Juniper Hill Farm Wadhams N.Y,

Prepared for Adam Hainer proprietor - Juniper Hill Farms
Project location: 80 Alden Road - the intersection of Twin Valley Rd. & Alden Rd. Wadhams NY
Prepared by Hildegaard D. Link P.E. PhD

Part 2 – Pond on Lot A of Juniper Hill Pond property North of Alden Road.

Table of Contents

1. Introduction.

Dr. Hildegaard D. Link Visited the site to evaluate and determine what materials and practices are relevant to accomplishment of the desired outcome.
The Juniper Hill Farm property, at 80 Alden Road in Wadhams N.Y., spans the north and south side of Alden Road at the intersection of Twin Valley Road. It is located at the base of a several forested hills.

The client seeks to manage runoff through construction of 2 ponds, one on the north side of the property and one on the south side of Alden Road.

The drawings in this package provide directions on the construction of the pond on the north side of Alden Rd in the north west corner of Lot A, hither to North Alden Pond (N. Alden Pond). N. Alden Pond will function as a storm water management and a feeder to the S. Alden Pond irrigation pond to capture surface runoff. The N. Alden Pond construction shall include a small inlet swale to collect overland flow runoff as well as the channel flow from the small hill side stream, a concrete “monk” style discharge structure and an emergency overflow spillway structure. Both the Monk outlet and the emergency spillway will direct water to the existing field drainage system in place. Overland flow from the 75 acre forested mountainside watershed will be the primary input to this pond.

Design Criteria:

Recent storm events in Essex County have led to extreme high water in the Bouquet River and road failures around the region. The client’s goal is to buffer storm water runoff storing as large a volume as practicable and to safely divert overflow to local streams. Review of historical storm data and climate change projects the following flows

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Peak Run-off Flow for Selected 24hr storms (cfs)

Return rate	1/25yr	1/50yr	1/100yr
Flows derived from USDA WinTR-55 model			
Historical	0.24	0.45	1.0
NYS Climate Change projections from Cornell NRCC			
15% increase for near term 8.5rcp scenario*	0.28	0.52	1.15

The dense forested land cover on the watershed creates a unique hydro dynamic regime. The soil type and the dense vegetation trap most of the rain fall. Storm water runs off the watershed only after high intensity storms or after longer periods of rainfall. The runoff characteristics of the watershed and the recent history of extreme weather are the basis of the pond system design for a minimum of 1/50 year storm and a maximum of a 1/100 year storm adjusted for climate change. Additional discharge capacity is designed into the system to account for extreme weather is based on projections from the Cornell University Northeast Regional Climate Center consistent with the climate adaptation goals of the NYS Climate Resiliency Grant program. Extreme weather in recent years has been problematic for residents across Essex County. In July of 2024 Hurricane Beryl dropped 6 " of rain on communities on the east side of the county, 20% more precipitation than an historical 1/100year storm. In 2023 3.5" of rain fell on Clinton county in less than 2 hours, a storm intensity % greater than average observed 1/ 100 year storms between 1970-1999 (NRCC). With these rapidly evolving weather patterns in mind, the pond volume has been designed to accommodate the USDA 1/50 year climate change adjusted flow of .117 Million gallons/storm plus an average annual inflow of 2.27 million gallons. Inlet and discharge conduits are designed to move flows of 1.0 cfs aligning with USDA WinTR-55model projections for 1/100yr flows. The emergency spillway will provide additional runoff management and direct excess flows to existing drainage systems.

Construction Specifications

2. Construction Specification 378– Pond

2.1 Scope

The work shall consist of.

- Excavation of materials for a pond and a small inlet swale in the designated area as required by the drawings on pages 3&4 of the drawing package.
- Disposal of excavated materials.
- Compacting the native clay for the pond ad swale lining,
- Installation of 3 culverts discharging water from the swale to the pond and an emergency vegetated spillway.

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- Placement of riprap at the inlet to the swale, at inlets to swale discharge culverts, at the pond discharge outlet, and at the culvert outlets.
- Revegetation of disturbed areas on the site.

