Village of Niles Bioinfiltration Facility
IEPA IGIG Grant

Final Report
Agreement Number IGIG1101

Prepared By:

Hey and Associates, Inc.
8755 W. Higgins Road
Suite 835
Chicago, Illinois 60631
(773) 693-9200

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Prepared for:
Illinois Environmental Protection Agency
Bureau of Water
1021 North Grand Avenue East, P.O. Box 19276
Springfield, Illinois 62794-9276

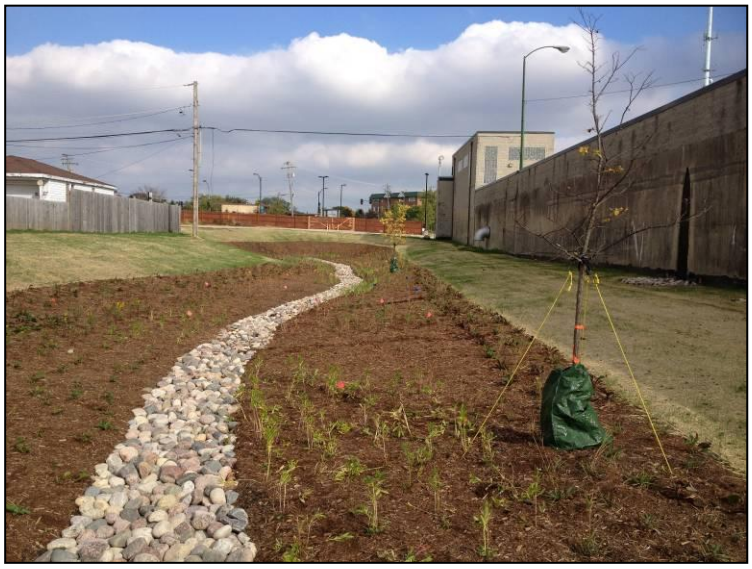
This report was prepared using Illinois Green Infrastructure Grant funds distributed through the Illinois Environmental Protection Agency. The findings and recommendations contained herein are not necessarily those of the funding agencies.

Hey and Associates, Inc.

VILLAGE OF NILES ILLINOIS GREEN INFRASTRUCTURE GRANT (IGIG) BIOINFILTRATION FACILITY FINAL REPORT – IEPA AGREEMENT NUMBER IGIG1101

PREPARED FOR:
Village of Niles
1000 Civic Center Drive
Niles, IL 60714
(847) 588-8000

PREPARED BY:
Hey and Associates, Inc.
8755 W. Higgins Road
Suite 835
Chicago, IL 60631
(773) 693-9200



DECEMBER 31, 2013

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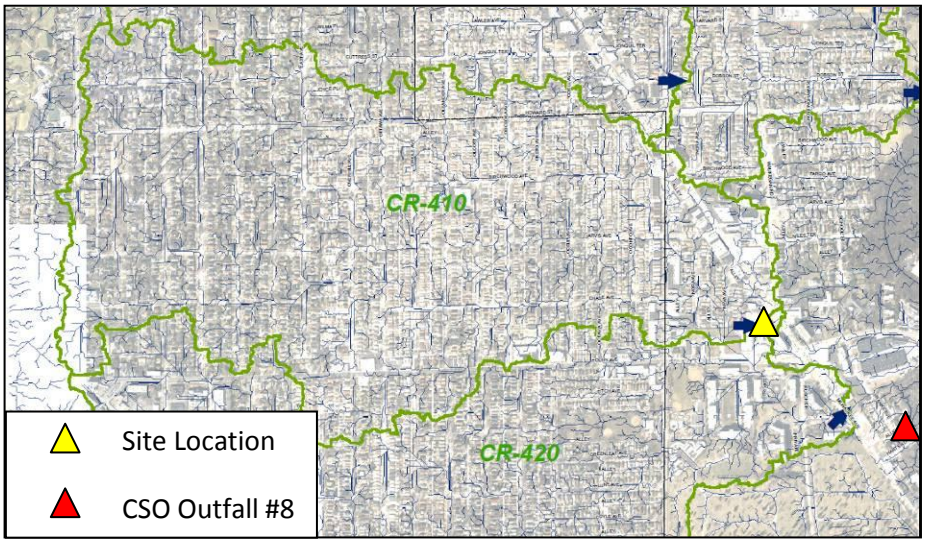
Section 1 Project Summary

The Village of Niles was awarded the Illinois Environmental Protection Agency (IEPA) Illinois Green Infrastructure Grant (IGIG) in 2011 for the design and construction of a bioinfiltration facility. Hey and Associates, Inc. (Hey) assisted the Village in the design and construction management of the bioinfiltration basin.

The location of the bioinfiltration project is north of the Niles Police station and concrete above-ground water reservoir on property owned by the Village. This location is east of the south end of Neva Avenue, north of Touhy Avenue and west of Milwaukee Avenue. The approximate address of the vacant lot where the facility was constructed is 7235 N. Neva Ave., Niles, Illinois.

The site is part of a 494-acre subwatershed (CR-410) that is located primarily outside of Niles. Overland flow from this subwatershed goes south on Neva Avenue toward the north wall of the water reservoir, which cuts off the overland flow path. During large events, water ponds in this area until it can drain into the sewer system. Both storm and combined sewer systems serve this location, however, they both discharge downstream to a 60-inch combined sewer. This combined sewer discharges to the MWRD's collection system through a drop structure (DS-N13R). When CSOs occur, the discharge is through the 60-inch pipe at Outfall #8. Figure 1 shows the general location of the project and its relationship to subwatershed CR-410 and the CSO outfall.

Figure 1: Site Location, Extent of Subwatershed CR-410 and CSO Outfall #8



In order to facilitate a stormwater management project that would increase stormwater storage and infiltration, thereby reducing the volume of CSO releases, this project is optimally located – at the downstream end of a large subwatershed and just upstream of an active CSO.

The installed bioinfiltration facility with an integrated filter strip will accept excess runoff from the 494-acre subwatershed that cannot fit into the existing sewer system at the site. It is also designed to capture storm water before it reaches the sewer system via a new curb cut. In addition to drainage from the larger subwatershed, localized runoff from the adjacent vacant lot, used as a snow dump area for the Village, also drains to the infiltration area. Figure 2 depicts the drainage patterns at the project site. The facility provides approximately 50,000 cubic-feet of storage, with about 70 percent of that surface storage being detained or infiltrated, with the remaining 30 percent of the storage provided in engineered soils and a gravel aggregate storage layer. The combination of these two storage methods will help to reduce the volume of stormwater runoff reaching the combined/storm sewer system, thereby helping to reduce the frequency of CSO's from this subwatershed, along with providing a water quality benefit.

Figure 2: Overview of stormwater runoff directed towards the bioinfiltration facility.

Construction plans and specifications were put out for competitive bid, with the contract being awarded in June 2013 to Earthwerks Inc. Construction of the facility was completed in approximately 13 working days over a 3-week period.

Section 2 Pre-Construction Conditions

The subwatershed draining to the project site is densely populated with a high amount of impervious area. Very little surface storage exists in the subwatershed, as single and multi-family residential and commercial areas dominate the tributary area. With such high impervious area in the subwatershed, runoff has little chance to infiltrate, thus resulting in increased volume in the sewer system and a higher frequency of CSO events.

Immediately next the project site are single-family homes, a vacant lot owned by the Village of Niles, the Niles Police station, and a Village of Niles water reservoir. The single-family homes are similar to those seen in the entire subwatershed in terms of size and amount of impervious and pervious area on each lot. A vacant lot used as a snow dump is located east of the project site. The snow dump area consists of compacted dirt and gravel, resulting in limited infiltration when snow melts in this area, with the subsequent overland flow of runoff was directed towards the backyards of adjacent homes. The site area where the basin was installed was formerly comprised of dense turf grass and a shallow detention area which flows to a storm sewer running west-to-east. Stormwater flow from the Niles Police station does not reach the project site, but flow from the parking lot located on the water reservoir to the south is routed to the project area via scuppers. Pre-construction photos of the project site can be seen in Appendix A.

Section 3 Design

The ultimate goal to increase infiltration and water quality on the project site was accomplished by implementing the following components. Design plans and details of the installations are included in Appendix B.

- Vegetation: IDOT Class 2A seed was used on the upslope areas of the facility to help provide a water quality benefit along with reducing the velocity of surface flow from the localized watershed area. Class 2A is a salt tolerant roadside seed mix. With the vacant lot to the east being utilized as a snow dump facility, chlorides and other chemicals seen on roadways will be present in snowmelt. The chosen seed mix will allow there to be a healthy stand of vegetation without being affected by the contaminated runoff. Erosion control blanket was installed with the seed mix to assist in the establishment and growth of the vegetation.

- Perennial plantings and trees: Downslope of the Class 2A seed are perennial plantings and trees. Planted to provide a water quality benefit to runoff, the perennial plantings will also serve an aesthetic benefit to the facility. A wide variety of plantings and trees were used, with the exact list seen on sheet 7 of the plan sets in Appendix B. As the lower portion of the facility will be inundated with water during rain events, the wetland plantings will tolerate these wet conditions. A planting bed of 2-3" of shredded mulch was spread in and around

the perennial plantings, which provides multiple benefits such as improving soil structure, drainage, and giving another aesthetically pleasing component to the facility.

- Site regrading: To convey runoff to the infiltration area of the facility, regrading of the vacant lots took place. Side slopes graded at 4:1 will enable access to the facility in the future for maintenance and management purposes. A curb cut was installed on Neva Ave to direct runoff into the facility before it is captured by catchbasins at the south end of the street. Cobble splash pads were installed below the scuppers draining the parking lot on the above ground water tank. These pads prevent erosion of the newly grades areas. To intercept runoff from the snow dump area, a swale running north-south was put in to convey water to the infiltration area. The grading and drainage plan can be seen on sheet 6 of the plan sets in Appendix B.

- Engineered soils: Spread at a depth of 18-inches, engineered soils were used to assist in the infiltration of stormwater runoff. Consisting of 33% coarse sand, 33% mushroom compost, and 33% pulverized topsoil, the soil was mixed on site by the contractor and spread once grading was complete. In addition to expediting the infiltration of runoff, the engineered soil provides a final water quality practice before fully infiltrating into the sub-grade. Placement of the engineered soil took place in the same area where the perennial plantings and trees were installed, as seen on sheet 7 of the plan sets.

- Gravel infiltration trench: Installed along the bottom of the infiltration facility, the gravel infiltration trench provides a path for runoff to flow and dissipate into the engineered soil. With a large rain event, any excess runoff will flow to an installed open-grate manhole, which connects into an existing 48-inch storm sewer flowing to the east. At a total depth of 2-feet, the trench consists of geotextile fabric, 18-inches of aggregate, and 6-inches of granite cobbles. The geotextile fabric was chosen to provide separation between the sub-grade but also provide for the flow of water between the trench and engineered soil/sub-grade. Aggregate provides another infiltration device along with another water quality benefit and a small amount of detention storage. The granite cobbles provide for velocity dissipation of runoff and an aesthetic measure along the bottom of the facility. The location and cross section of the infiltration trench can be seen on sheet 6 of the plan sets in Appendix B.

