WHITE LAKE TOWNSHIP
PLANNING COMMISSION
7525 Highland Road
White Lake, MI 48383
MAY 6, 2021 @ 7:00 p.m.
Electronic Meeting

Chairman Anderson called the meeting to order at 7:00 p.m. and led the Pledge of Allegiance. Roll was called.

ROLL CALL: Steve Anderson, White Lake, MI
Peter Meagher, White Lake, MI
Matt Slicker, Commerce, MI
Rhonda Grubb – Secretary, White Lake, MI
Mark Fine, White Lake, MI
Joe Seward, White Lake, MI
Debbie Dehart, White Lake, MI
Scott Ruggles, White Lake, MI

Absent: Merrie Carlock, White Lake, MI

Also Present: Sean O'Neil, WLT Planning Director
Sherri Barber, Recording Secretary

Visitors: Mike Leuffgen (DLZ)

Approval of Agenda

Commissioner Meagher moved to approve the agenda as presented. Commissioner Fine supported and the MOTION CARRIED with a roll call vote: (Anderson – yes; Dehart – yes; Meagher – yes; Slicker – yes; Grubb – yes; Fine – yes; Seward – yes; Ruggles -- yes). 8 yes votes

Approval of Minutes

a. April 15, 2021

Commissioner Meagher moved to approve the minutes of April 15, 2021 as presented. Commissioner Grubb supported and the MOTION CARRIED with a roll call vote: (Anderson – yes; Dehart – yes; Meagher – yes; Slicker – yes; Grubb – yes; Fine – yes; Seward – yes; Ruggles -- yes). 8 yes votes

Call to the Public (for items not on the agenda)

Scott Shepherd (6500 Cedar Island) wanted to hear what was proposed for the rezoning of parcel 12-29-476-006.

Public Hearing:

a) Stanford Holding LLC Rezoning

Location:	Property described as parcel number 12-29-476-006 (vacant parcel), located on the northwest corner of Bogie Lake and Cedar Island Road, consisting of approximately 10.3 acres.
Request:	**Rezoning from (AG) Agricultural to (R1-A) Single Family Residential or any other appropriate district.**
Applicant:	Stanford Holding LLC
Deed holders:	Stanford Holding LLC

Mr. O'Neil wanted to hit the highlights on the McKenna letter. Only 10.3 acres of the 45 acres are being proposed right now. The Southerly strip is proposed to be rezoned from AG to R1-A. They want to make 8 large acreage parcels in that area. The property is surrounded by similarly zoned property, or more dense zoning. The proposed homes should accommodate the traffic. He would recommend that the traffic study be waived. This does not create an unplanned spot zone. Mr. O'Neil wanted to mention that there was a question about utilities. The homes would be served by septic and well.

Tom Thomasma was in attendance on behalf of Stanford Holding LLC. He stated that they are looking to split off 8 one acre lots for the purpose of building single family residential R1A zoned homes.

Commissioner Anderson opened the public hearing at 7:17 p.m.

Mr. Shepherd (6500 Cedar Island) lives across the street and wondered if they would do anything for barriers along Bogie Lake to mitigate the traffic noise?

Autumn Gibson (1211 Bogie Lake Road) wanted to comment that her biggest concern is that eventually there will be another neighborhood there. There is already a lot of traffic and accidents. The school zone gets backed up and it's hard to get out of their neighborhood. She moved from Livonia and they don't want to lose the natural areas of White Lake.

Commissioner Anderson closed the public hearing at 7:24 p.m.

Commissioner Dehart didn't see the width for the access. It is on Exhibit B-1 in the agenda. It does meet the land division act. Commissioner Ruggles asked when he would start the homes. Mr. Thomasma would like to start this fall. Thomasma doesn't know what the future development may be on the remaining acres. In reference to the traffic concerns, the 8 lots are 8 single family homes with the drives going to Cedar Island Road. Mr. O'Neil stated that he is showing 8 parcels, if he didn't fit the leg through, he could probably get 9 lots. The Township requires one acre parcels and he loses some with the road right of way. If this was zoned R1A he won't even be here, it's just changing the zoning.

Commissioner Slicker noted that he's going for rezoning but we don't know if he has the splits. If he doesn't have the splits he wouldn't be able to create as many. Will he be required to put sidewalks in? The sidewalk ordinance doesn't apply to individual metes and bounds parcels. Mr. O'Neil noted

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that we have had interaction with the ITC corridor and they are pretty responsive. Mr. Leuffgen noted that they have to get approvals and possibly a maintenance easement. The insurance requirement was pretty significant in agreements with the ITC previously. Commissioner Slicker doesn't like the stub roads. Mr. O'Neil would like to see if we could leave the opening closer to the ITC and intersect Caya Way.