2.2 Site Preparation

Clear the pond area of all trees and vegetation. Fill all stump holes, crevices, and similar areas. Identify temporary overburden storage areas. Mark excavation area as marked on construction drawings using flags.

2.3 Seeding and Vegetation

The exposed surface of the pond edge and all disturbed areas shall be protected from erosion by establishing a vegetative community of appropriate species. The seed bed shall be prepared as soon after construction as practicable. This is generally done with disking and harrowing. Fertilize and seed with mixtures of perennial grasses and forbs appropriate for local soil and climactic conditions. If construction is completed when the soil is too dry for the seeds to germinate, irrigate the soil to ensure prompt germination and continued growth. Mulching with a thin layer of straw, fodder or old hay may be desirable to protect the young plants from rainfall damage and conserve moisture, providing favorable conditions for germination and growth.

3. Construction Specification 421– Excavation

3.1 Scope

The work shall consist of the excavation of materials required by the drawings and disposal of excavated materials.

3.2 Classification

Excavation is classified as common excavation, rock excavation, or unclassified excavation in accordance with the following definitions.

Common excavation is defined as the excavation of all materials that can be excavated, transported, and unloaded using heavy ripping equipment and wheel tractor scrapers with pusher tractors or that can be excavated and dumped into place or loaded onto hauling equipment by excavators equipped with attachments (shovel, bucket, backhoe, dragline, or clam shell) appropriate to the material type, character, and nature of the materials.

Unclassified excavation is defined as the excavation of all materials encountered, including rock materials, regardless of their nature or the manner in which they are removed.

3.3. Use of Excavated Material

Suitable material from the specified excavations may be used in the construction of required earthfill or rockfill. The suitability of material for specific purposes is determined by the engineer.

3.4 Disposal of Waste Materials

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All surplus or unsuitable excavated materials are designated as waste and shall be disposed of by the client at sites of their own choosing away from the site of the work. The disposal shall be in an environmentally acceptable manner that does not violate local rules and regulations.

3.5 Excavation Limits

Excavations shall comply with OSHA Construction Industry Standards (29CFR Part 1926) Subpart P, Excavations, Trenching, and Shoring. All excavations shall be completed and maintained in a safe and stable condition throughout the total construction phase. Structure and trench excavations shall be completed to the specified elevations and to the length and width required to safely install, adjust, and remove any forms, bracing, or supports necessary for the installation of the work. Excavations outside the lines and limits shown on the drawings or specified herein required to meet safety requirements shall be the responsibility of the contractor in constructing and maintaining a safe and stable excavation.

3.6 Overexcavation

Overexcavation in earth excavation in earth beyond the specified lines and grades shall be corrected by filling the resulting voids with approved, compacted earth fill. The exception to this is that if the earth is to become the subgrade for riprap, rockfill, sand or gravel bedding, or drain fill, the voids may be filled with material conforming to the specifications for the riprap, rockfill, bedding, or drain fill. Before correcting an over excavation condition, the contractor shall review the planned corrective action with the engineer and obtain approval of the corrective measures.

4. Construction Specification 521 – Pond Sealing

4.1 Scope

The scope of the work shall be to manage excessive seepage and reduce the permeability of the soils to a point where losses are insignificant.

4.2 Classification

Pond areas can be made relatively impervious by compaction alone if the material contains a wide range of particle sizes (small gravel or coarse sand to fine sand) and enough clay (10 percent or more) and silt to effect a seal. Site investigation of soil conditions at the South Alden road pond site borrow pits evidenced very heavy clay in the proposed pond area.

4.3 Site Preparation

Clear the pond area of all trees and other vegetation. Fill all stump holes, crevices, and similar areas with impervious material. Scarify the soil to a depth of 16 to 18 inches with a disk, rototiller, pulverizer, or similar equipment. Remove all rocks and tree roots.