Section 4 Costs

At the time of bidding, the engineer's construction cost estimate for the project was $138,212. The actual final construction cost was $137,826. These values are somewhat lower than originally estimated at the time of the grant application. The primary reason for this was that when a site survey was completed during the design phase, there was more overburden on east side of the site than anticipated. Removal of this overburden would have expanded the facility's footprint beyond what was compatible with the adjacent site uses (snow dump during the winter). For this reason, the

proposed facility was reduced in size, which then reduced the earthwork required to construct the site. The finished product represents a cost effective facility that detains, retains and infiltrates stormwater. Due to rainy weather and thunderstorms, the site was tested several times shortly after its completion and functioned well (this is described in more detail in Section 6).

Section 5 Installation Methods

The Village conducted a formal bidding process to select a contractor to perform the work. Hey assisted the Village in selecting the contractor to ensure they were qualified to complete the project along with selecting the most competitively priced bid for the work that was to be completed. Earthwerks, Inc., based in Batavia, IL, was selected to complete the project. Earthwerks completed the project within the requested timeline and before the September 15th deadline for the installation of perennial plantings. No unusual construction methods were needed to install this project.

Hey provided construction observation, inspection, and contract administration for the Village throughout the duration of the project. In the event of unexpected field conditions or installation problems, Hey was able to assist the contractor to ensure the project went smoothly and was implemented properly. All changes and field conditions were documented for payment and regulatory agencies.

Section 6 Post-Construction Conditions

Site conditions can be seen in the before, during, and after pictures in Appendix A. These photos provide a timeline of the transformation of the project site into its current condition.

A substantial rainfall event occurred less than a week after the facility was completed. The planted seeds had not yet germinated and the site was stabilized only by the erosion control blanket, perennial plants and mulch. This event did result in some minor erosion and migration of mulch. These areas were inspected and mulch was repaired as necessary. Additional thunderstorms occurred after the seeds had germinated and substantial grass growth had occurred. The site was more stable and little if any erosion was noted. There was some migration of mulch where the swale discharges to the bioinfiltration facility. This area should be observed over time as part of operations and maintenance to ensure that it remains stable. Future maintenance of the facility will be completed by the Village as part of an ongoing landscape maintenance contract.

Section 7 Project Evaluation

The bioinfiltration facility has been met with positive public opinion after its completion. Before the design was completed, the Village met with local residents to solicit their opinions and thoughts

on the proposed project. Feedback was taken into consideration and incorporated into the final plans and construction of the facility. Educating residents on the purpose of the facility and its benefits helped to foster a positive outlook on the project. The Village does have prior experience with green infrastructure practices, specifically the Niles Community Rain Garden located nearby on Touhy Avenue. That project has enjoyed several years of village-wide support. Although this bioinfiltration project is functionally more substantial due to its location near sewer inlets and its direct positive impact on CSOs, the development of a bioinfiltration facility with engineered soils and native plantings is similar aesthetically.

Before the start of construction, nearby residents and the Niles Police were informed of the construction timeline and activities. The required project sign was installed off of Neva Avenue giving details of the project and the ultimate goal: to improve water quality within the North Branch Chicago River watershed. A picture of this sign is included in Appendix C.

Overall the project went relatively smoothly. As previously stated, the contractor was able to finish the project before the September 15th deadline, allowing for the perennial vegetation to become established and for the seed to germinate and establish itself before winter. The project will continue to perform better and become more aesthetically pleasing once a full growing season is completed.

Section 8 Operation and Maintenance

An operations and maintenance (O&M) plan was prepared to ensure that the facility's infiltration and water quality benefits continue over a prolonged period. The Village will implement these procedures by in-house staff and through the contracting with a landscape maintenance company. The O&M Plan is included in Appendix D.

Section 9 Problems Encountered and Lessons Learned

The following problems were encountered during the project. Some of these problems were solved during construction and some problems are noted for reference when implementing future projects.

- Utility coordination should occur as early in the process as possible. Unanticipated delays can occur when waiting for utility review and comments.
- The slope transition between the low-gradient swale and the edge of the bioinfiltration basin has resulted in a location that may be subject to future erosion. This area will need to be closely watched. If erosion develops, then a permanent erosion control blanket should be installed.

- Since portions of the site were previously developed, additional concrete walks and debris were encountered under existing earth and turf that was not anticipated.
- If the resident engineer is not on-site full time, request a detailed construction schedule so inspections can be made during the installation of non-typical site work. For example, the installation of a curb cut to direct flow into the facility.

Appendix A – Photographs

Summary of Photographs

1. Pre-Construction taken October 2011
2. Construction photos taken August – September 2013
3. Post Construction photos taken September-November 2013

Pre-Construction Photo 1: Looking east toward project site. Existing swale and inlets along wall will be filled and removed.

Pre-Construction Photo 2: Looking west toward project site.

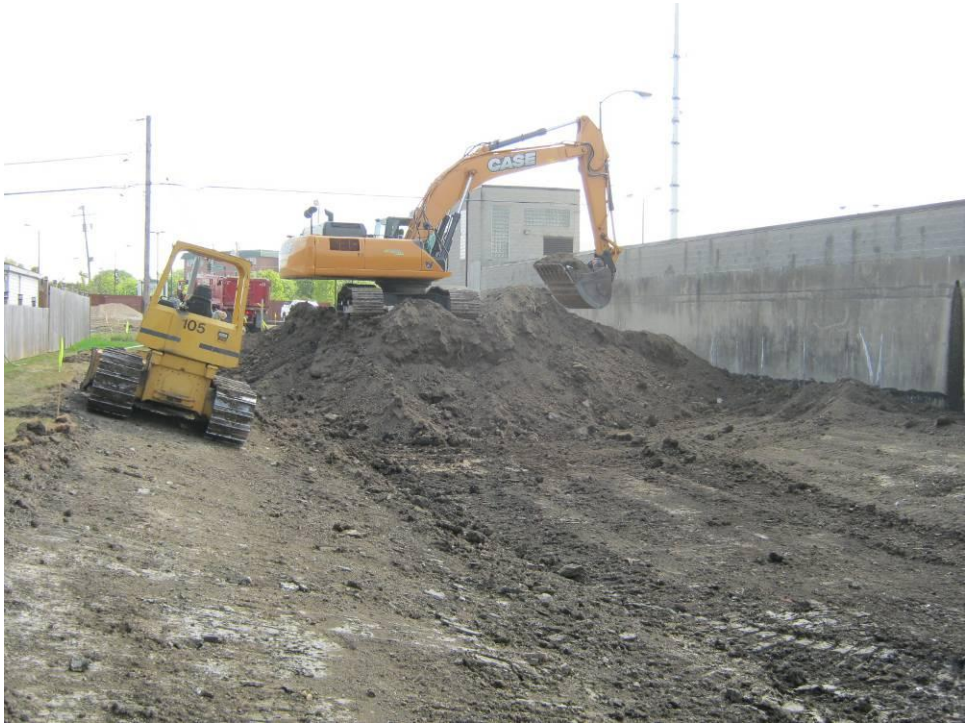
Pre-Construction Photo 3: Looking north along proposed swale location.

Pre-Construction Photo 4: Looking west along wall showing scupper locations and one of the existing inlets that was removed.

Pre-Construction Photo 5: Looking east at location of proposed curb cut.

Construction Photo 1: Looking west at construction layout.

Construction Photo 2: Rough grading west end of site.



Construction Photo 3: Looking east at rough grading operations.

Construction Photo 4: Partial **r**ough grading of swale.

Construction Photo 5: Removing curb section.

Construction Photo 6: Outlet Installation.

Construction Photo 7: Engineered soil placement.

Construction Photo 8: Infiltration trench installation.

Construction Photo 9: Infiltration trench installation.

Construction Photo 10: Dowel installation for curb cut.

Construction Photo 11: Plant installation.

Construction Photo 12: Storing of plants in water and shade over weekend.

Construction Photo 13: Watering and blanket installation.

Construction Photo 14: Swale seeded and blanketed.

Post-Construction Photo 1: Four days after planting completed (9/13/13).

Post-Construction Photo 2: Ten days after planting completed (9/19/13).

Post-Construction Photo 3: Four weeks after planting completed (10/3/13).

Post-Construction Photo 4: Six weeks after planting completed (10/18/13).

Post-Construction Photo 5: Six weeks after planting completed (10/18/13).

Post-Construction Photo 6: Six weeks after planting completed (10/18/13).

Appendix B – Construction Plan Sets

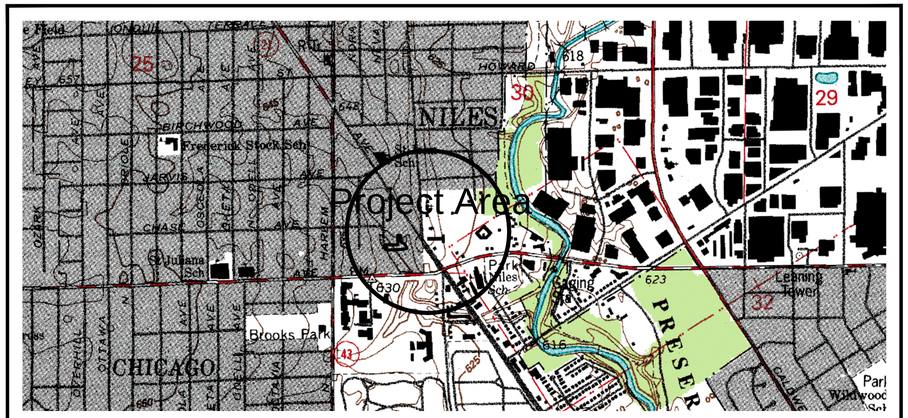
Niles IGIG Bioinfiltration Design
Niles, Illinois

Client:

Village of Niles
Mr. Steven Vinezeano
1000 Civic Center Drive
Niles, Illinois 60614
(847) 588-8007

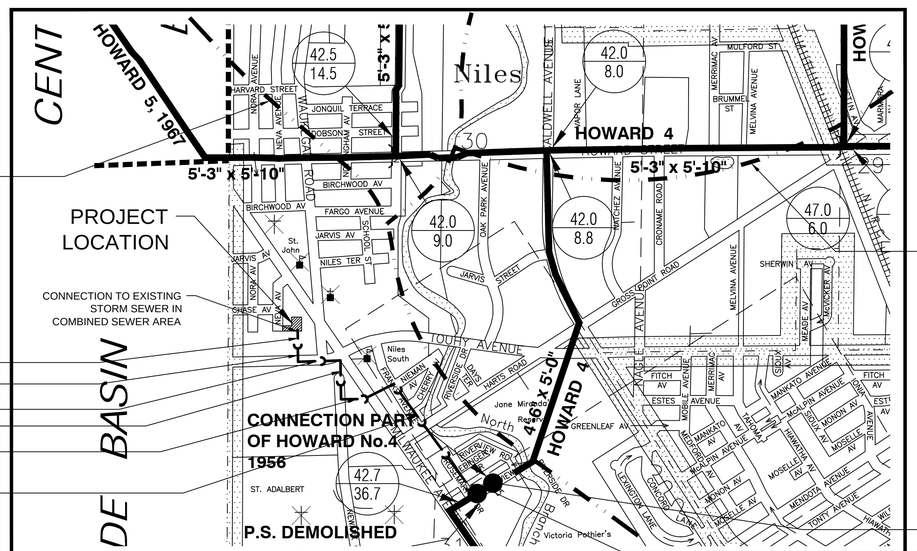
Engineer:

