



**ACME TOWNSHIP PLANNING COMMISSION MEETING
ACME TOWNSHIP HALL
6042 Acme Road, Williamsburg MI 49690
June 08, 2015 7:00 p.m.**

CALL TO ORDER WITH PLEDGE OF ALLEGIANCE: 7:01pm

ROLL CALL:

Members Present: D. Rosa, J. DeMarsh, D. White, J. Jessup, M. Timmins, B. Ballentine, S. Feringa, K. Wentzloff, T. Forgette

Members Excused: None

Staff Present: N. Lennox, Zoning Administrator; J. Iacoangeli, Township Planner

LIMITED PUBLIC COMMENT: 7:02om

Brian Fossiere , M-37 Mesick. Following up with Planning Commission (PC) in regard to opening a provisioning center here in the township. Seven centers in Traverse City that are doing well and thinks one in Acme would do well.

K. Wentzloff – Counsel has indicated that a provisioning center is not allowable use. Asked Lennox for clarification.

N. Lennox- Correct it is not an allowed use, however, Brian is asking PC to revisit.

K. Wentzloff – Taking the request under advisement.

Public comment closed at 7:04pm.

A. APPROVAL OF AGENDA: Motion by Timmins to approve agenda as presented; support by White. Motion passed unanimously.

B. INQUIRY AS TO CONFLICTS OF INTEREST: None

C. CONSENT CALENDAR:

a) RECEIVE AND FILE:

Draft Unapproved Minutes of:

1. Township Board minutes 05/12/15

b) ACTION:

Draft Unapproved Minutes of:

1. Planning Commission minutes: 05/11/15

D. ITEMS REMOVED FROM THE CONSENT CALENDAR:

1. none

Motion by Timmins to approve the consent calendar as presented; support by DeMarsh. Motion passed unanimously.

E. CORRESPONDENCE: None

F. PUBLIC HEARINGS: Opened at 7:05pm

- a) **Sign Amendment to Acme Township Zoning Ordinance:** Amendment #034 addition of Section 7.4.6.c (12. a-g). Commercial Zoning Districts Excluding B-4. On premise signs permitted to add: changeable message signs, including electronic changeable messages for motel/hotel vacancy or gas station price per gallon signs.

P. Schmuckal, Schmuckal Oil Company – Read over amendment and had a couple of questions. Specifically section on maintaining automatic brightness control. We have put up a number of these signs in the past year but

If you are planning to attend and are physically challenged, requiring any special assistance, please notify Cathy Dye, Clerk, within 24 hours of the meeting at 938-1350.

doesn't know if they have this feature. Assumes they are part of the sign. If it is part of the normal sign, then he does not have a problem with it but has not had the opportunity to research that. The other question was on the color requirement. He does not have a problem with the black background red and/or green requirement but others may be based on branding.

B. Kelley, Ridgecrest Road – Ordinance restricts signs to gas station and hotel/motel. Could another business use go to the Zoning Board of Appeals (ZBA) and request an electronic sign?

K. Wentzloff – Technically anyone can go to the ZBA and request a variance.

J. Iacoangeli – To go to the ZBA, the applicant would have to prove a hardship and not a self-induced hardship. If self-induced, the recommendation to the ZBA would be that it should not allow the variance.

Public hearing closed at 7:11pm

G. NEW BUSINESS:

a) Sign Amendment: Electronic Message Signs

No discussion,

Motion by Feringa to send Sign Amendment #034 of the Acme Township Zoning Ordinance to GT County for review and comment. Support by Timmins. Motion passed unanimously

H. OLD BUSINESS:

a) US 31/M72 Business District: Architectural Standards Amendment

J. Iacoangeli presented the amendment in ordinance format as put together by township counsel, J. Jocks. He explained next steps in process.

K. Wentzloff – Asked about confirmation of the build to line distances for accuracy.

J. Iacoangeli – Confirmed move to 20 feet along US31 corridor. Corridor Flex is set to 5 feet as it is more internal.

Timmins motion to approve setting a Public Meeting for review of an amendment of the Acme Township Ordinance Section 6.6 at the July 13th meeting, supported by White. Motion passed unanimously.

b) VGT-Presentation of Storm Water Final Engineering Plans: Township Planner

J. Iacoangeli presented a summary of the Storm Water Final Engineering Plans for VGT to the Planning Commission and was available to answer questions from the Planning Commission and public. Planning Commissioner Chairperson explained that this was not a Planning Commission review and merely a presentation and that the Township Attorney, Planner and Engineers feel the plan met the ordinance and therefore planning commission review was not needed. The corresponding memorandum, conclusion and submitted plans as presented are available online at <http://www.acmefuture.org/wp-content/uploads/2015/05/PA-May-21-2015-Final-Engineering.pdf>. Take-off summary of the basins are attached. Special note was made that future build-outs analyzed, additional pretreatment techniques should continue to be employed and as future developments occur and analyzed for stormwater, calculations for the existing basins will need to be updated as well and further modifications to the outlet structures may be necessary to keep release rates below the maximums allowed. Developer has committed to the plan and has commenced construction the components and are anticipating completion prior to occupancy of Meijer. Conclusion of memorandum states “based on the technical review performed by Gosling Czubak and Cardno and their respective observations and recommendations the final engineering for the stormwater system is complete and approved”. Chairperson asked Planning Commissioners if there were any questions.

D. Rosa - Is this what we see out there now?

J. Iacoangeli - The developer and engineers are completing the plan now. In the interim they have been pumping water to move water through the system until the vegetation is planted. As the planned constructed wetlands get built and vegetated, the interim pumping will stop. The engineers and biologists have stated that this will take a while to facilitate as it will take a up to three years to become fully established. Hydrologic cycles (ie rain and

snow) also play a part in the development of these natural systems.

S. Feringa - What is the schedule for the plantings?

J. Iacoangeli - Fully installed by September according to Project Manager.

K. Wentzloff – Since it takes 3 years to fully establish constructed wetlands, will they function soon after planting?

J. Iacoangeli – Yes, but they will function better over time as they grow.

K. Wentzloff – My concern then would be with future developments in two years, and a change in the modelling. Would the vegetation be removed or changed?

J. Iacoangeli – These would stay, however, additional systems may be added. With some of the smaller build-outs, stormwater measures could be contained within that specific property. Such as underground water storage, porous pavement, rain gardens, etc. to reduce the amount of water that goes into the treatment train system of the entire development. Each piece within the development as they become proposed will require our engineers to re-run the model to determine which technologies should be used.

T. Forgette – Work has to be done prior to occupancy, who puts the final stamp on the project as completed?

J. Iacoangeli – There is an occupancy checklist we work through and I will be doing that with the township and planning commission. You will see a new revision of the checklist at the July meeting but there are many components with the checklist. Stormwater, sanitary sewers, water supply, internal roads, and M72 improvements through substantial/operational completion along with others.

M. Timmins – Are they working with the people who are doing the plantings to make sure over the next three years that plants are being maintained and/or replaced if needed?

J. Iacoangeli – There is a maintenance agreement in place and the developers consultant is in the field laying the grid and as the plantings come in, our team is verifying as well. King and McGregor and Horizon representing the developer and Gosling Czubak will be reviewing technical aspect, and Cardno and Becket & Raeder will be reviewing the plantings and appropriate specifications.

I. PUBLIC COMMENT & OTHER PC BUSINESS

Public comment opened at 7:37pm.

Brian Kelley, Ridgecrest Road. Read a prepared statement into record that is attached to the minutes. Believes further review is needed.

C. Abernathy, 4312 West Ridge Drive. With train system, from swales is it straight dumping into the creek? With the system, how are the nutrients going to be cleaned? Concerned about two things. The things used for fertilization, how are those things going to be cleaned out before the water hits Acme Creek? How is system going to work for the usual parking lot detritus, chemicals, and oils? How is this treatment system going to affect Acme Creek and what is going to be done for water temperature control?

J. Iacoangeli – I can try to answer some of these questions. The swales don't dump immediately into the creek. They will enter into the current wetland system before they enter the creek. Temperature, suspended solids and turbidity is being monitored at every rain event, and in addition monthly. The information is collected by Horizon and is reported online under the GTTC tab of <http://www.acmefuture.org>. Once we move into September the full blown water monitoring plan goes into effect that has other chemicals that will be analyzed and they are listed in the SUP under the King and McGregor report of water quality monitoring; signed by developer and township. That plan was approved by Chris Grobel. There is four bay system parallel along Lautner Road to collect materials off of lot and oil and residual before they get into system. There is a whole biological technology built into this system that addresses different types of pollutants.

S. Feringa – Would like to see some black willows added to plantings as they are very good at removing a variety of chemicals. With respect to stream monitoring afterwards, the GT Tribe is working on Acme Creek as well. They are developing a Creek Restoration Plan. First thing to work on is the stream crossing at M72 as right now it is too short and fast. Going to replace culvert with longer, three sided, natural bottom culvert for improved fish and invertebrate passage. Next thing is to actually do some restoration on the creek based upon the pre-construction information which showed the creek to be in pretty bad shape. Especially with respect to the fish and food for fish population. The plan would address habitat concerns (removal of sand) and providing cover

next to creek to lower temperatures. The tribe has been doing work like this in northern Michigan for many years with a good success rate.

C. Abernathy – What is going to happen to the creek as we wait for the three years for the vegetation to develop? Is Acme Creek going to be affected by the stormwater runoff from the property?

J. Iacoangeli – Some of the stormwater will make it into the creek. There was natural runoff before the development and there will be runoff after. The key or objective is that when the stormwater does enter the creek, that it has been adequately treated by the constructed wetland system. What is going to be done in the three years? This is part of the BMP. You can't sprinkle magic seeds and tomorrow there is a fully functioning, self-sufficient wetland. It has to grow. The system will be used. Monitoring is in place to check the water quality at three or four locations within the GTTC site as well as upstream and downstream to look at comparable measurements. There are a variety of other property owners upstream of this development as well. Based on monitoring, adjustments can be made if needed. The system is based upon MDEQ BMP and township ordinance to handle a 25-year storm; not 100-year storm. Other systems being built in the area are pretty much following the same standards and pre-requisites. Except this one is a little bit different due to the size and complexity. There is not a constructed wetland in GT County the size of this one here. There are small ones but nothing of this size and complexity.

Chuck Walters, 6584 Bates Road. - Reminded everyone of the Williamsburg gas explosion of 1974 that was a national event. It took several months for agencies to come up with answers to the problems it created. Not sure they came back with anything like this. Back then, we let God do the work. Here we are trying to fix something quickly. There is a lot of unnecessary worry about this. There doesn't seem to be any constructive comments on what we should do, all I hear is what has been done and how bad it is. I think we need to look at the health and safety of all the people of the township, not just those few who are so concerned about this but can't come up with an answer.

J. Gerney - Hampshire Drive. Regarding how system will function, is there data from casino or GT Resort that would give you a feel how this system is going to work?

S. Feringa – They are different systems with respect to stormwater.

Paul Rundoff, 3733 Bunker Hill Road. Amount of water coming off lot is known. Why are calculations not on report? Originally, there was a retaining pond along Lautner Road? Why was this set aside?

J. Iacoangeli - Based on coefficients of development were included and some of the original plans showed traditional stormwater system with retention ponds. During the review process with community and township, it was decided through PC and community to build engineered wetlands. Based on original SUP and modelling of the watersheds, the designs changed to accommodate the stormwater requirement of the SUP and the current site.

John Zowlinak, 1035 Kay Ray Road. Who has responsibility that execution occurs as developments and plans change? Who will be representing Acme Township?

J. Iacoangeli – With these plans here, it will be a combination of Gosling Czubak (Township Engineer), Cardno Environmental who has been retained as the biologist and environmental scientists, myself (Becket & Raeder) will do site inspection work to ensure they are completed as designed. Reports and inspections are submitted and filed and posted on website.

J. Zowlinak. If water quality is not meeting standard, who has authority to fix it?

J. Iacoangeli. - With respect to water quality should it not meet the standard, it will be brought to the PC as part of the SUP and they through their representatives and work with developer to address any problems and come up with solutions at that point in time.

K. Wentzloff – Occupancy cannot be issued until that is verified that it is built out according to plan and going forward the Township Zoning Administrator and township follow-up. That is the case with anything built in the township.

P. Rundoff - If another store or development comes in, what kind of site plan approval is needed?

K. Wentzloff – Any time another development comes in, they would need to PC with a site plan for approval. The only thing that can be built right now is Meijer, interior roads, and constructed wetlands. The PC has indicated to developer that a new conceptual site plan that reflects changes in densities, stormwater infrastructure, as things have changed over the evolution of this project.

P. Rundoff – All these consultants are hired under contract and when they are no longer retained they will not work for free.

S. Feringa – MDEQ still has oversight.

K. Wentzloff – Monitoring plan is still in the SUP and results will continue to be reported to the website so all will know if something is not right. www.acmetownship.org

N. Lennox – And people can come to the office and see the results if they do not have web access.

Closed public comment at 8:09pm

1. Zoning Administrator update on projects:

N. Lennox - At next meeting in July you will have a site plan review for MI Local Hops. They would like to build a processing facility for hops. Receiving lots of calls for business but nothing concrete

2. Planning Consultant: None

3. P C Education etc.:

K. Wentzloff – Announced N. Lennox, Zoning Administrator, will be leaving the township. Committee made up of K. Wentzloff, T. Forgette, and A. Jenema interviewed four candidates and an offer has been extended to one applicant.

M. Timmins – Last Thursday, went to a Green Infrastructure Conference that presented best ways to implement. They did a good job explaining the technology and they talked about working with road commissions or MDOT on upcoming projects so you can get on their construction slates. One of the important things learned is that if a community can just control the stormwater from its road systems, it is controlling 50% of the stormwater within the township or county. Education of community on how these work and length of time it takes is important. There is a huge savings when green infrastructure is implemented as part of new construction. One example given was Suttons Bay. Watershed Center is spearheading. Challenges in Northern Michigan with respect to maintaining green infrastructure.

M. Timmins – This Thursday will be a public meeting of Parks and Recreation to go over direction. This is a working session.

S. Feringa – Those interested in stream restoration, lookup Otter Creek which is an example restoration project the GT Tribe has worked on.

ADJOURN: Motion to adjourn by M. Timmins, supported by B.Ballentine. Motion passed unanimously.

Meeting adjourned at 8:15pm .

To: Acme Township Planning Commission
From: Brian Kelley

June 8, 2015

Good evening,

I reviewed the VGT Stormwater design materials provided as part of the packet. For months citizens have asked township to hold a study session so they could discuss the system. And now what we see is a system that we are told is in final form. Is that citizen driven?

The materials provided are incomplete. The very critical stormwater calculation documents have not been shared. The summary documents of the system do not even tell us how much reserve capacity the system has, or what level of utilization will occur in a 25 year rain event. The documents carefully avoid whether there will be impact to the creek. You may recall that the rain events of last September were only a 10 year event and a 1.5 year event, according to the NOAA weather station at the airport.

The documents state that Dr. Chris Grobbel did the preliminary review, but they omit that he refused to accept the design compromises.

Page 3 of the Gosling Czubak review mentions that the basin outlet risers are only 36" in diameter. The Acme ordinance requires a diameter of 48". Those are the emergency overflows for the basins. They do not meet our township ordinance. On Basin 2, two 48" storm sewers feed into the basin, and the emergency outflow pipe is a single 24" pipe that is 100 feet long. Is that an example of good engineering? How do two 48" pipes flow into a 24" pipe? What happens at that basin when we get a 100 year rain? Basin 1 has a very similar problem, with two 36" sewers feeding it, and a 24" and 12" emergency overflow.

Additionally, those outlet risers do not meet the MDEQ BMP's, which require they be located in an accessible area for cleaning. Their location in the basin is not accessible.

