imported granular borrow. Once covered with granular borrow, the area is considered stable from a soil erosion perspective and the pervious nature of the replacement material will significantly reduce surface runoff to downstream areas. Therefore, the most critical period for the sediment basins will be during initial excavation of the native material, when up to 80,000sf is exposed and the remainder of the area is cleared (but not grubbed) in preparation for construction. Each of the basins has been designed for this case.

Design Summary

The basins are designed to drain via underdrained gravel benches, with overflow risers and to accommodate intermediate storm event flows. An emergency overflow is provided at each structure to pass flows from the most severe storm events. The bench drains are 8ft wide and 125ft long, giving 1,000sf of infiltration area. Assuming an average infiltration rate through the gravel material of 10mins/inch, gives and average infiltration outflow of 0.14cfs for each bench drain.

Sediment Basin Numbers 1, 3 and 4 include baffles along the center of each basin between the inlet side and the outlet bench drains. These are necessary to create longer flow paths, and promote increased settling of sediments suspended in the influent to the basins.

The layout and details of the temporary sediment basins are included on the Soil Erosion and Sediment Control Detail Sheets in the plan set. The attached HydroCAD model outputs demonstrate that the one-inch storm (90% probability event) passes solely through the gravel bench drain in each case.

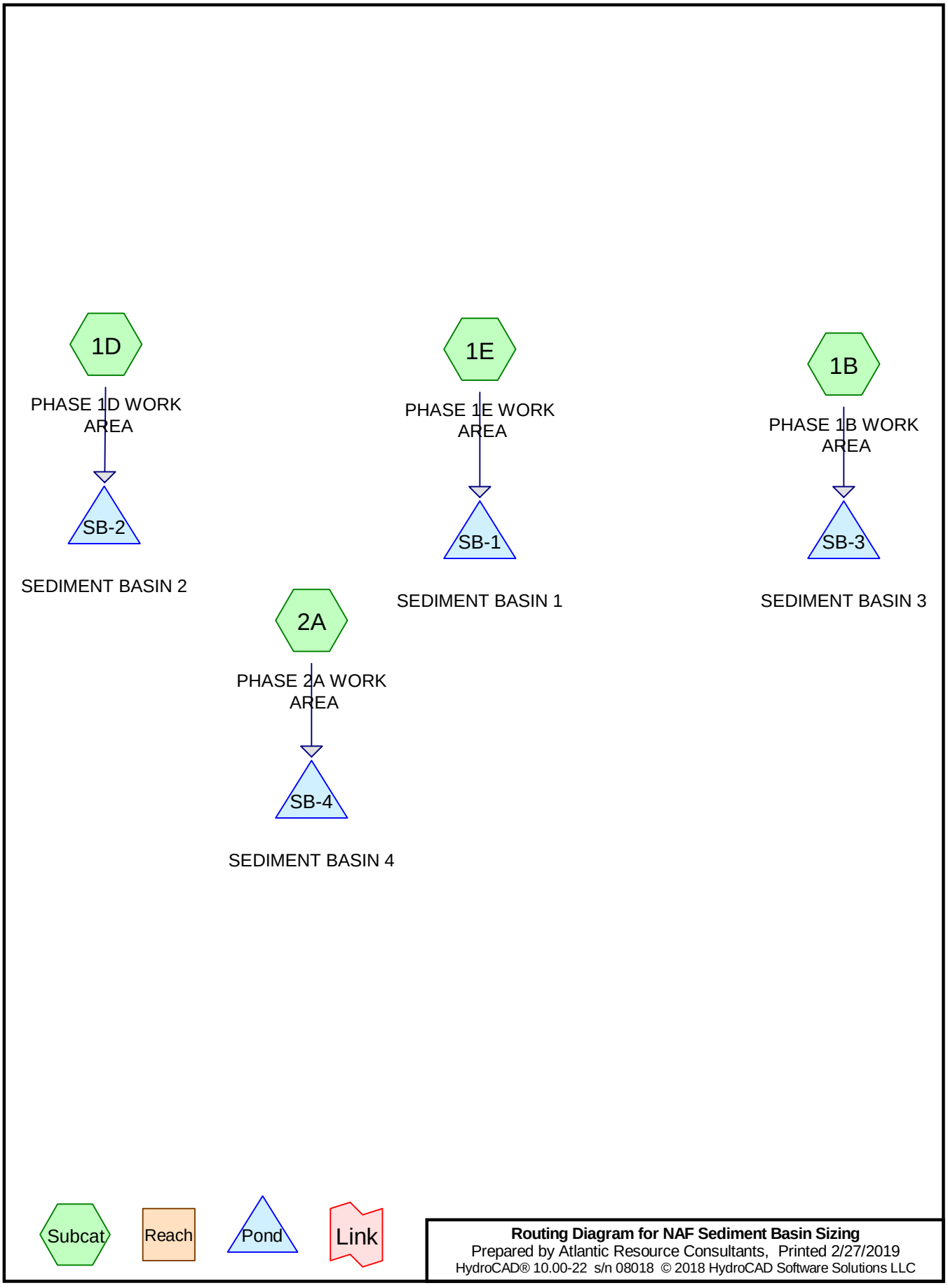
The 10-year storm event passes through the basins with the bench drains and risers operating only.

The emergency overflow weirs will operate during larger storm events.

Output tables showing the permanent pool and potential sediment storage capacity of each basin are included with the HydroCAD results.

The soil loss summary shows the anticipated volume of sediment discharge to the basins from each working area. The anticipated soil volumes in each case equate to significantly less than six inches over the area of the proposed basins.

HydroCAD Model Output


1D
PHASE 1D WORK AREA
SB-2
SEDIMENT BASIN 2
1E
PHASE 1E WORK AREA
SB-1
SEDIMENT BASIN 1
1B
PHASE 1B WORK AREA
SB-3
SEDIMENT BASIN 3
2A
PHASE 2A WORK AREA
SB-4
SEDIMENT BASIN 4
Subcat
Reach
Pond
Link
Routing Diagram for NAF Sediment Basin Sizing
Prepared by Atlantic Resource Consultants, Printed 2/27/2019
HydroCAD® 10.00-22 s/n 08018 © 2018 HydroCAD Software Solutions LLC

Time span=0.00-40.00 hrs, dt=0.05 hrs, 801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1B: PHASE 1B WORK AREA Runoff Area=400,619 sf 0.00% Impervious Runoff Depth=0.17"
Tc=10.0 min CN=85 Runoff=1.18 cfs 0.133 af

Subcatchment 1D: PHASE 1D WORK AREA Runoff Area=175,700 sf 0.00% Impervious Runoff Depth=0.25"
Tc=10.0 min CN=88 Runoff=0.91 cfs 0.085 af

Subcatchment 1E: PHASE 1E WORK AREA Runoff Area=195,500 sf 0.00% Impervious Runoff Depth=0.25"
Tc=10.0 min CN=88 Runoff=1.02 cfs 0.095 af

Subcatchment 2A: PHASE 2A WORK AREA Runoff Area=220,000 sf 0.00% Impervious Runoff Depth=0.22"
Tc=10.0 min CN=87 Runoff=0.97 cfs 0.094 af

Pond SB-1: SEDIMENT BASIN 1 Peak Elev=62.07' Storage=53,626 cf Inflow=1.02 cfs 0.095 af
Outflow=0.14 cfs 0.095 af

Pond SB-2: SEDIMENT BASIN 2 Peak Elev=61.64' Storage=24,789 cf Inflow=0.91 cfs 0.085 af
Primary=0.14 cfs 0.085 af Secondary=0.00 cfs 0.000 af Outflow=0.14 cfs 0.085 af

Pond SB-3: SEDIMENT BASIN 3 Peak Elev=57.07' Storage=45,251 cf Inflow=1.18 cfs 0.133 af
Primary=0.28 cfs 0.133 af Secondary=0.00 cfs 0.000 af Outflow=0.28 cfs 0.133 af

Pond SB-4: SEDIMENT BASIN 4 Peak Elev=48.09' Storage=38,577 cf Inflow=0.97 cfs 0.094 af
Primary=0.14 cfs 0.094 af Secondary=0.00 cfs 0.000 af Outflow=0.14 cfs 0.094 af

Total Runoff Area = 22.769 ac Runoff Volume = 0.407 af Average Runoff Depth = 0.21"
100.00% Pervious = 22.769 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1B: PHASE 1B WORK AREA

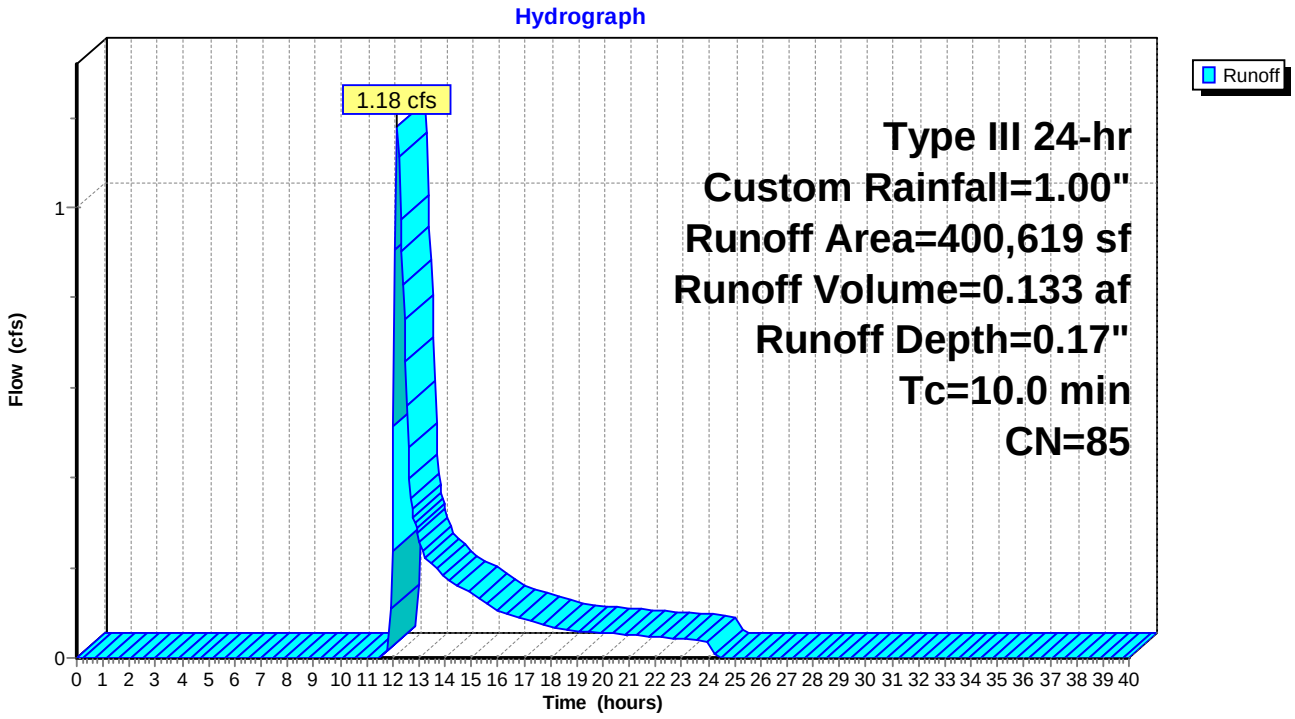
Runoff = 1.18 cfs @ 12.18 hrs, Volume= 0.133 af, Depth= 0.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr Custom Rainfall=1.00"

Area (sf)	CN	Description
80,000	94	Fallow, bare soil, HSG D
320,619	83	Brush, Poor, HSG D
400,619	85	Weighted Average
400,619		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry,**

Subcatchment 1B: PHASE 1B WORK AREA



Summary for Subcatchment 1D: PHASE 1D WORK AREA

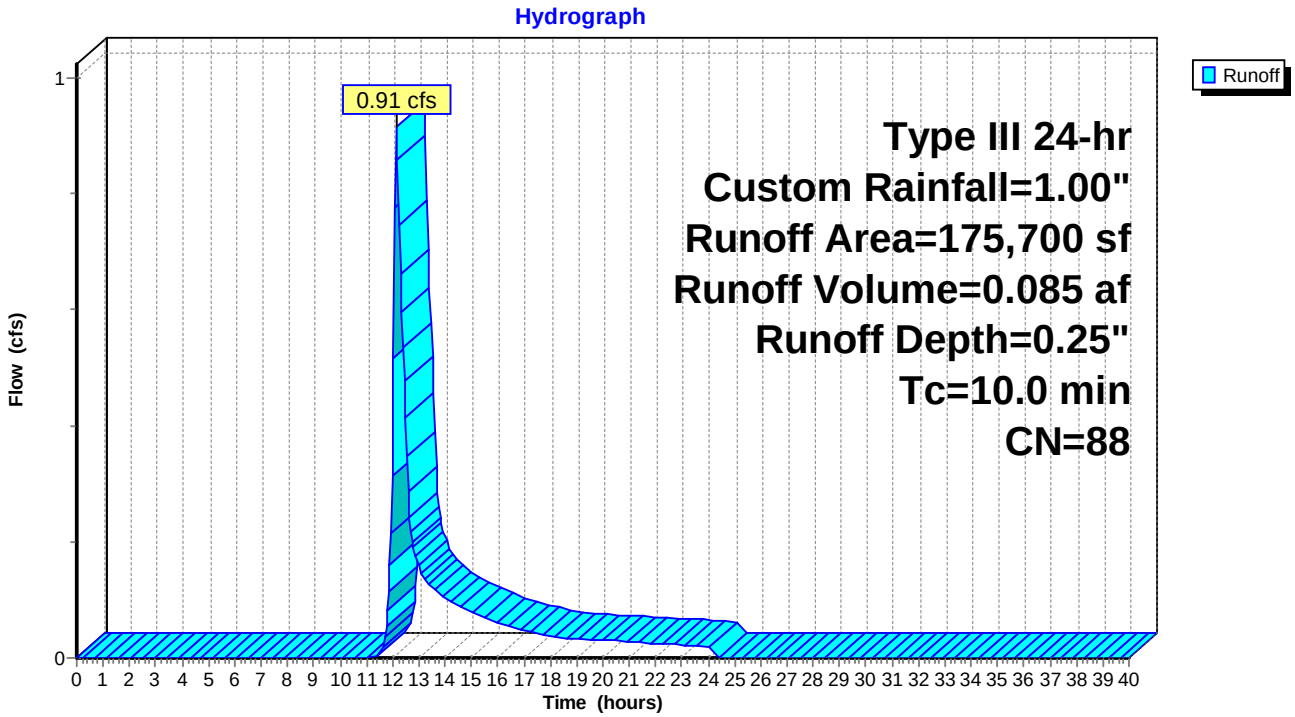
Runoff = 0.91 cfs @ 12.16 hrs, Volume= 0.085 af, Depth= 0.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr Custom Rainfall=1.00"