Hey and Associates, Inc.
8755 W. Higgins Road, Suite 835
Chicago, IL 60631
Office (773) 693-9200
Fax (773) 693-9202



Scale = 1" = 1000'

Project Area



Note: The routing shown on this map assumes heavy flow conditions.
VON=Village of Niles
CC=Chicago Combined Sewer

Scale = 1" = 1000'

MWRD Project Area Map

Sheet Index:

1. Cover Sheet with Vicinity Map and Sheet Index
2. Construction Notes & Specifications
3. Summary of Quantities
4. Existing Conditions
5. Demolition Plan
6. Grading & Drainage Plan
7. Planting Plan
8. Soil Erosion & Sediment Control Plan
9. Details
10. Details

CALL J.U.L.I.E. 1-800-892-0123
WITH THE FOLLOWING:
COUNTY Cook
CITY OR TOWNSHIP Niles
TIER, RANGE, & SECTION T41N R13E Sec 30
48 Hours Before Start of Construction

THE INFORMATION SHOWN ON THIS DRAWING CONCERNING TYPE AND LOCATION OF UNDERGROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL INCLUSIVE. THE CONTRACTOR IS RESPONSIBLE FOR MAKING HIS OWN DETERMINATIONS AS TO THE TYPE AND LOCATION OF UNDERGROUND UTILITIES AS MAY BE NECESSARY TO AVOID DAMAGE THERETO.

PROFESSIONAL SEAL

Signature:
Date:
License Expires:

This document shall not be considered a valid technical submittal unless it bears an original seal and signature.

No.	Revision/Issue	Date
2	Revised Per MWRDGC Comments	3-14-13
1	Revised Per MWRDGC Comments	3-8-13

Hey and Associates, Inc.
Engineering, Ecology and Landscape Architecture
8755 W. Higgins Road, Suite 835
Chicago, Illinois 60631
Office (773) 693-9200
Fax (773) 693-9202
Chicago@Heyassoc.com

Professional Design Firm
License No. 184.002429

Niles IGIG Bioinfiltration Design

Cover Sheet with Vicinity Map and Sheet Index

PROJECT NO:	11-0299	SHEET NO:
DESIGNED BY	TRP/JAW	1
DRAWN BY	NRS/CFR	
CHECKED BY	JAW	
APPROVED BY		
ISSUE DATE	9/10/2012	

Construction Documents

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GENERAL NOTES AND CONSTRUCTION SPECIFICATIONS

1. The "Standard Specifications for Road and Bridge Construction", State of Illinois, Department of Transportation, adopted January 1, 2012, and revisions thereto, and these improvement plans and details shall govern applicable portions of this project.

2. The Contractor shall obtain, erect, maintain and remove all signs, barricades, flagmen and other control devices as may be necessary for the purpose of regulating, warning or guiding traffic. Placement and maintenance of all traffic control devices shall be in accordance with the applicable parts of Article 1106 of the Standard Specifications and the "Standard Specifications for Traffic Control Items".

3. Location of utilities shown on plans are approximate only, and are not necessarily complete. Contractor shall make his own investigations as to location of all existing underground structures, cables and pipe lines.

4. If existing utility lines of any nature are encountered which conflict in location with new construction, the Contractor shall notify the Consultant and Owner so that the conflict may be resolved.

5. The Contractor shall notify J.U.L.I.E. (1-800-892-0123) at least ten days prior to construction so that each utility company can stake out any underground improvements that they may have which might interfere with the proposed construction.

6. The Contractor shall be required to make arrangements for the proper bracing, shoring and other required protection of all roadways, structures, poles, cables and pipe lines, before construction begins. He shall be responsible for any damage to the streets or roadways and associated structures and shall make repairs as necessary to the satisfaction of the Consultant and Owner at his own expense.

7. The Contractor shall be responsible for the protection of all private and public utilities even though they may not be shown on the plans. Any utility that is damaged during construction shall be repaired or replaced to the satisfaction of the Consultant and Owner by the Contractor at his own expense.

8. The Contractor shall examine all plans and specifications, visit the site of the work and inform himself fully with the work involved, general and local conditions, all Federal, State and local laws, ordinances, rules and regulations and all other pertinent items which may affect the cost and time of completion of this project before submitting a proposal.

9. All work and materials shall be in accordance with code requirements.

10. Permits and licenses of a temporary nature necessary for the prosecution of the work shall be secured and paid for by the Contractor.

11. Prior to submitting his bid, the Contractor shall call the attention of the Consultant to any material or equipment he deems inadequate and to any item of work omitted.

12. The Contractor shall restore any area disturbed outside the construction site to a condition equal to or better than its original use. This shall include finish grading, establishment of a vegetative cover (seeding or sod), general cleanup and pavement replacement.

13. The Contractor shall be responsible for providing safe and healthful working conditions throughout the construction of the proposed improvements.

14. The Contractor shall provide a written work schedule, and shall update said schedule as required. A minimum twenty-four (24) hour notice shall be given for any item that requires approval or inspection.

15. All lot irons damaged or removed during construction of this project shall be replaced by the Surveyor and said cost of replacement shall be paid by the Contractor.

16. Before acceptance by the Owner and final payment, all work shall be inspected and approved by the Consultant and Owner. Final payments shall be made after all of the Contractor's work has been approved and accepted.

17. The Contractor will have in his possession on the job site a copy of the plans and specifications during construction.

18. If any approved equal items are required the Contractor shall contact the Consultant for approval.

19. As-built drawings shall be prepared by the Contractor and submitted to the Consultant as soon as the site improvements are completed. Any change in length, location or alignment shall be shown in red. Final payments will not be issued until satisfactory as-built plans have been submitted.

20. All elevations are based on NAVD88 Datum.

21. The Contractor is responsible for coordinating any required inspections with the owner, consultant, and other agencies.

22. Special attention is drawn to the fact that Article 105.06 of the standard specifications requires the Contractor to have a competent superintendent on the project site at all times, irrespective of the amount of work sublet. The superintendent shall be capable of reading and understanding the plans and specifications, shall have full authority to execute orders to expedite the project, shall be responsible for scheduling and have control of all work as the agent of the Contractor. Failure to comply with this provision will result in a suspension of work as provided in Article 108.07

23. The Consultant and Owner are not responsible for the construction means, methods, techniques, sequences or procedures, time of performance, programs or for any safety precautions used by the Contractor. The Contractor is solely responsible for execution of his work in accordance with the contract documents and specifications.

EARTHWORK AND GRADING CONSTRUCTION

All work done under this heading will be done in accordance with applicable provisions of the "Standard Specifications for Road and Bridge Construction", State of Illinois, Department of Transportation, adopted January 1, 2012.

1. Work under this section shall include, but not be limited to, the following:

   a. Clearing and removal of all undesirable vegetative growth within the construction area except as noted otherwise on the plans.

   b. Removing unsuitable materials as specified from parking, roadway, building and other designated areas.

   c. Clay cut and clay fill with compaction within parking, roadway, building and other designated areas.

   d. Excavation and grading of the entire site per plan, including construction of berms, swales, etc., as shown on these plans.

   e. Placement and construction of structural and non-structural fills.

   f. If required, removal from site and disposal of any excess or unsuitable material upon completion of mass grading.

   g. Movement and compaction of spoil material from the construction of underground utilities.

   h. Final shaping and trimming to the lines, grades and cross-sections shown in these plans, and topsoil placement to design finish grade elevations.

   i. Soil erosion control measures in accordance with the applicable specifications and county requirements.

2. Silt fence as shown in the construction plans shall be erected prior to mass earthwork.

3. It is the Contractor's responsibility to determine all material quantities and apprise himself of all site conditions. No claims for extra work will be recognized unless ordered in writing by the Owner.

4. The grading operations are to be closely supervised and inspected, particularly during the removal of unsuitable material and the construction of embankments, by the geotechnical engineer or his representative. All testing, inspection and supervision of soil quality, unsuitable removal and its replacement, and other soils related operations shall be entirely the responsibility of the geotechnical engineer.

5. The grading and construction of the site improvements shall not cause ponding of stormwater except as noted on the plans. All areas adjacent to these improvements shall be graded to allow positive drainage.

6. The proposed grading elevations shown on the plans are finish grade. A minimum of six inches (6") of topsoil is to be placed before finish grade elevations are achieved, except where noted otherwise.

7. All disturbed areas to be seeded as specified on the Planting Plan. Any disturbed areas not specified on the Planting Plan shall be replaced in kind.

STORM DRAIN CONSTRUCTION

1. All storm drain construction shall be in accordance with the "Standard Specifications for Road and Bridge Construction", State of Illinois, Department of Transportation, adopted January 1, 2012, and revisions thereto, and the notes in the plan.

2. All storm sewers shall be as specified in the "MWRD Typical General Notes" section listed on this page.

3. All manholes and inlets shall be Precast Reinforced Concrete ASTM designation C-478.

4. Existing field tile encountered at an elevation above the proposed drainage system shall be connected to the drainage system by a method approved by the Engineer. The cost of this work shall be considered incidental to the cost of construction.

5. Existing field tile encountered at an elevation below the proposed drainage system shall be replaced by a method approved by the Engineer. (The usual method will be to sleeve the field tile with rigid pipe and bed the sleeve.) The cost of this work shall be considered incidental to the cost of construction.

6. Structures for storm drains shall be in accordance with the improvement plans and the applicable standard specifications. Where granular trench backfill is required around these structures, the cost shall be considered as incidental and shall be included in the contract unit price for the structure.

7. Frame and cover or grates for storm drains structures shall be as indicated within these improvement plans.

8. All final adjustments of casting will be accomplished by the use of precast concrete adjusting rings set in Butyl rope joint sealant, mortar joints will not be allowed. Total height of adjusting rings used shall not exceed eight inches (8"). Cost for adjustment is considered incidental.

9. The underground contractor shall be responsible to place on grade and coordinate with other contractors all underground structure frames such as catch basins, inlets, manholes, etc. No additional compensation shall be paid and said adjustments shall be considered incidental to other items of construction.

10. All trenches caused by the construction of sewers, service sewers, and the excavation around catch basins, manholes, inlets and other appurtenances which occur within the limits of existing or proposed pavements, sidewalks and curb and gutters or where the edge of the trench shall be within two feet (2') of said improvements shall be backfilled with approved suitable select material and properly compacted.
11. Resilient connections conforming to ASTM C-923 shall be used between manhole(s) and pipe(s).

SEDIMENTATION AND EROSION CONTROL NOTES

All soil erosion and sedimentation control measures shall be in accordance with the "Standard Specifications for Road and Bridge Construction", State of Illinois, Department of Transportation, adopted January 1, 2012, and the codes and ordinances of the local municipal and county agencies.