The artificial swales on the site (trenches for stormwater) terminate abruptly, one near the steep slopes of the creek, and the other at the steep slopes of a wetland. The flow from those swales is expected to be 6.14 Cubic Feet per-Second. That is 45 gallons per second. Those end points are inadequately engineered. Erosion at those points has been a documented problem many times in the past, even during very low rates of flow. The system engineering, and this review, fail to address that significant problem. This system needs to work, and work very well, for decades to come. When it fails it again, who will pay to fix it?

This review ignores the King and McGreggor constructed wetland concept that was approved. It focuses solely on minimum effort. It talks about meeting the "innovative" requirement, but never even defines the term.

Two constructed wetlands were required on the East side of the Meijer store, along Lautner road. Those have been removed from the design. Discharge from the rear parking lot and rooftop will enter the system without the pre-treatment that is required in the Acme Stormwater Ordinance.

The review fails to ascertain or disclose the capacity of the stormwater system, or whether there is any extra capacity for future development. That is an incomplete analysis.

The semi-wet habitat is reduced from the approved preliminary plans. Instead, we are told that doing plantings in the swale will replace that. This is a plan that cuts corners and attempts to do the bare minimum.

There is no schedule for constructed wetland plantings or establishment. If it isn't in the plan, then there is a great risk it will never happen.

Where is the analysis of what will occur in back to back 100 year rain events?

There are numerous issues and many questions regarding this plan. I urge the PC to pass a motion requesting a more complete study session and review, as the township would do if a gas station or auto parts were being constructed.

Thank you,

Brian Kelley



**ACME TOWNSHIP PLANNING COMMISSION MEETING
ACME TOWNSHIP HALL
6042 Acme Road, Williamsburg MI 49690
June 08, 2015 7:00 p.m.**

CALL TO ORDER WITH PLEDGE OF ALLEGIANCE

ROLL CALL:

LIMITED PUBLIC COMMENT:

Public Comment periods are provided at the beginning and end of each meeting agenda. Members of the public may address the Board regarding any subject of community interest during these periods. Comment during other portions of the agenda may or may not be entertained at the moderator's discretion.

A. APPROVAL OF AGENDA:

B. INQUIRY AS TO CONFLICTS OF INTEREST:

C. CONSENT CALENDAR: The purpose is to expedite business by grouping non-controversial items together for one Board motion without discussion. A request to remove any item for discussion later in the agenda from any member of the Board, staff or public shall be granted.

a) RECEIVE AND FILE:

Draft Unapproved Minutes of:

1. Township Board minutes 05/12/15

b) ACTION:

Draft Unapproved Minutes of:

1. Planning Commission minutes: 05/11/15

D. ITEMS REMOVED FROM THE CONSENT CALENDAR:

1. _____

E. CORRESPONDENCE: None

F. PUBLIC HEARINGS:

a) Sign Amendment: Electronic Message Signs

G. NEW BUSINESS:

a) Sign Amendment: Electronic Message Signs

H. OLD BUSINESS:

a) US 31/M72 Business District: Architectural Standards Amendment

b) VGT-Presentation of Storm Water Final Engineering Plans: Township Planner

I. PUBLIC COMMENT & OTHER PC BUSINESS

1. Zoning Administrator update on projects:

2. Planning Consultant:

3. P C Education etc.:

ADJOURN:



ACME TOWNSHIP BOARD MEETING
ACME TOWNSHIP HALL
6042 Acme Road, Williamsburg MI 49690
Tuesday, May 12, 2015, 7:00 p.m.

Study session on Saylor Park Boat Launch at 6:15 p.m.

Klaus Heinert, landscape architect/engineer from Gosling Czubak returned for an update on the Saylor Boat launch from the April 7th Board meeting. Board's recommendations discussed at that meeting were: What is cost to add a second boat ramp to Gosling Czubak's design and What is cost to add "tie-ups?" Cost of recommendations for adding a second boat ramp \$100k; adding "tie-ups" \$12.5K. Trustee, Aukerman gave a revised update on Funding plans.

CALL TO ORDER WITH PLEDGE OF ALLEGIANCE AT 7:15 p.m.

Members present: J. Aukerman, A. Jenema, G. LaPointe, P. Scott, D. White, J. Zollinger
Members excused: C. Dye
Staff present: J. Jocks, Legal Counsel
N. Edwardson, Recording Secretary

A. LIMITED PUBLIC COMMENT:

B Kelley, 4893 Ridge Crest Rd, read a prepared statement into record which is attached to the minutes.

B. APPROVAL OF AGENDA:

Motion by LaPointe, seconded by Aukerman to approve the agenda as presented. Motion carried by unanimous vote.

C. INQUIRY AS TO CONFLICTS OF INTEREST: None

D. CONSENT CALENDAR: The purpose is to expedite business by grouping non-controversial items together for one Board motion (roll call vote) without discussion. A request to remove any item for discussion later in the agenda from any member of the Board, staff or public shall be granted.

1. RECEIVE AND FILE:

- a. **Treasurer's Report**
- b. **Clerk's Revenue/Expenditure Report and Balance Sheet**
- c. **Draft Unapproved Meeting Minutes:**
 - 1. **Planning Commission 04/13/15**
- d. **Metro Newsletters March April**
- e. **Parks and Maintenance Report - Henkel**
- f. **Zoning Report - Lennox**
- g. **Grand Traverse County 2015 Equalization Report**
- h. **DEQ, Administrative Consent Order/The Village at Grand Traverse, L.L.C.**

2. APPROVAL:

- 1. **Township Board meeting minutes of 04/07/2015**
- 2. **Accounts Payable Prepaid of \$217,201.30 and Current to be approved of \$57,960.72 (Recommend approval: Cathy Dye, Clerk)**

E. ITEMS REMOVED FROM THE CONSENT CALENDAR:

Jenema asked that the Treasurer's report be removed for clarification to the Board. LaPointe requested the Clerk's Revenue/Expenditure report be removed.

DRAFT UNAPPROVED

Motion by Jenema, seconded by White to approve the consent calendar with the removal of the Treasurer's Report and the Clerk's Revenue/Expenditure report. Motion carried by unanimous roll call vote.

Motion by LaPointe, seconded by White to approve the Treasurer's report as presented. Motion carried by unanimous roll call vote.

Motion by Jenema, seconded by LaPointe to approve the Clerk's Revenue/Expenditure report as presented. Motion carried by unanimous roll call vote.

F. SPECIAL PRESENTATIONS/DISCUSSIONS: None

G. REPORTS: Received and filed

1. Sheriff's Report – Deputy: Ken Chubb
2. County Commissioner's Report - Crawford
3. Road commission report – McKellar

H. CORRESPONDENCE: None

I. PUBLIC HEARING: None

J. NEW BUSINESS:

1. SAD Resolution on contract with GTCRC on SAD bonds & contract for construction costing

Motion by Jenema, seconded by White to approve Resolution R-2015-15 approving the contract with the Board of County Road commissioners regarding the issuance of the Michigan Transportation fund bonds, Series 2015 for SAD contract for construction costs. Motion carried by unanimous roll call vote.

2. Budget Resolution on Tax reserve to General Funds

Motion by LaPointe, seconded by Jenema to approve Resolution R-2015-16 approving various fund budget moves adjustments. Motion carried by unanimous roll call vote.

3. Presentation for approval of final Acme FOIA act changes

Zollinger stated that the final charges from Clerk, Dye, were not on the form yet so the Board would not be approving this meeting. Jocks briefly explained the changes in FOIA procedures. Jocks also addressed questions raised earlier by Dye. Board was reminded that approval must be before July 1st.

K. OLD BUSINESS:

1. Traverse Bay RV Park Site Plan Approval Board

Fred Campbell, JML Design Grp and Dave Scheppe of Scheppe Investments, owner of the Traverse Bay RV park, were present requesting to construct 12 additional RV sites that can be used for "Park Model" cabins. The Planning Commission (PC) recommended approval of the SUP amendment to the Township Board, subject to stipulations of the PC April 11, 2015, motion. Additional discussion followed.

Motion by White, to approve major amendments to SUP 99-03 including stipulations 1-8 of the Planning Commission motion as presented, Seconded by LaPointe. Motion carried by unanimous roll call vote.

Recessed for five minutes

DRAFT UNAPPROVED

2. **2015/16 Budget continued discussion from 4/30/15 Budget meeting**
Zollinger reviewed the enterprise (police, cemetery) funds, Trust & Agency funds, Sewer, Insurance liability coverage. Scott asked about unemployment for the Parks workers.

The next scheduled Budget work session is Tuesday, May 19, 2015, at 7:00 p.m.

PUBLIC COMMENT & OTHER BUSINESS THAT MAY COME BEFORE THE BOARD:

Trustee, Jenema, commented that we have received 6 applications for the Zoning Administrator position. The deadline for submitting applications is May 28, 2015.

Adjourned at 9:30 pm

May 12, 2015

Good evening,

The RV Park expansion was described by John Iacoangeli at the Planning Commission meeting as a "Mini VGT". It has a trifeca of challenges - extremely steep slopes, a lot of clay, and close proximity to Yuba Creek wetlands.

The PC held a public hearing for an 80 unit expansion. The Record Eagle advertisement was for an 80 unit expansion. The suggested motion was for an 80 unit expansion. When it became clear that would not be approved, the application was modified for a 12 unit expansion. However, there were no plans for a 12 unit expansion. Planning Commissioners approved the project without final plans. Final plans will eventually be approved by Beckett and Raider.

This is a Special Use Permit project, in an environmentally sensitive area near a cold water trout stream. The Planning Commission required final plans for Tractor Supply, and they required final plans for the Auto parts store. To not require the same for a Special Use Permit project so close to the creek seems counter to the protections required in our Master Plan.

As you know, 96% of community survey respondents indicated protect^{ing} Acme Creeks, wetlands and shoreline ^{is} were a Priority for the township.

The complexity of this site needs a thorough environmental impact study by an independent expert. That expert would determine what needs to occur for this project to not adversely impact our creek. That expert would also verify that appropriate setbacks are maintained in regard to wetlands. Only an independent expert can make these determinations.

This is a SUP. You can and should require this, to be paid for by the developer.

Thank you,

Brian Kelley



**ACME TOWNSHIP PLANNING COMMISSION MEETING
ACME TOWNSHIP HALL
6042 Acme Road, Williamsburg MI 49690
May 11, 2015 7:00 p.m.
MINUTES**

CALL TO ORDER WITH PLEDGE OF ALLEGIANCE: 7:07pm

ROLL CALL:

Members Present: D. Rosa, J. DeMarsh, M. Timmins, B. Ballentine, S. Feringa, K. Wentzloff, T. Forgette

Members Excused: None

Staff Present: N. Lennox, Zoning Administrator; J. Jocks, Township Counsel

A. LIMITED PUBLIC COMMENT: Opened at 7:08pm

J. Heffner, 4050 Bayberry Lane – Notified commission members of an upcoming free presentation by Doug Tallamy, “Saving the Environment, One Backyard at a Time” on May 18th the HERTHA building in Elk Rapids. Dr. Tallamy is a renowned naturalist and bird habitat expert.

Brian Foster, M-37 Mesick. Inquired commission on opening of a Great Lakes Living Hands here in Acme and to bring the best possible product in a good space. This is a donation based service and is interested in going through any steps to open one here and to run the operation similar to those in Detroit. He was advised to speak with the zoning administrator. J. Jocks indicated that it is a non-conforming use. K. Wentzloff indicated research needed to be done.

Closed at 7:18pm

B. Presentation by Julie Clark TART Trails

J. Clark provided a status update on recent work with the TART trails. They are working with group of stake holders to extend the trail from Acme (Bunker Hill) to Charlevoix. Over past two years, they have broken the segment up. Non-motorized, multiple use. For those interested in updated information, go to the website <http://traversecitytocharlevoix.org>. They used “Choosing by Advantages” as criteria measurement for scoring routes. Restrictions for private involvement would rely on zoning. The DNR lists trails as a top priority which is way to get more points to get grant. The rail corridor to Lautner Road was considered but expensive and they are unable to get land owner approval. A map of proposed and existing routes is attached.

It is important for the Trail to get people down to the shoreline along Bunker Hill. Conclusion: More connections and alternative routes are best. It makes sense to have a trail run through the Bay Park property. LochenHeath owners have shown interest in integrating trail into their development as well. There is excitement about making Acme a connected community. Getting a plan together in common format for all entities to work from in order to start the grant process is key.

C. APPROVAL OF AGENDA:

Motion to approve agenda by M. Timmins; support by T. Forgette. Motion passed unanimously.

D. INQUIRY AS TO CONFLICTS OF INTEREST: None

E. CONSENT CALENDAR: The purpose is to expedite business by grouping non-controversial items together for one Board motion without discussion. A request to remove any item for discussion later in the agenda from any member of the Board, staff or public shall be granted.

a) RECEIVE AND FILE:

1. Draft Unapproved Minutes of:

- 1. Township Board minutes 04/07/15
- 2. Zoning Administrators monthly report March-April
- 3. ~~DEQ, Administrative Consent Order/The Village at Grand Traverse, L.L.C.~~

b) ACTION:

1. Draft Unapproved Minutes of:

1. Planning Commission minutes: 04/13/15

F. ITEMS REMOVED FROM THE CONSENT CALENDAR:

1. DEQ, Administrative Consent Order/The Village at Grand Traverse, L.L.C

Motion by M. Timmis to approve consent calendar with removal of DEQ Administrative Consent Order supported by B. Ballentine. Motion passed unanimously.

J. Jocks provided a review and summary of the April 17, 2015 received copy of the signed Administrative Consent Order between the Michigan DEQ and The Village at Grand Traverse. A copy of ACO-000265 is attached to the minutes. This settlement agreement between the DEQ and VGT sets out requirements and standards to go with project and has specific requirements on items such vegetating, sampling, and requirement of certified storm water agent onsite during rain or discharge events to name a few. By October 31st all of the property is to be "buttoned-up". Penalties would be applied for any non-compliance. Next month J. Iacoangeli will have the final engineered plan for review. C. Abernathy asked if plans would be available to the public. K. Wentzloff indicated that they would be available with next month packet.

Motion by M. Timmins to receive and file the DEQ Administrative Consent Order, supported by T. Forgette. Motion passed unanimously.

G. CORRESPONDENCE: Township received notice from Whitewater Township Planning Commission of their completed Master Plan.

H. PUBLIC HEARINGS: None

I. NEW BUSINESS: None

J. OLD BUSINESS:

a) Sign amendment: Electronic message/price signs

The revised sign ordinance was reviewed. J. Jocks discussed some possible changes to be made to J. Iacoangeli's revisions and recommended updated language. Discussion among planning commissioners regarding scope and the purpose of limitations.

Motion by M. Timmins to schedule a public hearing for next meeting for an amendment to the sign ordinance with changes to 12a, "Shall only be used on premises for a motel/hotel vacancy sign or gas station price per gallon of gas", and 12c, "No digital sign shall be permitted to flash, blink, scroll, oscillate or have animation. All digital signs shall have "instant" changes with no animated effects", and removal of item 12d. Second by S. Feringa. Motion passed unanimously.

K. PUBLIC COMMENT & OTHER PC BUSINESS

1. Zoning Administrator update on projects: N. Lennox indicated residential land use permits seem to be picking up

2. Planning Consultant: None

3. P C Education etc.: Steve Feringa: Trails. GT Resort & Spa is working with TART and VGT on getting a spur from M-72 to the Resort; and connecting West side of property to Hope Road; and on southeast side crossing of TART trail on S. Lautner near Redwood development to get to VASA trail.

M. Timmins - tomorrow night study session for boat launch at Saylor Park.

K. Wentzloff indicated several planning commission members are attending a green infrastructure conference workshop on June 4th which will discuss green infrastructure and planning.

PUBLIC COMMENT: None. Closed at 8:18pm.

ADJOURN: Motion to adjourn meeting by M. Timmins, supported by B. Ballentine. Motion passed. Meeting adjourned at 8:18pm.