4.4 Compaction

Make the compacted seal no less than 12 inches thick where less than 10 feet of water is to be impounded. Because seepage losses vary directly with the depth of water impounded over an

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area, increase the thickness of the compacted seal proportionately if the depth of water impounded exceeds 10 feet or more. The thickness of the compacted seal can be determined using equation 7.

$$d = \frac{k \times H}{(v - k)} \qquad \text{[Eq. 7]}$$

where:
- d = thickness of compacted seal
- k = coefficient of permeability of compacted seal, which is assumed to be 0.003 fpd unless testing is done
- H = water depth
- v = allowable specific discharge which is assumed to be 0.028 fpd unless otherwise specified

If no soil samples were taken for laboratory testing, use the assumed values for k and v. Calculate the required minimum thickness of the compacted seal. Without knowing whether the soil underlying the compacted layer will act as a filter for the compacted layer, the minimum thickness should never be less than 12 inches. Compact the soils in two or more layers not exceeding 9 inches uncompacted over the area. Remove and stockpile the top layer or layers while the bottom layer is being compacted.

5. Construction Specification 445 – plastic pipe

5.1. Scope The work consists of furnishing and installing HDPE plastic pipe (except corrugated polyethylene tubing) and the necessary fittings and appurtenances as shown on the drawings or as specified herein.

5.2 Material

Pipe, fittings, and gaskets shall be the type and material as specified in the plans

5.3. Handling and Storage

Pipe shall be delivered to the job site and handled by means that provide adequate support to the pipe and do not subject it to undue stresses or damage. When handling and placing plastic pipe, care shall be taken to prevent impact blows, abrasion damage, and gouging or cutting (by metal edges and/or surface or rocks). The manufacturer's special handling requirements shall be strictly observed. Special care shall be taken to avoid impact when the pipe must be handled at a temperature of 40 degrees Fahrenheit or less.

Pipe shall be stored on a relatively flat surface so that the barrels are evenly supported. Unless the pipe is specifically manufactured to withstand exposure to ultraviolet radiation, it shall be covered with an opaque material when stored outdoors for 15 days or longer. Any pipe that is faded will be considered unsuitable and rejected.

5.4. Excavation

Excavation shall be in accordance with the NRCS Construction Specification 421, Excavation, and Section 12 of this specification or as shown on the drawings. The pipe foundation shall be

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excavated a minimum of 4 inches lower than the pipe grade shown on the drawings or staked in the field whenever bedrock, boulders, cobbles, or other material that may cause pipe damage is encountered at the planned pipe grade.

5.5 Laying the Pipe

Plastic pipe conduits complete with fittings and other related appurtenances shall be installed to the lines and grades shown on the drawings or specified in Section 12 of this specification. The pipe shall be installed so that there is no reversal of grade between joints unless otherwise shown in the drawings. The pipe shall not be dropped or dumped on the bedding or into the pipe trench. The ground surface near the pipe trench shall be free of loose rocks and stones greater than 1 inch in diameter. This ensures that rock will not be displaced and impact the pipe.

Just before placement, each pipe section shall be inspected to ensure that all foreign material is removed from inside the pipe. The pipe ends and the couplings shall be free of foreign material when assembled. At the completion of a work shift, all open ends of the pipeline shall be temporarily closed off using a suitable cover or plug.

Care shall be taken to prevent distortion and damage during hot or cold weather. During unusually hot weather (daytime high temperature of more than 90°F), the pipe assembled in the trench shall be lightly backfilled or shaded to keep it as near to ground temperature as possible until final backfill is placed. Backfill operations should be performed during daily construction periods when the ground temperature and the temperature of the pipe do not vary more than 40 degrees Fahrenheit.

During installation, the pipe shall be firmly and uniformly bedded throughout its entire length, to the depth and in the manner specified in Section 12 of this specification or as shown on the drawings. Bell-holes shall be placed in bedding material under bells, couplings, and other fittings to assure the pipe is uniformly supported throughout its entire length. Blocking or mounding beneath the pipe to bring the pipe to final grade is not permitted.

5.6. Pipe Embedment

Earth Bedding—The pipe shall be firmly and uniformly placed on compacted earthfill bedding or an in-place earth material bedding of ample bearing strength to support the pipe without noticeable settlement. The earth material on which the pipe is placed shall be of uniform density to prevent differential settlement. Unless otherwise specified, a groove that closely conforms to the outside surface of the pipe shall be formed in the bedding. The depth of the groove shall be equal to or greater than 0.3 of the pipe diameter. Earth bedding shall be compacted to a density not less than adjacent undisturbed in place earth material or be compacted earth backfill. Earthfill material used for compacted earth bedding shall be free of rocks or stones greater than 1 inch in diameter and earth clods greater than 2 inches in diameter. The pipe shall be loaded sufficiently during the compaction of bedding under the haunches and around the sides of the pipe to prevent displacement from its final approved placement.