1. Soil disturbance shall be conducted in such a manner as to minimize erosion. Soil stabilization measures shall consider the time of year, site conditions and the use of temporary or permanent measures.

2. Soil erosion and sediment control features shall be constructed prior to the commencement of upland disturbance.

3. Temporary soil stabilization shall be applied to disturbed areas within 7 calendar days of the end of the active hydrologic disturbance. Permanent stabilization shall be completed within 14 days after completion of final grading of the soil.

4. All storm sewer facilities that are or will be functioning during construction shall be protected, filtered or otherwise treated to remove sediment.

5. All temporary erosion and sediment control measures shall be removed within 30 days after final site stabilization is achieved or after temporary measures are no longer needed. Trapped sediment and other disturbed soil areas shall be permanently stabilized.

6. All temporary and permanent erosion control measures must be maintained and repaired as needed. The general contractor will be responsible for inspection and repair during construction. The owner will be responsible if erosion control is required after the contractor has completed the project.

7. The erosion control measures indicated on the plans are the minimum requirements. Additional measures may be required as directed by the engineer or governing agency.

MWRD TYPICAL GENERAL NOTES

1. The MWRD Local Sewer Systems Section Field Office must be notified at least two (2) working days prior to the commencement of any work (call 708-588-4055).

2. Elevation datum is NAVD88 (As Established By GPS Observation)
   Conversion equation is NGVD29

3. ~~All floor drains shall discharge to the sanitary sewer system.~~ N/A

4. ~~All downspouts and footing drains shall discharge to the storm sewer system.~~ N/A

5. All sanitary sewer pipe materials and joints (and storm sewer pipe materials and joints in a combined sewer area) shall conform to:

Pipe Material Spec.	Joint Spec.
Vitrified Clay Pipe	
VCP C-700	C-425
VCP (No-Bel) C-700	
Joint	C-425
Collar	D-1784
Concrete Pipe C-14	C-443
RCP C-76	C-443
ACP C-428	D-1869
ABS Sewer Pipe	
Solid Wall 6" dia. SDR 23.5	
ABS D-2751	D-2751
ABS Composite/Truss Pipe	
8"-15" dia.	
ABS D-2680	D-2680
PVC Gravity Sewer Pipe	
6"-15" dia. SDR 26	
D-3034	D-3212 or D-2855
18"-27" dia. F/dy=46	
F-679	D-3212 or D-2855
CISP A-74	C-564
DIP A-21.51	A-21.11

(Note: The District has approved less common pipe materials on a qualified basis in addition to those above. Please contact the District if considering using pipe not listed above.**)**

6. All sanitary sewer construction (and storm sewer construction in combined sewer areas), requires stone bedding with stone ¼ " to 1" in size, with minimum bedding thickness equal to ¼ the outside diameter of the sewer pipe, but not less than four (4) inches nor more than eight (8) inches. Material shall be CA-11 or CA-13 and shall be extended at least 12" above the top of the pipe when using PVC.

7. "Band Seal" or similar flexible-type couplings shall be used in the connection of sewer pipes of dissimilar materials.

8. When connecting to an existing sewer main by means other that an existing wye, tee, or an existing manhole, one of the following methods shall be used:

   1. Circular saw-cut of sewer main by proper tools ("Sewer-Tap" machine or similar) and proper installation of hub wye saddle or hub-tee saddle.

   2. Remove an entire section of pipe (breaking only the top of one bell) and replace with a wye or tee branch section.

   3. With pipe cutter, neatly and accurately cut out desired length of pipe for insertion of proper fitting, using "Band Seal" or similar couplings to hold it firmly in place.

9. Whenever a sanitary/combined sewer crosses under a watermain, the minimum vertical distance from the top of the sewer to the bottom of the watermain shall be 18 inches. Furthermore, a minimum horizontal distance of 10 feet between sanitary/combined sewers and watermains shall be maintained unless: the sewer is laid in a separate trench, keeping a minimum 18" vertical separation; or the sewer is laid in the same trench with the watermain located at the opposite side on a bench of undisturbed earth, keeping a minimum 18" vertical separation. If either the vertical or horizontal distances described above can not be maintained, or the sewer crosses above the watermain, the sewer shall be constructed to watermain standards.

10. All existing septic systems shall be abandoned. Abandoned tanks shall be filled with granular material or removed.

11. All sanitary manholes, (and storm manholes in combined sewer areas), shall have a minimum inside diameter of 48 inches, and shall be cast in place or pre-cast reinforced concrete.

12. Resilient connections conforming to ASTM C-923 shall be used between manhole(s) and pipe(s).

LEGEND

No.	Revision/Issue	Date
2	Revised Per MWRDGC Comments	3-14-13
1	Revised Per MWRDGC Comments	3-8-13

Hey and Associates, Inc.
Engineering, Ecology and Landscape Architecture
8755 W. Higgins Road, Suite 835
Chicago, Illinois 60631
Office (773) 693-9200
Fax (773) 693-9202
Chicago@Heyassoc.com

Professional Design Firm
License No. 184.002429

Niles IGIG Bioinfiltration Design

Construction Notes & Specifications

PROJECT NO:	11-0299	SHEET NO:
DESIGNED BY	TRP/JAW	2
DRAWN BY	NRS/CFR	
CHECKED BY	JAW	
APPROVED BY		
ISSUE DATE	9/10/2012	

Construction Documents

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SUMMARY OF QUANTITIES		
Item	**Unit**	**Quantity**
Site Demolition	Lump Sum	1
Site Excavation, Grading and Removal	Cu. Yd.	1385
Site Fill	Cu. Yd.	76
Concrete Curb Saw Cut	Each	1
Stabilized Construction Entrance	Each	1
Temporary Construction Fence, 6' Chain Link In Ground, 1 to 12 Month Rental	Linear Foot	150
3' Inlet Type A w/ Type B Grate	Each	1
Storm MH Cover Replaced, Type 1 Heavy Duty	Each	1
Storm Sewer, 12" PVC SDR. 26	Linear Foot	15
Engineered Soil, 18" Depth, including overexcavation	Sq. Yd.	796
Gravel Infiltration Trench, 18" CA-7 Stone	Sq. Yd.	64
Gravel Infiltration Trench 4" Granite Cobbles	Sq. Yd.	64.00
(4"-8") Granite Cobbles Over Geotextile Woven Fabric For Splash Pads	Sq. Yd.	8.00
Erosion Control Blanket	Sq. Yd.	1430
Perennial Plants, 2" diameter x 4" deep plug	Lump Sum	1
Trees, Common Hackberry, 2.5" diameter	Each	2
Trees, Alternate-leaved Dogwood, 5' Height	Each	6
IDOT Class 2A Seed	Sq. Yd.	1430
Tree Protection	Each	1
Silt Fence	Linear Foot	241

LEGEND

No.	Revision/Issue	Date
2	Revised Per MWRDGC Comments	3-14-13
1	Revised Per MWRDGC Comments	3-8-13

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Engineering, Ecology and Landscape Architecture
8755 W. Higgins Road, Suite 835
Chicago, Illinois 60631
Office (773) 693-9200
Fax (773) 693-9202
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Summary of Quantities

PROJECT NO:	11-0299	SHEET NO:
DESIGNED BY	TRP/JAW	3
DRAWN BY	NRS/CFR	
CHECKED BY	JAW	
APPROVED BY		
ISSUE DATE	9/10/2012	

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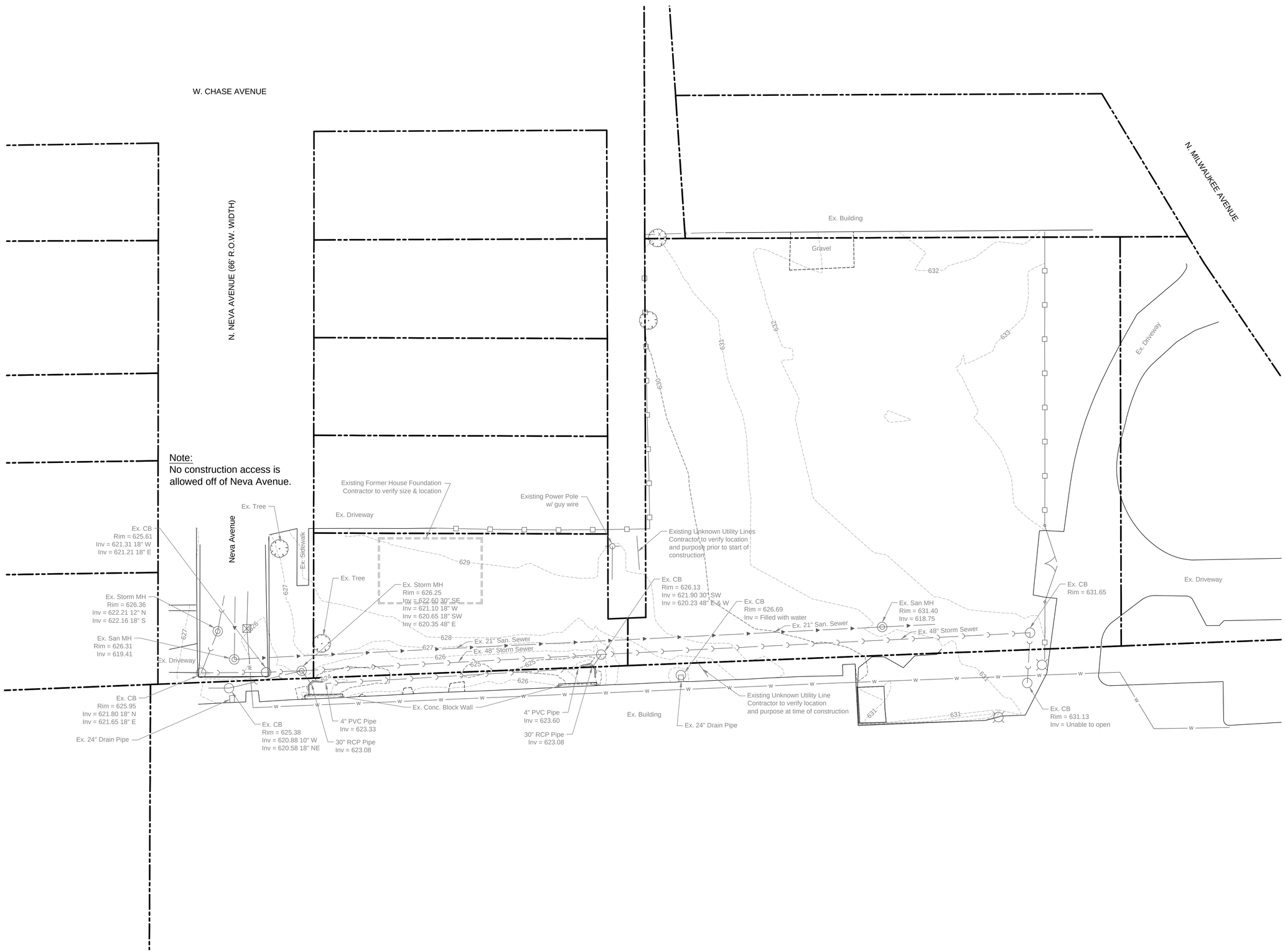