TOWNSHIP OF ACME - NOTICE OF HEARING

PLEASE TAKE NOTICE that the ACME TOWNSHIP PLANNING COMMISSION will hold a public hearing at its regular meeting on Monday, June 8, 2015 at 7:00 p.m. at the Acme Township Hall, 6042 Acme Road, Williamsburg MI 49690, to consider the following amendments to the Acme Township Zoning Ordinance.

Amendment # 034 would amend the Acme Township Zoning Ordinance with the addition of:

SECTION 7.4.6. c. (12. a-g) Commercial Zoning Districts Excluding B-4 On Premise Signs Permitted to add: Changeable message signs, including electronic changeable messages for motel/hotel vacancy or gas station price per gallon of gas signs.

Copies of the entire proposed Amendment #034 are available for inspection at the Acme Township hall. All interested persons are invited to attend and be heard at public hearings before the Planning Commission. After each public hearing, the Planning Commission may or may not deliberate and take action. The entire Zoning Ordinance is available for inspection at the Acme Township Hall from 8:00 a.m. to 5:00 p.m. Monday through Friday. Proposed Zoning Ordinance Amendments and the entire Zoning Ordinance are also available for inspection via the Township's website, www.acmetownship.org.

Written comments may be directed to:

Nikki Lennox; Zoning Administrator
Acme Township
6042 Acme Road
Williamsburg, MI 49690
(231) 938-1350

c. Commercial Zoning Districts, Excluding B-4, On-Premise Signs Permitted

1. All signs permitted in Residential Zoning Districts.
2. One free-standing per premises indicating businesses on said premises. Such signs may be up to thirty-two (32) square feet in area, up to twelve (12) feet tall, and set back at least ten (10) feet from any street right-of-way; signs no taller than eight (8) feet are allowed a size bonus of twenty (20) percent. For a planned shopping center, the free-standing sign may identify the center per se and not the individual occupants.
3. Temporary signs not previously specified. Such signs are limited to sixteen (16) square feet in area and may be displayed for no more than sixty (60) days in any calendar year.
4. Wall signs, provided the total area of said signs do not exceed twenty (20) percent of the area of the façade or one-hundred (100) square feet, whichever is less.
5. Canopy-, marquee-, or architectural-projection signs. Such signs' copy area may not exceed twenty (20) percent of the area of the face of the canopy, marquee, or arch-projection.
6. Awning signs. The maximum copy area for awning signs is twenty (20) percent of the background/backlit area of the awning.
7. One (1) projecting sign for each building façade, up to four (4) square feet in area.
8. Window signs. Such signs are limited to twenty (20) percent of window area.
9. Signs displaying the price of gasoline at gasoline stations, not to exceed six (6) square feet in area.
10. One (1) directional signs and/or sign that consist only of words "washing," "lubrication," "repair," or similar above each service bay of an automobile service station. Such signs may not exceed four (4) square feet in area.
11. Corporate logo or institutional flags. Such flags are limited to thirty-five (35) square feet in size.
12. **Changeable message sign. A sign may contain a changeable message, but only under the following conditions:**
 - a) Shall only be used on premise for a motel/hotel vacancy sign, or gas station price per gallon of gas sign.
 - b) Electronic changeable messages shall be part of the total square footage of display area permitted for the sign even if the message

is contained in a separate cabinet, except the face of the message shall not consume more than 35 percent of the total permitted display area of the sign.

- c) No digital sign shall be permitted to flash, blink, scroll, oscillate or have full animation. All digital signs shall have "instant" changes with no animated effects.
- d) The digital sign shall have a black color background and the lettering shall be either in red or green colors but shall not display light of such intensity or brilliance to cause glare or otherwise impair the vision of the driver, or results in a nuisance to the driver.
- e) All digital signs shall maintain an automatic brightness control keyed to ambient light levels.
- f) Digital signs shall be programmed to go dark if the sign malfunctions.
- g) Signage should not be designed to emulate traffic safety signage.

**AMENDMENT TO ACME TOWNSHIP ZONING ORDINANCE
SECTION 6.6 US-31 / M-72 BUSINESS DISTRICT**

The Acme Township Planning Commission has reviewed and considered changes to Section 6.6 pursuant to the following:

Whereas the Township adopted Section 6.6 on April 8, 2014;

Whereas the implementation of Section 6.6 has revealed that certain sections of 6.6 should be revised to better meet the Township’s zoning goals;

Whereas setbacks, lighting, storm water, and building facades require amendment in order to meet those goals.

Now Therefore, the following changes shall be made to Section 6.6 of the Acme Township Zoning Ordinance:

1. The Table in Section 6.6.5.2 Building Placement, Density and Parking shall be deleted in its entirety and replaced with the following:

Building Placement	SFN	MHN	CS	C	CF
<u>Built-to Line (BTL) Distance from Property Line</u>					
Front	30'	30'	30'	20'	5'
Side Street, corner lot	30'	30'	NA	20'	5'
<u>Setback</u>					
Side	10'	10'	10'	3'	5'
Rear	30'	30'	35'	25'	5'
Building front facade as a % of Lot Width (Min.)	NA	NA	NA	65%	75%
Side Street Facade as a % of Lot Depth (Min.)	NA	NA	NA	30%	50%

2. The following shall be added to Section 6.6.6.3:

“Wall pack lighting shall only be used on the rear or side of the building to illuminate exits and loading facilities.

Front facade illumination lighting may be used only over the customer entry.

Parking lot lighting pole height (including luminaire) shall not exceed the height of the building or 27 feet whichever is less.”

3. Section 6.6.6.5 Facades (All Buildings Except 1st Floor Residential) shall be deleted in its entirety and replaced by the following:

“Section 6.6.6.6 Facade Components and Materials (All Buildings Except Residential-Only Buildings)”

Facade Ornamentation

All visible elevations shall include decorative features such as cornices, pilasters, and friezes. Building recesses and protrusions will be required on larger buildings to break long uninterrupted building walls.

Facade Massing

Front facades 60 feet wide or wider shall incorporate wall offsets of at least two feet in depth (projections or recesses) a minimum of every 40 feet. Each required offset shall have a minimum width of 20 feet.

Roofs

When flat roofs are used, parapet walls with three-dimensional cornice treatments shall be used to conceal the roof.

Asymmetric or dynamic roof forms allude to motion, provide variety and flexibility in nonresidential building design, and allow for unique buildings. Asymmetric or dynamic roof forms shall be permitted on nonresidential buildings as an alternative to Flat Roofs.

All roof-based mechanical equipment, as well as vents, pipes, antennas, satellite dishes, and other roof penetrations (with the exception of chimneys), shall be located on the rear elevations or screened with a parapet wall having a three-dimensional cornice treatment so as to have a minimal visual impact as seen from public street, existing single family uses, and land zoned for residential and agricultural uses.

Customer Entrances

Each side of a building facing a public street shall include at least one customer entrance,

except that no building shall be required to provide entrances on more than two sides of the structure that face public streets.

Buildings shall have clearly defined, highly visible customer entrances that include no less than three of the following design features:

- a) Canopies/porticos above the entrance;
- b) Roof overhangs above the entrance;
- c) Entry recesses/projections;
- d) Arcades that are physically integrated with the entrance;
- e) Raised corniced parapets above the entrance;
- f) Gabled roof forms or arches above the entrance;
- g) Outdoor plaza adjacent to the entrance having seating and a minimum depth of 20 feet;
- h) Display windows that are directly adjacent to the entrance; or
- i) Architectural details, such as tile work and moldings, that is integrated into the building structure and design and is above and/or directly adjacent to the entrance.

Building Materials

Use of durable and traditional building materials shall be used. Fluted concrete masonry units and scored concrete masonry unit block, although not considered traditional building materials may be used but shall not exceed 25% of the surface square footage of any portion of the building exposed to a public right-of-way, or customer access or parking area.

Materials such as exterior insulation finish system (EIFS), concrete panels, and panel brick are not considered durable and traditional building materials and will not be used.

4. Section 6.6.6.6 Water Quality shall be deleted in its entirety and replaced by the following.

“Section 6.6.6.6 Water Quality

All projects shall adhere to the Acme Township Stormwater Ordinance, as well as, incorporating low impact development (LID) water quality technologies. Low impact development water quality technologies shall include, but are not limited to, rain gardens, rooftop gardens, vegetated swales, cisterns, permeable pavers, porous pavement, and filtered stormwater structures will be required on site as a component of the overall stormwater plan. The Planning Commission has the authority to determine the type of LID that will be used as part of the approval process.”

planning review

FOR THE RECORD

Date: 05.15.2015 (Review Draft)
05.21.2015 (Revised and Final)

From: John Iacoangeli
To: **Karly Wentzloff, Chairperson**
ACME TOWNSHIP PLANNING COMMISSION
6042 Acme Road
Traverse City, MI 49690

Project: **Village at Grand Traverse (VGT-Phase 1 SUP#2009-1P)**
Final Engineering
Stormwater Collection and Treatment System

Issuance

This memorandum is issued to conclude the final review and approval of the stormwater and constructed wetlands facilities consistent with SUP #2009-1P and SUP 2004-11P. Consistent with professional protocols a draft was issued for review and comment to the Applicant on May 15, 2015. Based on the Applicant's review additional narrative was incorporated in the final version that provides additional background and explanation into the process of evaluation and design performed by their technical working group.

Background

The current provision of #9.g. of Permit No. 2009-1P states:

g. The Application will adequately meet the environmental requirements set out in SUP 2004-11P and the Master Plan for purposes of Phase I and review of the same if the following conditions are met to the satisfaction of Acme Township's consultant and staff. As recognized by SUP 2004-11P and the Court of Appeals Opinion, Acme Township shall review these standards for each subsequent Phase and has the right to approve or deny each subsequent Phase for the same.

- 1. Final engineered drawings, detailed wetland maintenance/monitoring plans, revised stormwater calculations, hydrograph/retention times for each phase and respective wetland basins shall be provided and approved by Acme Township staff prior to construction **and/or** issuance of land use permit(s)..¹*

The stormwater system approved in the SUP was based on the MDEQ BMP (September 1997) "Constructed Wetland Use in Nonpoint Source Control."² The description from the MDEQ BMP is attached to the memo. Please take notice of the NOTE that says this

¹ Page 4; Permit No. 2009-01; The Village at Grand Traverse LLC. ("VGT")

² http://www.michigan.gov/documents/deq/deq-wb-nps-conw_250610_7.pdf

BMP should never be used during the construction phase of any project or for sedimentation control. (underline added)

The concept for the constructed wetlands was outlined in a report authored by King & MacGregor entitled, "Stormwater Management Recommendations," dated December 22, 2011³. In that report two conceptual designs were presented to explain how the stormwater system would work using a combination of slow release structures, plunge pools, micro pools, grass swales, and wetland mix plant materials. As the title suggests, the 2011 King & MacGregor report did not set forth engineering plans for the construction of the detention basin system, but rather articulated a "conceptual approach" to addressing runoff from the site based on the Michigan Department of Environmental Quality's (MDEQ) "pond/wetland" stormwater BMP.

The applicant's engineer of record, Gourdie Fraser, Inc., submitted preliminary drawings for portions of the overall stormwater system in June 2011. The initial technical review focused on the size and impervious areas of the two watersheds within the development parcel and the size of the basins that would collect the storm water prior to release into the constructed wetland system. Detailed engineering was completed in July and August 2012 to take into account more information about site conditions and development features to assure that the constructed wetland system could be implemented while still complying with the other relevant Township storm water ordinance (storage/detention, discharge rate, etc.) Construction of the east and west basins was done concurrent with installation of the water and sanitary sewer infrastructure due to the amount of earth movement and grading activities that would be taking place on-site as outlined in the SUP.

As noted by the MDEQ BMP the constructed wetland should occur after site stabilization and construction is finished. The final engineering for a constructed wetland is a delicate balance between stormwater flows, release rates into the treatment train, the type and sustainability of wetland plant materials, and soil conditions. In order to accomplish the final engineering for the stormwater system numerous designs backed up with hydro CAD modeling were performed by the Applicant's consultants and reviewed by the Township consultants. It should be understood that a constructed wetland may take several years to fully establish and function as designed. The establishment is contingent on normal growing conditions and annual average precipitation.

In addition to telephone conference calls and e-mail exchanges between technical personnel there were five technical review meetings that involved all or some of the various engineers and environmental scientists. Most of the sessions were attended by professional engineers that were reviewing designs, release rates, and hydro CAD model calculations. These meetings were held November 26, 2014, January 8, 2015, February 19, 2015, March 3, 2015 and May 5, 2015.

³ Page 690/1003 from the 2009-01P Site Plan Permit

planning review

The framework for the design and review, which is based on the Site Plan approval, is divided into two components:

1. The final engineered stormwater system needs to meet the Acme Township Storm Water Control Ordinance (2007-01), and
2. The final engineered stormwater system needs to meet or exceed the MDEQ BMP for a constructed wetland.

As the engineering design and review effort continued, the size, geographic area, and shape of the stormwater facilities (including the constructed wetlands) changed. The final engineered plans (attached) reflect the actual application of the “pond/wetland” stormwater BMP on an existing site where the functionality is the same but the physical form is different than the conceptual drawings included in the SUP document.

As build-out proceeds on the GTTC site the need to re-evaluate the stormwater facilities consistent with the provisions of the SUP and future site plan approvals will be required. A product of this 6-month engineering effort has resulted in a baseline hydro CAD model that can be adjusted to reflect additional impervious surface area as development occurs so that it can be determined if the stormwater facilities can accommodate the runoff or whether new facilities will need to be added.

Personnel involved in the preliminary and final engineering plans include:

Developer		
Gordie Fraser	Terry Boyd, P.E. VGT Engineer of Record	Performed engineering and modeling for storm system
Horizon Environmental	Allen Reilly, Jr. Christopher Miron, P.E. Environmental Scientists and Engineers	Performed technical review of engineering; evaluated hydro CAD modeling and final design details.
King and MacGregor	Matt MacGregor Environmental Scientists	Performed design for the constructed wetlands.
Township		
Beckett & Raeder	John Iacoangeli, AICP Heath Hartt, P.E. Landscape Architects, Planners and Engineers	Performed overall review coordination; performed preliminary engineer review for stormwater and basin sizing.
Gosling Czubak	Robert Verschaeve, P.E. Engineers and Scientists	Review modeling and calculations and performed engineering review for compliance with Township Stormwater ordinance and SUP.

Grobbel Environmental	Chris Grobbel, Ph.D. Environmental Scientists	Performed preliminary review.
Cardno	Adam Crowe, Biologist Kara Grisamer, P.E. Environmental Scientists and Engineers	Performed final review on the wetland construction details and compliance with the MDEQ BMP for a constructed wetland.

Review

Please find attached the following memoranda:

- Robert Verschaeve, P.E., Gosling Czubak, final engineering review, dated May 7, 2015
- Adam Crowe, Cardno, final wetland design review, dated May 15, 2015

Conclusion

Based on the technical review performed by Gosling Czubak and Cardno and their respective observations and recommendations the final engineering for the stormwater system is complete and approved.

The Occupancy Checklist that was developed for Phase 1 (Permit No. 2009-1P) requires that the full storm water facilities system needs to be completed by September 1, 2015. However, if the Developer determines that full construction of the storm water facilities system is in conflict with Section 3.17 and 3.18 of the MDEQ Administrative Consent Order⁴, dated April 16, 2015, which limits further disturbance of the construction site they will need to request and seek approval from the Acme Township Planning Commission for a minor amendment from Permit No. 2009-1P.

⁴ Pages 10 and 11 of 40: MDEQ Administrative Consent Order entered into April 16, 2015

Technical Memo – Storm Water Review

To: John Iacoangeli - Beckett & Raeder, Inc.

From: Robert Verschaeve, P.E. – Gosling Czubak Engineering Sciences, Inc.