Commissioner Anderson noted that it meets the master plan, the traffic plan for 8 homes is small and you can consider the recommendation to waive that traffic plan because it's such a small area.

Mr. O'Neil wanted to note that the neighborhoods to the west have sidewalks and its important for kids walking to school. It would be very much appreciated and he encourages Mr. Thomasma to put sidewalks in. Mr. Thomasma stated that he will take it under consideration. Commissioner Anderson stated that the sidewalks would be good for the Township.

Commissioner Ruggles moved to recommend to the White Lake Township Board of Trustees the approval of the rezoning of the property described as parcel number 12-29-476-006 (vacant parcel), located on the northwest corner of Bogie Lake and Cedar Island Road, consisting of approximately 10.3 acres from (AG) Agricultural to (R1-A) Single Family Residential. Subject to all Planning Department and consultant comments and the waiver of the traffic plan. Commissioner Dehart supported and the MOTION CARRIED with a roll call vote: (Anderson – yes; Dehart – yes; Meagher – yes; Slicker – yes; Grubb – yes; Fine – yes; Seward – yes; Ruggles -- yes). 8 yes votes

This will be forwarded to the Township board for the first reading.

Old Business:

No old business.

New Business

a) Lakepointe

Location:	Located on the northeast corner of Union Lake Road and Carpathian, consisting of approximately 13.32 acres. The property is currently zoned PD (Planned Development). Identified as parcel numbers 12-36-177-002 and 17-36-177-003.
Request:	**i) Final Site Plan**
	ii) Planned Development Agreement
Applicant:	Fairview Construction Company

Mr. Leuffgen referenced his letter and noted that they recommend approval with other agency approvals. This development is tied into West Valley across the street.

Commissioner Slicker noticed in the detention calculations that it drains to the north, not the ultimate outlet. He wanted to make sure he checked the outlet downstream. They designed Lakepointe site to detain water on site. Originally it was proposed as retention, now detention with outlet through West Valley. They acquired the adequate discharge permits through EGLE.

Commissioner Anderson asked if the water flow was going to be underneath Union Lake, and that is correct. How do they manage that? Is it a situation that won't affect the traffic flow? All utilities are bore and jack or directional, with no road closures. How far below the road surface? It's a

minimum of three feet of cover. The northeast side of Union Lake Road doesn't currently have drainage and it floods, this will resolve the flooding.

Commissioner Meagher saw some unresolved items from Mr. Leuffgen's letter. One of the items was a comment about a bypass lane and it was not needed.

Commissioner Slicker asked about the sidewalk layouts. The layout was the only way they could make them ADA compliant and extend them to the sidewalks along the road. ADA requires maximum longitude slope of 5%. He feels the sidewalk is pushing people towards walking in the road. Mr. Furnari will pay $ 2,050 toward the sidewalk fund since they were unable to connect to Independence Village. The sidewalks would have to comply and probably have a landing on the other side of the road. Mr. Emerine said that they were asked to do this about two years ago. On the final construction site plan we'll make sure it's compliant.

Mr. O'Neil presented the McKenna letter. One item has to do with a deficiency in plantings. There is some existing vegetation. They are short shrubs and planting trees and perennials in place. Mr. O'Neil has no objection to that. There is no street lights, they are proposing coach lights. They proposed this across the street at West Valley. The applicants have indicated that they intend to meet all the requirements.

Commissioner Dehart still has an issue with the bypass lane. The traffic is horrendous and she thought we said that we wanted a traffic study. Is there anyway to alleviate the turning issues without putting in the turn lane? Mr. Emerine noted that they spoke with someone who is very familiar with the traffic study. The level of service did not change per her study. She did the analysis showing that the level of service didn't change and also included West Valley. Commissioner Anderson took issue with the study. We have passing lanes on Elizabeth Lake Road and other areas where the traffic is less than Union Lake Road. He felt she couldn't validate why we have turning lanes in other areas. Commissioner Anderson noted that we definitely have some concerns about this. Mr. Leuffgen stated that we reviewed the assessment and checked the numbers, they did not disagree with the numbers.

Mr. O'Neil noted that the Community Impact Study is required to document the impact of intensive developments. A Meijer would be intensive. This is the same level of intensity as the development across the street. It didn't seem equitable. Commissioner Meagher asked if the issue for the Community Impact Study is the time it takes or the cost, it's probably both. Commissioner Anderson asked if the other subdivisions and developers don't have a problem with this. Mr. Emerine can't speak to that.