Area (sf)	CN	Description
80,000	94	Fallow, bare soil, HSG D
95,700	83	Brush, Poor, HSG D
175,700	88	Weighted Average
175,700		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry,**

Subcatchment 1D: PHASE 1D WORK AREA



Summary for Subcatchment 1E: PHASE 1E WORK AREA

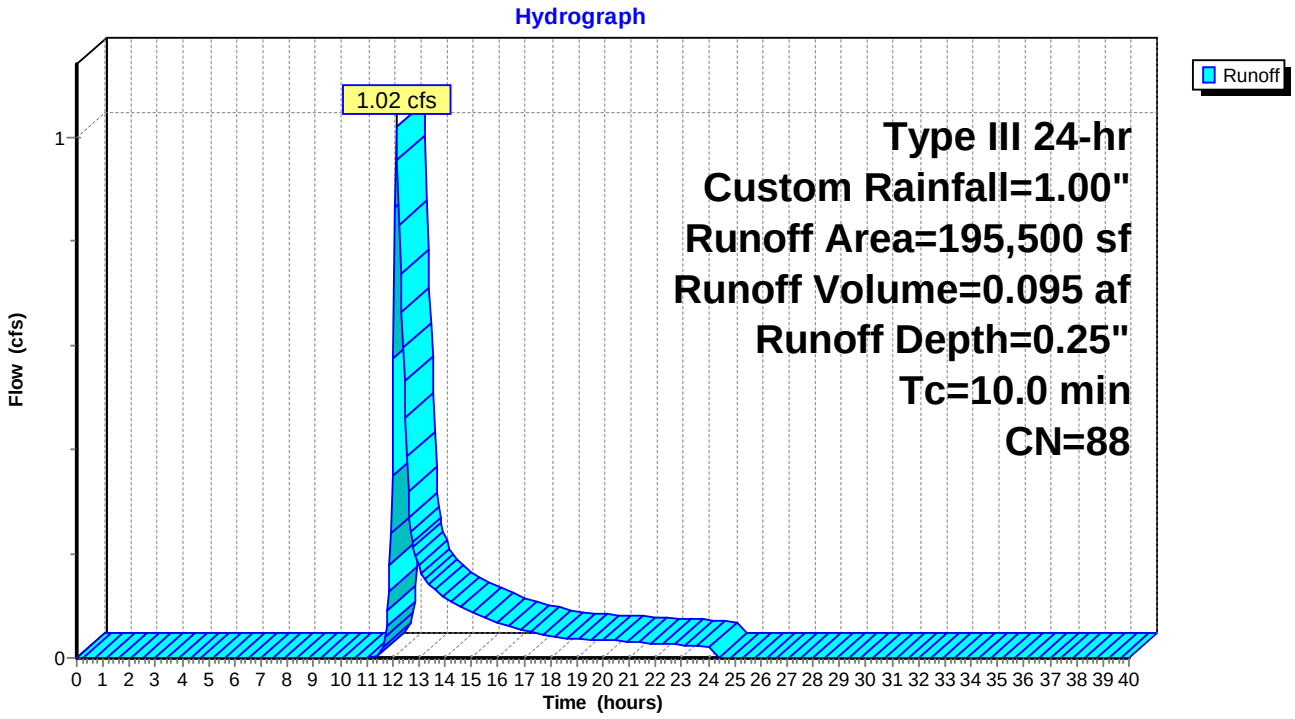
Runoff = 1.02 cfs @ 12.16 hrs, Volume= 0.095 af, Depth= 0.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr Custom Rainfall=1.00"

Area (sf)	CN	Description
80,000	94	Fallow, bare soil, HSG D
115,500	83	Brush, Poor, HSG D
195,500	88	Weighted Average
195,500		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry,**

Subcatchment 1E: PHASE 1E WORK AREA



Summary for Subcatchment 2A: PHASE 2A WORK AREA

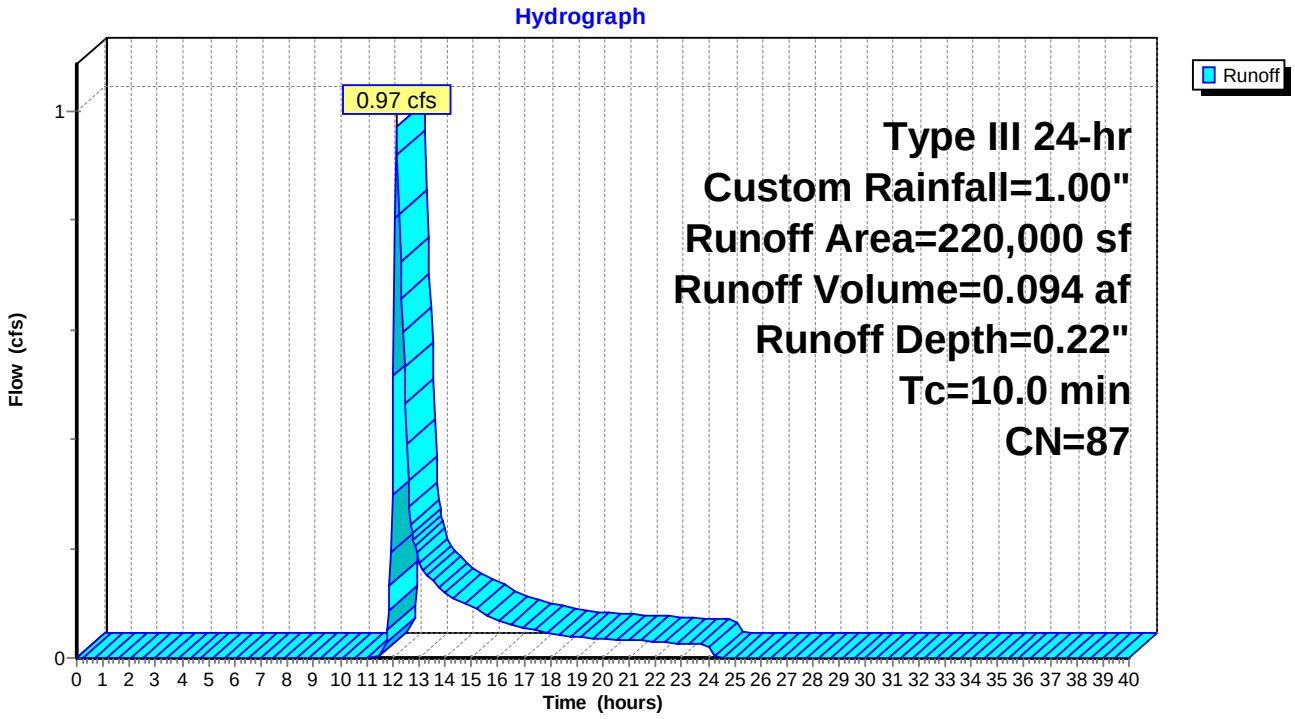
Runoff = 0.97 cfs @ 12.16 hrs, Volume= 0.094 af, Depth= 0.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr Custom Rainfall=1.00"

Area (sf)	CN	Description
80,000	94	Fallow, bare soil, HSG D
140,000	83	Brush, Poor, HSG D
220,000	87	Weighted Average
220,000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry,**

Subcatchment 2A: PHASE 2A WORK AREA



Summary for Pond SB-1: SEDIMENT BASIN 1

Inflow Area = 4.488 ac, 0.00% Impervious, Inflow Depth = 0.25" for Custom event
Inflow = 1.02 cfs @ 12.16 hrs, Volume= 0.095 af
Outflow = 0.14 cfs @ 12.40 hrs, Volume= 0.095 af, Atten= 86%, Lag= 14.4 min
Primary = 0.14 cfs @ 12.40 hrs, Volume= 0.095 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Starting Elev= 62.00' Surf.Area= 21,234 sf Storage= 52,122 cf
Peak Elev= 62.07' @ 13.40 hrs Surf.Area= 21,366 sf Storage= 53,626 cf (1,504 cf above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 143.4 min (1,024.2 - 880.8)

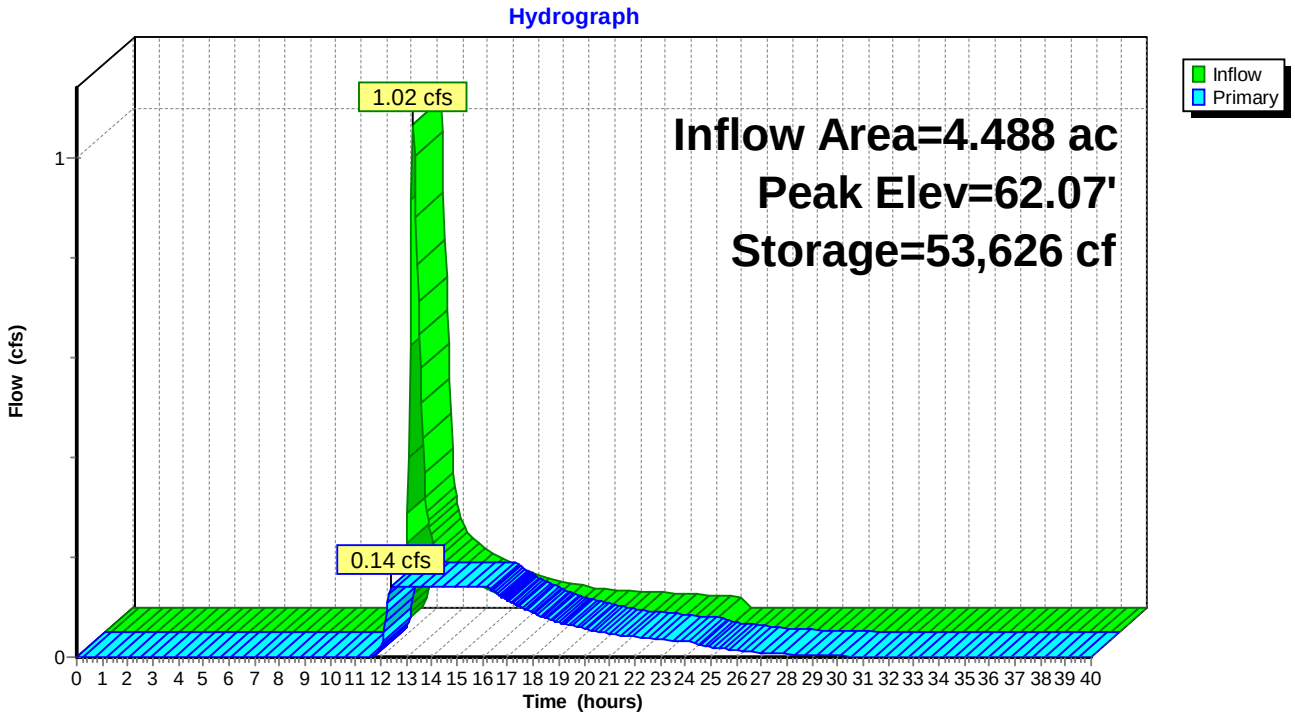
Volume	Invert	Avail.Storage	Storage Description
#1	59.00'	98,359 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
59.00	14,450	0	0
60.00	16,235	15,343	15,343
61.00	18,045	17,140	32,483
62.00	21,234	19,640	52,122
63.00	23,110	22,172	74,294
64.00	25,020	24,065	98,359

Device	Routing	Invert	Outlet Devices
#1	Device 2	62.00'	**125.0' long x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#2	Device 4	62.00'	**0.14 cfs Exfiltration when above 62.00'**
#3	Device 4	62.67'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	58.00'	**24.0" Round Culvert** L= 220.0' Ke= 0.500 Inlet / Outlet Invert= 58.00' / 57.00' S= 0.0045 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#5	Device 4	63.05'	**48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.14 cfs @ 12.40 hrs HW=62.05' (Free Discharge)
- **4=Culvert** (Passes 0.14 cfs of 22.49 cfs potential flow)
  - **2=Exfiltration** (Exfiltration Controls 0.14 cfs)
    - **1=Broad-Crested Rectangular Weir** (Passes 0.14 cfs of 3.93 cfs potential flow)
  - **3=Orifice/Grate** (Controls 0.00 cfs)
  - **5=Orifice/Grate** (Controls 0.00 cfs)

Pond SB-1: SEDIMENT BASIN 1



Summary for Pond SB-2: SEDIMENT BASIN 2

Inflow Area = 4.034 ac, 0.00% Impervious, Inflow Depth = 0.25" for Custom event
Inflow = 0.91 cfs @ 12.16 hrs, Volume= 0.085 af
Outflow = 0.14 cfs @ 12.15 hrs, Volume= 0.085 af, Atten= 85%, Lag= 0.0 min
Primary = 0.14 cfs @ 12.15 hrs, Volume= 0.085 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Starting Elev= 61.50' Surf.Area= 8,610 sf Storage= 23,563 cf
Peak Elev= 61.64' @ 13.13 hrs Surf.Area= 8,891 sf Storage= 24,789 cf (1,226 cf above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 88.7 min (969.5 - 880.8)

Volume	Invert	Avail.Storage	Storage Description
#1	58.00'	49,004 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