Date: May 7, 2015

RE: Grand Traverse Town Center
Final Engineering Storm Water Review

A review has been completed as requested by Beckett & Raeder, Inc. limited to the storm water control plans and engineering calculations for the storm water detention basins of the Grand Traverse Town Center project in Acme Township. Plans and calculations have been prepared by the design engineer, Gourdie Fraser, in conjunction with Horizon Environmental and reflect modifications to the slow release outlet structures of Basins #1 and #2. Proposed additional treatment tiers to the outlet swales from Basins #1 and #2 are also shown on the plans.

This review is based on the Acme Township Storm Water Control Ordinance No. 2007-01 and the Special Use Permit (SUP) #2009-01P. It is noted the SUP requires “innovative” storm water Best Management Practices (BMP) to remove sediment, nutrients, and pollutants.

The latest drawings provided for review are plan sheets C312 “Basin #1 Detail” and C313 “Basin #2 Detail” revision no. 6 dated 05/05/2015. Engineering calculations for Watersheds #1 and #2 dated 05/05/2015 are also provided. An “Overall Grading Plan”, sheet C300 dated 09/05/2012 was previously provided.

It is noted that other proposed modifications regarding vegetation have been prepared and are included in sheets C613 “Basin #1 Planting Plan” and C614 “Basin #2 Planting Plan”. Both drawings are Revision #2 dated 05/07/2015 prepared by King and Macgregor. It is understood commentary regarding those plans as well as commentary on the wetlands and treatment components of the storm water system has been prepared by Cardno Inc. for your consideration.

Commentary on Storm water Control Plans and Calculations

The site is divided into watershed #1 and watershed #2 with storm water runoff from each watershed directed to a detention basin servicing that watershed. The engineering calculations presented detail the amounts of impervious area, pervious area, and total area of each watershed. The impervious areas include the paved roads, parking, and water surfaces of each watershed. The Meijer store roof is also included in the impervious area for watershed #1.

Measurements were scaled off of the provided drawings to calculate the areas and found to match what was presented in the calculations. Measurements scaled off the drawings of the detention basins also match values presented in the calculations.

The calculations show design criteria requirements of a storm water detention system as required by the Acme Township Storm water Control Ordinance. This criterion includes "Treatment Volume" and "Flood Control Volume" requirements. The "Treatment Volume" requirement is the volume of runoff from the 1.5 year, 24 hour rainfall event with post development conditions or a minimum of 5,000 cft per impervious acre. A maximum release rate of .05 cfs/impervious acre is also given. In both watersheds, the minimum volume requirement of 5,000 cft per impervious acre controls. For watershed #1, the minimum volume required is 90,950 cft with a maximum release rate of .91 cfs. For watershed #2, the minimum volume required is 27,650 cft with a maximum release rate of .27 cfs. The plans and calculations show both detention basins #1 and #2 are capable of storing the minimum treatment volumes with a release rate below the maximum allowed.

The "Flood Control Volume" requirement is that the basin be sized to detain the 25-year rainfall event from the entire contributing area with a maximum release rate of .13 cfs/acre. Additionally, minimum storage requirements per acre at the maximum release rate are also included via a table based on the "C" factor of the watershed. In both watersheds, it is shown that the minimum volume requirements control. For watershed #1, the minimum required flood control storage volume is 352,634 cft with a maximum release rate of 6.14 cfs. For watershed #2, the minimum required flood control storage volume is 247,511 cft with a maximum release rate of 5.12 cfs. The plans and calculations show both detention basins #1 and #2 capable of storing the minimum flood control volumes with release rates below the maximum allowed.

Bioswales are shown on the C300 drawing that collect runoff from the Meijer store and parking lot and provide pre-treatment of this runoff from watershed 1. Additionally, catch basin sumps along the road provide for localized sediment collection for both watersheds 1 and 2. These initial BMP's can be considered as equivalent pre-treatment with respect to sediment forebay criteria in the Ordinance.

It is noted the inlet pipes at Basin #2 are shown below the permanent water level in that basin. It was noted by the design engineer that site constraints at this location necessitated placing these inlet pipe inverts below the permanent water level. Additional hydraulic calculations were provided showing that the pipes will function in this situation and flood volume water levels won't rise above the rim elevations of the drainage structures causing flooding or uncontrolled release of runoff.

Outlet risers are shown over five feet tall in both basins and 36 inches in diameter. Risers over five feet tall are required to be 48 inches in diameter per the Ordinance. The MDEQ Nonpoint Source Best Management Practices Manual BMP for a Wet Detention Basin describes guidelines for outlets. It is noted that outlets “should have an accessible, above-ground cap to allow easy cleaning” and outlets “should be designed so that trapped trash and debris can be easily removed”. The outlets provided meet the criteria of this BMP and leaving the current outlets structures in place in this case is acceptable in our professional opinion.

Future Build-Outs

The impervious areas presented in the calculations are only those of the current phase 1 build-out of the development as shown on the C300 plan sheet. It is understood that the developer intends to address storm water from future build outs as they are proposed and would employ advanced analysis, sizing, and controls. The following items are needed going forward:

- *As-built plans for phase 1 are required that accurately show and include the following: the boundary for each watershed, total acreage within each watershed boundary, and built-out impervious area within each boundary for phase 1. Specifically, C300 needs to be updated to reflect the noted items above and the latest C312 and C313 revisions.*
- *As future build-outs are analyzed for storm water, additional pre-treatment techniques should continue to be employed for the individual future build-out phases.*
- *As future build-outs are analyzed for storm water, calculations for the existing basins will need to be updated as well. Further modifications to the outlet structures may be necessary to keep release rates below the maximums allowed.*

Summary

Overall, the detention basins that have been constructed have the capacity to detain the required runoff volumes from the phase 1 build-out to the Ordinance standards. This runoff is also released downstream at rates below the maximum allowed per the Ordinance. As-built plans need to be provided when the proposed modifications are completed and future build-outs need to be analyzed as described.

Grand Traverse Town Center Development Storm water Plan Review



Document Information

Prepared for Beckett and Raeder, Inc.
Project Name Grand Traverse Town Center Storm Water Plan Review
Project Number j1536061.00
Project Manager John Iacoangeli/ Beckett & Raeder
 Adam Crowe/ Cardno
Date 05/15/2015

Prepared for:

Beckett and Raeder, Inc.
535 West William, Suite 101, Ann Arbor, MI, 48103

Prepared by:



Cardno Inc.
11181 Marwill Ave. West Olive, MI, 49460

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Executive Summary

Cardno Inc. was contracted on March 09, 2015 by Beckett and Raeder, Inc. to provide technical review and comment on the storm water detention and treatment plan associated with the Grand Traverse Town Center Development Site (Site). The Site, located in Acme Township, Grand Traverse County Michigan, consists primarily of newly constructed and proposed commercial and retail buildings. Construction activities are ongoing at the Site and much of the project area surface is currently either paved or cleared and graded.

Storm water detention and treatment at the Site relies on two detention basins, the east basin and the west basin, draining 47 acres and 40 acres respectively. These basins including the outflow swales are the focus of the review process undertaken by Cardno. This document will include review narrative, comment and remediation suggestions relating to the functionality, constructability and the state and local regulatory compliance status of the predicted storm water detention plan and vegetation planting plan.

Wetland Habitats Vegetation Restoration and Replacement

In addition to the engineering review of the detention basin and swale design, an examination of the proposed modifications to the final plan regarding wetland creation and vegetation augmentation has been completed and included in this report. Modifications to the initially proposed treatment train design have been put forth in the updated plan revisions dated 05/05/2015. Additionally a project goal of rapid vegetation establishment has been set forth for the Site in spring of 2015 as stated in the Draft Vegetation Augmentation Plan developed by King and MacGregor Environmental Inc. dated 02/23/2015 (VAP). The VAP report includes a detailed description of proposed plant species selection, stocking rate and site location. This report contains comments and recommendations regarding the establishment and continued viability of wetland habitat within the storm water treatment system.

1 Vegetation Component

1.1 Basin Redesign implications on Wetland Habitats

1.1.1 Treatment Train Concept

The Special Use Permit #2009-01P as adopted on 04/03/2012 (SUP) stipulates that “innovative” best management practices (BMPs) must be employed in the design and construction of the storm water treatment systems associated with the Site. In keeping with this condition a treatment train concept has been refined and is represented in the final plan. The treatment train concept takes into consideration the potential benefits of introducing ecological functions and natural constituents into storm water treatment systems to augment engineered control structures.

The incorporation of wetland habitats as a part of the system at the Site has been an integral part of Site plans from the earliest design phases of the project. The original design incorporated a treatment train design consisting of three basins in succession that encompassed designed and maintained wetland habitats with varying depth regimes to control runoff velocity, retention time, treatment of water quality and to provide a diversity in habitat. A report completed by King and MacGregor Environmental Inc. date March 9, 2015 shows a multifaceted comparison of function, footprint and practical water quality benefits between the original preliminary design and the plan dated 09/05/2012. Further plan revisions incorporated on 05/5/2015 increased the presence of each depth regime in both basins. The final design

is an adaptation of the treatment train concept consisting of multiple depth regimes and wetland habitat types.

This section of the report will focus on the functional comparison of these two designs as presented by King and MacGregor Environmental Inc. in their comparison report as well as the additional final plan revisions that resulted from reviewer feedback. The final plan design has been demonstrated to perform the storm water detention function from a runoff volume and flow rate standpoint in compliance with applicable regulations by Hydro Cad calculations and professional opinion. Here we will focus on the establishment, maintenance and function of proposed vegetative components of the wetland habitats.

1.1.2 Deviation from Preliminary Engineering Plans

The intended goal of the most recent plan revisions to both basins (05/05/2015) has been to more closely resemble the approved preliminary plan from the standpoint of surface area per habitat type and the three tier concept. The functional benefits of wetland habitats on water quality and groundwater recharge are directly proportional to the amount of habitat present in most cases. To this end the final plan design with the additional modifications proposed has increased or maintained surface area of each habitat type in both except for semi wet habitats. The semi wet habitat is reduced from preliminary plans because portions of the swale will be converted to high and low marsh habitat.

With the addition of the final plan modifications (05/05/2015) the treatment system will retain the three tier concept. Armored and compacted clay berms will provide impoundment and retention of hydrology sufficient to create a moist soil environment conducive to wetland development. These berms will provide for flow through as well during storm events, while providing a functional benefit of velocity decrease. Within each basin, the wetland cell modifications are proposed within low gradient reaches that will provide the highest probability of successful establishment for these habitat types.

It is our conclusion that the modifications reflected in the final engineering plans and specifications will effectively provide positive treatment functions upon the successful establishment of an intact hydrophytic vegetative community. The wetland cells are in keeping with the treatment train concept as originally proposed in the approval of the special use permit. The wetlands, when established, will provide some phytoremediation function regarding uptake of dissolved and suspended particulate in the Site runoff. Additionally, the retention and infiltration capacity of the constructed wetlands will be significantly greater than the null alternative. With appropriate maintenance and accessibility, the proposed modifications will provide an opportunity to showcase innovative landscape design to the public in an aesthetically pleasing way.

1.1.3 A Word on Establishment of Constructed Wetlands

Wetland habitats are formed naturally where groundwater or surface water resources create a semi permanently saturated or inundated soil condition for long periods during the growing season. The physical conditions required of a wetland can be reproduced through applied engineering practices but the successful establishment of functional wetland habitats requires careful selection of planted species, consistent manipulation of hydrologic conditions and site preparation and maintenance.

In a dynamic system such as a storm water treatment train, hydrologic conditions can vary widely on a seasonal basis presenting a challenge to the establishment of introduced vegetation. Additionally, soil conditions at constructed sites often have minimal or no organic topsoil remaining on site. Many desirable wetland species require a thick, nutrient rich organic topsoil layer to establish and thrive. Conversely, invasive and exotic plant species tend to thrive on moist, disturbed sites such as a constructed storm water basin and swale system.

To maximize the speed of successful hydrophytic plant community establishment, it is suggested that careful and specific attention be given to planting plan revisions. Species selection within various areas at the Site should focus on four things; 1.) species suitability relative to saturation level, native status and

intended function. 2.) species resistance to dissolved and suspended pollutants in the water. 3.) species root system stratification relative to sprawl and depth. The highest degree of soil erosion prevention and resistance to ice scour is achieved when the selected plant species form a stratified root mass network. 4.) Practicability of using bare root or dormant plant materials with a previously developed root system. Once vegetation is well established, a micro climate is allowed to develop which facilitates soil saturation, retention of organic matter and the persistence of wetland conditions. Years one through five are critical in the development of a successful constructed wetland habitat.

It is expected that the proposed modifications to the final plan will be successful through diligent manipulation of hydrology, soil augmentation, species selection and implementation of the five year monitoring program. In compliance with the SUP, a five year wetland monitoring plan supplemented by a maintenance plan that will continue in perpetuity has been agreed to by The Village at Grand Traverse LLC (TVGT) as per an agreement signed July 24, 2013. Specific performance criteria for vegetation establishment and persistence, sediment accumulation thresholds and relative percent native species to invasive should be based on standard MDEQ mitigation monitoring performance criteria modified to suit this application. These criteria should be stated prior to the establishment of year one vegetation to avoid ambiguity in the monitoring and maintenance program.

2 Conclusions

2.1 Environmental Compliance with Special Use Permit

Proposed modifications to the final storm water treatment system are found to be in keeping with the SUP #2009-01P approved March 6, 2012 and meet or exceed MDEQ BMP standards given the successful establishment of hydrophytic plant communities within the system. Based on the findings of Cardno biologists and the recommendations detailed above The treatment train system proposed fulfills the SUP requirement for innovation, functionality, protection of public health and environmental resources. The wetland habitats within the system are expected to provide enhanced function to the system as well as an increase in local biological diversity.

Constructed Wetland Use in Nonpoint Source Control

New BMP, September, 1997

Description

Constructed wetlands are excavated basins with irregular perimeters and undulating bottom contours into which wetland vegetation is purposely placed to enhance pollutant removal from stormwater runoff. Stormwater enters a constructed wetland through a forebay where the larger solids and coarse organic material settle out. The stormwater discharged from the forebay passes through emergent vegetation which acts to filter organic materials and soluble nutrients. The vegetation can also remove some dissolved nutrients. Constructed wetlands can also be designed to reduce peak stormwater flows.

The use of constructed wetlands can be looked at from two ways. First, a constructed wetland may be used primarily to maximize pollutant removal from stormwater runoff and also help to control stormwater flows. Or, it may be used primarily to control stormwater flows, with increased pollutant removal capabilities.

Secondary benefits of constructed wetland include preservation and restoration of the natural balance between surface waters and ground waters, increased wildlife habitats, and higher property values than if the same area was turned into a rectangular stormwater basin.

The following criteria dictate the feasibility of using a constructed wetland for stormwater treatment: 1) the type of wetland designed and its characteristics; 2) the hydrologic characteristics of the designed wetland; 3) the vegetation planted within the wetland (to utilize and lower nutrients and pollutants); 4) the type and volume of nutrients and pollutants entering the wetland prior to treatment; and 5) soil texture.