Mr. Emerine can go into the CIS for some items, but he will defer others to Mr. Furnari. Mr. Furnari stated that we think we're providing a unique property keeping active adults and empty nesters in your community. It is a product that is lacking in a lot of communities. Financially it is a multi million dollar property. We're bringing utilities along Union Lake Road. These studies are typically for larger developments. Typically you don't need it for a 69 unit development.

Commissioner Grubb wanted to comment that she has concerns about traffic and people having to wait for people to turn in front of them. She doesn't have a problem with the landscape deficiencies.

Commissioner Slicker asked if the RCOC has looked at the whole corridor and looked at the acceleration/deceleration lanes. Mr. O'Neil doesn't know, he doesn't meet with them regularly.

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He's a little disappointed they didn't require it. These two projects are at the tail end of decades worth of development with little attention paid to cars. This project probably doesn't have an opportunity to make it any better or any worse. Commissioner Anderson asked if we can do anything about a bypass lane. Mr. O'Neil noted that if we were concerned about it, we should have dug in on this at the very first meeting and this puts us in an odd spot that the RCOC says we don't have to do it.

Mr. Leuffgen went over his letter dated 4-23-21 for the development agreement. They defer to the Township attorney for agreement language. They recommend a joint maintenance agreement between West Valley and Lakepointe, West Valley is critical to Lakepointe. Mr. O'Neil discussed the McKenna review letter and the attorney review. Mr. O'Neil noted that in the future if they did condos, they would need a private road agreement. If the applicant agrees to conditions of the letter, we'll be in good shape for the development agreement. Mr. O'Neil wanted to note that there was discussion about community benefit and Mr. Furnari agreed to make a $ 5,000 contribution to Parks fund and $2,050 to the sidewalk fund. We need to have final action on the site plan and the planned development agreement.

Mr. Emerine wanted to comment that they have revised the planned development agreement and everything has been addressed. The development schedule comment will be addressed. Commissioner Slicker wanted to ask about the clubhouse being built as part of the site plan, it has to be built per the site plan.

Commissioner Meagher moved to recommend to the White Lake Township Board of Trustees the approval of the Planned Development agreement for Lakepointe. The approval will include the waiver of the Community Impact Study and is subject to all Planning Department and consultant comments. The development agreement will include a $5,000 contribution to the Park Fund and a $ 2,050 contribution to the sidewalk fund. Commissioner Dehart supported and the MOTION CARRIED with a roll call vote: (Anderson – yes; Dehart – yes; Meagher – yes; Slicker – yes; Grubb – yes; Fine – yes; Seward – yes; Ruggles -- yes). 8 yes votes

Commissioner Meagher moved to recommend that the Planning Commission approve the Final Site Plan for Lakepointe. The approval is subject to all Planning Department and consultant comments. Commissioner Fine supported and the MOTION CARRIED with a roll call vote: (Anderson – yes; Dehart – yes; Meagher – yes; Slicker – yes; Grubb – yes; Fine – yes; Seward – yes; Ruggles -- yes). 8 yes votes

Liaison's Report

Commissioner Grubb reported that Parks and Recreation will have a meeting next Wednesday, May 12th.

Trustee Ruggles reported that the White Lake Township board of trustees met twice since the last Planning Commission meeting. They will meet in person for the next meeting. At the last meeting the board recommended to approve River Caddis as our developer to work together for the Civic Center Development Committee. Trustee Ruggles thanked everyone for their time with the CCDC. He respects the committee decision when they put in so much time. The Fee Ordinance was updated. The Township entered into a contract with our new Fire Chief, John Holland. Supervisor Kowall read a resolution about May being mental health awareness Month.

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Commission Dehart noted that the ZBA meetings have run quite long lately. They go through the state standards on each case to make sure each case meets the state standards.

Planning Consultant's Report

Mr. Leuffgen reported that the Bogie Lake north sanitary sewer project is nearing an end. The plans are in for Aspen Meadows iron filtration. The plans are in for permits to bring water to the Huron Valley Schools complex.

Director's Report:

Mr. O'Neil reported that last weekend a few people were out at 4 Corners for a temporary Certificate of Occupancy for 8030 Wadi for the 1st and 2nd floor. 4 Corners has about 8 units rented out. They are a few months behind on 8020 Wadi and it looks pretty good exterior wise. The Preserve at Hidden Lake determined townhouses won't be in their best interest and they will go to a duplex concept for the north end. The townhouses have lots of stairs and probably are not widely embraced in White Lake Township. They are reducing units. Mr. O'Neil noted that the development at the old Ruggles farm lot will probably not be successful unless they incorporate the vision of the Planning Commission and CCDC. New Hope is making progress and working on a storm water issue. Centerpointe Plaza nearing completion and looking for tenants. We hope they get finished and tenanted out. Construction costs are so high right now, but we remain optimistic.