0 20 40
Scale in Feet

N

LEGEND

- Property Line
- Existing Contours
- Existing Storm Line
- Existing Sanitary Line
- Existing Water Main
- Existing Wood Fence
- Existing Chainlink Fence
- Existing Catch Basin (CB)
- Existing Storm Manhole (MH)
- Existing Sanitary Manhole (MH)
- Existing Water Valve & Vault
- Existing Light Pole
- Existing Power Pole
- Ex. Tree

No.	Revision/Issue	Date
2	Revised Per MWRDGC Comments	3-14-13
1	Revised Per MWRDGC Comments	3-8-13

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Engineering, Ecology and Landscape Architecture
8755 W. Higgins Road, Suite 835
Chicago, Illinois 60631
Office (773) 693-9200
Fax (773) 693-9202
Chicago@Heyassoc.com

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Niles IGIG Bioinfiltration Design

Existing Conditions

PROJECT NO:	11-0299	SHEET NO:
DESIGNED BY	TRP/JAW	4
DRAWN BY	NRS/CFR	
CHECKED BY	JAW	
APPROVED BY		
ISSUE DATE	9/10/2012	

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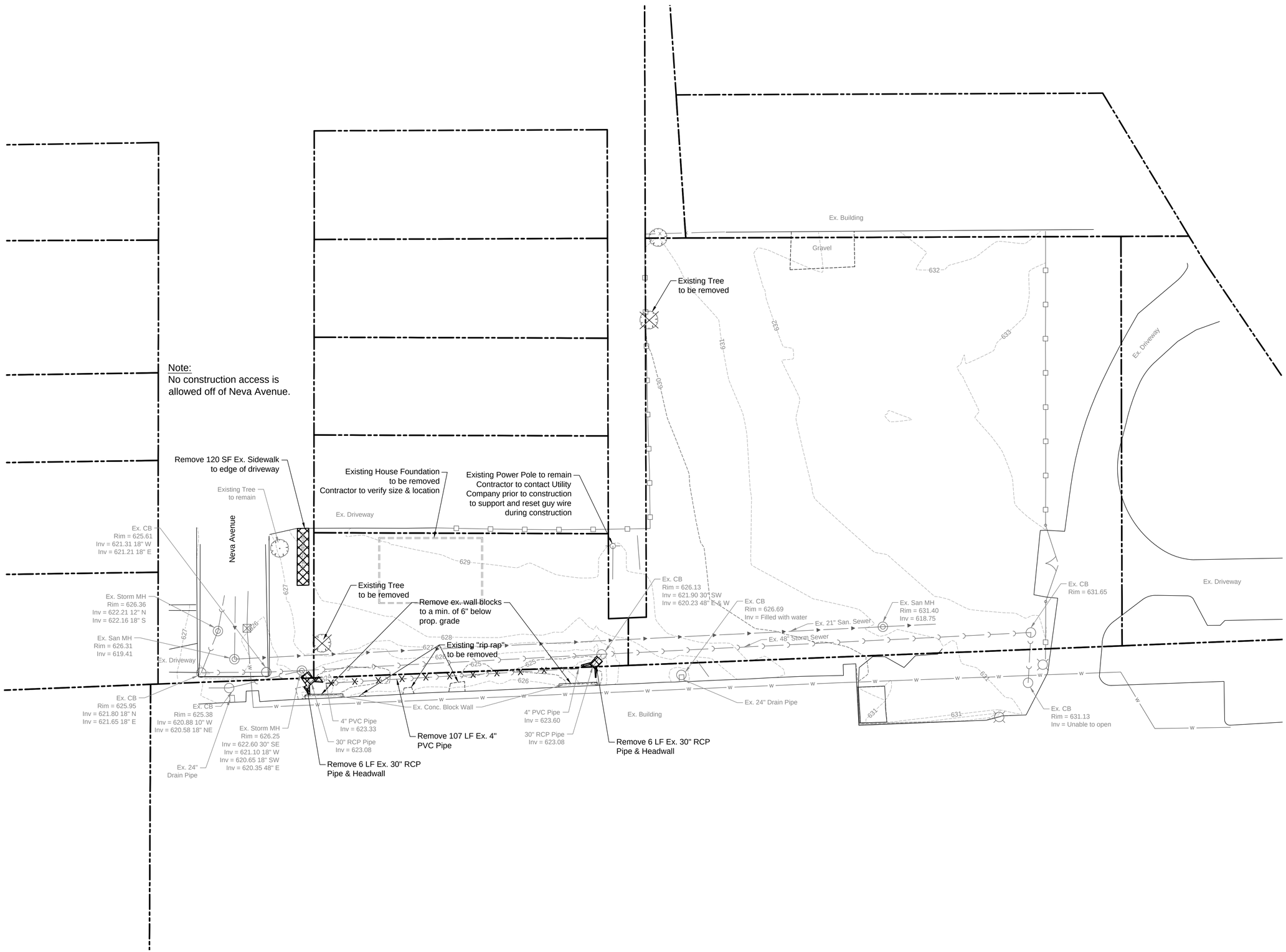

LEGEND

- Property Line
- Existing Contours
- Existing Storm Line
- Existing Sanitary Line
- Existing Water Main
- Existing Wood Fence
- Existing Chainlink Fence
- Existing Catch Basin (CB)
- Existing Storm Manhole (MH)
- Existing Sanitary Manhole (MH)
- Existing Water Valve & Vault
- Existing Light Pole
- Existing Power Pole
- Ex. Tree

No.	Revision/Issue	Date
2	Revised Per MWRDGC Comments	3-14-13
1	Revised Per MWRDGC Comments	3-8-13

Hey and Associates, Inc.
Engineering, Ecology and Landscape Architecture
8755 W. Higgins Road, Suite 835
Chicago, Illinois 60631
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Fax (773) 693-9202
Chicago@Heyassoc.com

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Niles IGIG Bioinfiltration Design

Demolition Plan

PROJECT NO:	11-0299	SHEET NO:
DESIGNED BY	TRP/JAW	5
DRAWN BY	NRS/CFR	
CHECKED BY	JAW	
APPROVED BY		
ISSUE DATE	9/10/2012	

Construction Documents

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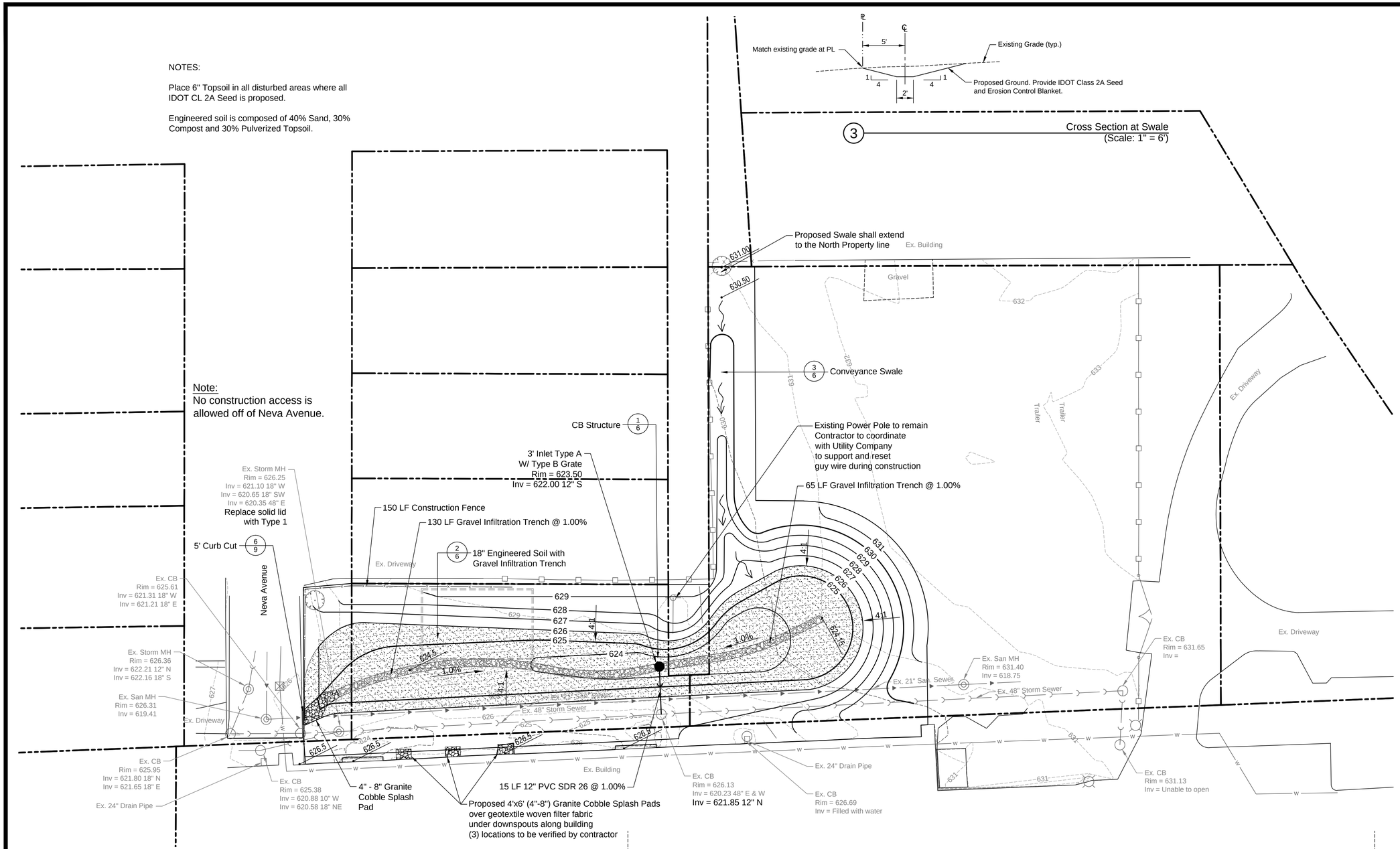
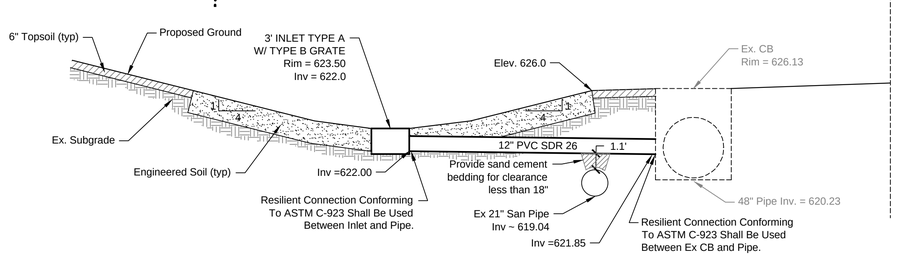
NOTES:

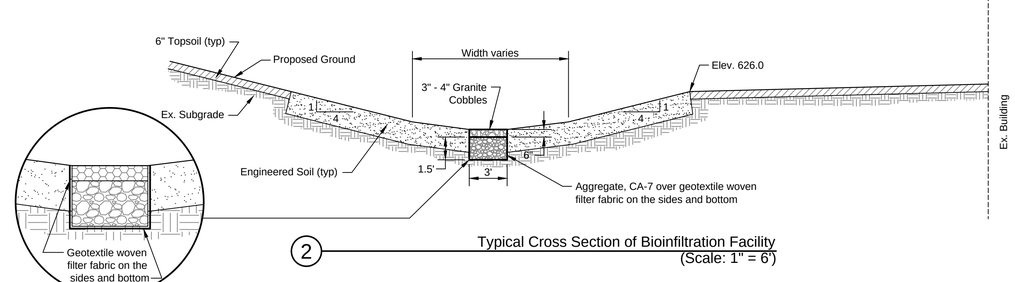
Place 6" Topsoil in all disturbed areas where all IDOT CL 2A Seed is proposed.