Note: This BMP should never be used during the construction phase of any project or for sedimentation control. Runoff from construction sites is typically very sediment-laden. Such runoff will choke the constructed wetland and may render it useless in a short amount of time. **Existing natural wetland systems should *never* be destroyed to construct another wetland habitat for stormwater treatment.**

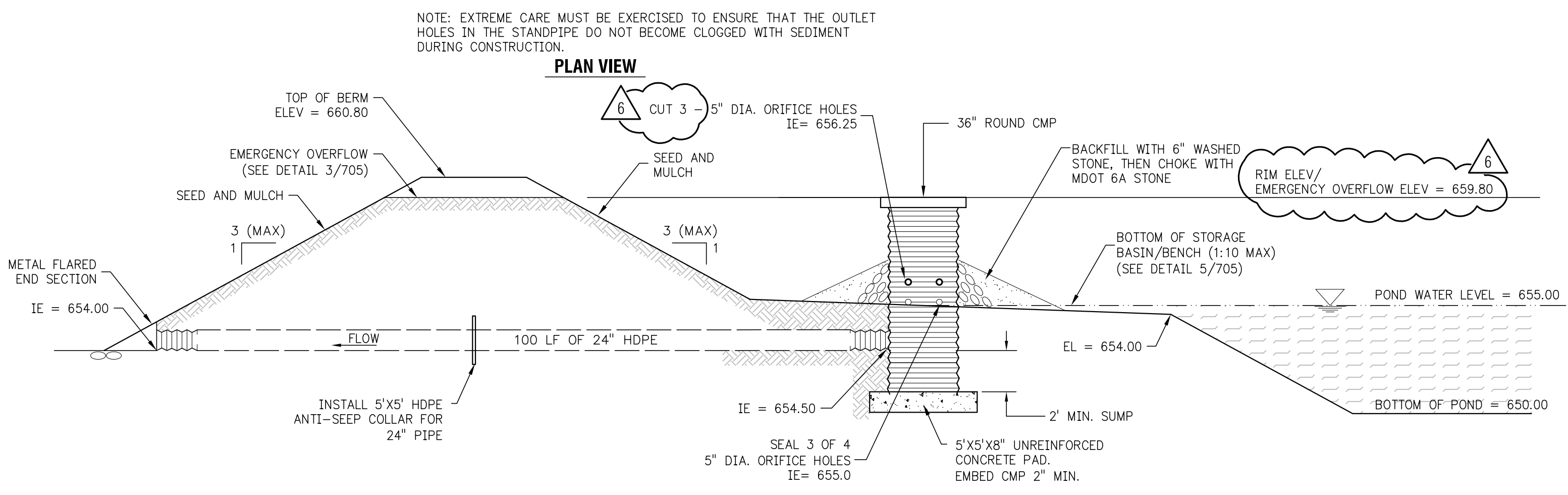
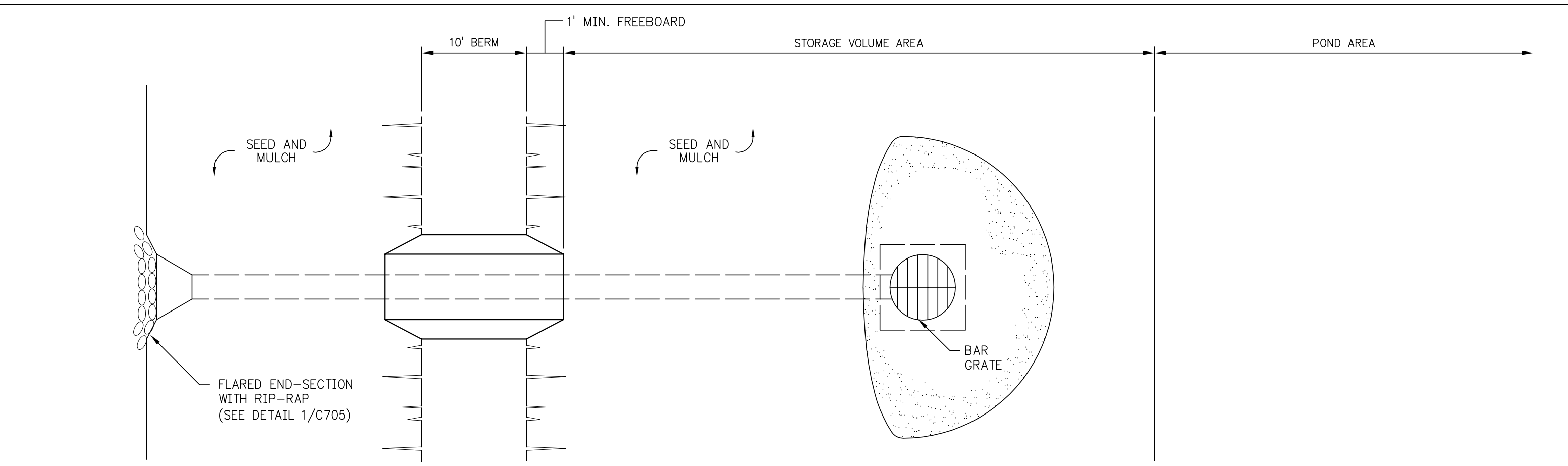
Other Terms Used to Describe

Wetlands include fens, bogs, swamps and marshes.

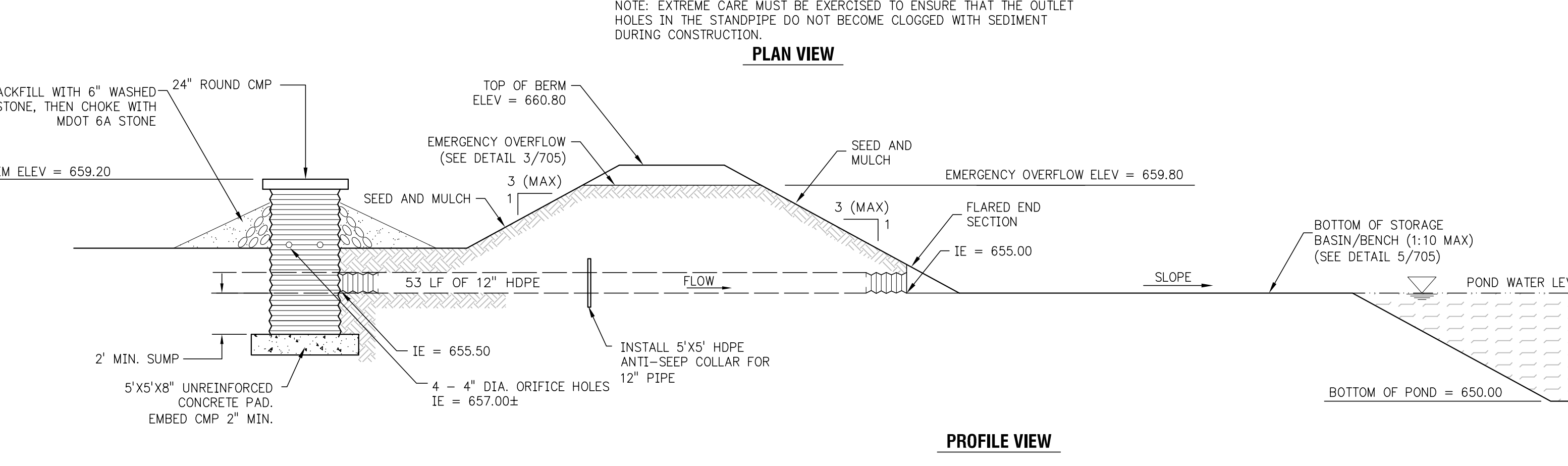
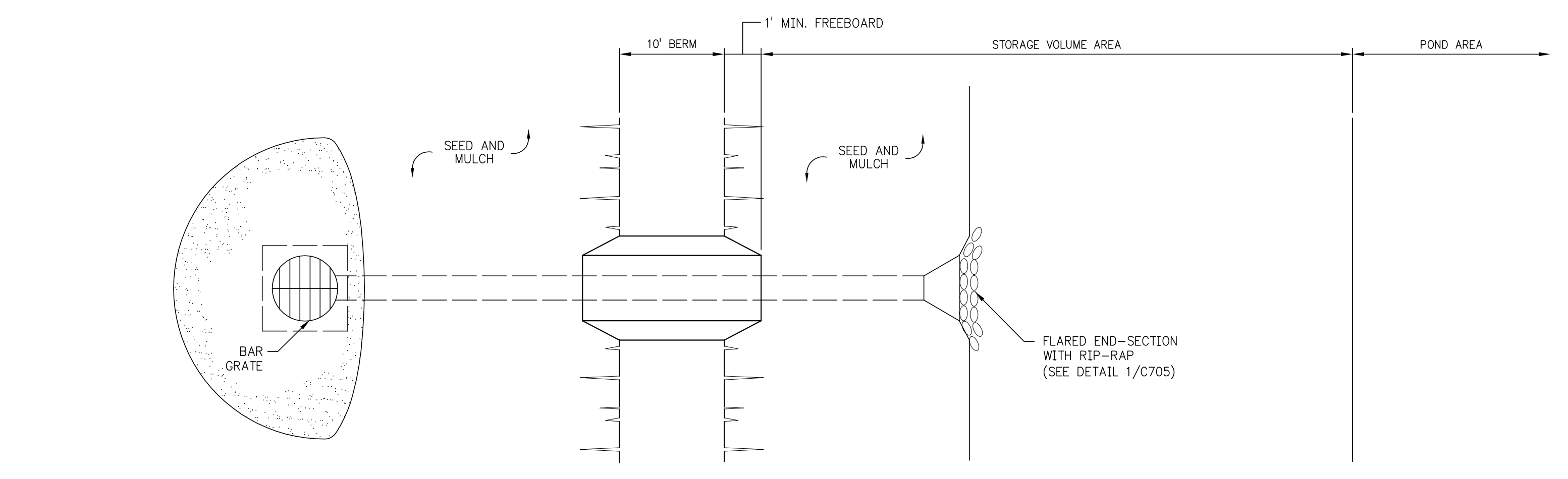
Pollutants Controlled and Impacts

In addition to trapping sediment, nutrients and soluble pollutants may be taken up and assimilated into the plant tissues where they are held until harvesting or the annual fall die-back.

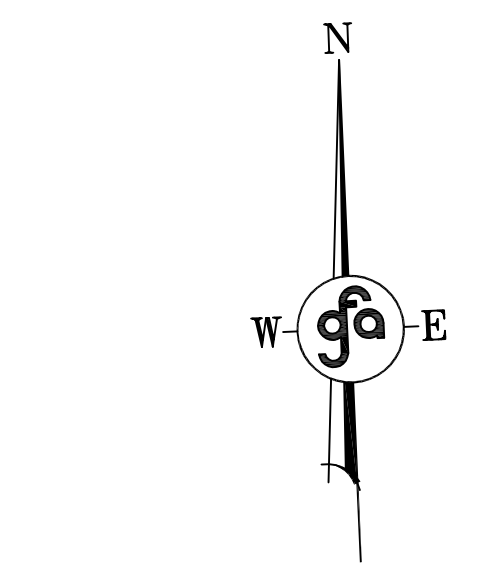
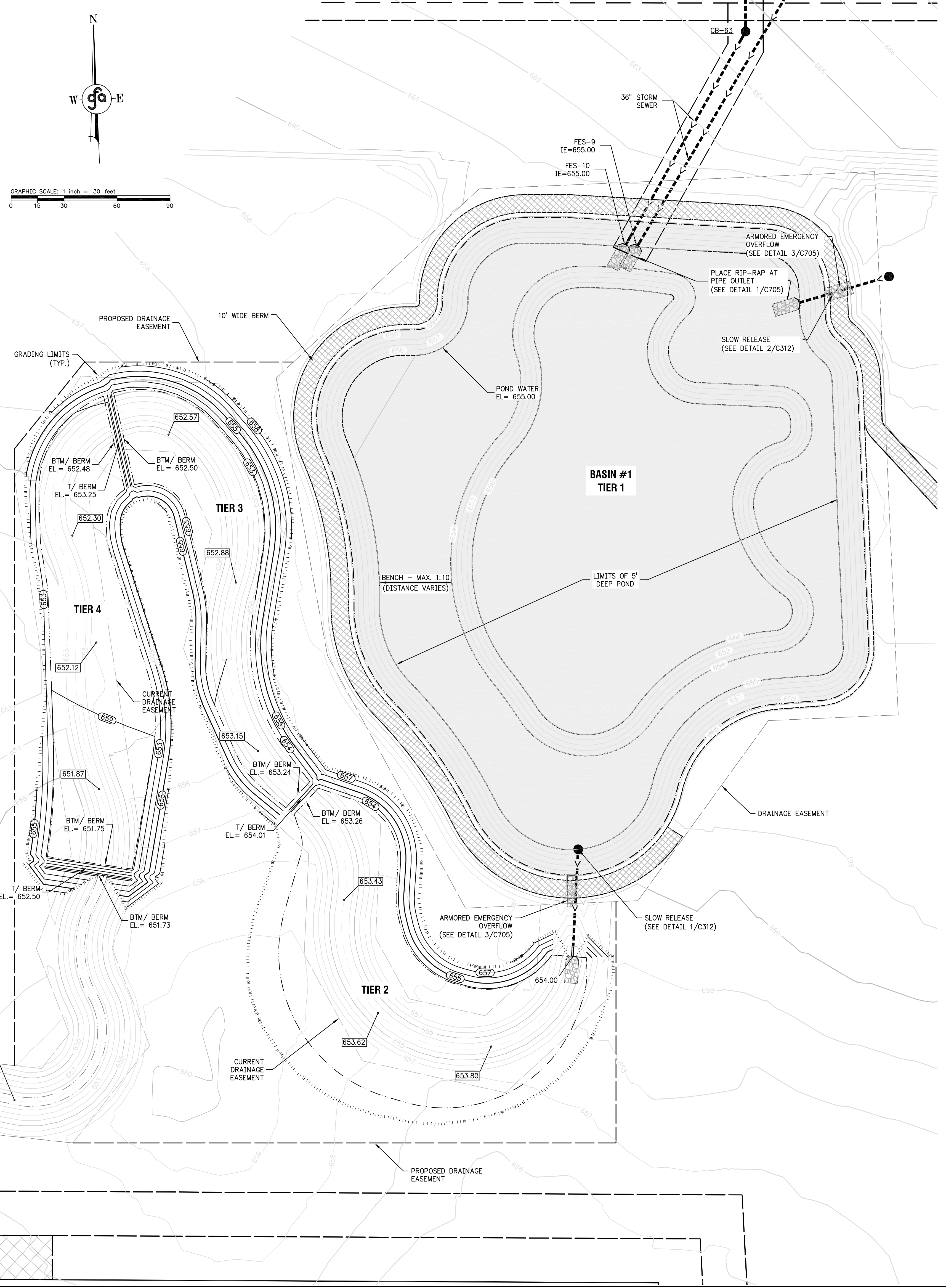
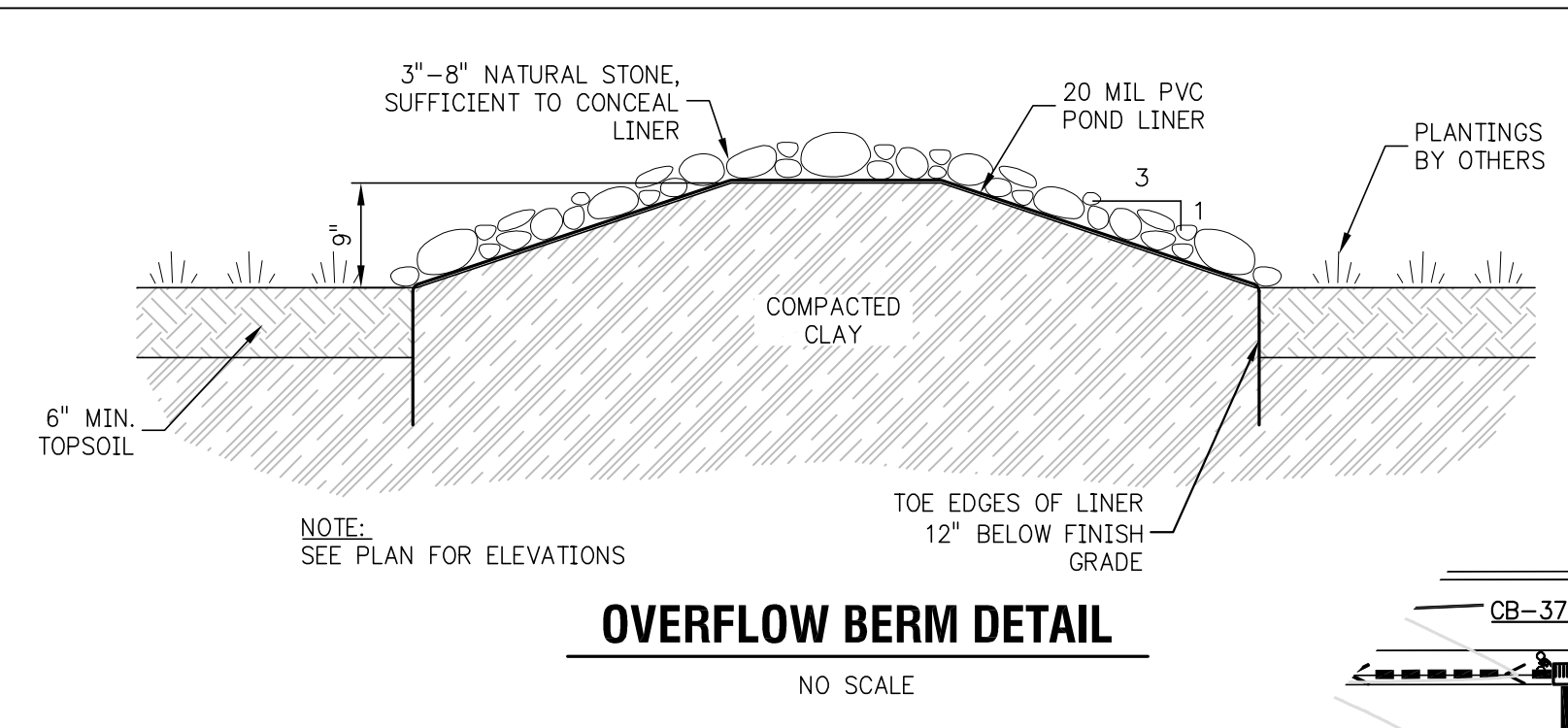
GENERAL NOTES
 1. REFER TO SHEET C100 FOR BENCHMARK INFORMATION.