Trustee Ruggles wanted to note that Township board didn't see anything impressive with the plans for the corner of M-59 and Elizabeth Lake Road.

Other Business:

None.

Communications:

Mr. O'Neil noted that there is a 50/50 chance of having either of the next two meetings.

Next Meeting Dates: May 20th, 2021
June 3rd, 2021

Adjournment:

Commissioner Meagher moved to adjourn the meeting at 9:08 p.m. Commissioner Fine supported and the MOTION CARRIED with a roll call vote: (Anderson – yes; Dehart – yes; Meagher – yes; Slicker – yes; Grubb – yes; Fine – yes; Seward – yes; Ruggles -- yes). 8 yes votes

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Director's Report

Project Name: Preserve at Hidden Lake

Description: Amended Final Site Plan

Date on Agenda this packet pertains to: June 3rd, 2021

- ☐ Public Hearing
- ☑ Initial Submittal
- ☑ Revised Plans
- ☐ Preliminary Approval
- ☑ Final Approval

- ☐ Special Land Use
- ☐ Rezoning
- ☐ Tentative Preliminary Plat
- ☐ Final Preliminary Plat
- ☐ Other :

Contact	Consultants & Departments	Approval	Denial	Approved w/ Conditions	Comments
DLZ	Engineering	☐	☐	☑	See letter dated 05/20/21
McKenna & Associates	Planning Consultant	☐	☐	☑	See letter dated 05/24/21
John Holland	Fire Chief	☐	☐	☑	See letter dated 05/20/21
Sean O'Neil	Planning Director	☐	☐	☑	Per reviewer's comments.

DLZ
ARCHITECTURE • ENGINEERING • PLANNING
SURVEYING • CONSTRUCTION SERVICES

INNOVATIVE IDEAS
EXCEPTIONAL DESIGN
UNMATCHED CLIENT SERVICE

May 20, 2021

Sean O' Neil
Community Development Department
Charter Township of White Lake
7525 Highland Road
White Lake, Michigan 48383

RE: **Preserve at Hidden Lake** - Revised FSP Review #3

DLZ# 1845-0886-00

Dear Mr. O' Neil,

We have completed our review of the revised Final Site Plan for the above-mentioned project. Plans were prepared by Kieft Engineering and are dated May 6, 2021. The submittal indicates some of the unit types have been revised for phases 2 & 4. We offer the following comments with respect to the submitted plans:

Please note that comments from our April 27, 2021 review letter are in *italics*. Responses to those comments are in **bold**. New comments are in standard typeface.

Our office also received the updated Final Engineering Plans dated May 6, 2021.

In addition, we have also included comments for the following easement documents that were submitted under separate cover to our office:

- Sanitary Sewer Easement Sketch for Phases 2-4 dated April 20, 2021.
- Water Main Easement Sketch for Phases 2-4 dated April 20, 2021.
- Storm Sewer Easement Sketch for Phases 2-4 dated April 19, 2021.

<u>Final Site Plan (FSP) Comments:</u>

<u>General</u>

1. *The revised plans will need to be signed & sealed; signature is missing on electronic submittal.*
   Comment addressed. Plans have now been signed and sealed on both the FSP and FEP.

2. *The title block indicates only phase 2&4 are revised; however, Phase III has been changed from the stamped approved plan set as follows:*
    a. *Total Phase III Acreage changed from 11.53 to 11.49 Acres*
    b. *The number of units in Phase III changed from 28 units to 27 units*
    c. *The unit lines along Preserve Lane changed (this is where the missing unit came from) and the location of the storm sewer shifted further south from the previous approval.*

    Items a.-c.- Comments addressed, Design engineer notes in response letter that these items have been revised to match the Exhibit B plans and notes that the Exhibit B plans are in process. Please also note that unit numbering for Phases 2-4 will need to be in accordance with Oakland County requirements.
3. *Setbacks noted on the Final Site Plan and Final Engineering Plan shall also match and be noted on the Exhibit B documents for Phases 2-4.* **Comment will be reviewed on the Exhibit B drawings for consistency.**
4. We note that Sheet 1 indicates 28 units for Phases 4-17. We count 29. Please verify. In addition, the FEP indicates Phase 4 only and does not list as Phases 4-17. Please clarify.