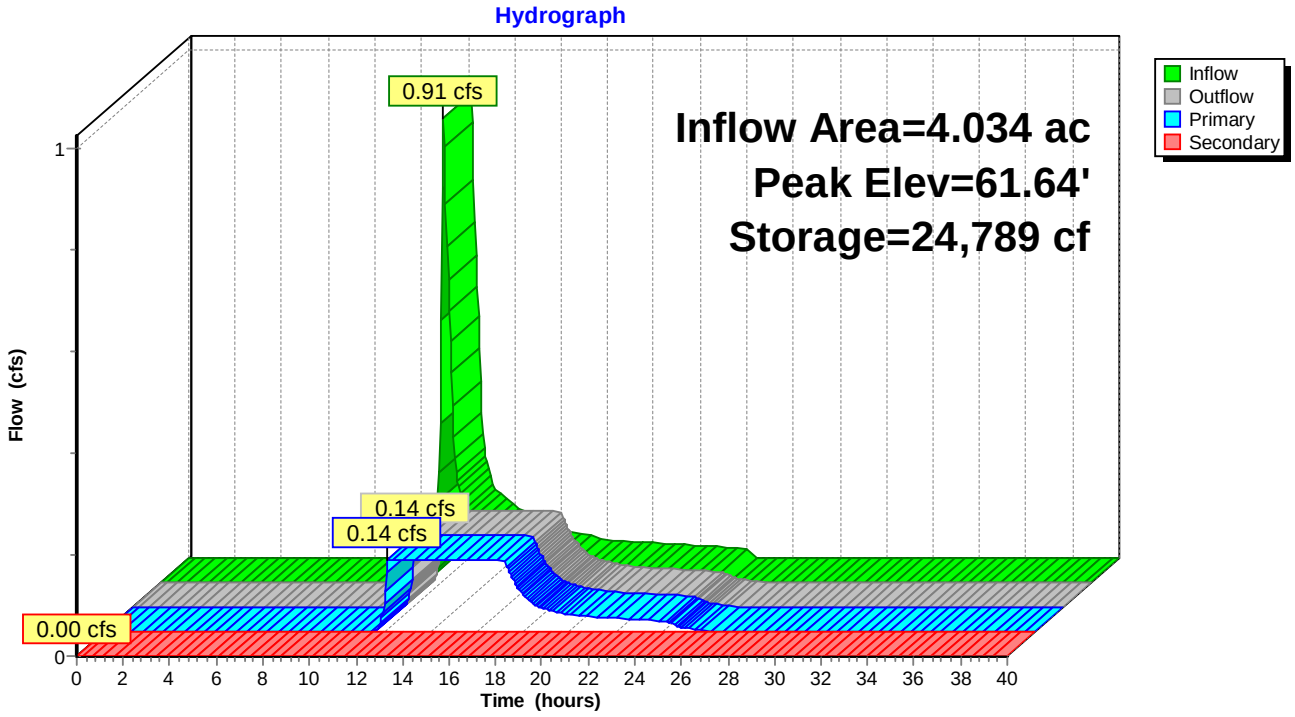
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
58.00	5,440	0	0
59.00	6,132	5,786	5,786
60.00	6,855	6,494	12,280
61.00	7,605	7,230	19,510
62.00	9,614	8,610	28,119
63.00	10,437	10,026	38,145
64.00	11,281	10,859	49,004

Device	Routing	Invert	Outlet Devices
#1	Device 5	61.50'	**100.0' long x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#2	Device 3	62.00'	**10.0" Horiz. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Primary	59.00'	**12.0" Round Culvert** L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 59.00' / 58.00' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#4	Secondary	63.00'	**20.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74
#5	Device 3	61.50'	**0.14 cfs Exfiltration when above 61.50'**

Primary OutFlow Max=0.14 cfs @ 12.15 hrs HW=61.55' (Free Discharge)
└**3=Culvert** (Passes 0.14 cfs of 4.92 cfs potential flow)
└**2=Orifice/Grate** (Controls 0.00 cfs)
└**5=Exfiltration** (Exfiltration Controls 0.14 cfs)
└**1=Broad-Crested Rectangular Weir** (Passes 0.14 cfs of 2.73 cfs potential flow)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=61.50' (Free Discharge)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond SB-2: SEDIMENT BASIN 2



Summary for Pond SB-3: SEDIMENT BASIN 3

Inflow Area = 9.197 ac, 0.00% Impervious, Inflow Depth = 0.17" for Custom event
Inflow = 1.18 cfs @ 12.18 hrs, Volume= 0.133 af
Outflow = 0.28 cfs @ 12.40 hrs, Volume= 0.133 af, Atten= 76%, Lag= 13.5 min
Primary = 0.28 cfs @ 12.40 hrs, Volume= 0.133 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Starting Elev= 57.00' Surf.Area= 21,708 sf Storage= 43,774 cf
Peak Elev= 57.07' @ 12.93 hrs Surf.Area= 21,919 sf Storage= 45,251 cf (1,477 cf above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 70.0 min (973.9 - 904.0)

Volume	Invert	Avail.Storage	Storage Description
#1	54.00'	93,433 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

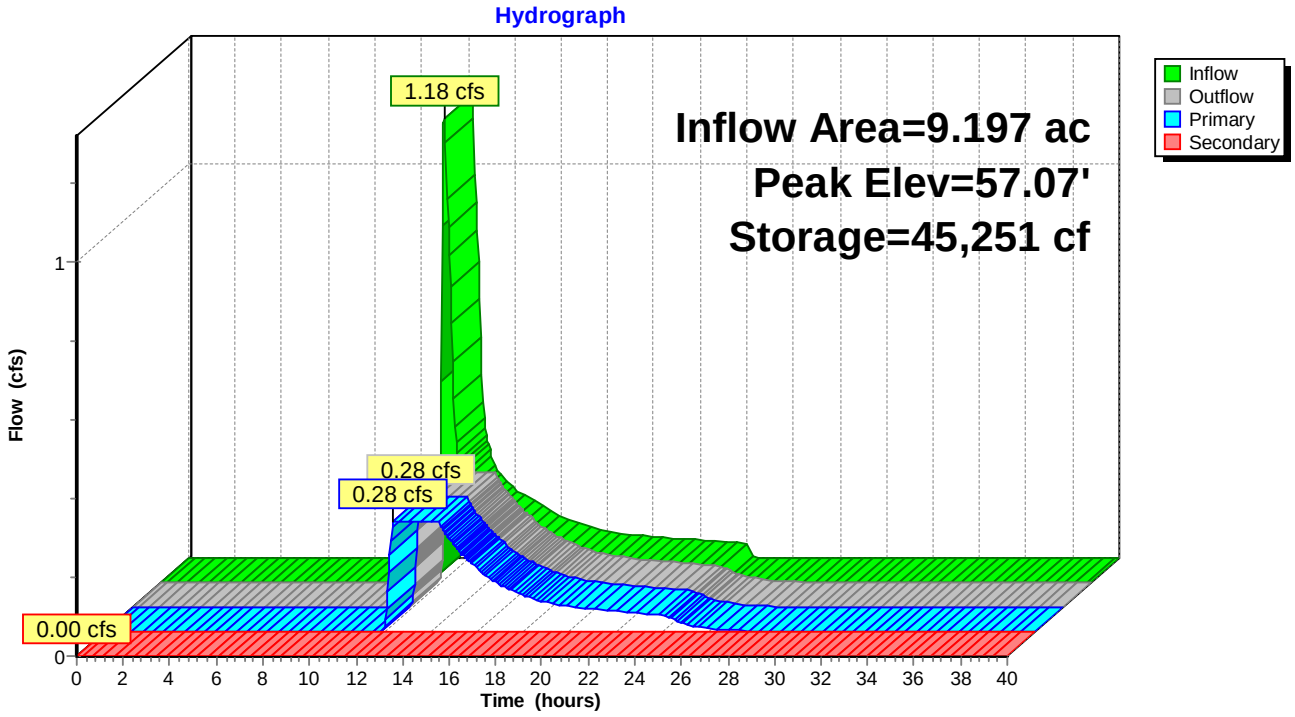
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
54.00	9,552	0	0
55.00	12,557	11,055	11,055
56.00	15,587	14,072	25,127
57.00	21,708	18,648	43,774
58.00	24,827	23,268	67,042
59.00	27,955	26,391	93,433

Device	Routing	Invert	Outlet Devices
#1	Device 2	57.00'	**50.0' long x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#2	Device 4	57.00'	**0.28 cfs Exfiltration when above 57.00'**
#3	Device 4	57.50'	**12.0" Horiz. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads
#4	Primary	54.50'	**12.0" Round Culvert X 2.00** L= 60.0' Ke= 0.500 Inlet / Outlet Invert= 54.50' / 54.00' S= 0.0083 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#5	Secondary	58.15'	**20.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Primary OutFlow Max=0.28 cfs @ 12.40 hrs HW=57.05' (Free Discharge)
└**4=Culvert** (Passes 0.28 cfs of 10.25 cfs potential flow)
└**2=Exfiltration** (Exfiltration Controls 0.28 cfs)
└**1=Broad-Crested Rectangular Weir** (Passes 0.28 cfs of 1.51 cfs potential flow)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=57.00' (Free Discharge)
└**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond SB-3: SEDIMENT BASIN 3



Summary for Pond SB-4: SEDIMENT BASIN 4

Inflow Area = 5.051 ac, 0.00% Impervious, Inflow Depth = 0.22" for Custom event
Inflow = 0.97 cfs @ 12.16 hrs, Volume= 0.094 af
Outflow = 0.14 cfs @ 12.30 hrs, Volume= 0.094 af, Atten= 86%, Lag= 8.1 min
Primary = 0.14 cfs @ 12.30 hrs, Volume= 0.094 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Starting Elev= 48.00' Surf.Area= 15,504 sf Storage= 37,176 cf
Peak Elev= 48.09' @ 13.49 hrs Surf.Area= 15,653 sf Storage= 38,577 cf (1,401 cf above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 121.5 min (1,009.7 - 888.2)

Volume	Invert	Avail.Storage	Storage Description
#1	45.00'	71,536 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

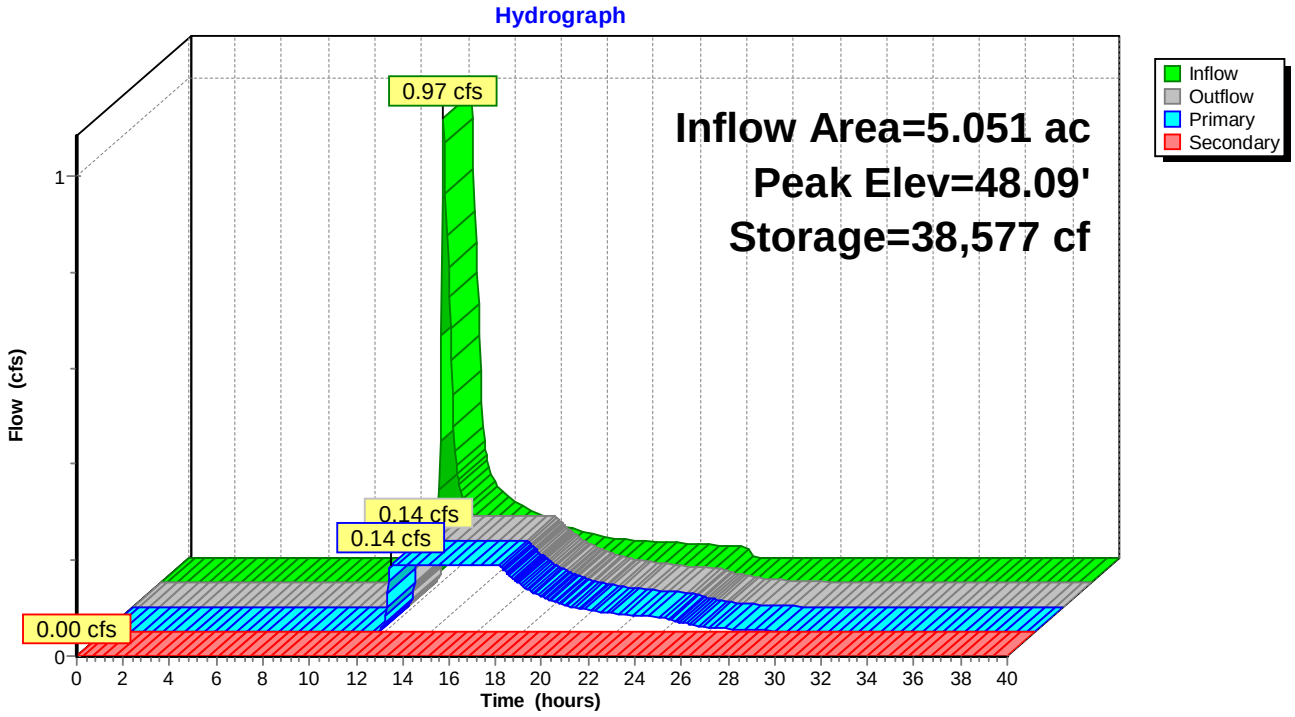
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
45.00	9,398	0	0
46.00	11,011	10,205	10,205
47.00	13,714	12,363	22,567
48.00	15,504	14,609	37,176
49.00	17,163	16,334	53,510
50.00	18,889	18,026	71,536