Engineered soil is composed of 40% Sand, 30% Compost and 30% Pulverized Topsoil.





1 Cross Section at Proposed CB (Scale: 1" = 6')



2 Typical Cross Section of Bioinfiltration Facility (Scale: 1" = 6')

0 20 40
Scale in Feet

N

LEGEND

- Property Line
- Existing Contours
- Proposed Contours
- Existing Storm Line
- Proposed Storm Line
- Existing Sanitary Line
- Existing Wood Fence
- Existing Chainlink Fence
- Proposed Catch Basin (CB)
- Existing Catch Basin (CB)
- Existing Storm Manhole (MH)
- Existing Sanitary Manhole (MH)
- Existing Light Pole
- Existing Power Pole
- Ex. Tree
- Proposed Engineered Soil & Gravel

No.	Revision/Issue	Date
2	Revised Per MWRDGC Comments	3-14-13
1	Revised Per MWRDGC Comments	3-8-13

Hey and Associates, Inc.
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8755 W. Higgins Road, Suite 835
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Fax (773) 693-9202
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Niles IGIG Bioinfiltration Design

Grading & Drainage Plan

PROJECT NO:	11-0299	SHEET NO:
DESIGNED BY	TRP/JAW	6
DRAWN BY	NRS/CFR	
CHECKED BY	JAW	
APPROVED BY		
ISSUE DATE	9/10/2012	

Construction Documents

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PERRENIAL PLANTS

Symbol	Botanic Name	Common Name	Qnty.	Size
AS	*Andropogon scoparius*	Little bluestem	115	2" diameter x 4" deep plug
AI	*Asclepias incarnata*	Marsh milkweed	103	2" diameter x 4" deep plug
AL	*Aster laevis*	Smooth blue aster	293	2" diameter x 4" deep plug
AN	*Aster novae-angliae*	New England aster	162	2" diameter x 4" deep plug
CV	*Carex vulpinoidea*	Brown fox sedge	111	2" diameter x 4" deep plug
CH	*Cassia hebecarpa*	Wild senna	64	2" diameter x 4" deep plug
EP	*Echinacea purpurea*	Purple coneflower	144	2" diameter x 4" deep plug
EV	*Elymus virginicus*	Virginia wild rye	356	2" diameter x 4" deep plug
EM	*Eupatorium maculatum*	Joe Pye weed	151	2" diameter x 4" deep plug
HA	*Helenium autumnale*	Sneezeweed	130	2" diameter x 4" deep plug
HO	*Helianthus occidentalis*	Western sunflower	119	2" diameter x 4" deep plug
HP	*Hibiscus palustris*	Swamp rose mallow	124	2" diameter x 4" deep plug
IV	*Iris viginica shrevei*	Blue flag	212	2" diameter x 4" deep plug
MF	*Monarda fistulosa*	Wild bergamot	192	2" diameter x 4" deep plug
PV	*Panicum virgatum*	Switchgrass	200	2" diameter x 4" deep plug
PD	*Penstemon digitalis*	Foxglove beard tongue	354	2" diameter x 4" deep plug
PH	*Physostegia virginiana*	Obedient plant	149	2" diameter x 4" deep plug
RL	*Rudbeckia laciniata*	Wild goldenglow	124	2" diameter x 4" deep plug
SS	*Solidago speciosa*	Showy goldenrod	58	2" diameter x 4" deep plug
ZA	*Zizia aurea*	Golden Alenxanders	124	2" diameter x 4" deep plug

TREES

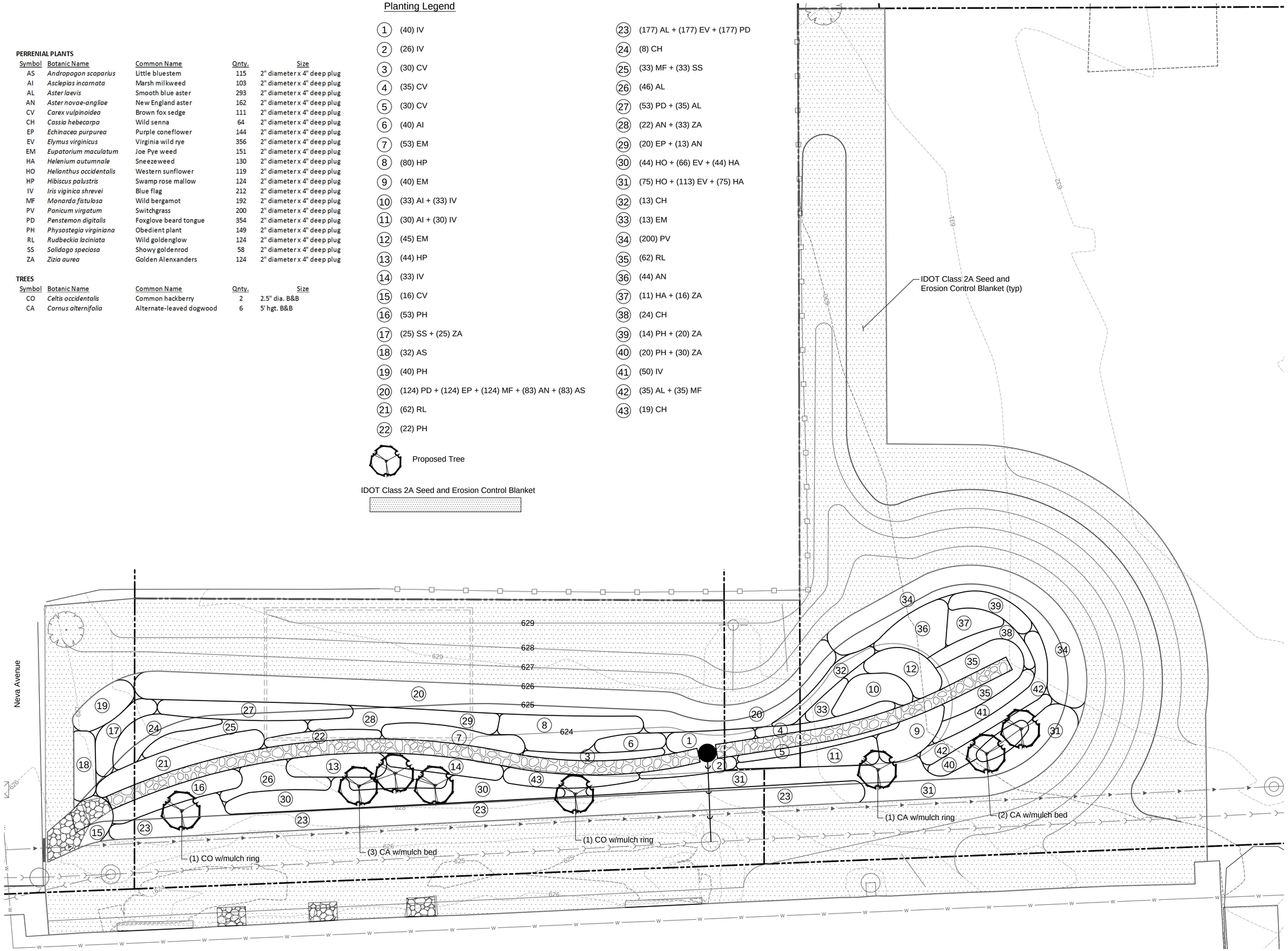
Symbol	Botanic Name	Common Name	Qnty.	Size
CO	*Celtis occidentalis*	Common hackberry	2	2.5" dia. B&B
CA	*Cornus alternifolia*	Alternate-leaved dogwood	6	5' hgt. B&B

Planting Legend

1. (40) IV
2. (26) IV
3. (30) CV
4. (35) CV
5. (30) CV
6. (40) AI
7. (53) EM
8. (80) HP
9. (40) EM
10. (33) AI + (33) IV
11. (30) AI + (30) IV
12. (45) EM
13. (44) HP
14. (33) IV
15. (16) CV
16. (53) PH
17. (25) SS + (25) ZA
18. (32) AS
19. (40) PH
20. (124) PD + (124) EP + (124) MF + (83) AN + (83) AS
21. (62) RL
22. (22) PH
23. (177) AL + (177) EV + (177) PD
24. (8) CH
25. (33) MF + (33) SS
26. (46) AL
27. (53) PD + (35) AL
28. (22) AN + (33) ZA
29. (20) EP + (13) AN
30. (44) HO + (66) EV + (44) HA
31. (75) HO + (113) EV + (75) HA
32. (13) CH
33. (13) EM
34. (200) PV
35. (62) RL
36. (44) AN
37. (11) HA + (16) ZA
38. (24) CH
39. (14) PH + (20) ZA
40. (20) PH + (30) ZA
41. (50) IV
42. (35) AL + (35) MF
43. (19) CH

Proposed Tree

IDOT Class 2A Seed and Erosion Control Blanket



0 10 20
Scale in Feet

N

LEGEND

- Property Line
- Existing Contours
- Proposed Contours
- Existing Storm Line
- Proposed Storm Line
- Existing Sanitary Line
- Existing Wood Fence
- Existing Chainlink Fence
- Proposed Catch Basin (CB)
- Existing Catch Basin (CB)
- Existing Storm Manhole (MH)
- Existing Sanitary Manhole (MH)
- Existing Light Pole
- Existing Power Pole
- Ex. Tree

NOTES:

Plant Bed is to receive 2-3" of premium shredded hardwood mulch.