5.7 Backfill

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Initial backfill—Unless otherwise specified, initial backfill to 6 inches above the top of the conduit is required. Earth haunching and initial backfill material shall consist of soil material that NRCS-ME 445-3 May 2017 is free of rocks, stones, or hard clods more than 1 inch in diameter. Coarse backfill material shall be the specified sand, gravel, crushed rock, or drainfill material.

Initial backfill shall be placed in two stages. In the first stage (haunching), backfill is placed to the pipe spring line (center of pipe). In the second stage, it is placed to 6 inches above the top of the pipe.

The first stage material shall be worked carefully under the haunches of the pipe to provide continuous support throughout the entire pipe length. The haunching backfill material shall be placed in layers that have a maximum thickness of about 6 inches and are compacted as specified in Section 12 of this specification or as shown on the drawings. During compaction operations, care shall be taken to ensure that the tamping or vibratory equipment does not come in contact with the pipe and the pipe is not deformed or displaced.

When pressure testing is not specified, the pipe shall be covered with a minimum of 6 inches of backfill material as soon as possible following assembling of the pipe in the trench, but not later than within the same day that placement has occurred. When pressure testing is specified, sufficient backfill material shall be placed over the pipe to anchor the conduit against movement during pressure testing activities.

Final backfill—Final backfill shall consist of placing the remaining material required to complete the backfill from the top of the initial backfill to the ground surface, including mounding at the top of the trench. Final backfill material within 2 feet of the top of the pipe shall be free of debris or rocks larger than 3 inches nominal diameter. Coarse backfill material shall be the specified sand, gravel, crushed rock, or drainfill. Final backfill shall be placed in approximately uniform, compacted layers. Final backfill compaction requirements shall be as specified in Section 12 of this specification or as shown on the drawings.

5.8 Joints

Unless otherwise specified or shown on the drawings, joints shall be either bell and spigot type with elastomeric gaskets, coupling type, solvent cement bell and spigot, or jointed by butt heat fusion. When a lubricant is required to facilitate joint assembly, it shall be a type having no deleterious effect on the gasket or pipe material.

Pipe joints shall be watertight at the pressures specified except where unsealed joints are indicated.

Pipe shall be installed and joined in accordance with the manufacturer's recommendations. Laying deflections and joint fitting or stab depths shall be within the manufacturer's recommended tolerances.

When solvent cement joints are specified for PVC or ABS pipe and fittings, they shall be made in accordance with the following ASTMs and the related appendix of each ASTM; D 2855 for PVC pipe and fittings and D 2235 for ABS pipe and fittings.

Flanged, banded, heat-fusion, or elastomeric-sealed mechanical joints shall be used when joining polyethylene (PE) and high-density polyethylene (HDPE) pipe and fittings unless otherwise specified or as shown on the drawings.

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Pipe ends shall be cut square and be deburred to provide a uniform, smooth surface for the jointing process. Reference marks shall be placed on the spigot ends to assist in determining when proper seating depth has been achieved within the joint

5.9. Fittings

Unless otherwise specified, steel fittings, valves, and bolted connections shall be painted or coated as recommended by the manufacturer. Fittings for non-pressure pipe shall be of the same or similar material as the pipe and shall provide the same durability, watertightness, and strength as the pipe unless otherwise specified.

5.10 Pressure Testing Method 1—Pressure testing of the completed conduit is not required.

6. Construction Specification 362 – Diversions

6.1 Scope:

The work shall consist of excavating and seeding a vegetated overflow spillway as required by the drawings.