1
C312
BASIN #1 SLOW RELEASE DETAIL
 NO SCALE



2
C312
TEMPORARY POND RELEASE DETAIL
 NO SCALE



GRAND TRAVERSE TOWN CENTER
 ACME TOWNSHIP, GRAND TRAVERSE COUNTY, MI

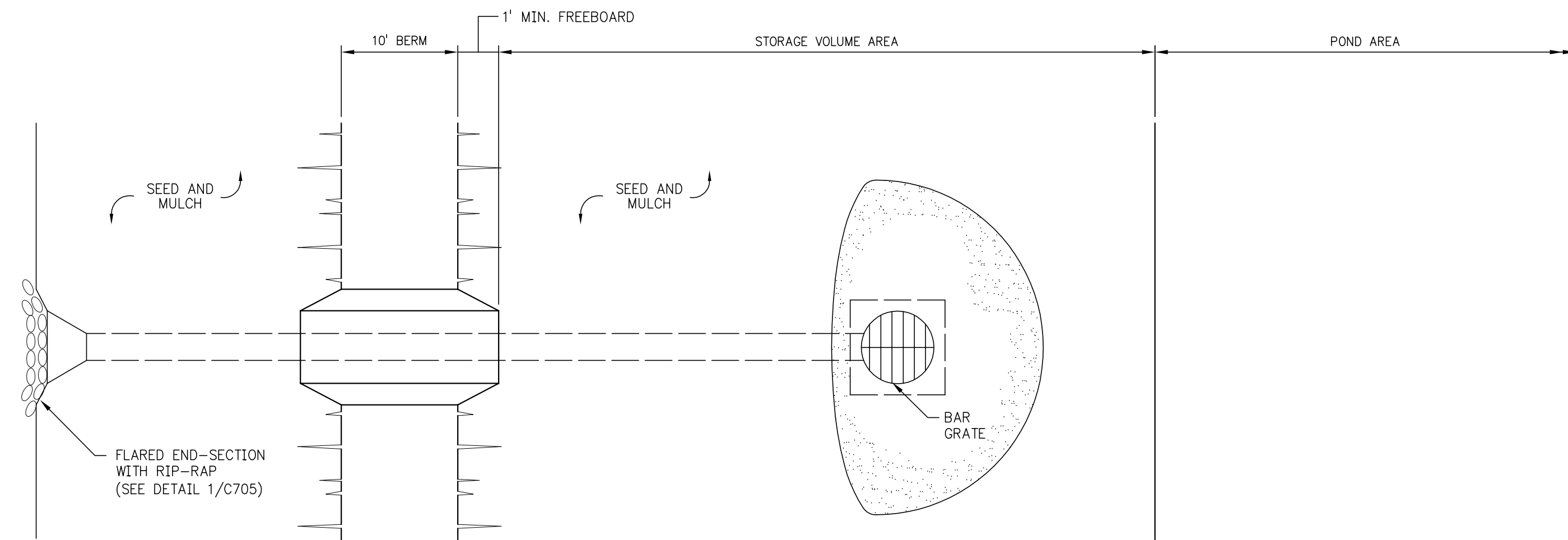
VILLAGE AT GRAND TRAVERSE, LLC
 CINCINNATI, OH 45209-1955
 3805 EDWARDS ROAD, SUITE 700
 (513) 241-5800

REVISION NO.	REVISION	REV. DATE
4	SLOW RELEASE REVISIONS	02/29/2015
5	GC REVIEW COMMENTS	04/15/2015
6	GOŚLING CZUBAK REV.	05/05/2015
3	CREATE TIERED DRAINAGE SWALE	02/13/2015

DESIGNED BY:
ga Gourdie-Fraser
 Municipal | Development | Transportation
 123 W. Front Street, Troy, MI 48060
 phone: (313) 946-9874, fax: (313) 946-3703

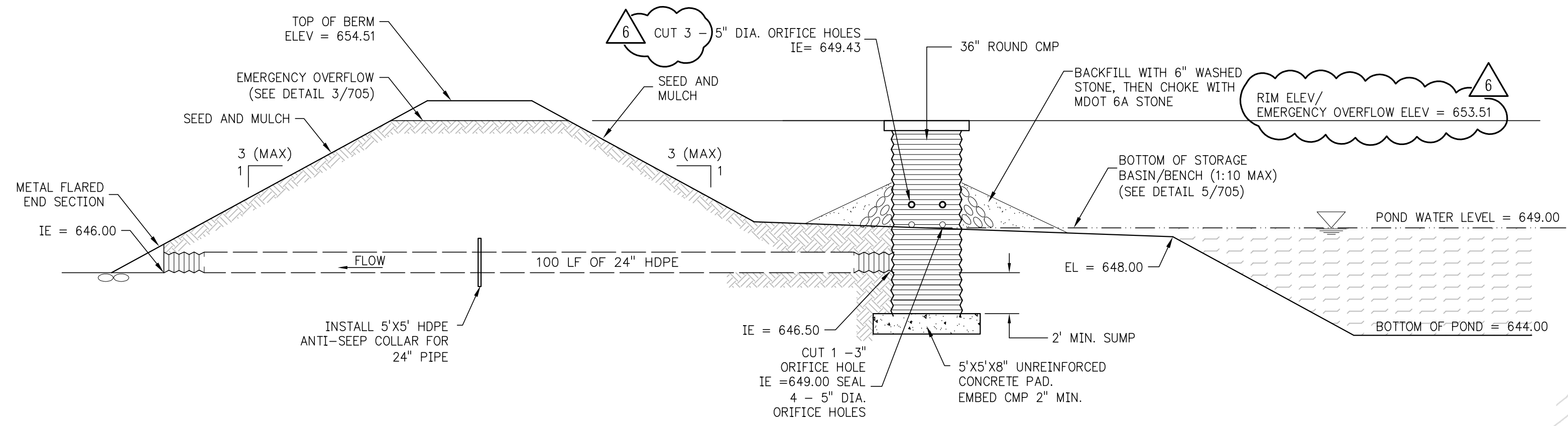
BASIN #1 DETAIL

DRAWN BY	ISSUE	ISSUE DATE	SHEET NO.
TGR			C312
CHECKED BY	MANAGER	GFA PROJECT NO.	GFA PROJECT NO.
TLMB	T. BOYD P.E.		12102



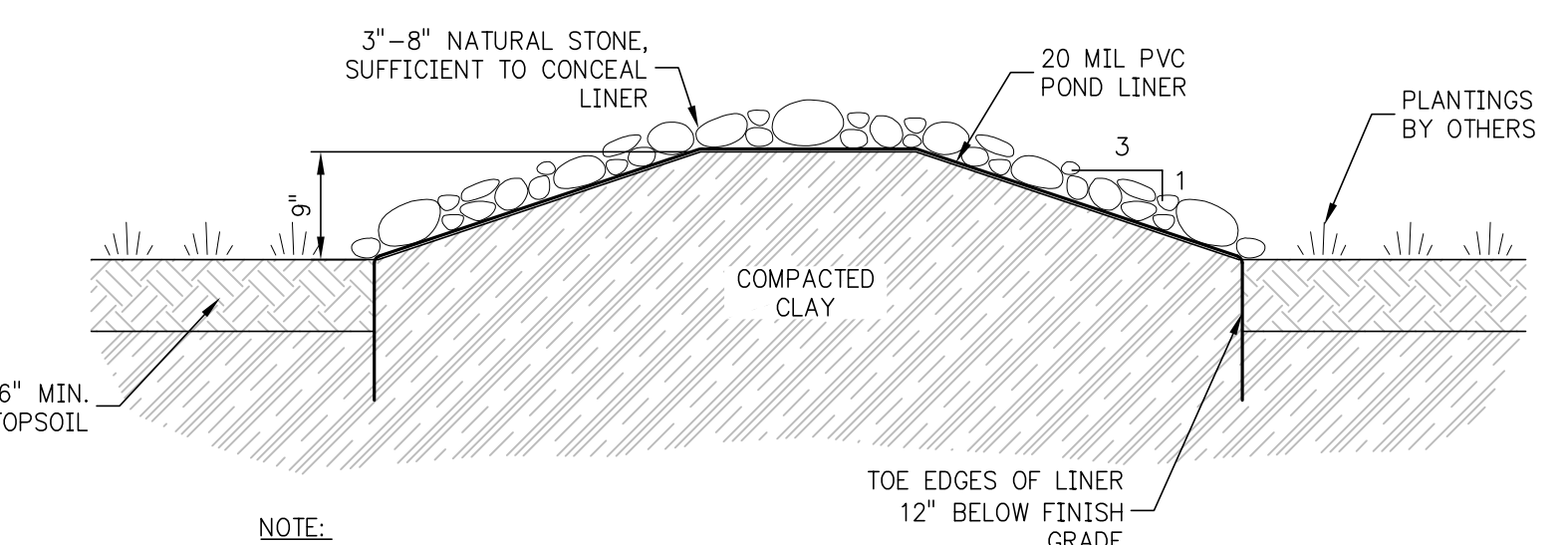
NOTE: EXTREME CARE MUST BE EXERCISED TO ENSURE THAT THE OUTLET HOLES IN THE STANDPIPE DO NOT BECOME CLOGGED WITH SEDIMENT DURING CONSTRUCTION.

PLAN VIEW

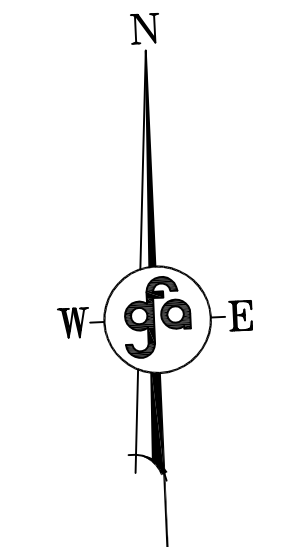


PROFILE VIEW

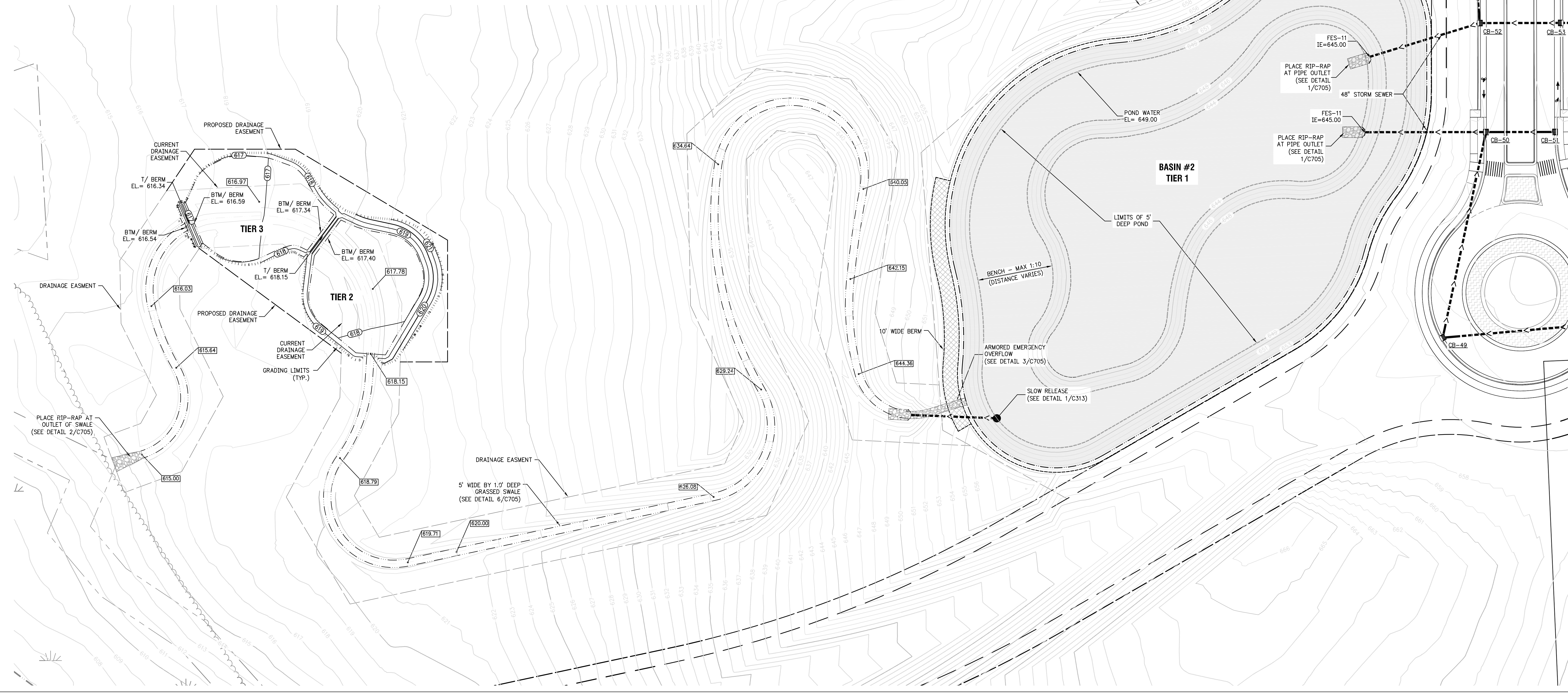
1
C313
BASIN #2 SLOW RELEASE DETAIL
NO SCALE



OVERFLOW BERM DETAIL
NO SCALE



GRAPHIC SCALE: 1 inch = 30 feet



GENERAL NOTES

1. REFER TO SHEET C100 FOR BENCHMARK INFORMATION.

GRAND TRAVERSE TOWN CENTER

ACME TOWNSHIP, GRAND TRAVERSE COUNTY, MI

VILLAGE AT GRAND TRAVERSE, LLC
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REVISION NO.	REVISION	REV. DATE
4	SLOW RELEASE REVISIONS	02/27/2015
5	GC REVIEW COMMENTS	04/15/2015
6	CONSULTING ENGINEER REV.	05/05/2015
3	SLOW RELEASE REVISIONS	02/25/2015