No.	Revision/Issue	Date
2	Revised Per MWRDGC Comments	3-14-13
1	Revised Per MWRDGC Comments	3-8-13

Hey and Associates, Inc.
Engineering, Ecology and Landscape Architecture
8755 W. Higgins Road, Suite 835
Chicago, Illinois 60631
Office (773) 693-9200
Fax (773) 693-9202
Chicago@Heyassoc.com

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Niles IGIG Bioinfiltration Design

Planting Plan

PROJECT NO:	11-0299	SHEET NO:
DESIGNED BY	TRP/JAW	7
DRAWN BY	NRS/CFR	
CHECKED BY	JAW	
APPROVED BY		
ISSUE DATE	9/10/2012	

Construction Documents

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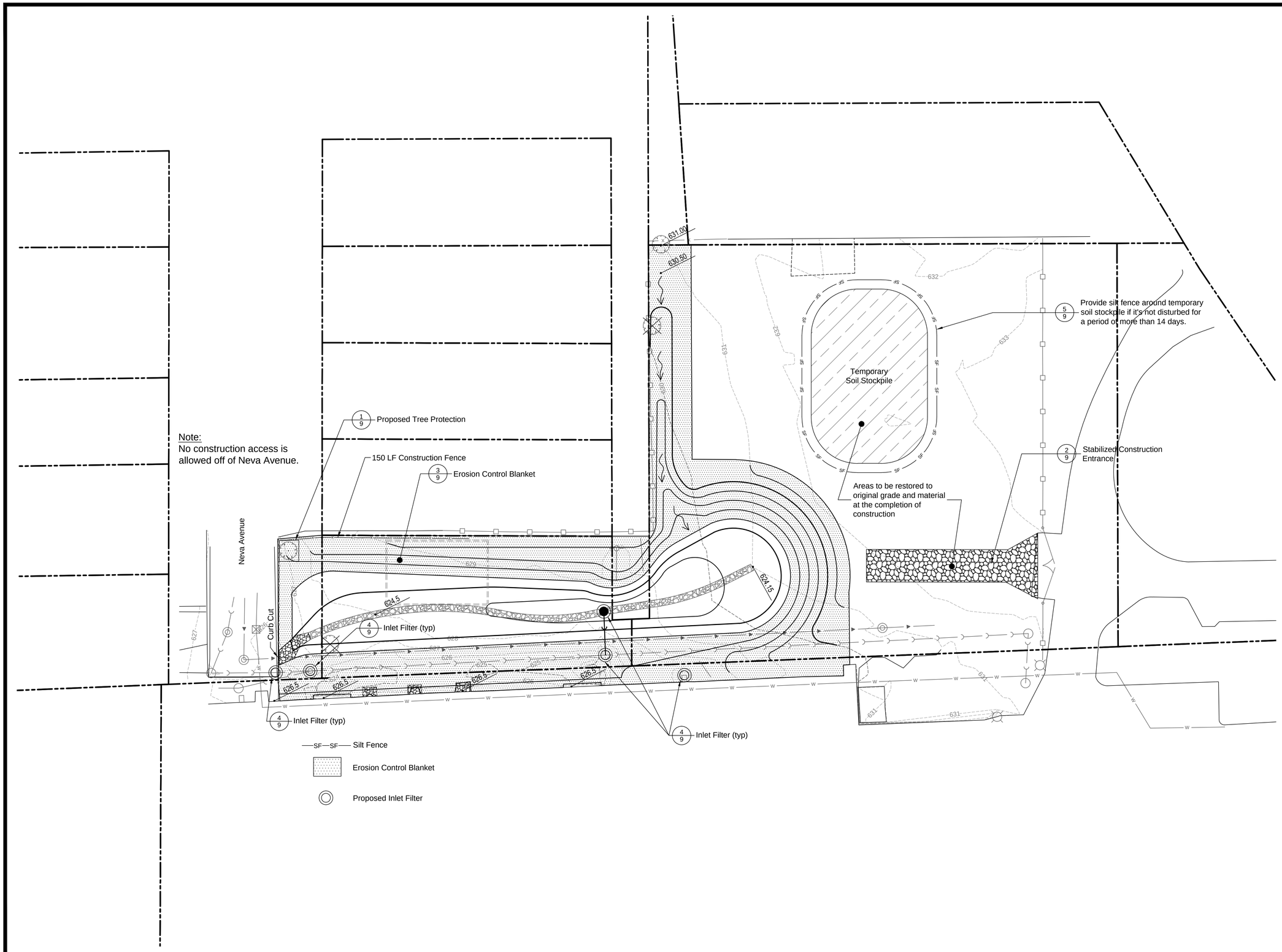

0 20 40
Scale in Feet

N

LEGEND

- Property Line
- Existing Contours
- Proposed Contours
- Existing Storm Line
- Proposed Storm Line
- Existing Sanitary Line
- Existing Wood Fence
- Existing Chainlink Fence
- Proposed Catch Basin (CB)
- Existing Catch Basin (CB)
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- Existing Light Pole
- Existing Power Pole
- Ex. Tree

No.	Revision/Issue	Date
2	Revised Per MWRDGC Comments	3-14-13
1	Revised Per MWRDGC Comments	3-8-13

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Chicago, Illinois 60631
Office (773) 693-9200
Fax (773) 693-9202
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Soil Erosion & Sediment Control Plan

PROJECT NO:	11-0299	SHEET NO:
DESIGNED BY	TRP/JAW	8
DRAWN BY	NRS/CFR	
CHECKED BY	JAW	
APPROVED BY		
ISSUE DATE	9/10/2012	

Construction Documents

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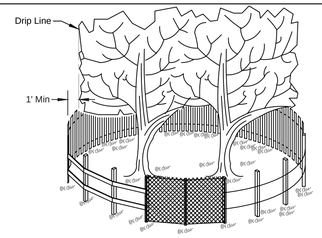
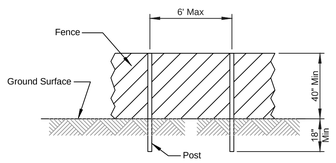
TREE PROTECTION - FENCING



SIDE VIEW

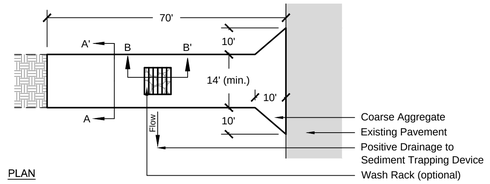


POST AND FENCE DETAIL

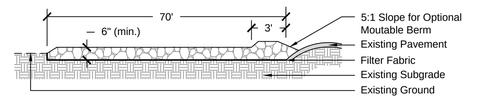
NOTES:
1. The fence shall be located a minimum of 1 foot outside the drip line of the tree to be saved and in no case closer than 5 feet to the trunk of any tree.
2. Fence posts shall be either standard steel posts or wood posts witha minimum cross sectional area of 3.0 sq. in.
3. The fence may be either 40" high snow fence, 40" plastic web fencing or any other material as approved by the engineer/inspector.

REFERENCE Project Designed ____ Date ____ Checked ____ Date ____ Approved ____ Date ____	NRCS Natural Resources Conservation Service	STANDARD DWG. NO. IL-690 SHEET 1 OF 1 DATE 4-7-94

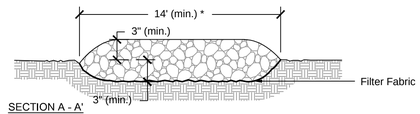
1 Tree Construction Fencing (Tree Protection) Detail
(Not to Scale)



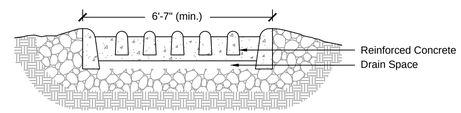
PLAN



SIDE ELEVATION



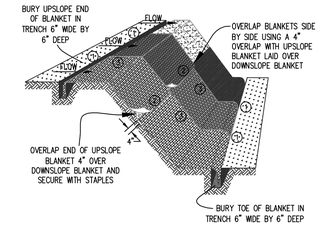
SECTION A - A'

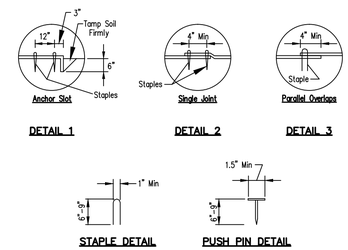


SECTION B - B'

Notes:
1. Filter fabric shall meet the requirements of the specifications and shall be placed over the cleared area prior to the placing of rock.
2. Rock or reclaimed concrete shall meet one of the following coarse aggregate gradation - CA-1, CA-2, CA-3 or CA-4 and be placed according to the standard specifications.
3. Any drainage facilities required because of washing shall be construced according to manufacturer's specifications.
4. If wash racks are used they shall be installed according to the manufacturer's specifications.
* Must extend full width of ingress and egress operation.

2 Stablilized Construction Entrance Detail
(Not to Scale)



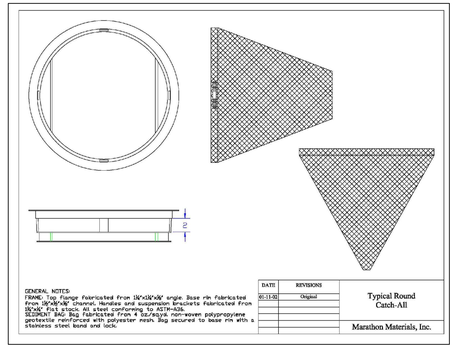


NOTES:

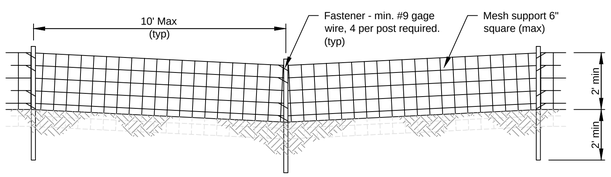
1. Staples shall be placed in a diamond pattern at 2 per s.y. for sticked blankets. Non-stiched shall use 4 staples per s.y. of material. This equates to 200 staples with stiched blanket and 400 staples with non-stiched blanket per 100 s.y. of material.
2. Staple or push pin lengths shall be selected based on soil type and conditions. (minimum staple length is 6")
3. Erosion control material shall be placed in contact with the soil over a prepared seedbed.
4. All anchor slots shall be stapled at approximately 12" intervals.

Rev. Date 1 8-8-13 2 3-14-13	Fig. No. Detail No. 630	EROSION CONTROL BLANKET INSTALLATION DETAILS
		Date Designed ____ Drawn G. GRIGRO ____ 3/1/06 Checked ____ Approved ____

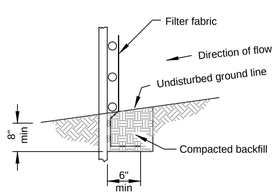
3 Erosion Control Blanket Detail
(Not to Scale)



4 Inlet Filter Detail
(Not to Scale)



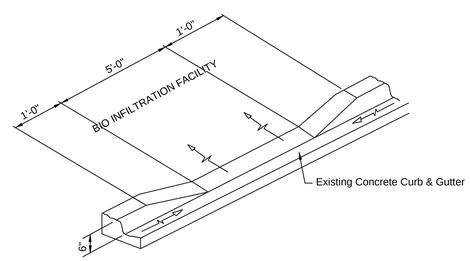
ELEVATION



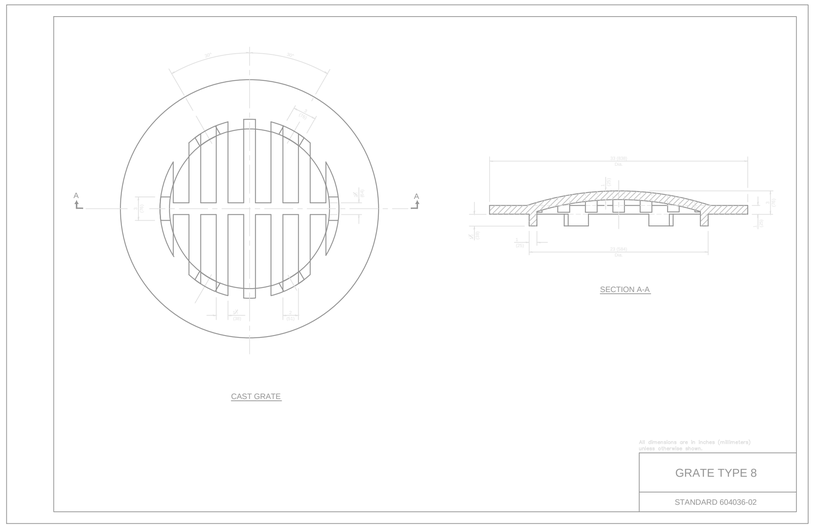
FABRIC ANCHOR DETAIL

Notes:
1. Top and bottom wires of mesh support shall be min. gage no. 9.
2. Intermediate wires of mesh supports shall be min. gage no. 11.
3. Temporary sediment fence shall be installed prior to any grading work in the area to be protected. They shall be maintained throughout the construction period and removed in conjuction with the final grading.
4. Filter fabric shall meet the requirements of material specification 592 Geotextile Table 1 or 2, Class with equivalend opening size of at least 30 for nonwoven and 50 for woven.
5. Fence post shall be either standard steel post or wood post with a minimum sectional area of 3.0 sq. in.
6. The mesh support may be omitted if a maximum of 5' is used for post to post spacing.