<u>Sanitary Sewer</u>

1. *FSP should include proposed sanitary lead locations.* **Comment remains as a notation. Sanitary lead locations have been shown for all phases on the FEP. Note the Township DPS has indicated the driveways shall not be located in the influence of the service leads. Care must be taken during individual unit planning to avoid conflict.**

<u>Watermain</u>

1. *FSP should include domestic water service locations in the revised plan. Lead locations appear to be shown on Sheet 4 but not on units on Sheet 3, for consistency we recommend removing leads from sheet 3 of the FSP. The FEP plans indicate proposed lead locations adequately.* **Comment addressed. Note the Township DPS has indicated the driveways shall not be located in the influence of the service leads. Care must be taken during individual unit planning to avoid conflict.**
2. *We defer comment regarding fire hydrant coverage and site access to the Township Fire Department.* **Comment remains as a notation.**

Comments that will Need to be Addressed on Final Engineering Plan (FEP):

General

1. *The updated Landscaping Plan will need to include sanitary sewer, storm sewer, and watermain locations.* **Comment partially addressed. It appears that the water and sanitary sewer lead locations are now shown but not the storm sewer. The lead locations will need to be darker as they are difficult to see on the Landscape Plans. Additionally, there are many locations where street trees are proposed to be planted directly over leads; the trees proposed near the watermain stub to Kettering Street will also need to be planted outside the influence of the watermain.**

Paving and Grading

1. *Clarify on Sheet 7 what the area that appears to be boulders is in the back of Unit 31.* **Comment outstanding. The design engineer has indicated that the boulders have been removed and contours added. However, grades in this area now exceed the maximum allowable 33% grade. Please revise. Shall a retaining wall be required, a 36" minimum height decorative railing will need to be installed at the top of the wall if the wall height exceeds 30".**
2. *Sheet 5- The area along Arcadia Lane now proposes a higher boulder wall than previously proposed. Add note to this area that a 36" minimum height decorative railing shall be installed at the top of the wall. This railing is required per Township Ordinance in residential areas where retaining walls higher than 30" are proposed.* **Comment addressed.**

Sanitary Sewer

1. *The revised plans do not appear to change the location of the proposed sanitary sewer so a permit revision with EGLE should not be necessary. The plans will need to be updated to show the revised Sanitary sewer basis of design so the updated sanitary sewer loading can be reported to OCWRC and Commerce Township.* **Comment remains. Upon final revisions of the plan set the sanitary sewer plans and tracking sheet will be provided to Commerce Township and OCWRC for consistency with the number of REU's associated with phase II & III. Please adjust the proposed REU contributions per phase to match the units within each phase.**
2. *Approval and permits will be required for the phase IV sanitary sewer extension from OCWRC and EGLE. Please provide completed Part 41 permit application with revised plan submittal for the OCWRC permit submittal.* **Comment remains. Design engineer indicates the application is attached. However, we did not receive.**

Watermain

1. *The revised plans do not appear to change the location of the proposed watermain; a permit revision with EGLE should not be necessary.* **Comment remains as a notation, no further action is required.**
2. *It appears the watermain will be installed below sanitary sewer service leads for units 48-53. Township Engineering design standards discourage this configuration; however, we believe it necessary due to available grade for the gravity sanitary sewer system. The engineering design standards item D.8 indicates if this is necessary the crossing shall be perpendicular and no watermain joint shall be closer than 8 feet from the sewer. Please identify all areas where this will occur and include appropriate notes to the plan set.* **Comment partially addressed, please further clarify the note on Sheet 22 to indicate this treatment is for Units 48-53.**

Easement Review Comments

1. Sanitary Sewer Easement 1 – closes (.0095)
   Call out the POB of Sanitary Sewer Easement No. 1 in the description.

2. Sanitary Sewer Easement 2- closes (0.117)
   Call out the POB of Sanitary Sewer Easement No. 2 in the description.

3. Sanitary Sewer Easement – **Preserve at hidden Lake** – We c*ould not get this to close* and did not see plan document to check it against, please review and revise as necessary.

4. Water Main Easement – Call out the POB of Centerline of Watermain Easement in the description and qualify POE of W2, W3, W5 and W6 to the West line of Section 36.

5. Water Main Easement **– Preserve at Hidden Lake** – We c*ould not get this to close* and did not see plan document to check it against.

6. Storm Sewer Easement 4 – closes (.0050) – Call out the POB of Storm Sewer Easement No. 4 in the description.

7. Storm Sewer Easement 5 – closes (.0471) – Call out the POB of Storm Sewer Easement No. 5 in the description.

8. Storm Sewer Easement 6 – Please review description as closure is only within .8639 feet. Please call out the POB of Storm Sewer Easement No. 6 in the description.

9. Storm Sewer Easement 7 – closes (.0328) – Call out the POB of Storm Sewer Easement No. 7 in the description.

10. Storm Sewer Easement – **Preserve at Hidden Lake** – We c*ould not get this to close* and did not see plan document to check it against, please review and revise as necessary.