6.2 Site preparation

Clear the spillway area of all trees and vegetation. Fill all stump holes, crevices, and similar areas. All ditches or gullies that are to be crossed should be filled and compacted before construction begins so as to prevent seepage through the ridge, prevent more than normal settlement, and facilitate construction. Identify temporary overburden storage areas.
Mark excavation area as marked on construction drawings using flags. On smooth, uniform slopes the stakes may be set 100 feet apart; however, on abrupt changes in topography or on grades less than 1 percent, stakes are usually set on 50-foot stations. When the diversion outlets onto grassland or a broad, shallow waterway, allowance must be made for the depth of channel cut plus gradient in the last 50 to 100 feet in order to outlet the water at ground level. On erosive soils, the last 50 to 100 feet is sometimes constructed on zero grade to reduce erosion at the outlet section. Layout shall be consistent with guidance in Soil Conservation Service Technical Release Number 62, Engineering Layout, Notes, Staking, and Calculations.
After the centerline has been staked, it is recommended to check and move some stakes, if necessary, to improve alignment. The staked line then may be marked with a plow or other means to make a continuous reference line. Existing vegetation (trees, shrubs) and other landscape features to be protected during construction should also be marked.

6.3 Excavation

Excavation shall be in accordance with the NRCS Construction Specification 421, Excavation.

6.4 Allowance for settlement

Settlement should be allowed for at the time of design. The amount will depend on soils, moisture conditions, and type of construction equipment. Five percent of fill height is

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common when scrapers or rubber-tired tractors are used and 10 percent when crawler tractors with blades are used.

6.5 Checking construction

The diversion should be checked for compliance with design and layout while the construction equipment is still onsite and available to make necessary changes. The finished grade and ridge height should be checked throughout the length of the diversion and the cross section of the channel should be checked at several locations, including the location least likely to meet the design.

6.6 Seeding and Vegetation

The exposed surface of the diversion and all disturbed areas shall be protected from erosion by establishing a vegetative community of appropriate species. The seed bed shall be prepared as soon after construction as practicable. This is generally done with disking and harrowing. Fertilize and seed with mixtures of perennial grasses and forbs appropriate for local soil and climactic conditions. If construction is completed when the soil is too dry for the seeds to germinate, irrigate the soil to ensure prompt germination and continued growth. Mulching with a thin layer of straw, fodder or old hay may be desirable to protect the young plants from rainfall damage and conserve moisture, providing favorable conditions for germination and growth. All seeding, planting, sodding, and mulching should conform to standards as given in the field office technical guide.

6.7 Outlets

The runoff collected by a diversion must be conveyed to a point of safe disposal or usage. An adequate vegetated, riprapped, paved, or underground outlet should be included as part of the design. See EFH650.07 for vegetated waterways. It is important that vegetated waterways used as outlets be well established before diversions are constructed.

7.Construction Specification 461 – Riprap

7.1 Scope

The work shall consist of the construction of rock riprap revetments and blankets, including filter or bedding where specified.

7.2 Material

Rock riprap shall be dense, sound and free from cracks, seams and other defects conducive to accelerated weathering. The rock shall be angular to sub-rounded in shape with the greatest dimension not greater than 2 times the least dimension. It shall be free from dirt, clay, sand, rock fines, and other material not meeting the required gradation limits. Rock density shall be 165 pounds per cubic foot or greater. Rock hardness shall be such that it will not dent when struck with the rounded end of a one-pound ball peen hammer, or hardness shall be determined by other methods approved by the NRCS. Unless otherwise specified on the plans riprap gradation shall conform to the specified mix number as

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follows:

Rock size in inches			
Mix Number	Maximum	Average D50	Minimum
1	7	4	1
2	9	6	1
3	14	9	1
4	18	12	2
5	23	15	2
6	27	18	3
7	32	21	3
8	36	24	4
9	45	30	4
10	54	36	5

The mix number shall be 3.

Before rock is delivered from its source, the contractor shall designate the source from which rock material will be obtained and provide information satisfactory to the NRCS that the material meets design requirements. The contractor shall provide the NRCS technical representative free access to the source for the purpose of visually inspecting the rock and/or obtaining samples for testing. The size and grading of the rock shall be as specified in the construction drawings.