5 Silt Fence Installation Detail
(Not to Scale)



6 Curb Cut Detail
(Not to Scale)



7 Grate, Type B Detail
(Not to Scale)

Scale bar measures 1" at full scale

0 1"

LEGEND

No.	Revision/Issue	Date
2	Revised Per MWRDGC Comments	3-14-13
1	Revised Per MWRDGC Comments	3-8-13

Hey and Associates, Inc.
Engineering, Ecology and Landscape Architecture
8755 W. Higgins Road, Suite 835
Chicago, Illinois 60631
Office (773) 693-9200
Fax (773) 693-9202
Chicago@Heyassoc.com

Professional Design Firm
License No. 184.002429

Niles IGIG Bioinfiltration Design

Details

PROJECT NO: 11-0299		SHEET NO:
DESIGNED BY	TRP/JAW	9
DRAWN BY	NRS/CFR	
CHECKED BY	JAW	
APPROVED BY		
ISSUE DATE	9/10/2012	

Construction Documents

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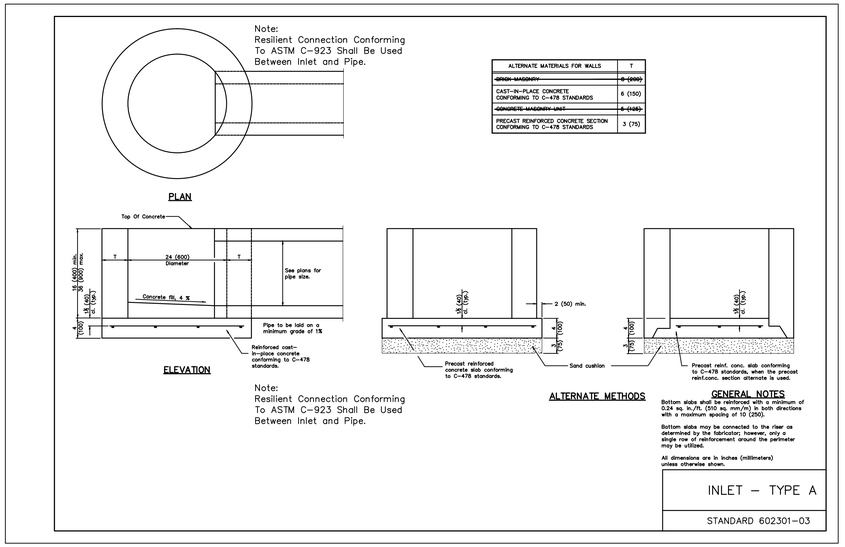
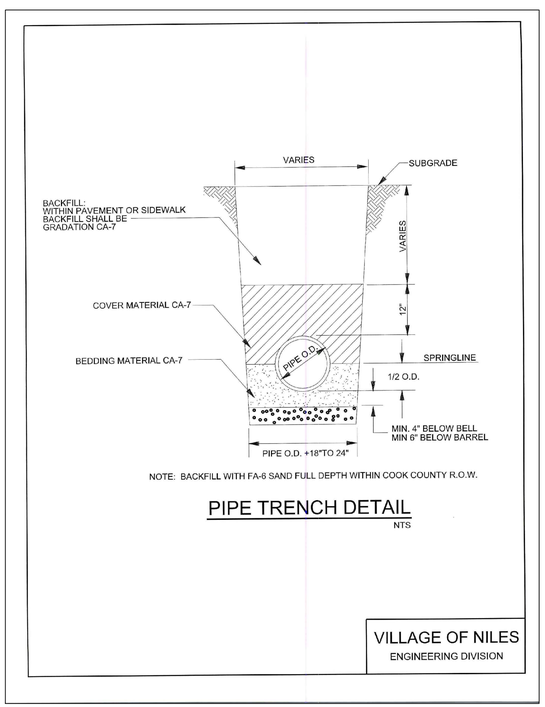
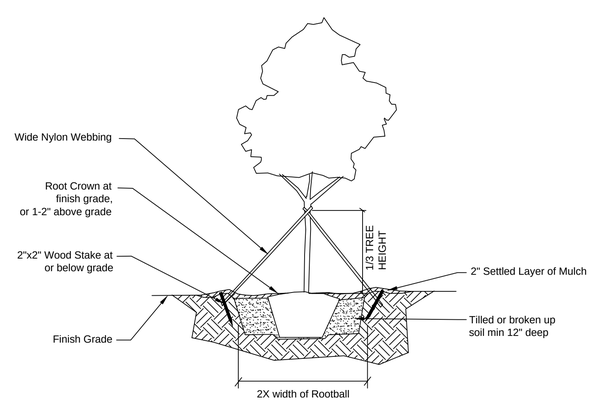


ALTERNATE MATERIALS FOR WALLS	T
~~BRICK MASONRY~~	~~8 (200)~~
CAST-IN-PLACE CONCRETE CONFORMING TO C-478 STANDARDS	6 (150)
~~CONCRETE MASONRY UNIT~~	~~4 (100)~~
PRECAST REINFORCED CONCRETE SECTION CONFORMING TO C-478 STANDARDS	3 (75)

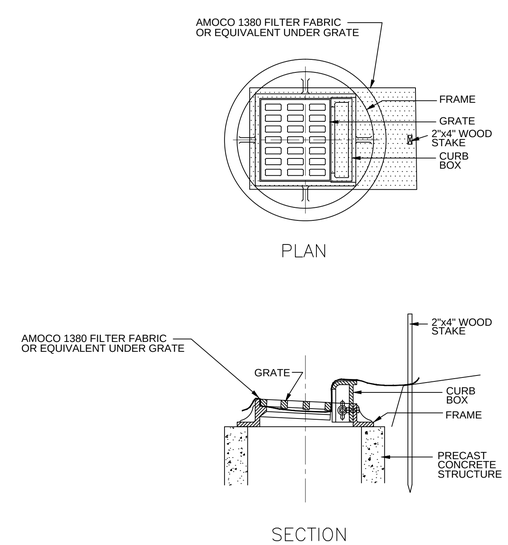
1 Inlet, Type A Detail
(Not to Scale)



2 Trench Cross Section
(Not to Scale)



3 Tree Planting Detail
(Not to Scale)



4 Curb Box Filter Fabric Detail
(Not to Scale)

Scale bar measures 1" at full scale

0 1"

LEGEND

No.	Revision/Issue	Date
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CHECKED BY	JAW	
APPROVED BY		
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Construction Documents

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Appendix C – Public Information Materials

Informational sign posted at the project site off of Neva Avenue:

Appendix D – Operations and Maintenance Plan

Operations and Maintenance Plan
Village of Niles
Bioinfiltration Facility – Neva Avenue

Bioinfiltration design promotes and enhances the treatment of stormwater runoff in an effective and environmentally sound manner by encouraging native plant establishment and increased storage rates through the use of engineered solutions and biological processes. Both vegetation and built structures need to be maintained on a regular basis throughout the year to ensure the bioretention system is achieving maximum results. The operations and maintenance procedures described in this document provides for a guide to successfully implement a maintenance program for ten years aimed at reducing localized flooding and damages incurred from large storm events, ultimately providing the local community with a safer more desirable place to live and work.

Vegetation Maintenance:

Perennial Plants:

- Inspect planting area annually in early spring to determine if supplemental or replacement planting is needed due to herbivory damage, disease, insect predation, contamination (i.e. high salinity) or other pressures that inhibit growth and establishment. Perform remedial actions as needed.
- Water all plants as needed until a strong root system is established, which is typically achieved in two growing seasons. Once established, plants should only require watering during drought conditions.
- Remove dead plant debris in late fall if not intended to be left standing over winter by means of hand clipping or mowing to a height of 4"-6" inches.

Trees:

- Inspect tree plantings twice per year for signs of herbivory damage, disease, contamination (i.e. high salinity), insect predation or other pressures that inhibit growth and establishment. Perform remedial actions as determined by a certified arborist.
- Water trees as needed until established. Once established, trees may only require watering during drought conditions.

Planting Area:

- Replenish **mulch** annually in early spring to maintain a 2" - 3" depth throughout the entire bioinfiltration area after dead foliage and debris has been removed from the specified area.
- Lightly cultivate the top 2"-3" inches of surface layer mulch 2-3 times per growing season with a four tined hand tool (rake) to prevent **weed growth** from occurring.
- If substantial **weed growth** does occur after maintenance as described above is performed, proceed to hand weed all invasive weed species before they go to seed.
- A **selective herbicide** application is not recommended due to high populations of desirable plant species, but may be necessary if species such as *Phragmites australis* or *Lythrum salicaria* are allowed to establish.

- Remove all **trash and debris** as needed throughout the site to maintain proper growing conditions and functionality.

Class 2A Seed:

- Aerate surrounding turf areas annually during the fall months to enhance stormwater infiltration before entering the basin.
- Inspect turf for any signs of disease, insect predation or any other pressures that inhibit growth or establishment. Perform remedial actions as needed including, but not limited to soil amendments that enhance the composition of soil structure.
- Broadleaf herbicide applications may be necessary if the specified IDOT Class 2A seed mix is desired to maintain a monolithic quality.

Other Maintenance:

Curb Cuts / Splash Pads:

- Maintain a clear/debris free flow path from gutter to bioinfiltration area.
- Remove sediment buildup from splash pads in spring and fall.

Gravel Infiltration Trench:

- Inspect infiltration trench and underdrain cleanout in late fall and early spring after vegetation maintenance has been performed. Perform remedial actions as needed to maintain proper stormwater infiltration.

Inlet / Overflow Grate:

- Remove mulch, leaves, trash and other debris from overflow grate as needed to maintain proper drainage.

Coordination

The Village of Niles will coordinate the inspection and management needs for the project along with the financial resources necessary for the Operations and Maintenance Plan. For the 2014 budget, the Village has set aside resources to hire a landscape contractor to take care of vegetative management. Any other remaining inspection and maintenance needs will be handled by the Village of Niles Public Works Department.