Recommendation

We find the Final Site Plan (FSP) to be acceptable subject to the clarification of the unit and phase numbering referenced above. We note a few minor items that should be addressed on the Final Engineering Plans (FEP) prior to final approval. ***Upon resubmittal of the revised plans, we respectfully request that a response letter from the applicant's engineer be provided so as to assist in the efficiency of our rereview.***

Please feel free to contact our office should you have any questions.

Sincerely,

DLZ Michigan

Michael Leuffgen, P.E.
Department Manager

Victoria Loemker, P.E.
Senior Engineer

Cc: Justin Quagliata, Community Development, *via email*
Hannah Micallef, Community Development, *via email*
Aaron Potter, DPS Director, White Lake Township, *via email*
John Holland, Fire Chief, White Lake Township, *via email*

Enc. none

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MCKENNA

May 24, 2021

Planning Commission
Charter Township of White Lake
7525 Highland Road
White Lake, MI 48383

Subject: Preserve at Hidden Lake Planned Development Final Site Plan Review #6

Location: West side of Union Lake Road, between Cooley Lake and Hutchins Roads
Tax Parcel No. 12-36-101-001, -003, and -004

Dear Planning Commissioners:

Preserve at Hidden Lake, LLC has submitted revised plans to develop a 97-unit residential development on a site consisting of 38.33 gross acres for PD zoning. The site contains a 6.38-acre lake. The plans previously proposed a mixture of 37 townhouse units, 12 duplex units, 3 units in a three-plex configuration, and 68 single-family lots. The revised final site plan proposes 68 single-family lots in a similar configuration to the previously submitted plans, with 26 duplex units and one triple unit building. The applicant is no longer proposing the 37 townhouse units as was previously considered by the planning Commission in May of 2019.

Planned Development approval involves three (3) steps: Preliminary Site Plan Review, Final Site Plan Review, and Development Agreement Review. We have reviewed the application for compliance with the Township's Zoning Ordinance and Master Plan, as well as sound planning and design principles, and offer the following comments:

Planned Development Review Process

The Planned Development review process involves the following three (3) steps:

1. Preliminary Site Plan Review: This is the step in which the number of units and road layout are established, the amount of open space is determined, and other project details are decided upon. At the preliminary review step the Planning Commission holds a public hearing. The Planning Commission must review the PD proposal and make a recommendation to the Township Board for the preliminary site plan. The Township Board is required to take action, approving or denying the preliminary site plan. The property is rezoned to PD at the end of this step.
2. Final Site Plan Review: Final site plan review is the step at which all of the details are included on the final site plan and all of the conditions of preliminary site plan review must be satisfied. The Planning Commission is required to review the final site plan and take action, approving or denying the final site plan. It is at this step where the Planning Commission also reviews the proposed Development Agreement and makes a recommendation to the Township Board

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28 West Adams Street
Suite 1000
Detroit, Michigan 48226

O 313.888.9882
F 248.596.0930
MCKA.COM

3. Development Agreement Review: Upon recommendation of the Development Agreement by the Planning Commission, the Township Board takes final action on the Development Agreement.

Review Comments

1. **Zoning, Land Use, and Future Land Use:** The current Zoning District, current land use, and future land use of the site, as well as the surrounding areas, are as follows:

	Zoning Districts	Current Land Uses	Future Land Use
Site	PD District	Preserve at Hidden Lake	Planned Neighborhood
North	R1-D	Vacant	Planned Neighborhood
East	R1-C	Residential	Residential Resort
South	LB, R1-A, & R1-C	Residential	Planned Neighborhood and Residential Resort
West	R1-D	Residential	Residential Resort

Single family is a permitted use in the PD District.

2. **Required Information:** For Planned Development final site plan review, all of the required information listed in Section 6.8 of the Zoning Ordinance must be included. All required information for a final site plan was provided during the previous review and approval in 2019. We note a few instances in this review where it may be appropriate to update several of these items, such as landscaping and building elevations.

3. **Dimensional Standards:**

   a. **Lot Area, Setbacks, Lot Coverage.** Sections 3.1.10 (PD, Planned Development District) and 3.11 (Notes to District Standards) of the Zoning Ordinance include provisions for minimum lot area, setbacks, and lot coverage, as follows:

	Zoning Ordinance Requirements	PD
Min. Lot Area (Site)	10 acres (PD District)	38.33 acres
Min. Lot Area (Lots)	TBD	7,045-13,436 SF
Min. Lot Width (Lots)	TBD[1]	70'at setback
Min. Front Yard (Lots)	40'	25'
Min. Side Yard (Lots)	25' min. and 50' combined.[2]	10' min.
Min. Rear Yard (Lots)	TBD	15-60'
Max. Height	30' or 2 stories	Not provided.[3]
Max. Lot Coverage	Governed by parking, landscaping, etc.	30% or less

   b. **Wetland Setbacks.** Section 3.11(Q) of the Zoning Ordinance requires all buildings to be located at least 25 feet from a regulated wetland, submerged land, or other water body. The plan requires the building envelopes to be at least 25' from the regulated wetland edge surrounding the pond.