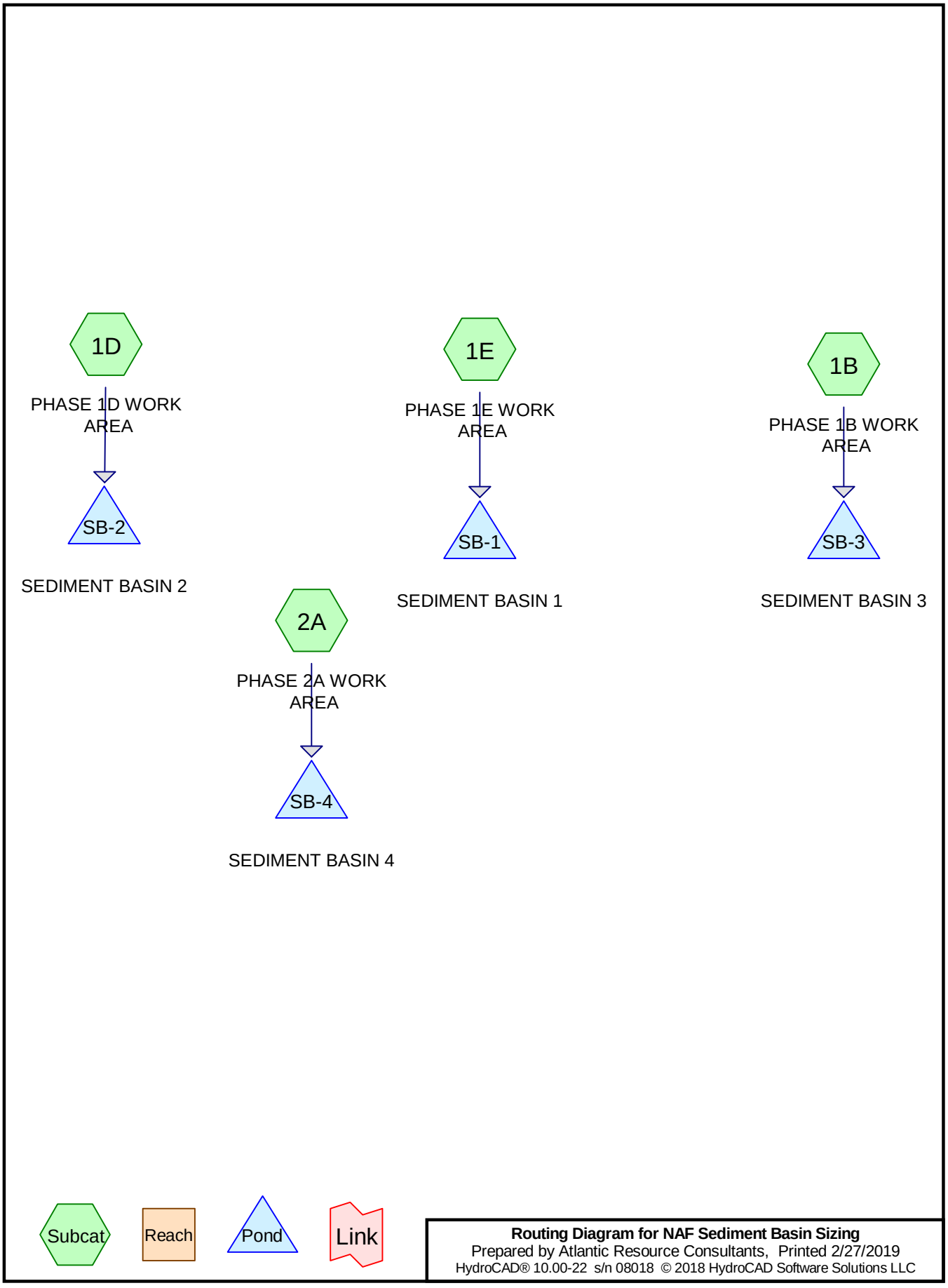
Device	Routing	Invert	Outlet Devices
#1	Device 2	48.00'	**125.0' long x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#2	Device 4	48.00'	**0.14 cfs Exfiltration when above 48.00'**
#3	Device 4	48.50'	**12.0" Horiz. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#4	Primary	45.00'	**12.0" Round Culvert** L= 170.0' Ke= 0.500 Inlet / Outlet Invert= 45.00' / 43.00' S= 0.0118 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#5	Secondary	49.10'	**20.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Primary OutFlow Max=0.14 cfs @ 12.30 hrs HW=48.05' (Free Discharge)
└**4=Culvert** (Passes 0.14 cfs of 5.16 cfs potential flow)
  └**2=Exfiltration** (Exfiltration Controls 0.14 cfs)
    └**1=Broad-Crested Rectangular Weir** (Passes 0.14 cfs of 3.97 cfs potential flow)
  └**3=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=48.00' (Free Discharge)
└**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond SB-4: SEDIMENT BASIN 4




1D
PHASE 1D WORK AREA
SB-2
SEDIMENT BASIN 2
1E
PHASE 1E WORK AREA
SB-1
SEDIMENT BASIN 1
1B
PHASE 1B WORK AREA
SB-3
SEDIMENT BASIN 3
2A
PHASE 2A WORK AREA
SB-4
SEDIMENT BASIN 4
Subcat
Reach
Pond
Link
Routing Diagram for NAF Sediment Basin Sizing
Prepared by Atlantic Resource Consultants, Printed 2/27/2019
HydroCAD® 10.00-22 s/n 08018 © 2018 HydroCAD Software Solutions LLC

Time span=0.00-40.00 hrs, dt=0.05 hrs, 801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1B: PHASE 1B WORK AREA Runoff Area=400,619 sf 0.00% Impervious Runoff Depth=2.64"
Tc=10.0 min CN=85 Runoff=24.47 cfs 2.021 af

Subcatchment 1D: PHASE 1D WORK AREA Runoff Area=175,700 sf 0.00% Impervious Runoff Depth=2.92"
Tc=10.0 min CN=88 Runoff=11.74 cfs 0.980 af

Subcatchment 1E: PHASE 1E WORK AREA Runoff Area=195,500 sf 0.00% Impervious Runoff Depth=2.92"
Tc=10.0 min CN=88 Runoff=13.07 cfs 1.090 af

Subcatchment 2A: PHASE 2A WORK AREA Runoff Area=220,000 sf 0.00% Impervious Runoff Depth=2.82"
Tc=10.0 min CN=87 Runoff=14.29 cfs 1.187 af

Pond SB-1: SEDIMENT BASIN 1 Peak Elev=63.06' Storage=75,726 cf Inflow=13.07 cfs 1.090 af
Outflow=2.61 cfs 0.925 af

Pond SB-2: SEDIMENT BASIN 2 Peak Elev=62.88' Storage=36,944 cf Inflow=11.74 cfs 0.980 af
Primary=5.08 cfs 0.980 af Secondary=0.00 cfs 0.000 af Outflow=5.08 cfs 0.980 af

Pond SB-3: SEDIMENT BASIN 3 Peak Elev=58.13' Storage=70,321 cf Inflow=24.47 cfs 2.021 af
Primary=12.29 cfs 2.021 af Secondary=0.00 cfs 0.000 af Outflow=12.29 cfs 2.021 af

Pond SB-4: SEDIMENT BASIN 4 Peak Elev=49.12' Storage=55,575 cf Inflow=14.29 cfs 1.187 af
Primary=5.80 cfs 1.177 af Secondary=0.21 cfs 0.003 af Outflow=6.01 cfs 1.180 af

Total Runoff Area = 22.769 ac Runoff Volume = 5.279 af Average Runoff Depth = 2.78"
100.00% Pervious = 22.769 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1B: PHASE 1B WORK AREA

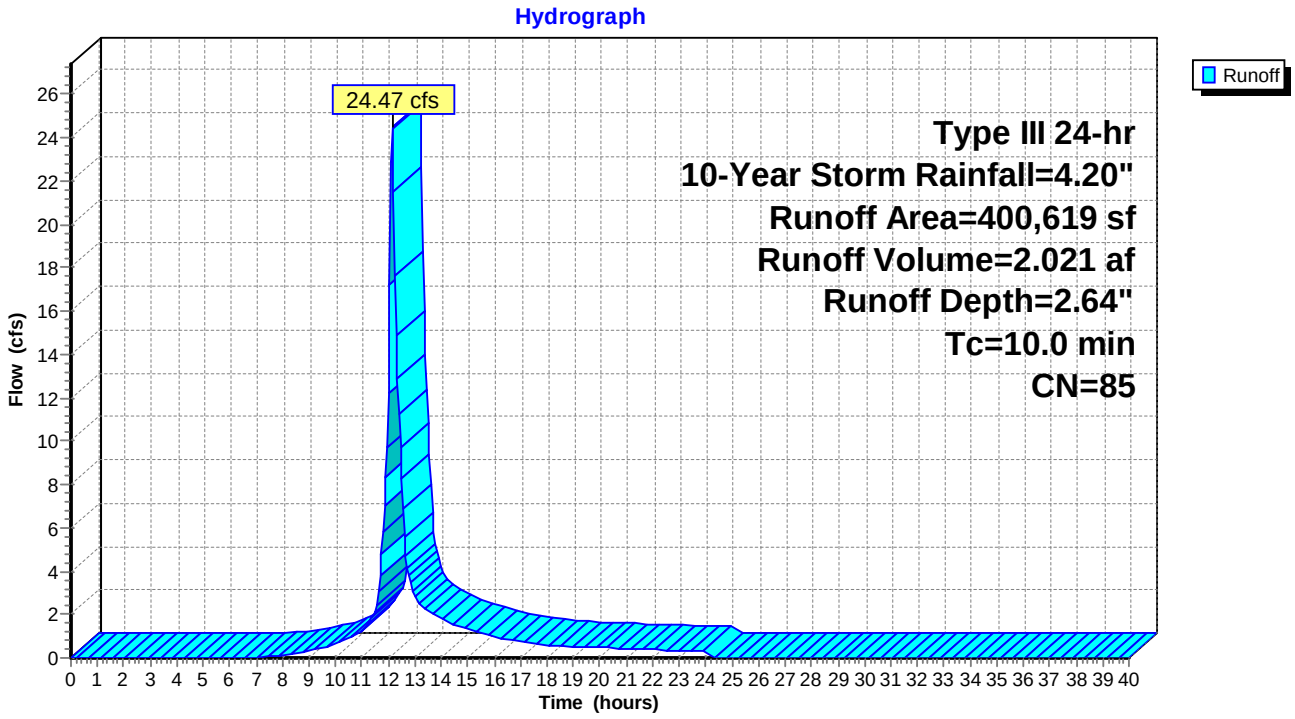
Runoff = 24.47 cfs @ 12.14 hrs, Volume= 2.021 af, Depth= 2.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Storm Rainfall=4.20"

Area (sf)	CN	Description
80,000	94	Fallow, bare soil, HSG D
320,619	83	Brush, Poor, HSG D
400,619	85	Weighted Average
400,619		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry,**

Subcatchment 1B: PHASE 1B WORK AREA



Summary for Subcatchment 1D: PHASE 1D WORK AREA

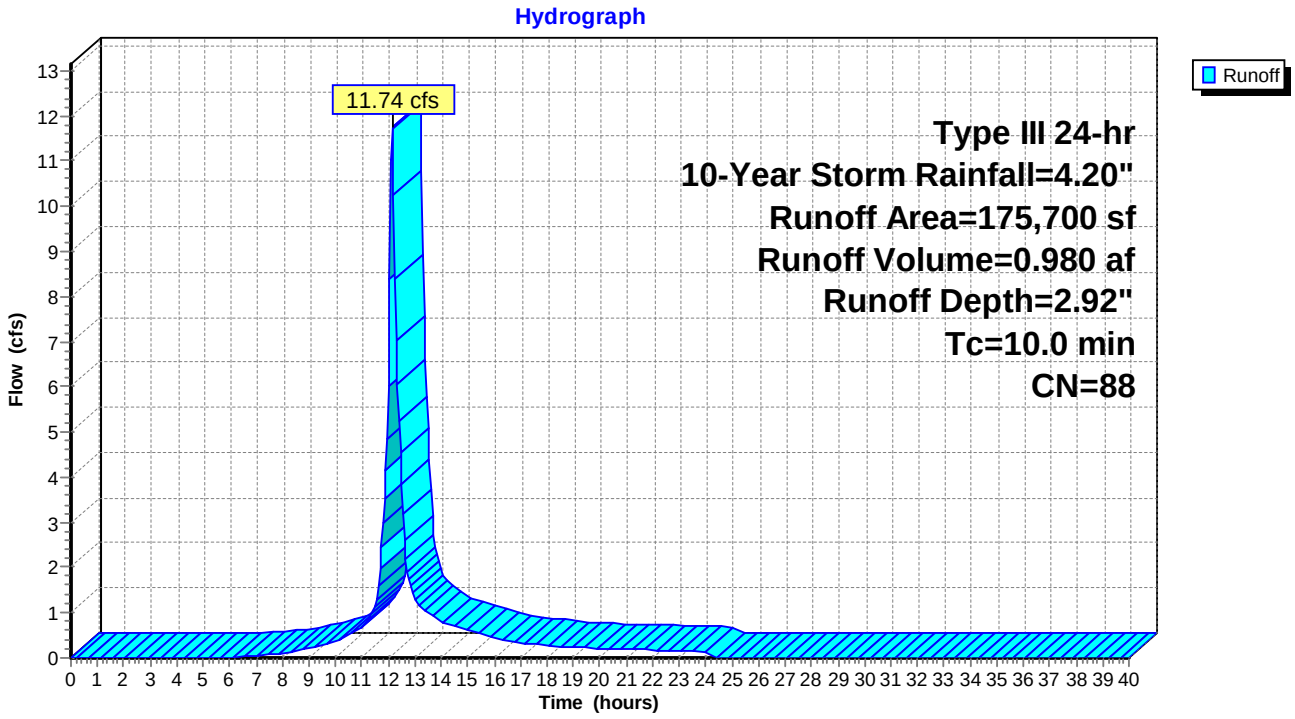
Runoff = 11.74 cfs @ 12.14 hrs, Volume= 0.980 af, Depth= 2.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Storm Rainfall=4.20"

Area (sf)	CN	Description
80,000	94	Fallow, bare soil, HSG D
95,700	83	Brush, Poor, HSG D
175,700	88	Weighted Average
175,700		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry,**

Subcatchment 1D: PHASE 1D WORK AREA



Summary for Subcatchment 1E: PHASE 1E WORK AREA

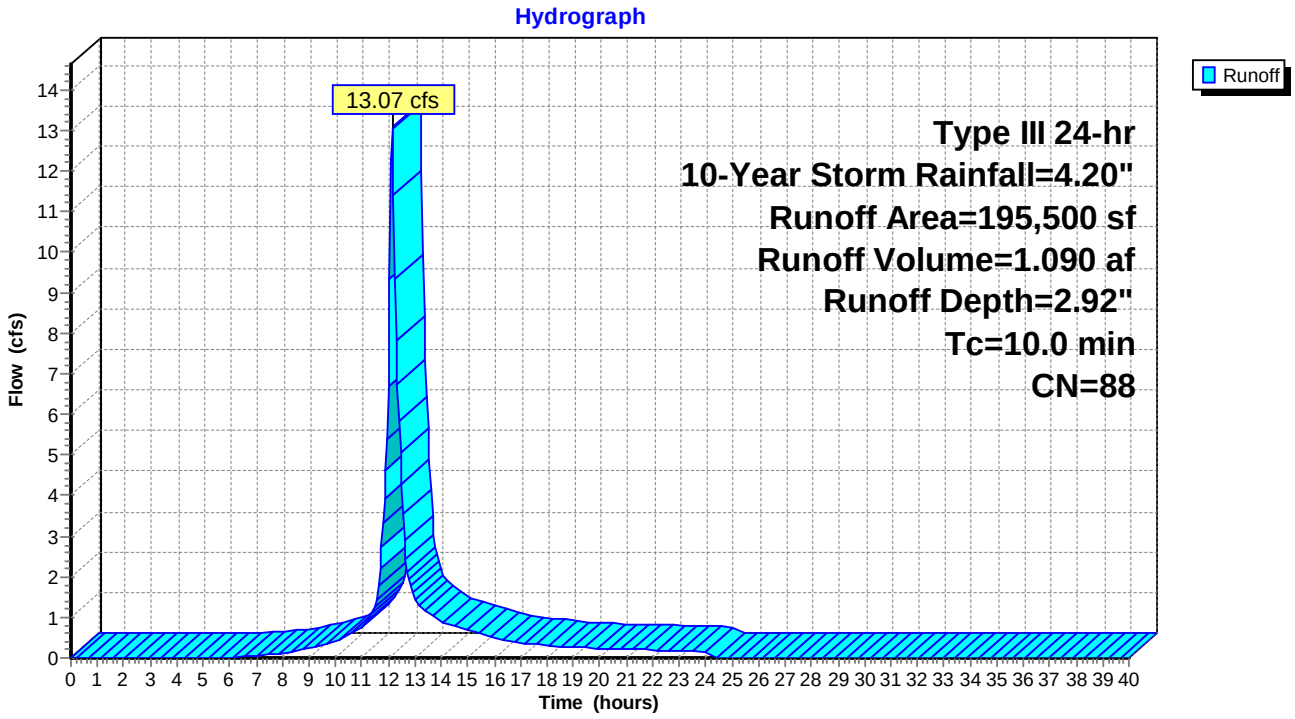
Runoff = 13.07 cfs @ 12.14 hrs, Volume= 1.090 af, Depth= 2.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Storm Rainfall=4.20"