Filter or bedding aggregates, when required, shall be composed of clean, hard and durable mineral particles free from organic matter, clay balls or other deleterious substances. The size and grading of the filter or bedding shall be as specified in the construction drawings. Geotextiles, when required, shall conform to the requirements outlined in Construction Specification 495, Geotextile.

7.3 Subgrade preparation

The subgrade surface on which the rock riprap, filter, bedding, or geotextile shall not be placed until the foundation preparation is completed and the NRCS-ME (461-2) May 2017 subgrade surface has been inspected and approved by the NRCS.

7.4 Equipment-placed rock riprap

The rock riprap shall be placed by equipment on the surface and to the depth specified. It shall be installed to the full course thickness in one operation and in such a manner as to avoid serious displacement of the underlying material. The rock for riprap shall be delivered and placed in a manner that ensures the riprap in place is reasonably homogeneous with the larger rocks uniformly distributed and firmly in contact one to another with the smaller rocks and spalls filling the voids between the larger rocks. Rock riprap shall be placed in a manner to prevent damage to structures. Hand placing is required as necessary to prevent damage to any new and existing structures.

7.5. Hand placed rock riprap The rock riprap shall be placed by hand on the surface and to the depth specified. It shall be securely bedded with the larger rocks firmly in contact one

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to another without bridging. Spaces between the larger rocks shall be filled with smaller rocks and spalls. Smaller rocks shall not be grouped as a substitute for larger rock.

7.6 Filter or bedding

When the contract specifies filter, bedding, or geotextile beneath the rock riprap, the designated material shall be placed on the prepared subgrade surface as specified. Compaction of filter or bedding aggregate shall be as specified on the construction drawings. The final surface of such material shall be finished reasonably smooth and free of mounds, dips, or windrows.

7.7 Construction operations

Construction operations shall be done in such a manner that erosion and air and water pollution are minimized. The owner, operator, contractor or others will conduct all work and operations in accordance with proper safety guidelines for the type of construction being performed. The completed job shall be workmanlike and provide a good overall appearance.

8.Construction Specification – Appurtenances: Pond Outlet

Discharge from the pond shall be Monk outlet. The outlet shall b concrete constructed consistent with the drawings on pages X thr uY and FAO pond outlet specifications 10.7 [10. Pond Outlet Structures (fao.org)]