[1] A minimum of 65' of width is required along the right-of-way for lots on curvilinear streets or cul-de-sacs.
[2] Side entry garages require a 25' side yard setback.
[3] We noted in 2019 that the tallest elevation had an average height of approximately 32.5'. No revised elevations were submitted with this version of the plans.

c. **Setbacks**. We would like to note that three units have setbacks which differ from what is typical for the other units. Unit 78 has a 19' rear yard setback, while unit 89 is setback 25' from the Union Lake and Hutchins Road rights-of-way, and unit 69 has a 40-foot setback in the rear from the Union Lake Road right-of-way.

4. **Landscaping and Screening:** The site was historically farmed but, since those activities ceased, has grown to be heavily wooded, with the exception of the 3.83-acre northern parcel. The plan will preserve woodlands only at the periphery. We previously reviewed a conceptual plan that called for the maintenance of existing vegetation along the majority of the west and south side of the site, street trees, random plantings in the common areas, evergreens and flowering trees along the Union Lake Road side of the single-family, detached lots, and adding screen fencing and evergreens where the existing greenbelt will be removed at the site's west and south sides. The final site plan included a landscape plan that was consistent with the concept approved. The screening fence proposed for those locations where neighboring properties will not have an adequate vegetative screen is now shown as 6', decorative, white vinyl.

   Though most of the previously approved landscaping is unaffected by the changes to proposed layout. The applicant has proposed a row of shademaster Honeylocust deciduous trees adjacent to units 94-97 and 69-76. Additionally, a number of spruce trees are proposed behind the units, adjacent to the road. We believe the proposed landscaping changes are appropriate.

5. **Building Architecture and Design:** Section 6.7(C)(iii) requires residential Planned Developments to provide variations in building facades and setbacks that avoid the creation of regimented alignment of buildings. However, design compatibility within the development is required, and garages are recommended. As the proposed streets are generally curving, alignment is not much of an issue for the detached and duplex areas.

   Elevations were included in the approved plan set when the Planning Commission considered this development in May of 2019. Revised elevations were not submitted as part of this application. If the changes are proposed to building material, color, or a similar item of importance to the building design and architecture, revised elevations must be submitted for review and approval.

6. **Layout and Open Space:** The layout of the single-family portion of the development appears to be consistent with the preliminary and previously approved final site plan. With the removal of the proposed townhomes from the plans, the northern most portion of the site will vary from the layout that was considered in 2019 Alder Lane will remain unchanged. However, a second drive lane to the east of Alder, is no longer necessary. It has been removed from the plans. Where duplexes have taken the place of the previously proposed townhouses, a minimum of 20-feet is maintained between building groupings.

7. **Sidewalks and Non-Motorized Pathway:** Safety paths are shown along Union Lake Road and Hutchins Road, consistent with ordinance requirements. Sidewalk connections are provided to the subdivision to the west at Milward, Ashdown, Mandon, and Kettering Streets.

8. **Roads and Access:** The proposed development has two access points unto Union Lake Road and one on Hutchins Road. The southernmost connection is aligned with Akehurst Lane to the east. The applicant has previously submitted a Traffic Impact Study, which was discussed during preliminary review.

   While there are numerous public streets that intersect the property to the west, the applicant is not proposing to connect to any of these, given that private roads are proposed for the development and given the potential for cut through traffic. An emergency connection is proposed to Hidden Cove Drive to the south.

9. **Off-Street Parking:** Two car garages and driveways will accommodate the required off-street parking for the units themselves. Previously There are 13 guest spots provided for the townhouses, which have been removed from the proposed plans.

10. **Lighting:** Section 5.18(G) of the Zoning Ordinance includes standards for outdoor lighting and requires light levels to be the minimum necessary for safety, security, and illumination in light of the proposed use in the discretion of the Planning Commission. No street, driving, or parking area lighting has been proposed with these plans.
11. **Signs:** The plans indicate a monument sign is planned for each of the three entryways to the development. The applicant has not proposed change to the number of signs from the previously approved version of these plans.
12. **Community Impact:** A Community Impact Statement has been provided, as was discussed during preliminary review.

Recommendation

The revised final site plan differs from the preliminary and final site plan in the types and total number of dwelling units proposed. It also diverges slightly in the street layout around the duplex area on the north side of the development. Generallythough, it conforms to the previously approved site plans, maintaining a similar layout for the sing-family area of the development. If the Commission is comfortable with the applicant's responses to the issues raised herein, we find approval of the revised final site plan appropriate.