Area (sf)	CN	Description
80,000	94	Fallow, bare soil, HSG D
115,500	83	Brush, Poor, HSG D
195,500	88	Weighted Average
195,500		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry,**

Subcatchment 1E: PHASE 1E WORK AREA



Summary for Subcatchment 2A: PHASE 2A WORK AREA

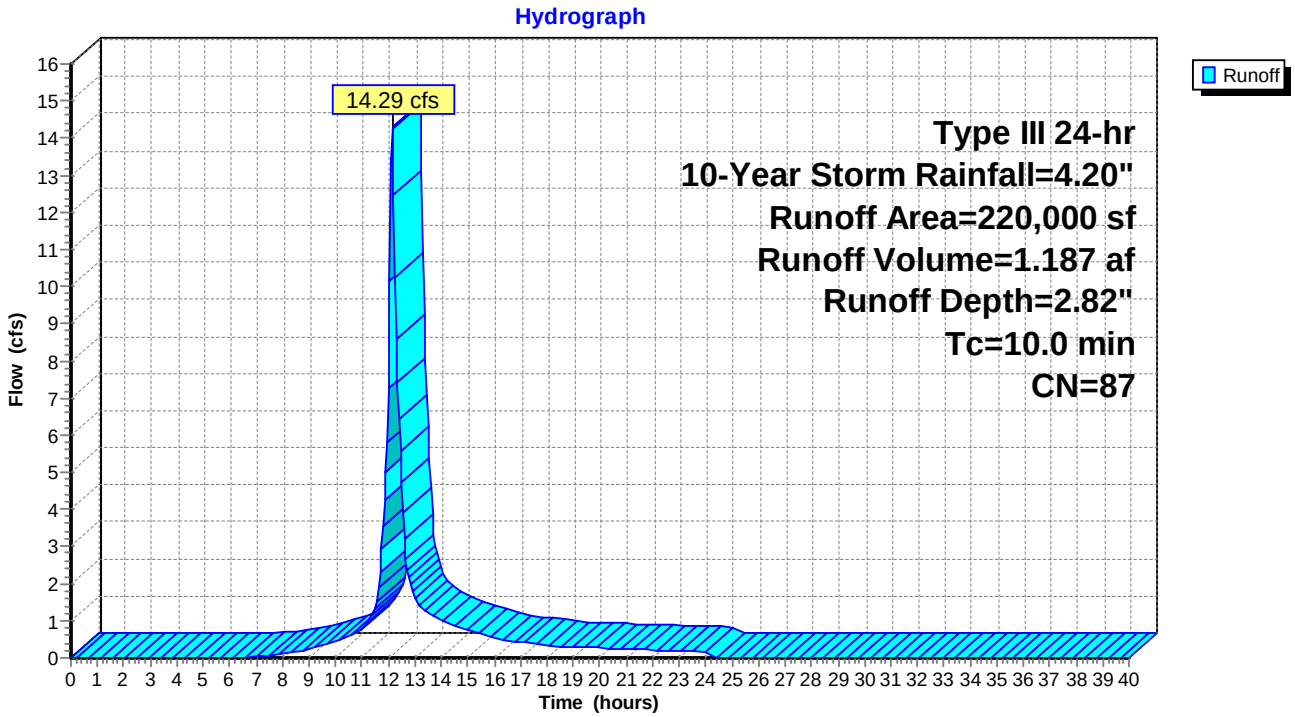
Runoff = 14.29 cfs @ 12.14 hrs, Volume= 1.187 af, Depth= 2.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Storm Rainfall=4.20"

Area (sf)	CN	Description
80,000	94	Fallow, bare soil, HSG D
140,000	83	Brush, Poor, HSG D
220,000	87	Weighted Average
220,000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry,**

Subcatchment 2A: PHASE 2A WORK AREA



Summary for Pond SB-1: SEDIMENT BASIN 1

Inflow Area = 4.488 ac, 0.00% Impervious, Inflow Depth = 2.92" for 10-Year Storm event
Inflow = 13.07 cfs @ 12.14 hrs, Volume= 1.090 af
Outflow = 2.61 cfs @ 12.63 hrs, Volume= 0.925 af, Atten= 80%, Lag= 29.4 min
Primary = 2.61 cfs @ 12.63 hrs, Volume= 0.925 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Starting Elev= 62.00' Surf.Area= 21,234 sf Storage= 52,122 cf
Peak Elev= 63.06' @ 12.63 hrs Surf.Area= 23,228 sf Storage= 75,726 cf (23,604 cf above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 308.7 min (1,116.7 - 808.0)

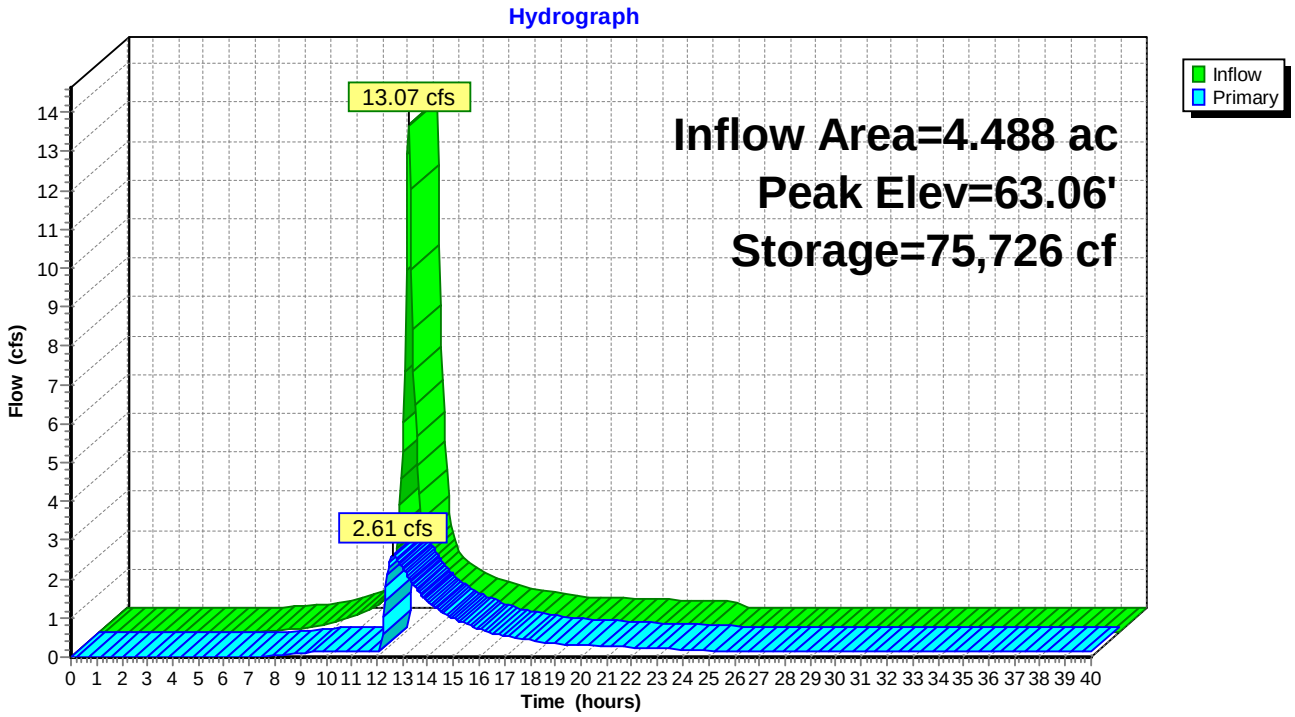
Volume	Invert	Avail.Storage	Storage Description
#1	59.00'	98,359 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
59.00	14,450	0	0
60.00	16,235	15,343	15,343
61.00	18,045	17,140	32,483
62.00	21,234	19,640	52,122
63.00	23,110	22,172	74,294
64.00	25,020	24,065	98,359

Device	Routing	Invert	Outlet Devices
#1	Device 2	62.00'	**125.0' long x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#2	Device 4	62.00'	**0.14 cfs Exfiltration when above 62.00'**
#3	Device 4	62.67'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Primary	58.00'	**24.0" Round Culvert** L= 220.0' Ke= 0.500 Inlet / Outlet Invert= 58.00' / 57.00' S= 0.0045 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#5	Device 4	63.05'	**48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.56 cfs @ 12.63 hrs HW=63.06' (Free Discharge)
- **4=Culvert** (Passes 2.56 cfs of 25.94 cfs potential flow)
  - **2=Exfiltration** (Exfiltration Controls 0.14 cfs)
    - **1=Broad-Crested Rectangular Weir** (Passes 0.14 cfs of 365.31 cfs potential flow)
  - **3=Orifice/Grate** (Orifice Controls 2.37 cfs @ 3.01 fps)
  - **5=Orifice/Grate** (Weir Controls 0.05 cfs @ 0.35 fps)

Pond SB-1: SEDIMENT BASIN 1



Summary for Pond SB-2: SEDIMENT BASIN 2

Inflow Area = 4.034 ac, 0.00% Impervious, Inflow Depth = 2.92" for 10-Year Storm event
Inflow = 11.74 cfs @ 12.14 hrs, Volume= 0.980 af
Outflow = 5.08 cfs @ 12.41 hrs, Volume= 0.980 af, Atten= 57%, Lag= 16.4 min
Primary = 5.08 cfs @ 12.41 hrs, Volume= 0.980 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Starting Elev= 61.50' Surf.Area= 8,610 sf Storage= 23,563 cf
Peak Elev= 62.88' @ 12.41 hrs Surf.Area= 10,342 sf Storage= 36,944 cf (13,381 cf above start)

Plug-Flow detention time= 499.1 min calculated for 0.439 af (45% of inflow)
Center-of-Mass det. time= 135.0 min (943.0 - 808.0)

Volume	Invert	Avail.Storage	Storage Description
#1	58.00'	49,004 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

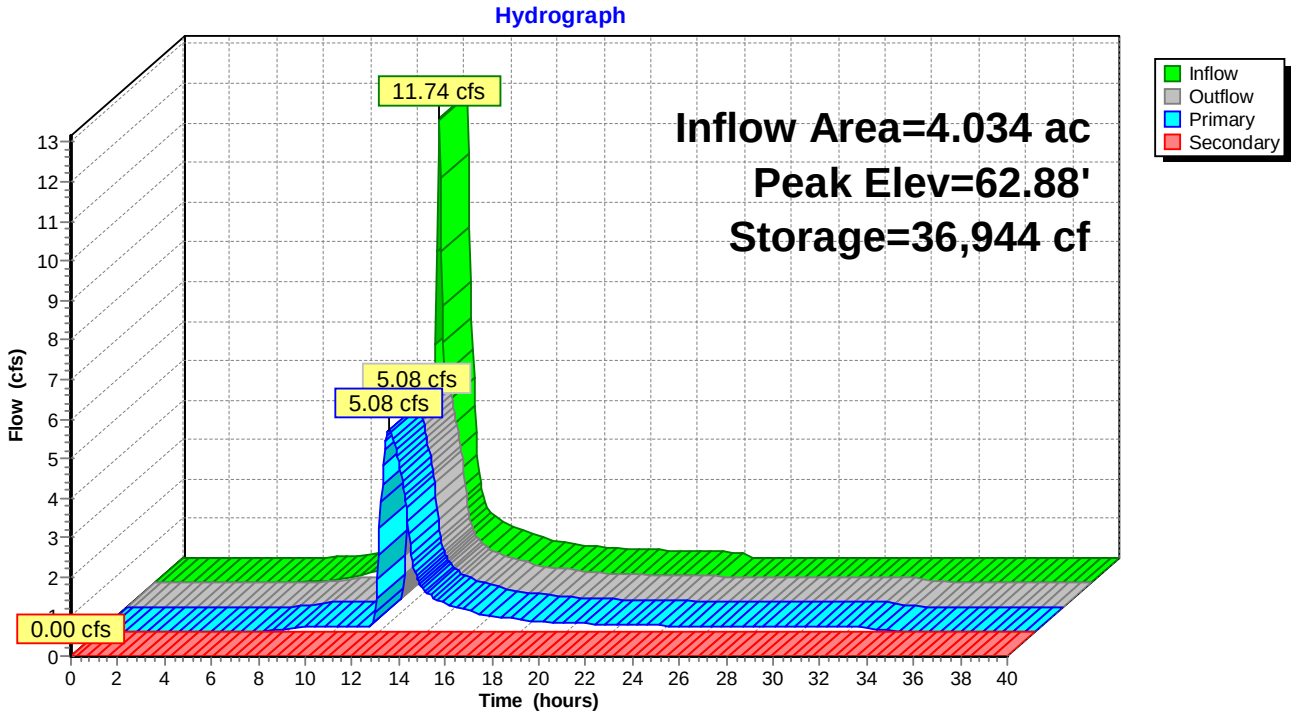
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
58.00	5,440	0	0
59.00	6,132	5,786	5,786
60.00	6,855	6,494	12,280
61.00	7,605	7,230	19,510
62.00	9,614	8,610	28,119
63.00	10,437	10,026	38,145
64.00	11,281	10,859	49,004

Device	Routing	Invert	Outlet Devices
#1	Device 5	61.50'	**100.0' long x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#2	Device 3	62.00'	**10.0" Horiz. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Primary	59.00'	**12.0" Round Culvert** L= 100.0' Ke= 0.500 Inlet / Outlet Invert= 59.00' / 58.00' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#4	Secondary	63.00'	**20.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74
#5	Device 3	61.50'	**0.14 cfs Exfiltration when above 61.50'**