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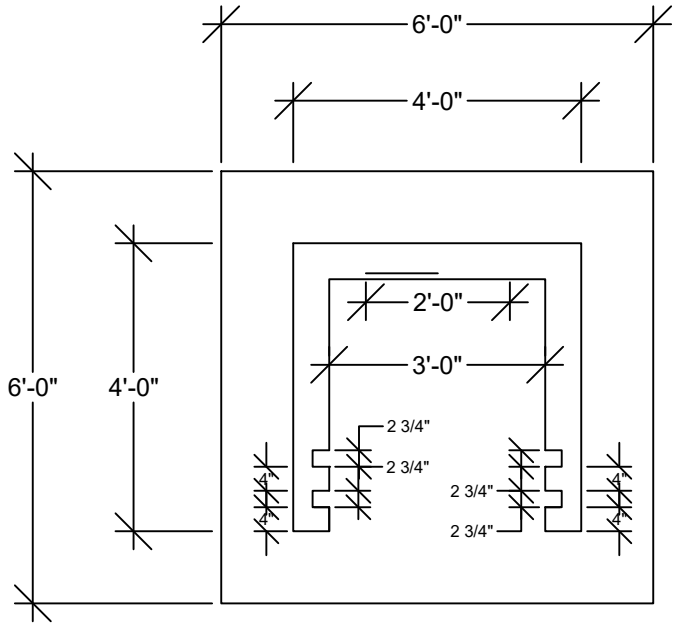
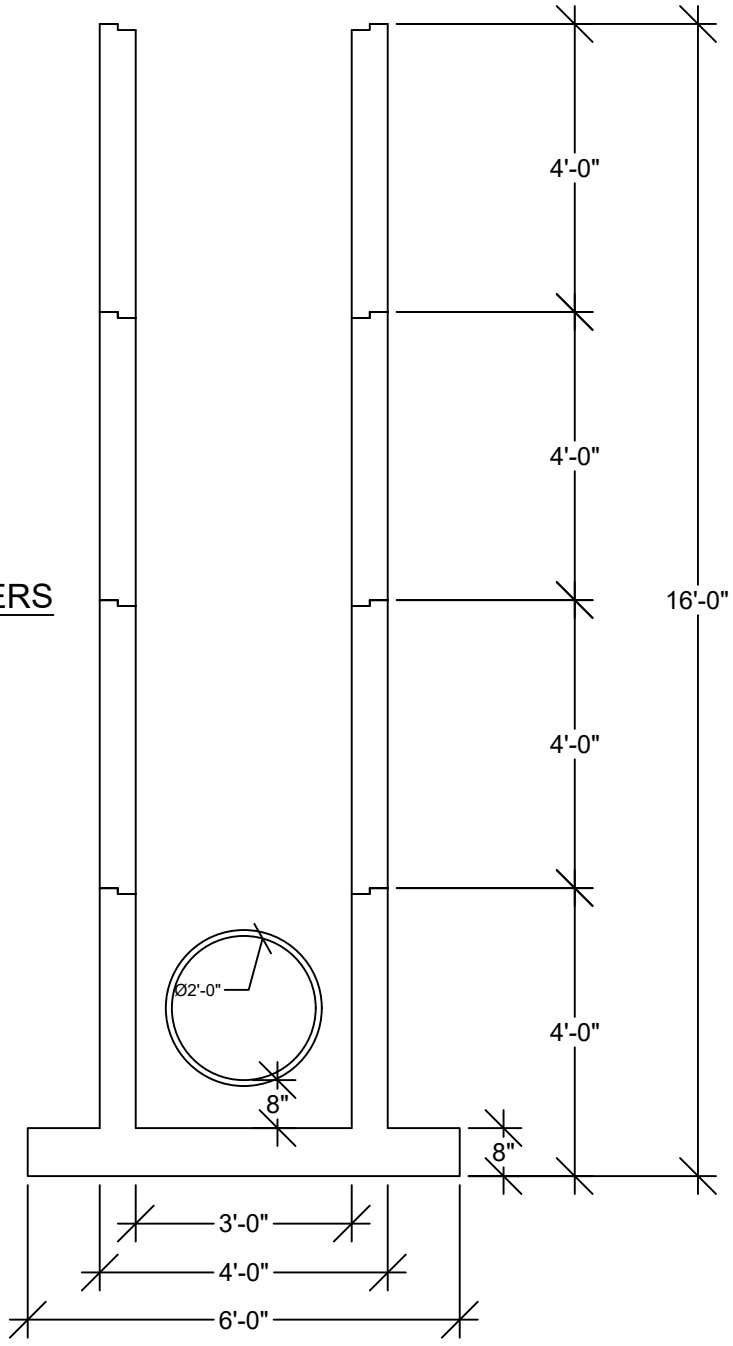


TOP VIEW OF MUCK POND RISERS (TYP. OF 3)

N.T.S.



PLAN OF 36" SQ. MOCK POND

MATERIALS NOTES:

1. CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF NOT LESS THAN 4,000 PSI AT 28 DAYS. MAXIMUM W/C RATIO SHALL BE 0.45.
2. REINFORCING BARS SHALL BEET ASTM A-615, GRADE 60. WELDED WIRE FABRIC (WWF) SHALL CONFORM TO ASTM A-185 AND/OR A-184.
3. CEMENT SHALL BE PORTLAND CEMENT MEETING ASTM C-150.
4. CONCRETE SHALL BE VIBRATED WITH INTERNAL, SPUD TYPE VIBRATORS AND/OR EXTERIOR SURFACE MOUNTED VIBRATORS.
5. REINFORCING PLACEMENT SHALL BE IN ACCORDANCE WITH ACI 301, ACI 318 AND ACI SP-66.
6. MINIMUM COVER ON REINFORCING SHALL BE ¾".
7. CONCRETE SHALL HAVE 5-9% AIR ENTRAINED