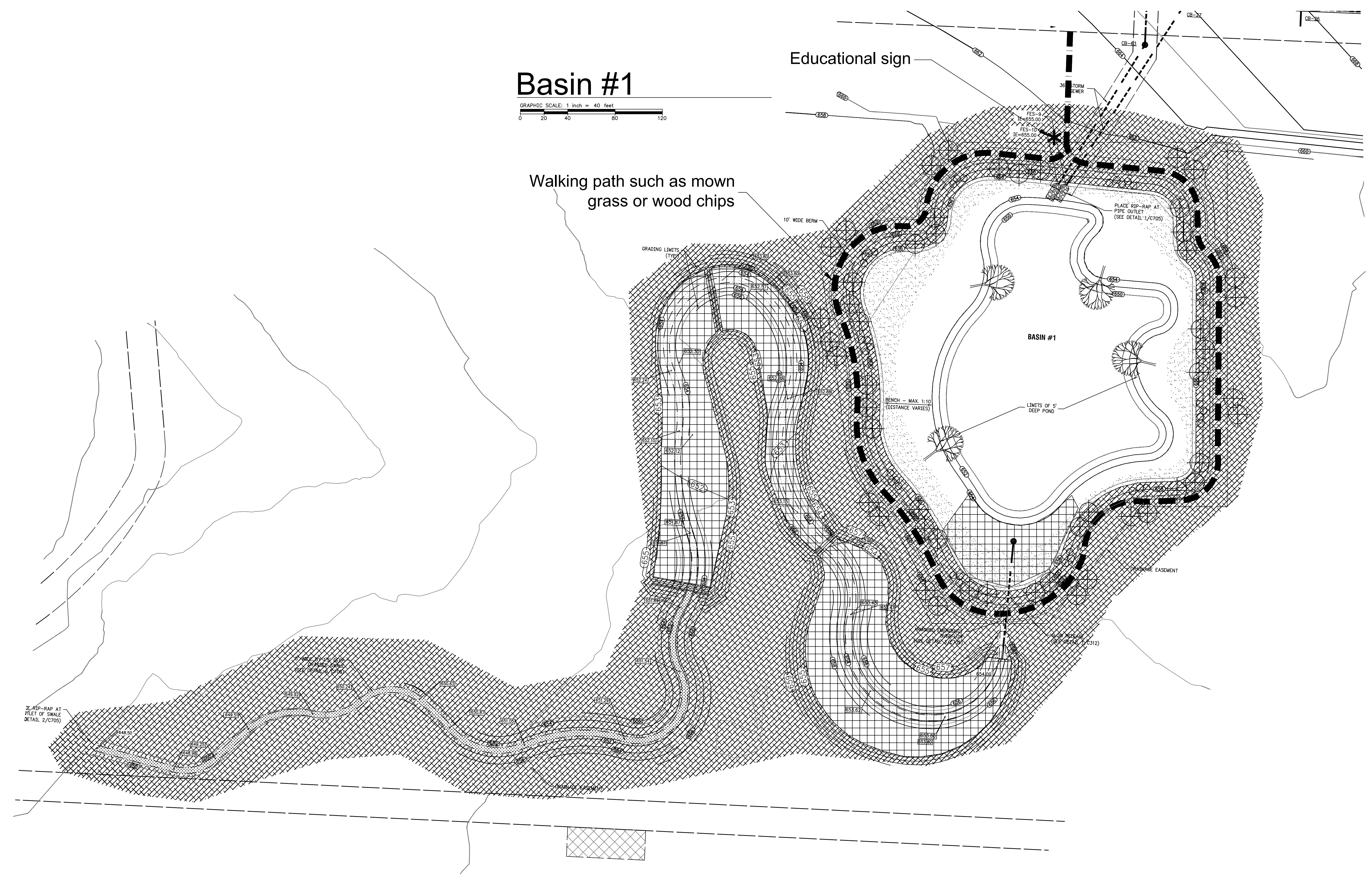
CONSTRUCTION MANAGED BY:

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Municipal | Development | Transportation
123 W. Front Street, Troy, MI 48064
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BASIN #2 DETAIL

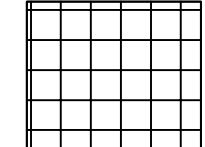
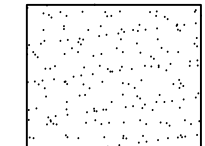

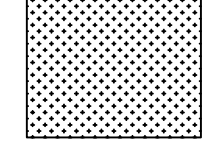
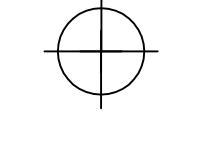
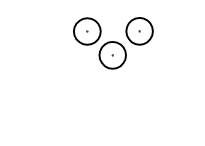
DRAWN BY	ISSUE	ISSUE DATE	SHEET NO.
TGR			C313
CHECKED BY	MANAGER	GFA PROJECT NO.	GFA PROJECT NO.
TLMB	T. BOYD P.E.	12102	

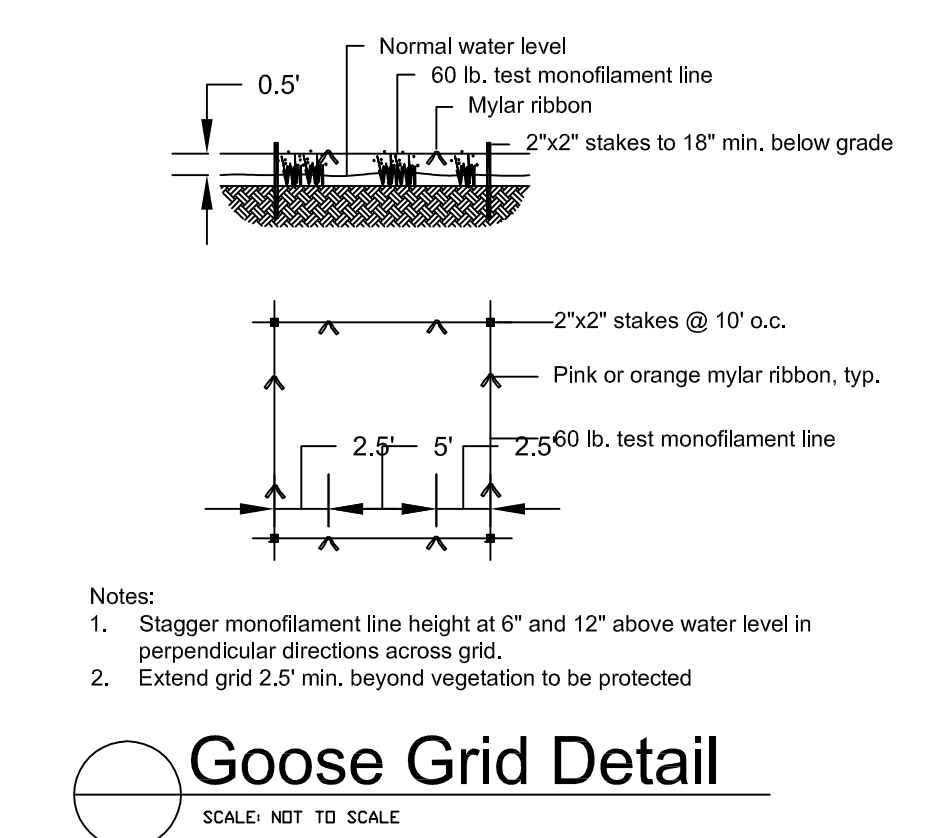
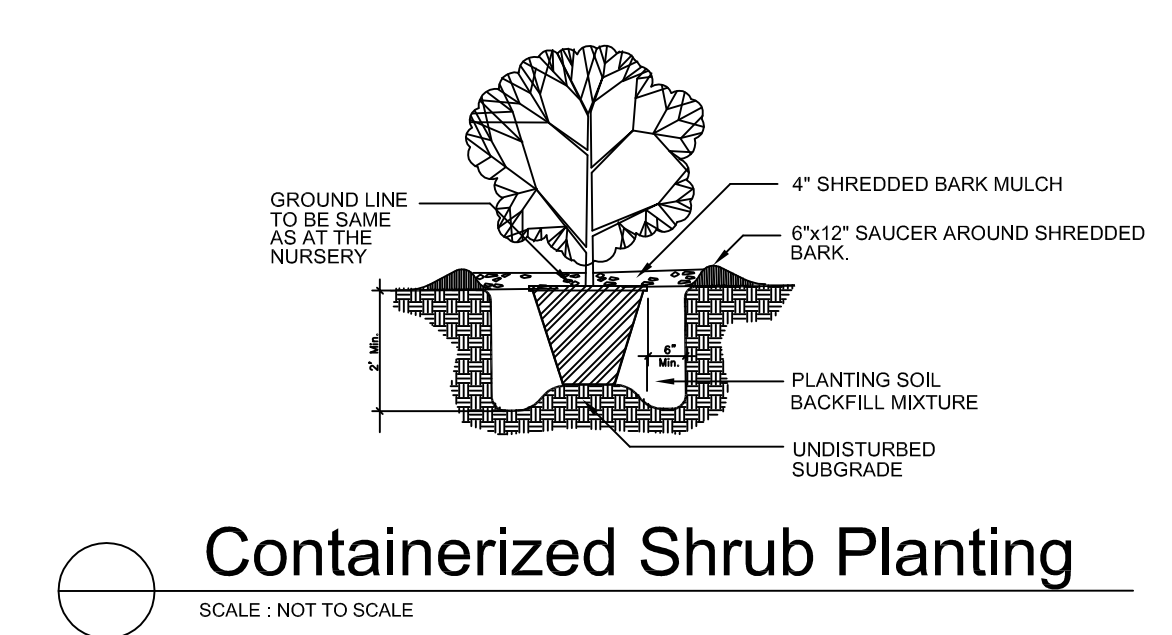
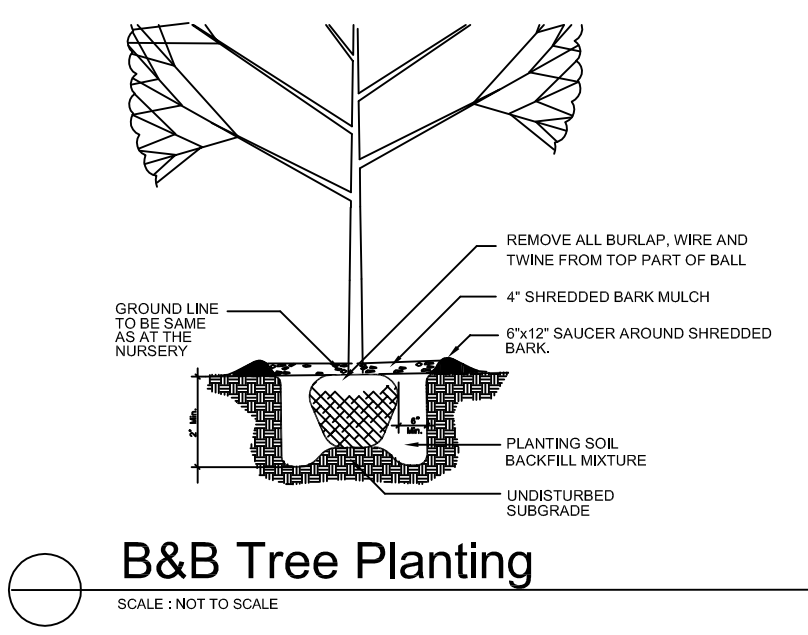
GENERAL NOTES
 1. REFER TO SHEET C100 FOR BENCHMARK INFORMATION.



Key

Refer to seed and planting schedule for species.

-  HERBACEOUS PLANTS
-  BASIN SHELF SEED MIX:
-  UPLAND BUFFER SEED MIX:
-  GRASSED SWALE SEED MIX:
-  TREES
-  SHRUBS



Notes:
 1. Stagger monofilament line height at 6" and 12" above water level in perpendicular directions across grid.
 2. Extend grid 2.5' min. beyond vegetation to be protected.

GRAND TRAVERSE TOWN CENTER

ACME TOWNSHIP, GRAND TRAVERSE COUNTY, MI

VILLAGE AT GRAND TRAVERSE, LLC
 CINCINNATI, OH 45209-1955
 3805 EDWARDS ROAD, SUITE 700
 (513) 241-5800

REVISION NO.	REVISION	REV. DATE
0	FOR CONSTRUCTION	08/30/2012
1	REVISED PER BECKETT & RAEDER REVIEW	09/05/2012
2	REVISED BASIN PLANTING PLAN	05/07/2015

CONSTRUCTION MANAGED BY:

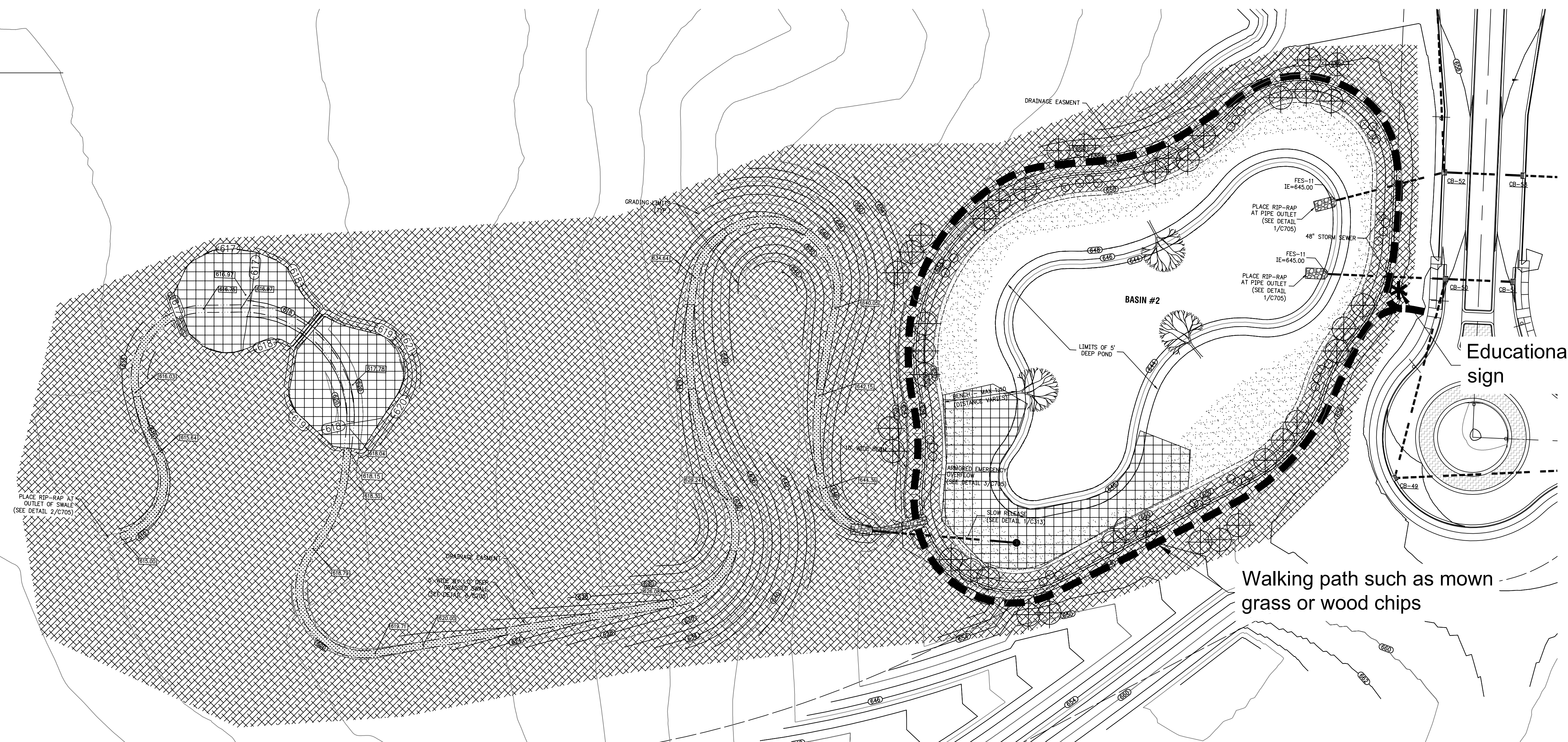
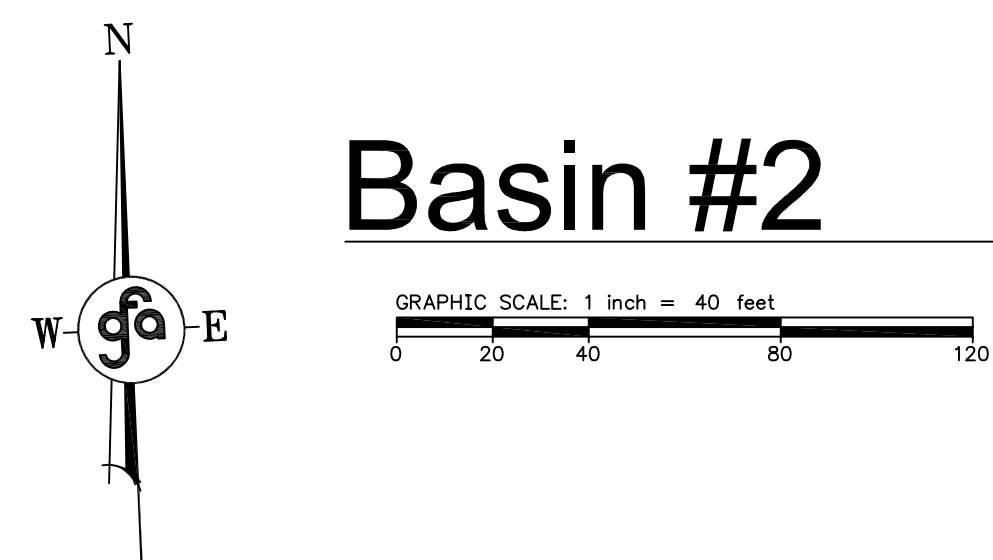
DESIGNED BY:
go Gourdie-Fraser
 Municipal | Development | Transportation
 123 W. Ford Street, Traverse City, Michigan 49684
 Phone: (231) 946-0974, Fax (231) 946-3703