Primary OutFlow Max=5.08 cfs @ 12.41 hrs HW=62.88' (Free Discharge)
└**3=Culvert** (Passes 5.08 cfs of 6.08 cfs potential flow)
└**2=Orifice/Grate** (Orifice Controls 4.94 cfs @ 4.52 fps)
└**5=Exfiltration** (Exfiltration Controls 0.14 cfs)
└**1=Broad-Crested Rectangular Weir** (Passes 0.14 cfs of 449.61 cfs potential flow)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=61.50' (Free Discharge)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond SB-2: SEDIMENT BASIN 2



Summary for Pond SB-3: SEDIMENT BASIN 3

Inflow Area = 9.197 ac, 0.00% Impervious, Inflow Depth = 2.64" for 10-Year Storm event
Inflow = 24.47 cfs @ 12.14 hrs, Volume= 2.021 af
Outflow = 12.29 cfs @ 12.37 hrs, Volume= 2.021 af, Atten= 50%, Lag= 13.6 min
Primary = 12.29 cfs @ 12.37 hrs, Volume= 2.021 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Starting Elev= 57.00' Surf.Area= 21,708 sf Storage= 43,774 cf
Peak Elev= 58.13' @ 12.37 hrs Surf.Area= 25,237 sf Storage= 70,321 cf (26,547 cf above start)

Plug-Flow detention time= 507.4 min calculated for 1.016 af (50% of inflow)
Center-of-Mass det. time= 161.1 min (979.3 - 818.2)

Volume	Invert	Avail.Storage	Storage Description
#1	54.00'	93,433 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

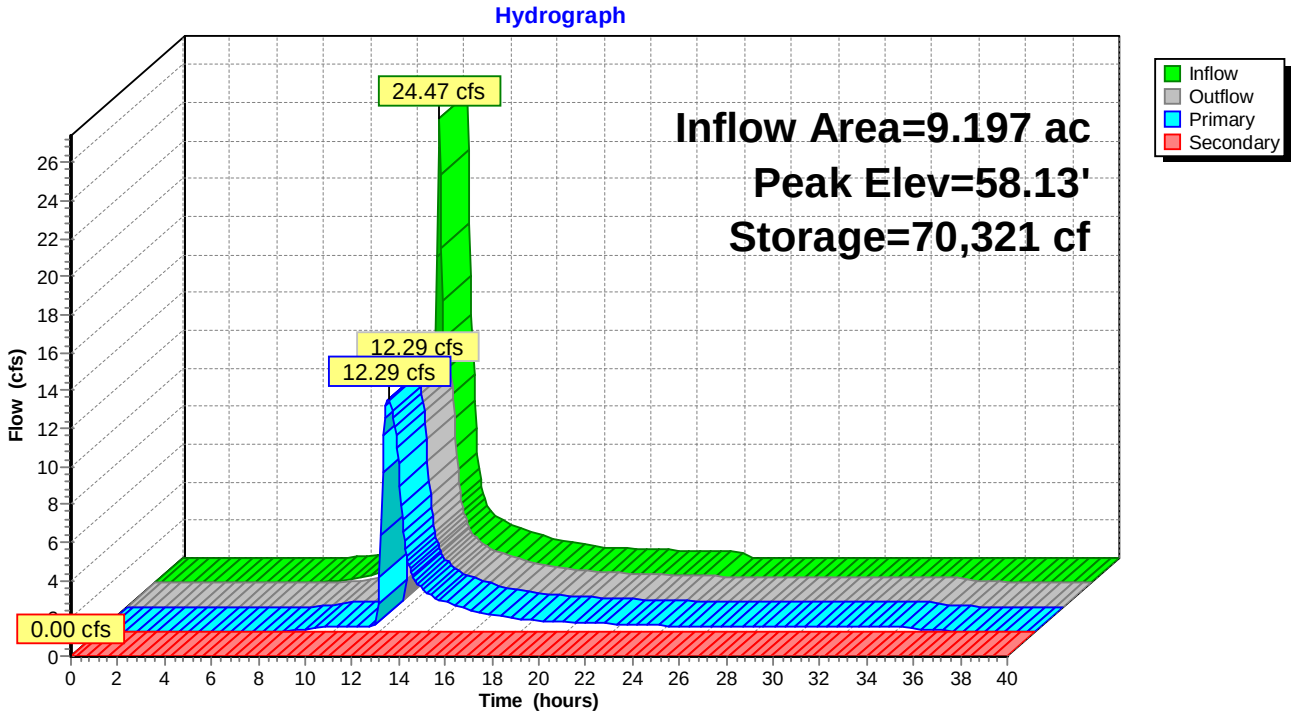
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
54.00	9,552	0	0
55.00	12,557	11,055	11,055
56.00	15,587	14,072	25,127
57.00	21,708	18,648	43,774
58.00	24,827	23,268	67,042
59.00	27,955	26,391	93,433

Device	Routing	Invert	Outlet Devices
#1	Device 2	57.00'	**50.0' long x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#2	Device 4	57.00'	**0.28 cfs Exfiltration when above 57.00'**
#3	Device 4	57.50'	**12.0" Horiz. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads
#4	Primary	54.50'	**12.0" Round Culvert X 2.00** L= 60.0' Ke= 0.500 Inlet / Outlet Invert= 54.50' / 54.00' S= 0.0083 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#5	Secondary	58.15'	**20.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Primary OutFlow Max=12.28 cfs @ 12.37 hrs HW=58.13' (Free Discharge)
└**4=Culvert** (Passes 12.28 cfs of 12.65 cfs potential flow)
  └**2=Exfiltration** (Exfiltration Controls 0.28 cfs)
    └**1=Broad-Crested Rectangular Weir** (Passes 0.28 cfs of 161.20 cfs potential flow)
  └**3=Orifice/Grate** (Orifice Controls 12.00 cfs @ 3.82 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=57.00' (Free Discharge)
└**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond SB-3: SEDIMENT BASIN 3



Summary for Pond SB-4: SEDIMENT BASIN 4

Inflow Area = 5.051 ac, 0.00% Impervious, Inflow Depth = 2.82" for 10-Year Storm event
Inflow = 14.29 cfs @ 12.14 hrs, Volume= 1.187 af
Outflow = 6.01 cfs @ 12.43 hrs, Volume= 1.180 af, Atten= 58%, Lag= 17.0 min
Primary = 5.80 cfs @ 12.43 hrs, Volume= 1.177 af
Secondary = 0.21 cfs @ 12.43 hrs, Volume= 0.003 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Starting Elev= 48.00' Surf.Area= 15,504 sf Storage= 37,176 cf
Peak Elev= 49.12' @ 12.43 hrs Surf.Area= 17,369 sf Storage= 55,575 cf (18,399 cf above start)

Plug-Flow detention time= 934.2 min calculated for 0.326 af (27% of inflow)
Center-of-Mass det. time= 211.9 min (1,023.4 - 811.6)

Volume	Invert	Avail.Storage	Storage Description
#1	45.00'	71,536 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

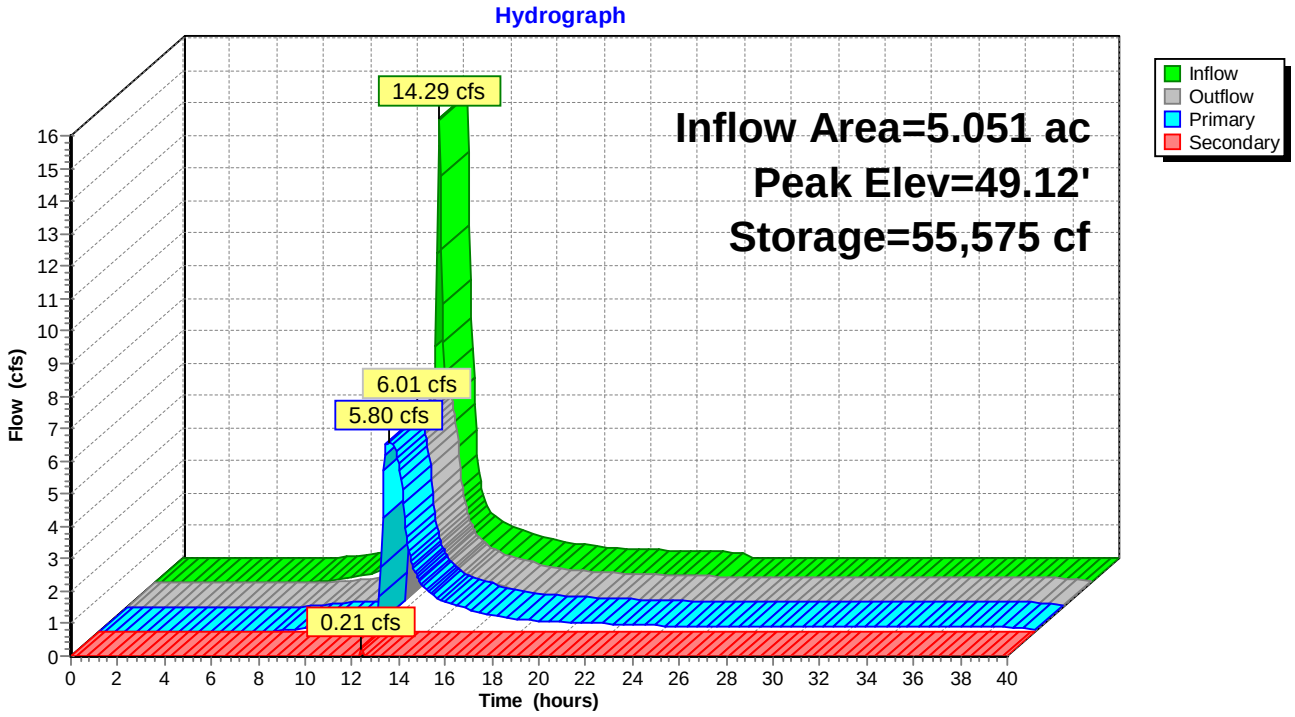
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
45.00	9,398	0	0
46.00	11,011	10,205	10,205
47.00	13,714	12,363	22,567
48.00	15,504	14,609	37,176
49.00	17,163	16,334	53,510
50.00	18,889	18,026	71,536

Device	Routing	Invert	Outlet Devices
#1	Device 2	48.00'	**125.0' long x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#2	Device 4	48.00'	**0.14 cfs Exfiltration when above 48.00'**
#3	Device 4	48.50'	**12.0" Horiz. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#4	Primary	45.00'	**12.0" Round Culvert** L= 170.0' Ke= 0.500 Inlet / Outlet Invert= 45.00' / 43.00' S= 0.0118 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#5	Secondary	49.10'	**20.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Primary OutFlow Max=5.80 cfs @ 12.43 hrs HW=49.12' (Free Discharge)
└**4=Culvert** (Barrel Controls 5.80 cfs @ 7.38 fps)
└**2=Exfiltration** (Passes < 0.14 cfs potential flow)
└**1=Broad-Crested Rectangular Weir** (Passes < 396.88 cfs potential flow)
└**3=Orifice/Grate** (Passes < 5.95 cfs potential flow)

Secondary OutFlow Max=0.12 cfs @ 12.43 hrs HW=49.12' (Free Discharge)
└**5=Broad-Crested Rectangular Weir** (Weir Controls 0.12 cfs @ 0.33 fps)

Pond SB-4: SEDIMENT BASIN 4



Stage-Area-Storage for Pond SB-1: SEDIMENT BASIN 1

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
59.00	14,450	0
59.05	14,539	725
59.10	14,629	1,454
59.15	14,718	2,188
59.20	14,807	2,926
59.25	14,896	3,668
59.30	14,985	4,415
59.35	15,075	5,167
59.40	15,164	5,923
59.45	15,253	6,683
59.50	15,343	7,448
59.55	15,432	8,217
59.60	15,521	8,991
59.65	15,610	9,770
59.70	15,700	10,552
59.75	15,789	11,340
59.80	15,878	12,131
59.85	15,967	12,927
59.90	16,056	13,728
59.95	16,146	14,533
60.00	16,235	15,343
60.05	16,325	16,157
60.10	16,416	16,975
60.15	16,506	17,798
60.20	16,597	18,626
60.25	16,688	19,458
60.30	16,778	20,294
60.35	16,869	21,136
60.40	16,959	21,981
60.45	17,050	22,832
60.50	17,140	23,686
60.55	17,230	24,546
60.60	17,321	25,409
60.65	17,411	26,278
60.70	17,502	27,150
60.75	17,593	28,028
60.80	17,683	28,910
60.85	17,774	29,796
60.90	17,864	30,687
60.95	17,955	31,583
61.00	18,045	32,483
61.05	18,204	33,389
61.10	18,364	34,303
61.15	18,523	35,225
61.20	18,683	36,155
61.25	18,842	37,093
61.30	19,002	38,040
61.35	19,161	38,994
61.40	19,321	39,956
61.45	19,480	40,926
61.50	19,640	41,904
61.55	19,799	42,890
61.60	19,958	43,884
61.65	20,118	44,885
61.70	20,277	45,895
61.75	20,437	46,913
61.80	20,596	47,939
61.85	20,756	48,973
61.90	20,915	50,015
61.95	21,075	51,064
62.00	21,234	52,122
62.05	21,328	53,186
62.10	21,422	54,255
62.15	21,515	55,328
62.20	21,609	56,406
62.25	21,703	57,489
62.30	21,797	58,577
62.35	21,891	59,669
62.40	21,984	60,766
62.45	22,078	61,867
62.50	22,172	62,974
62.55	22,266	64,084
62.60	22,360	65,200
62.65	22,453	66,320
62.70	22,547	67,445
62.75	22,641	68,575
62.80	22,735	69,710
62.85	22,829	70,849
62.90	22,922	71,992
62.95	23,016	73,141
63.00	23,110	74,294
63.05	23,205	75,452
63.10	23,301	76,615
63.15	23,396	77,782
63.20	23,492	78,954
63.25	23,588	80,131
63.30	23,683	81,313
63.35	23,779	82,499
63.40	23,874	83,691
63.45	23,970	84,887
63.50	24,065	86,088
63.55	24,160	87,293
63.60	24,256	88,504
63.65	24,351	89,719
63.70	24,447	90,939
63.75	24,543	92,164
63.80	24,638	93,393
63.85	24,734	94,627
63.90	24,829	95,867
63.95	24,925	97,110
64.00	**25,020**	**98,359**