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Brushton, NY 12916

CREST HAVEN
PRE-CAST
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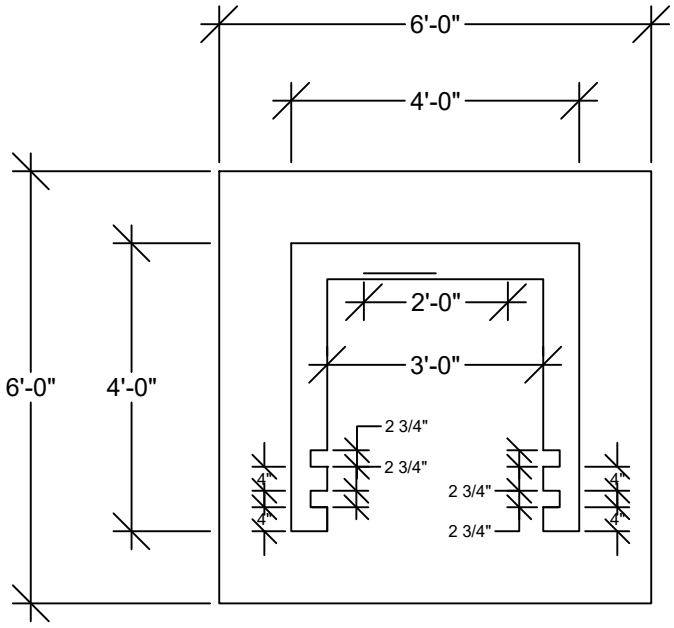
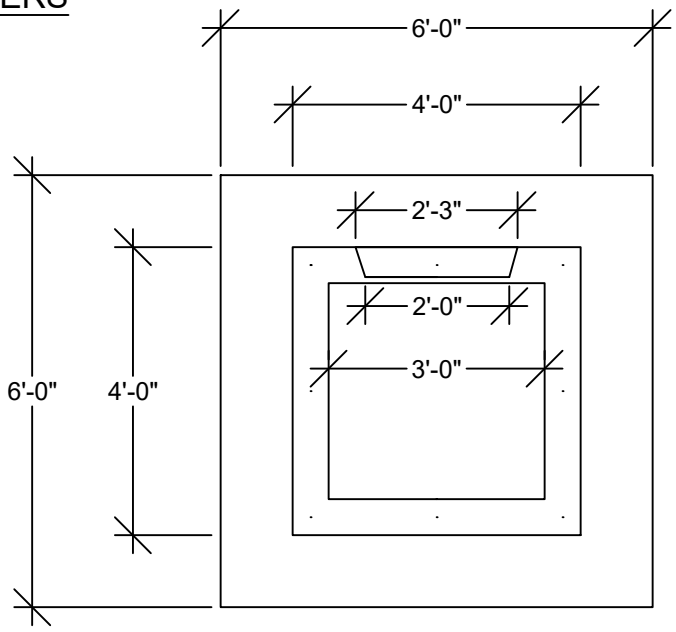
4925 St. Rt. 11
Burke, NY 12917

DESCRIPTION: 3'x3' SQ. MUCK POND			8/12/2024
CLIENT: JUNIPER ORGANIC			DRAWING No.: CB-36
CK'D BY:	DATE: 8/07/24	SCALE: AS SHOWN	SHEET: SK-1



TOP VIEW OF MUCK POND RISERS
(TYP. OF 3)

N.T.S.



TOP VIEW OF BOTTOM SECTION
MUCK POND

N.T.S.

MATERIALS NOTES:

1. CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF NOT LESS THAN 4,000 PSI AT 28 DAYS. MAXIMUM W/C RATIO SHALL BE 0.45.
2. REINFORCING BARS SHALL BEET ASTM A-615, GRADE 60. WELDED WIRE FABRIC (WWF) SHALL CONFORM TO ASTM A-185 AND/OR A-184.
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6. MINIMUM COVER ON REINFORCING SHALL BE ¾".
7. CONCRETE SHALL HAVE 5-9% AIR ENTRAINED

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DESCRIPTION:				8/12/2024
3'x3' SQ. MUCK POND				
CLIENT: JUNIPER ORGANIC			DRAWING No.:	CB-36
CK'D BY:	DATE: 8/07/24	SCALE: AS SHOWN	SHEET:	SK-1