BASIN #1 PLANTING PLAN

DRAWN BY	ISSUE	ISSUE DATE	SHEET NO.
TGR			C613
CHECKED BY	MANAGER	GFA PROJECT NO.	
TLMB	T. BOYD P.E.	12102	

King & MacGregor Environmental Inc.
 2520 Woodmeadow SE
 Grand Rapids, MI 49548
 Phone: (616) 957-1231
 43050 Ford Road, Suite 130
 Canton, MI 48187
 Phone: (734) 354-0594
 KME Project No. 11031

Basin #2



GENERAL NOTES
1. REFER TO SHEET C100 FOR BENCHMARK INFORMATION.

BASIN SHELF SEED MIX:

SPECIES	COMMON NAME	RATE (PLS OZ./AC.)
FORBS		
<i>Alisma plantago-aquatica</i>	Mud Plantain	2.5
<i>Aster novae-angliae</i>	New England Aster	4.0
<i>Bidens cernua</i>	Nodding Bur Marigold	4.0
<i>Bidens frondosa</i>	Common Beggartick	4.0
<i>Helenium autumnale</i>	Snicezweed	2.5
<i>Iris virginica shrevei</i>	Southern Blue Flag	8.0
<i>Sagittaria latifolia</i>	Arrowhead	2.0
<i>Verbena hastata</i>	Blue Vervain	4.0
GRAMINOIDS		
<i>Carex comosa</i>	Bristly Sedge	4.0
<i>Carex lacustris</i>	Lake Sedge	4.0
<i>Carex lupuliformis</i>	Knobbed Hop Sedge	4.0
<i>Elymus virginicus</i>	Virginia Wild Rye	16.0
<i>Glyceria striata</i>	Fowl Manna Grass	4.0
<i>Leersia oryzoides</i>	Rice Cut Grass	16.0
<i>Scirpus acutus</i>	Hardstemmed Bulrush	4.0
<i>Scirpus atrovirens</i>	Dark-green Bulrush	4.0
<i>Scirpus cyperinus</i>	Wool Grass	4.0
<i>Scirpus pungens</i>	Three-square Bulrush	4.0
<i>Scirpus fluviatilis</i>	River Bulrush	4.0
<i>Scirpus validus</i>	Great Bulrush	2.0
<i>Sparganium eurycarpum</i>	Giant Burreed	16.0
<i>Typha latifolia</i>	Broadleaf Cattail	4.0
Total:		121.0

GRASSED SWALE SEED MIX:

SPECIES	COMMON NAME	RATE (PLS OZ./AC.)	SPECIES	COMMON NAME	RATE (PLS OZ./AC.)
<i>Alisma plantago-aquatica</i>	Mud Plantain	1.0	<i>Andropogon garardii</i>	Big Bluestem	12.0
<i>Asclepias incarnata</i>	Swamp Milkweed	2.0	<i>Carex comosa</i>	Bristly Sedge	2.0
<i>Aster novae-angliae</i>	New England Aster	0.5	<i>Carex lupulina</i>	Common Fox Sedge	2.0
<i>Eupatorium maculatum</i>	Joe Pye Weed	0.5	<i>Carex stipata</i>	Common Fox Sedge	2.0
<i>Iris virginica shrevei</i>	Southern Blue Flag	4.0	<i>Elymus virginicus</i>	Virginia Wild Rye	10.0
<i>Lobelia cardinalis</i>	Cardinal Flower	0.3	<i>Glyceria striata</i>	Fowl Manna Grass	2.0
<i>Lobelia siphilitica</i>	Great Blue Lobelia	0.5	<i>Panicum virgatum</i>	Switch Grass	3.0
<i>Sagittaria latifolia</i>	Common Arrowhead	0.8	<i>Scirpus atrovirens</i>	Dark-green Bulrush	3.0
<i>Verbena hastata</i>	Blue Vervain	1.5	<i>Scirpus cyperinus</i>	Wool Grass	3.0
			<i>Spartina pectinata</i>	Cord Grass	3.0

TREES:

SPECIES	COMMON NAME	QUANTITY
<i>Acer rubrum</i>	Red Maple	18
<i>Acer saccharum</i>	Sugar Maple	18
<i>Celtis occidentalis</i>	Hackberry	18
<i>Platanus occidentalis</i>	Sycamore	18
<i>Pinus strobus</i>	White Pine	27
Total		90

Notes: trees to be 2.5" caliper balled and burrlapped stock. Install in locations shown with each grouping being of a single species.

SHRUBS:

SPECIES	COMMON NAME	QUANTITY
<i>Amelanchier laevis</i>	Serviceberry	27
<i>Aronia prunifolia</i>	Chokeberry	27
<i>Cornus stolonifera</i>	Red Twig Dogwood	27
<i>Physocarpus opulifolius</i>	Ninebark	27
<i>Sambucus canadensis</i>	American Elder	27
Total		140

Notes: shrubs to be 2 gallon sized containerized stock. Install in locations shown with each grouping being of a single species.

HERBACEOUS PLANTS:

SPECIES	COMMON NAME	QUANTITY
<i>Alisma plantago-aquatica</i>	Water Plantain	
<i>Carex lacustris</i>	Lake Sedge	
<i>Leersia oryzoides</i>	Rice Cut Grass	
<i>Sagittaria latifolia</i>	Arrowhead	
<i>Scirpus fluviatilis</i>	River Bulrush	
<i>Scirpus pungens</i>	Three-square bulrush	
<i>Scirpus validus</i>	Great Bulrush	
<i>Sparganium eurycarpum</i>	Giant Burreed	
<i>Typha latifolia</i>	Broadleaf Cattail	
Total		10,944

- A minimum of six species shall be selected from the list provided based on availability at time of planting.
- Quantity of individuals of each species selected shall be approximately equal number of species.
- Form shall be plug or tuber, depending upon species.
- Layout of individual planting areas to be determined by Wetland Consultant in the field.
- Plants shall be protected by Goose Grid immediately following installation.

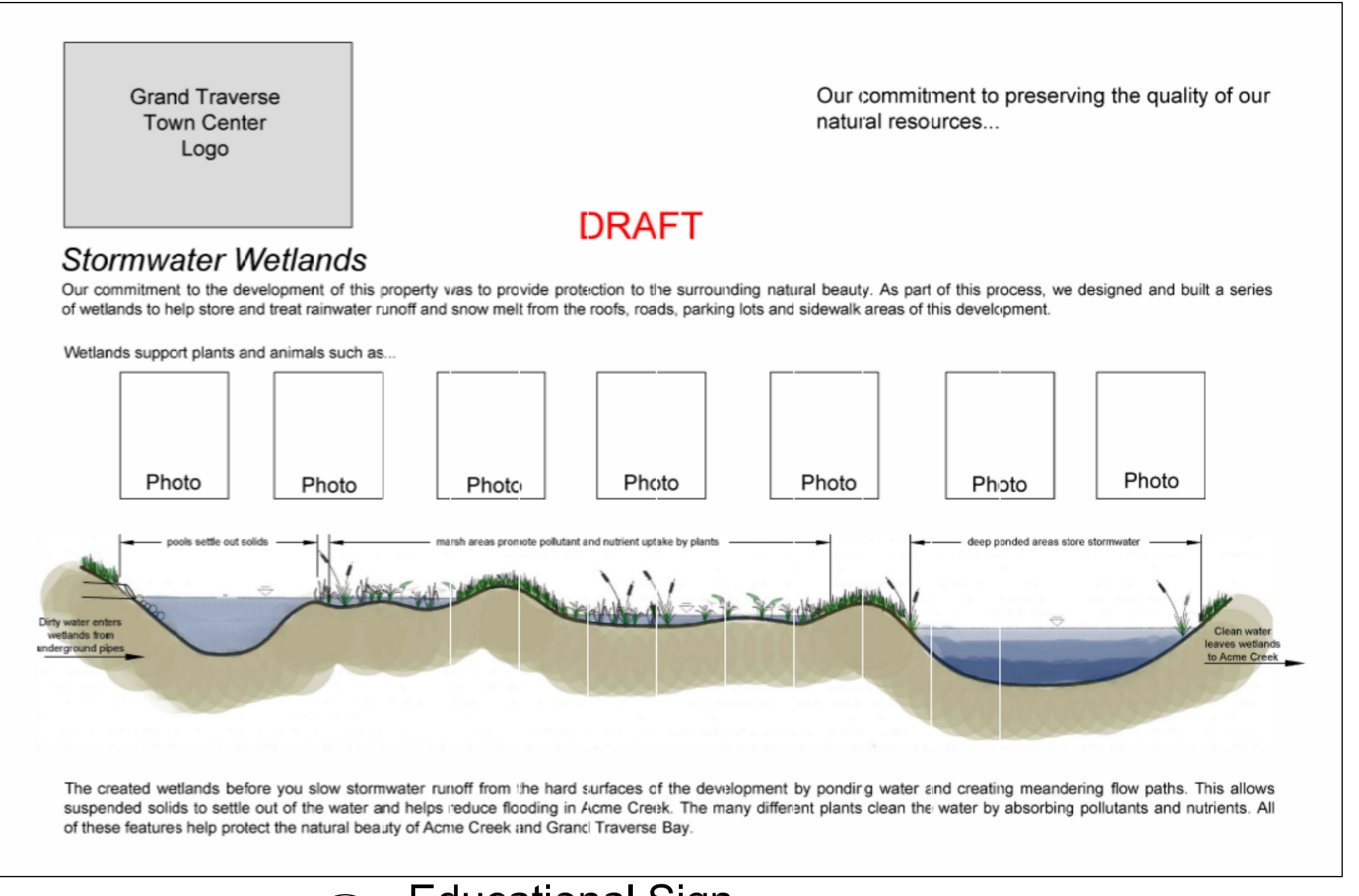
- Notes:
- Seed mix to be sown over areas depicted on the plans. These areas are approximately from normal water level to 6 inches below normal water level.
 - Wetland consultant shall review boundaries of seeding area prior to sowing.
 - Seed shall not be sown over standing water. Pumping to lower water level in basins may be required prior to sowing.
 - Seed shall be raked, disked, or otherwise mechanically incorporated into the topsoil immediately following sowing.

UPLAND BUFFER SEED MIX:

SPECIES	COMMON NAME	RATE (LBS./AC.)
<i>Andropogon scoparius</i>	Little Bluestem	3,000
<i>Avena sativa</i>	Seed Oats	20,000
<i>Elymus virginicus</i>	Virginia Wild Rye	1,000
<i>Asclepias syriaca</i>	Common Milkweed	0.063
<i>Aster ericoides</i>	Heath Aster	0.031
<i>Aster novae-angliae</i>	New England Aster	0.250
<i>Desmodium canadense</i>	Showy Tick Trefoil	0.031
<i>Echinacea pallida</i>	Pale Purple Coneflower	0.063
<i>Echinacea purpurea</i>	Purple Coneflower	0.375
<i>Helopsis helianthoides</i>	Falset Sunflower	0.125
<i>Lespedeza capitata</i>	Roundheaded Bush Clover	0.125
<i>Liatris spicata</i>	Spiked Gayfeather	0.125
<i>Monarda fistulosa</i>	Bergamot	0.031
<i>Parthenium integrifolium</i>	Wild Quinine	0.375
<i>Penstemon digitalis</i>	Foxglove Beardtongue	0.063
<i>Petalostemum purpureum</i>	Purple Prairie Clover	0.250
<i>Ratibida pinnata</i>	Yellow Coneflower	0.250
<i>Rudbeckia hirta</i>	Black-eyed Susan	0.375
<i>Rudbeckia subtomentosa</i>	Sweet Coneflower	0.063
<i>Solidago rigida</i>	Rigid Goldenrod	0.375
TOTAL		26,970

HABITAT STRUCTURES:

Whole trees to be installed horizontally. Trees shall be a minimum of 20 feet long and 12 inches in diameter at breast height (dbh). Do not trim down fine structure of limbs. At least 50% of entire structure shall extend 6 inches above projected high water level.



- Notes:
- Signs shall be of a material suitable to withstand normal climatic conditions.
 - Signs to be mounted in locations shown on the plans.
 - Signs to be 24" tall by 36" wide.
 - Final graphic presentation subject to modifications that do not substantially impact the information described.

GRAND TRAVERSE TOWN CENTER

ACME TOWNSHIP, GRAND TRAVERSE COUNTY, MI

VILLAGE AT GRAND TRAVERSE, LLC
CINCINNATI, OH 45209-1955
3805 EDWARDS ROAD, SUITE 700
(513) 241-5800

REVISION NO.	REVISION	REV. DATE
0	FOR CONSTRUCTION	08/30/2012
1	REVISED PER BECKETT & RAEDER REVIEW	09/05/2012
2	REVISED BASIN PLANTING PLAN	05/07/2015

CONSTRUCTION MANAGED BY:

DESIGNED BY:
go Gourdie-Fraser
Municipal | Development | Transportation
123 W. Front Street, Troy, MI 48064
Phone: (313) 946-0974, Fax: (313) 946-3703

BASIN #2 PLANTING PLAN

DRAWN BY	ISSUE	ISSUE DATE	SHEET NO.
TGR			C614
CHECKED BY	MANAGER	GFA PROJECT NO.	
TLMB	T. BOYD P.E.		12102

King & MacGregor Environmental Inc.
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Phone: (616) 957-1231
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KME Project No. 11031