Stage-Area-Storage for Pond SB-2: SEDIMENT BASIN 2

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
58.00	5,440	0
58.10	5,509	547
58.20	5,578	1,102
58.30	5,648	1,663
58.40	5,717	2,231
58.50	5,786	2,807
58.60	5,855	3,389
58.70	5,924	3,978
58.80	5,994	4,573
58.90	6,063	5,176
59.00	6,132	5,786
59.10	6,204	6,403
59.20	6,277	7,027
59.30	6,349	7,658
59.40	6,421	8,297
59.50	6,494	8,942
59.60	6,566	9,595
59.70	6,638	10,256
59.80	6,710	10,923
59.90	6,783	11,598
60.00	6,855	12,280
60.10	6,930	12,969
60.20	7,005	13,666
60.30	7,080	14,370
60.40	7,155	15,081
60.50	7,230	15,801
60.60	7,305	16,528
60.70	7,380	17,262
60.80	7,455	18,003
60.90	7,530	18,753
61.00	7,605	19,510
61.10	7,806	20,280
61.20	8,007	21,071
61.30	8,208	21,881
61.40	8,409	22,712
61.50	8,610	23,563
61.60	8,810	24,434
61.70	9,011	25,325
61.80	9,212	26,236
61.90	9,413	27,168
62.00	9,614	28,119
62.10	9,696	29,085
62.20	9,779	30,058
62.30	9,861	31,040
62.40	9,943	32,030
62.50	10,026	33,029
62.60	10,108	34,036
62.70	10,190	35,050
62.80	10,272	36,074
62.90	10,355	37,105
63.00	10,437	38,145
63.10	10,521	39,192
63.20	10,606	40,249
63.30	10,690	41,314
63.40	10,775	42,387
63.50	10,859	43,469
63.60	10,943	44,559
63.70	11,028	45,657
63.80	11,112	46,764
63.90	11,197	47,880
64.00	**11,281**	**49,004**

Stage-Area-Storage for Pond SB-3: SEDIMENT BASIN 3

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
54.00	9,552	0
54.05	9,702	481
54.10	9,853	970
54.15	10,003	1,467
54.20	10,153	1,971
54.25	10,303	2,482
54.30	10,453	3,001
54.35	10,604	3,527
54.40	10,754	4,061
54.45	10,904	4,603
54.50	11,055	5,152
54.55	11,205	5,708
54.60	11,355	6,272
54.65	11,505	6,844
54.70	11,656	7,423
54.75	11,806	8,009
54.80	11,956	8,603
54.85	12,106	9,205
54.90	12,256	9,814
54.95	12,407	10,430
55.00	12,557	11,055
55.05	12,708	11,686
55.10	12,860	12,325
55.15	13,011	12,972
55.20	13,163	13,627
55.25	13,315	14,288
55.30	13,466	14,958
55.35	13,618	15,635
55.40	13,769	16,320
55.45	13,921	17,012
55.50	14,072	17,712
55.55	14,223	18,419
55.60	14,375	19,134
55.65	14,526	19,857
55.70	14,678	20,587
55.75	14,830	21,324
55.80	14,981	22,070
55.85	15,133	22,823
55.90	15,284	23,583
55.95	15,436	24,351
56.00	15,587	25,127
56.05	15,893	25,914
56.10	16,199	26,716
56.15	16,505	27,533
56.20	16,811	28,366
56.25	17,117	29,215
56.30	17,423	30,078
56.35	17,729	30,957
56.40	18,035	31,851
56.45	18,341	32,760
56.50	18,648	33,685
56.55	18,954	34,625
56.60	19,260	35,580
56.65	19,566	36,551
56.70	19,872	37,537
56.75	20,178	38,538
56.80	20,484	39,555
56.85	20,790	40,587
56.90	21,096	41,634
56.95	21,402	42,696
57.00	21,708	43,774
57.05	21,864	44,863
57.10	22,020	45,960
57.15	22,176	47,065
57.20	22,332	48,178
57.25	22,488	49,298
57.30	22,644	50,427
57.35	22,800	51,563
57.40	22,956	52,707
57.45	23,112	53,858
57.50	23,268	55,018
57.55	23,423	56,185
57.60	23,579	57,360
57.65	23,735	58,543
57.70	23,891	59,734
57.75	24,047	60,932
57.80	24,203	62,138
57.85	24,359	63,353
57.90	24,515	64,574
57.95	24,671	65,804
58.00	24,827	67,042
58.05	24,983	68,287
58.10	25,140	69,540
58.15	25,296	70,801
58.20	25,453	72,069
58.25	25,609	73,346
58.30	25,765	74,630
58.35	25,922	75,923
58.40	26,078	77,223
58.45	26,235	78,530
58.50	26,391	79,846
58.55	26,547	81,169
58.60	26,704	82,501
58.65	26,860	83,840
58.70	27,017	85,187
58.75	27,173	86,542
58.80	27,329	87,904
58.85	27,486	89,274
58.90	27,642	90,653
58.95	27,799	92,039
59.00	**27,955**	**93,433**

Stage-Area-Storage for Pond SB-4: SEDIMENT BASIN 4

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
45.00	9,398	0
45.05	9,479	472
45.10	9,559	948
45.15	9,640	1,428
45.20	9,721	1,912
45.25	9,801	2,400
45.30	9,882	2,892
45.35	9,963	3,388
45.40	10,043	3,888
45.45	10,124	4,392
45.50	10,205	4,901
45.55	10,285	5,413
45.60	10,366	5,929
45.65	10,446	6,449
45.70	10,527	6,974
45.75	10,608	7,502
45.80	10,688	8,035
45.85	10,769	8,571
45.90	10,850	9,111
45.95	10,930	9,656
46.00	11,011	10,205
46.05	11,146	10,758
46.10	11,281	11,319
46.15	11,416	11,887
46.20	11,552	12,461
46.25	11,687	13,042
46.30	11,822	13,629
46.35	11,957	14,224
46.40	12,092	14,825
46.45	12,227	15,433
46.50	12,363	16,048
46.55	12,498	16,669
46.60	12,633	17,298
46.65	12,768	17,933
46.70	12,903	18,574
46.75	13,038	19,223
46.80	13,173	19,878
46.85	13,309	20,540
46.90	13,444	21,209
46.95	13,579	21,885
47.00	13,714	22,567
47.05	13,803	23,255
47.10	13,893	23,947
47.15	13,982	24,644
47.20	14,072	25,346
47.25	14,162	26,051
47.30	14,251	26,762
47.35	14,341	27,477
47.40	14,430	28,196
47.45	14,520	28,920
47.50	14,609	29,648
47.55	14,698	30,380
47.60	14,788	31,118
47.65	14,877	31,859
47.70	14,967	32,605
47.75	15,057	33,356
47.80	15,146	34,111
47.85	15,236	34,871
47.90	15,325	35,635
47.95	15,415	36,403
48.00	15,504	37,176
48.05	15,587	37,953
48.10	15,670	38,735
48.15	15,753	39,520
48.20	15,836	40,310
48.25	15,919	41,104
48.30	16,002	41,902
48.35	16,085	42,704
48.40	16,168	43,510
48.45	16,251	44,321
48.50	16,334	45,135
48.55	16,416	45,954
48.60	16,499	46,777
48.65	16,582	47,604
48.70	16,665	48,435
48.75	16,748	49,271
48.80	16,831	50,110
48.85	16,914	50,954
48.90	16,997	51,801
48.95	17,080	52,653
49.00	17,163	53,510
49.05	17,249	54,370
49.10	17,336	55,234
49.15	17,422	56,103
49.20	17,508	56,977
49.25	17,595	57,854
49.30	17,681	58,736
49.35	17,767	59,622
49.40	17,853	60,513
49.45	17,940	61,408
49.50	18,026	62,307
49.55	18,112	63,210
49.60	18,199	64,118
49.65	18,285	65,030
49.70	18,371	65,946
49.75	18,458	66,867
49.80	18,544	67,792
49.85	18,630	68,722
49.90	18,716	69,655
49.95	18,803	70,593
50.00	**18,889**	**71,536**

Nordic Aquafarms

Summary of Soil Loss During Construction

Phase	Working Area	Working Area	RUSLE2 Soil Loss	RUSLE2 Soil Loss	Working Area Soil Loss	Non-Working Area	Non-Working Area	RUSLE2 Soil Loss	RUSLE2 Soil Loss	Non-Working Area Soil Loss	Total Phase Soil Loss
	sf	ac	Tons/ac/yr	cf/ac/yr	cf/yr	sf	ac	Tons/ac/yr	cf/ac/yr	cf/yr	cf/yr
1A	80000	1.84	14.90	248.33	456.08	489000	11.23	5.80	96.67	1085.17	1541.25
1B	80000	1.84	14.90	248.33	459.14	328600	7.54	5.80	96.67	729.22	1188.35
1C	80000	1.84	14.90	248.33	459.14	63600	1.46	5.80	96.67	141.14	600.28
1D	80000	1.84	14.90	248.33	459.14	119200	2.74	5.80	96.67	264.52	723.66
1E	80000	1.84	14.90	248.33	459.14	134500	3.09	5.80	96.67	298.48	757.61
2A	80000	1.84	14.90	248.33	459.14	140000	3.21	5.80	96.67	310.68	769.82
2B	80000	1.84	14.90	248.33	459.14	115500	2.65	5.80	96.67	256.31	715.45

Assumes soil unit weight of 120lbs/cu.ft

VA RUSLE2 Profile Printout w/ Details

Detailed printout of RUSLE2 calculation for one field, one management alternative

I. Client/Field ID & Summary

Client/Owner name: SMRT/Nordic Aquafarms
Field name: Nordic Aquafarms
Project #: 18-041
Location: USA\Maine\Waldo County

Printout date: March 18, 2019
Prepared by (name): Atlantic Resource Consultants, LLC
USDA Service Center/Location:

Narrative description of profile, field, and/or management:
Info: Major earthwork operations- exposed areas

Notes on collection of input data, field visits, etc.:
None

Summary of RUSLE2 output:

Soil Loss	Soil Quality
Soil loss for cons. plan: 15 t/ac/yr.	**Soil conditioning index (SCI): -1.0**
T value: 5.0 t/ac/yr.	**Avg. annual slope STIR: 5.20**

Recommendations / Comments:

II. RUSLE2 Profile Input

1. CLIMATE (R FACTOR)

- Climate Location: USA\Maine\Waldo County (R Factor: 110 US)

2. SOIL (K FACTOR)

- Predominant Soil: Waldo County, Maine\BoB Boothbay silt loam, 3 to 8 percent slopes\Boothbay Silt loam 86% (Erodibility: 0.37 US)
- T value: 5.0 t/ac/yr.

3. TOPOGRAPHY (LS FACTOR)

- RUSLE Slope length (along slope): 300 ft
- Avg. slope steepness: 2.0 %

4. CROP MANAGEMENT (C FACTOR)

- Crop management narrative description / background info:

Info:

- Rotation Duration: 1 yr.

- Crops / vegetations in rotation and long-term yield averages:

Vegetation	*Yield units*	*# yield units, #/ac*
No Vegetation		

- Field operation dates and descriptions, manure application rates, etc.:

Date	*Operation*	*Vegetation*	*Yield (harv. units)*	*Type of cover material*	*Cover matl add/remove, lb/ac*
4/15/19	Bulldozer, filling/leveling				

External residue (i.e., manure) application rates in RUSLE2 are expressed in lbs. of "effective" dry matter per acre. For liquid, slurry, poultry, and semi-solid manures, "effective" dry matter in = 50% of actual dry matter

- Additional RUSLE2 crop management info:
  - Rock cover: 0 %
  - Adjust res. burial level: Normal res. burial
  - RUSLE2 management file name: Base management: Strip/Barrier Managements\Bare ground; rough surface*

5. SUPPORT PRACTICES (P FACTOR)

- Contouring: a. rows up-and-down hill (Actual row grade: 2.0%)

- Strips/barriers: (none)

- Diversion/terrace, sediment basin: (none)

- Subsurface drainage: (none)

6. RUSLE2 SOFTWARE DETAILS

- Program version: Mar 27, 2017
- Database name: MOSES 2016
- Profile file name: profiles\default

III. RUSLE2 Profile Output & Definitions

1. SURFACE RESIDUE COVER ESTIMATES:

Long-term average predicted surface residue cover after each field operation:

Date	*Operation*	*Vegetation*	*Surf. res. cov. after op, %*
4/15/19	Bulldozer, filling/leveling		0

One way to verify whether RUSLE2 is properly modeling a situation is to check these long-term average surface residue results. An unexpectedly high or low surface residue cover value after a particular operation indicates that the choice of operation or some other input in the calculation (such as vegetation or yield) should be reviewed.

RUSLE2 counts as surface residue **only** material lying flat on the soil surface (automatically adjusted for overlap). RUSLE2 does **not** count the following as surface residue cover: (a) above-ground or standing material (including live canopy cover and standing dead residue) or (b) buried material (including live roots and dead plant residue). RUSLE2 does account for the erosion control value of standing and buried material when calculating soil loss.

Therefore, these surface residue numbers are most useful for analyzing annual cropping systems in which field operations routinely bury and/or flatten most residue and in which surface residue plays a leading role in erosion prevention. When analyzing results for cropping systems involving perennials and/or no-till planting into large amounts of standing residue (such as a chemically killed cover crop), also consult RUSLE2 canopy cover estimates (available in the VA Basic User Template 2007 Profile Screen).

2. SOIL LOSS ESTIMATES:

- Soil loss for conservation planning:
  - Soil loss for cons. plan: 15 t/ac/yr.
  - T value: 5.0 t/ac/yr.

Estimate of average annual rainfall-induced soil loss (detachment of soil particles & transport downhill) over the length of the modeled slope. It is critical to understand that this value represents a long-term (20- to 30-year) average, not a prediction of actual soil loss in any single year. This is the number to use for conservation planning and to compare with the field's "T" soil loss tolerance value. This number is a measure of the likelihood of degradation by erosion of the soil resource in upslope (steeper) areas of the field. Very little credit is given for any sediment deposition that may occur towards the bottom of the modeled slope (for example, due to an end-of-slope filter strip), because upslope areas are still being degraded.

- Sediment Delivery:
  - Sediment delivery: 14.9 t/ac/yr.

Estimate of the amount of sediment delivered by runoff to the end of the modeled slope. This is RUSLE2's best estimate of long-term average "edge of field" soil loss. Full credit is given for any sediment deposition that occurs anywhere on the modeled slope due to reductions in slope grade, filter strips, terraces, etc. This number is not used for conservation planning but may be used for other environmental applications (e.g., P-Index). In many cases, RUSLE2 users will model slopes as uniform with no structural practices, vegetative features (filter strips), or breaks in topography that result in sediment deposition. In this typical situation, results for sediment delivery and soil loss for conservation planning will be identical.

3. SOIL QUALITY SCORES:

- Soil Conditioning Index:
  - Soil conditioning index (SCI): -1.0

Soil organic matter (SOM) or soil carbon (C) trend score. If SCI is negative (less than zero), SOM and soil C and soil quality are predicted to decline over time on the modeled slope under the modeled management system. If SCI is positive (greater than zero), SOM and soil C and soil quality are predicted to stay the same or to increase over time. SCI scores usually range from -1 to +1 in typical VA situations, although more extreme values are possible. SCI is an index score (no units) designed solely for comparing the relative impact of different management alternatives on long-term soil quality trends. When calculating SCI, RUSLE2 considers three key factors: (1) amount of surface and subsurface biomass returned to the soil; (2) tillage-induced oxidation of soil carbon; and (3) predicted sheet & rill erosion. Climate and soil type inputs are also considered due to the influence of these factors on soil C oxidation trends.

- Soil Tillage Intensity Rating (STIR):

  - Avg. annual slope STIR: 5.20 (averaged across all years in the rotation)

  - STIR value for each individual crop (or vegetation record) in the rotation:

Veg.	*STIR value*	*Start date*	*End date, m/d/y*

Measure of intensity of tillage or soil disturbance. STIR is an index (no units) designed solely for comparing the relative impact of different management alternatives on soil disturbance. STIR increases with increasing tillage and can range from 0 to 200+. Average annual STIR values reflect the total amount of soil disturbance that occurs during the overall rotation, averaged across the number of years in the rotation. STIR values can also be calculated for individual crops. The STIR for an individual crop represents the sum of all soil disturbance associated with establishing and harvesting that crop. Both types of STIR values are shown above. STIR values in the 5 to 20 range are typical of no-till crops and/or continuous no-till or low soil disturbance cropping systems. In long rotations with a mix of tilled and no-till and/or perennial crops, the average annual STIR for the overall rotation may be relatively low even if significant tillage occurs in individual years and STIR values for one or more crops in the rotation are relatively high.

VA RUSLE2 Profile Printout w/ Details

Detailed printout of RUSLE2 calculation for one field, one management alternative

I. Client/Field ID & Summary

Client/Owner name: SMRT/Nordic Aquafarms
Field name: Nordic Aquafarms
Project #: 18-041
Location: USA\Maine\Waldo County

Printout date: March 18, 2019
Prepared by (name): Atlantic Resource Consultants, LLC
USDA Service Center/Location:

Narrative description of profile, field, and/or management:
Info: Cleared areas – not yet grubbed

Notes on collection of input data, field visits, etc.:
None

Summary of RUSLE2 output:

Soil Loss	Soil Quality
Soil loss for cons. plan: 5.8 t/ac/yr.	**Soil conditioning index (SCI): -0.3**
T value: 5.0 t/ac/yr.	**Avg. annual slope STIR: 0**

Recommendations / Comments:

II. RUSLE2 Profile Input

1. CLIMATE (R FACTOR)

- Climate Location: USA\Maine\Waldo County (R Factor: 110 US)

2. SOIL (K FACTOR)

- Predominant Soil: Waldo County, Maine\BoB Boothbay silt loam, 3 to 8 percent slopes\Boothbay Silt loam 86% (Erodibility: 0.37 US)
- T value: 5.0 t/ac/yr.

3. TOPOGRAPHY (LS FACTOR)

- RUSLE Slope length (along slope): 300 ft
- Avg. slope steepness: 2.0 %

4. CROP MANAGEMENT (C FACTOR)

- Crop management narrative description / background info:

Info:

- Rotation Duration: 1 yr.

- Crops / vegetations in rotation and long-term yield averages:

Vegetation	*Yield units*	*# yield units, #/ac*
No Vegetation		

- Field operation dates and descriptions, manure application rates, etc.:

Date	*Operation*	*Vegetation*	*Yield (harv. units)*	*Type of cover material*	*Cover matl add/remove, lb/ac*
4/15/19	No Operation				

External residue (i.e., manure) application rates in RUSLE2 are expressed in lbs. of "effective" dry matter per acre. For liquid, slurry, poultry, and semi-solid manures, "effective" dry matter in = 50% of actual dry matter

- Additional RUSLE2 crop management info:
  - Rock cover: 0 %
  - Adjust res. burial level: Normal res. burial
  - RUSLE2 management file name: Base management: Strip/Barrier Managements\Bare ground; rough surface*

5. SUPPORT PRACTICES (P FACTOR)

- Contouring: a. rows up-and-down hill (Actual row grade: 2.0%)

- Strips/barriers: (none)

- Diversion/terrace, sediment basin: (none)

- Subsurface drainage: (none)

6. RUSLE2 SOFTWARE DETAILS

- Program version: Mar 27, 2017
- Database name: MOSES 2016
- Profile file name: profiles\Nordic Aquafarms

III. RUSLE2 Profile Output & Definitions

1. SURFACE RESIDUE COVER ESTIMATES:

Long-term average predicted surface residue cover after each field operation:

Date	*Operation*	*Vegetation*	*Surf. res. cov. after op, %*
4/15/19	No operation		0

One way to verify whether RUSLE2 is properly modeling a situation is to check these long-term average surface residue results. An unexpectedly high or low surface residue cover value after a particular operation indicates that the choice of operation or some other input in the calculation (such as vegetation or yield) should be reviewed.

RUSLE2 counts as surface residue **only** material lying flat on the soil surface (automatically adjusted for overlap). RUSLE2 does **not** count the following as surface residue cover: (a) above-ground or standing material (including live canopy cover and standing dead residue) or (b) buried material (including live roots and dead plant residue). RUSLE2 does account for the erosion control value of standing and buried material when calculating soil loss.

Therefore, these surface residue numbers are most useful for analyzing annual cropping systems in which field operations routinely bury and/or flatten most residue and in which surface residue plays a leading role in erosion prevention. When analyzing results for cropping systems involving perennials and/or no-till planting into large amounts of standing residue (such as a chemically killed cover crop), also consult RUSLE2 canopy cover estimates (available in the VA Basic User Template 2007 Profile Screen).

2. SOIL LOSS ESTIMATES:

- Soil loss for conservation planning:
  - Soil loss for cons. plan: 5.8 t/ac/yr.
  - T value: 5.0 t/ac/yr.

Estimate of average annual rainfall-induced soil loss (detachment of soil particles & transport downhill) over the length of the modeled slope. It is critical to understand that this value represents a long-term (20- to 30-year) average, not a prediction of actual soil loss in any single year. This is the number to use for conservation planning and to compare with the field's "T" soil loss tolerance value. This number is a measure of the likelihood of degradation by erosion of the soil resource in upslope (steeper) areas of the field. Very little credit is given for any sediment deposition that may occur towards the bottom of the modeled slope (for example, due to an end-of-slope filter strip), because upslope areas are still being degraded.

- Sediment Delivery:
  - Sediment delivery: 5.77 t/ac/yr.

Estimate of the amount of sediment delivered by runoff to the end of the modeled slope. This is RUSLE2's best estimate of long-term average "edge of field" soil loss. Full credit is given for any sediment deposition that occurs anywhere on the modeled slope due to reductions in slope grade, filter strips, terraces, etc. This number is not used for conservation planning but may be used for other environmental applications (e.g., P-Index). In many cases, RUSLE2 users will model slopes as uniform with no structural practices, vegetative features (filter strips), or breaks in topography that result in sediment deposition. In this typical situation, results for sediment delivery and soil loss for conservation planning will be identical.

3. SOIL QUALITY SCORES:

- Soil Conditioning Index:
  - Soil conditioning index (SCI): -0.3

Soil organic matter (SOM) or soil carbon (C) trend score. If SCI is negative (less than zero), SOM and soil C and soil quality are predicted to decline over time on the modeled slope under the modeled management system. If SCI is positive (greater than zero), SOM and soil C and soil quality are predicted to stay the same or to increase over time. SCI scores usually range from -1 to +1 in typical VA situations, although more extreme values are possible. SCI is an index score (no units) designed solely for comparing the relative impact of different management alternatives on long-term soil quality trends. When calculating SCI, RUSLE2 considers three key factors: (1) amount of surface and subsurface biomass returned to the soil; (2) tillage-induced oxidation of soil carbon; and (3) predicted sheet & rill erosion. Climate and soil type inputs are also considered due to the influence of these factors on soil C oxidation trends.

- Soil Tillage Intensity Rating (STIR):

  - Avg. annual slope STIR: 0 (averaged across all years in the rotation)

  - STIR value for each individual crop (or vegetation record) in the rotation:

Veg.	*STIR value*	*Start date*	*End date, m/d/y*

Measure of intensity of tillage or soil disturbance. STIR is an index (no units) designed solely for comparing the relative impact of different management alternatives on soil disturbance. STIR increases with increasing tillage and can range from 0 to 200+. Average annual STIR values reflect the total amount of soil disturbance that occurs during the overall rotation, averaged across the number of years in the rotation. STIR values can also be calculated for individual crops. The STIR for an individual crop represents the sum of all soil disturbance associated with establishing and harvesting that crop. Both types of STIR values are shown above. STIR values in the 5 to 20 range are typical of no-till crops and/or continuous no-till or low soil disturbance cropping systems. In long rotations with a mix of tilled and no-till and/or perennial crops, the average annual STIR for the overall rotation may be relatively low even if significant tillage occurs in individual years and STIR values for one or more crops in the rotation are relatively high.

ATTACHMENT C

Sample Erosion Control Compliance Certification and Inspection Forms

CONTRACTOR/SUBCONTRACTOR CERTIFICATION

PROJECT INFORMATION

Project Name:

Address:

CONTRACTOR/SUBCONTRACTOR INFORMATION

Firm Name:

Address:

Telephone:

Type of Firm:

CERTIFICATION STATEMENT

"I certify under penalty of law that I understand the terms and conditions of the Maine Construction General Permit (MCGP) permit that authorizes the stormwater discharges associated with construction activity from the project site identified as part of this certification."

_____
Signature

_____
Typed Name

_____
Title

_____
Date

Soil Erosion and Sedimentation Control
WEEKLY INSPECTION REPORT

Sheet ___ of ___

Project Name:_____
File No._____

Inspection Date:_____ Time:_____ Inspected by:_____

STAGE OF CONSTRUCTION

___ Pre-Construction Conference ___ Rough Grading ___ Finish Grading
___ Clearing and Grubbing ___ Building Construction ___ Final Stabilization

==========

INSPECTION CHECKLIST

Yes	No	NA	
[ ]	[ ]	[ ]	Have Soil Erosion and Sediment Control BMPs been installed in accordance with the plans and/or specifications?
[ ]	[ ]	[ ]	Are SESC measures operating effectively?
[ ]	[ ]	[ ]	Have all SESC control repairs and sediment removal been performed?
[ ]	[ ]	[ ]	Are properties and waterways downstream from development adequately protected from erosion and sediment deposition
[ ]	[ ]	[ ]	Are soil and mud kept off public roadways at intersections with site access roads?
[ ]	[ ]	[ ]	Have all exposed areas requiring temporary or permanent stabilization been stabilized?
[ ]	[ ]	[ ]	Are soil stock piles adequately stabilized with seeding and/or sediment trapping measures?
[ ]	[ ]	[ ]	Is there evidence of scouring velocities in runoff from construction areas?
[ ]	[ ]	[ ]	Are sediment basins installed and operating where needed?
[ ]	[ ]	[ ]	Are finished cut and fill slopes adequately stabilized?
[ ]	[ ]	[ ]	Are on-site channels, inlets and outlets adequately stabilized?
[ ]	[ ]	[ ]	Do all operational storm sewer inlets have adequate inlet protection?
[ ]	[ ]	[ ]	Are storm water conveyance channels adequately stabilized with channel lining and/or outlet protection?
[ ]	[ ]	[ ]	Are utility trenches stabilized properly?
[ ]	[ ]	[ ]	Is there evidence of siltation, or sediment transport in receiving waterways?
[ ]	[ ]	[ ]	Have all temporary control structures that are no longer needed been removed?

==========

Report Date_____ Sheet of

Comments:_____

_____

_____

_____

_____

_____

_____

Verbal/Written notification given to:

Name	Organisation	Email Address	Sent
Andrew Johnston	ARC	andyj@arc-maine.com	
	NAF		
	Maine DEP		
	City of Belfast		

Report by: _____Date:_____

POST-RAINFALL INSPECTION REPORT

Project Name:_____

File No._____

Inspection Date:_____ Time:_____ Inspected by:_____

Total Rainfall Received:_____ Duration Of Storm Event:_____

STAGE OF CONSTRUCTION

___ Pre-Construction Conference ___ Rough Grading ___ Finish Grading
___ Clearing and Grubbing ___ Building Construction ___ Final Stabilization

==========

INSPECTION CHECKLIST

Yes	No	NA	
[ ]	[ ]	[ ]	Have Soil Erosion and Sediment Control BMPs been installed in accordance with the plans and/or specifications?
[ ]	[ ]	[ ]	Are SESC measures operating effectively?
[ ]	[ ]	[ ]	Have all SESC control repairs and sediment removal been performed?
[ ]	[ ]	[ ]	Are properties and waterways downstream from development adequately protected from erosion and sediment deposition
[ ]	[ ]	[ ]	Are soil and mud kept off public roadways at intersections with site access roads?
[ ]	[ ]	[ ]	Have all exposed areas requiring temporary or permanent stabilization been stabilized?
[ ]	[ ]	[ ]	Are soil stock piles adequately stabilized with seeding and/or sediment trapping measures?
[ ]	[ ]	[ ]	Is there evidence of scouring velocities in runoff from construction areas?
[ ]	[ ]	[ ]	Are sediment basins installed and operating where needed?
[ ]	[ ]	[ ]	Are finished cut and fill slopes adequately stabilized?
[ ]	[ ]	[ ]	Are on-site channels, inlets and outlets adequately stabilized?
[ ]	[ ]	[ ]	Do all operational storm sewer inlets have adequate inlet protection?
[ ]	[ ]	[ ]	Are storm water conveyance channels adequately stabilized with channel lining and/or outlet protection?
[ ]	[ ]	[ ]	Are utility trenches stabilized properly?
[ ]	[ ]	[ ]	Is there evidence of siltation, or sediment transport in receiving waterways?
[ ]	[ ]	[ ]	Have all temporary control structures that are no longer needed been removed?

==========

Report Date_____ Sheet ___ of

Comments:_____

_____

_____

_____

_____

_____

_____

Verbal/Written notification given to:

Name	Organisation	Email Address	Sent
Andrew Johnston	ARC	andyj@arc-maine.com	
	NAF		
	Maine DEP		
	City of Belfast		

Report by: _____Date:_____