If you have any questions about this report or require additional information, please do not hesitate to contact us.

Respectfully submitted,

McKENNA

Chris Madigan, AICP
Associate Planner

cc: Mr. Sean O'Neal, AICP
Mr. Justin Quaqliata
Ms. Hannah Micallef

Fire Department
Charter Township
of White Lake

Site / Construction Plan Review

To: Sean O'Neil, Planning Department Director

Date: 05/20/21

Project: Preserve at Hidden Lake

File #: 18-018

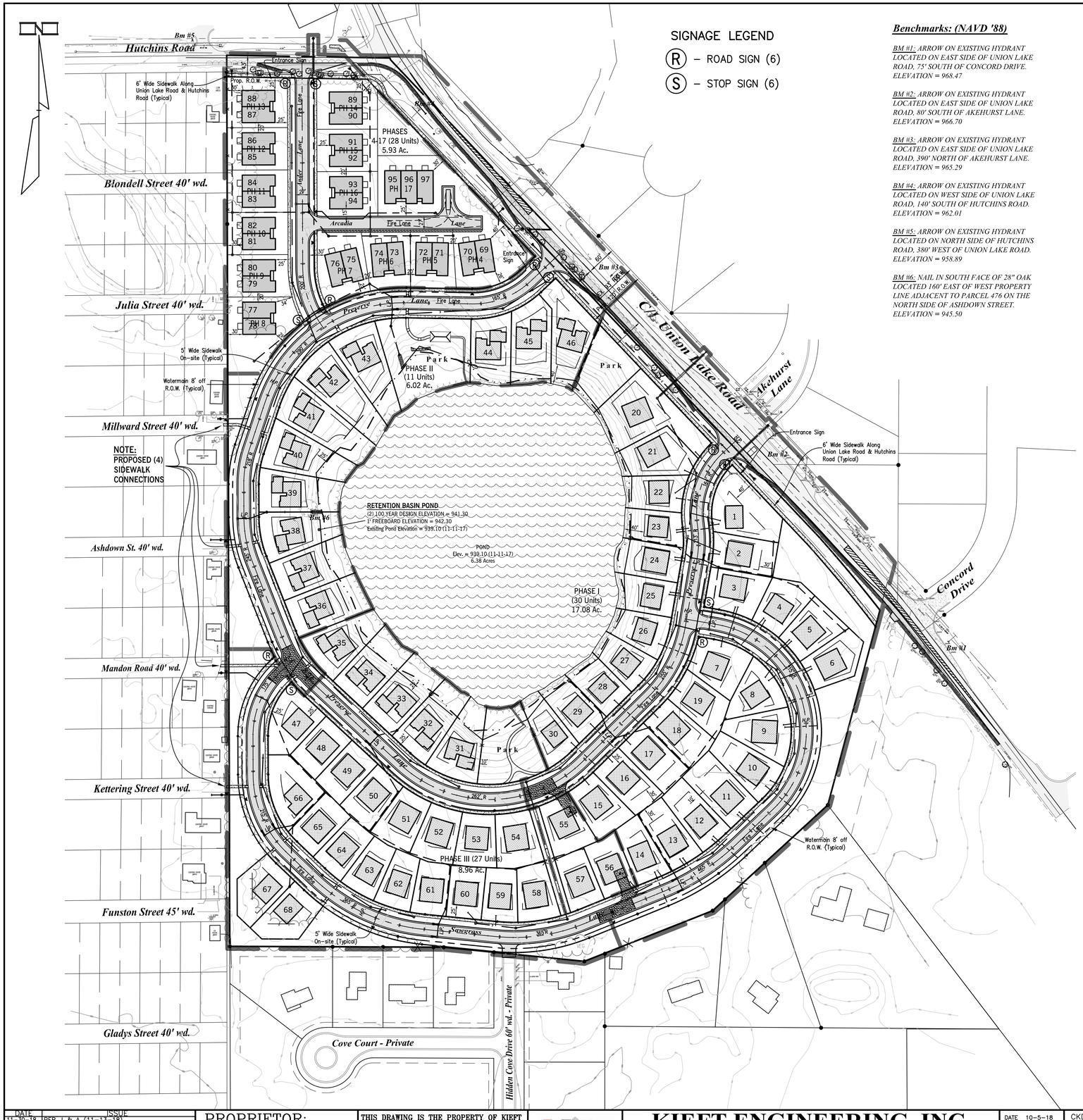
Date on Plans: 10/05/18

The Fire Department has the following comments with regards to the revised plan submitted on 05/10/21 for the project known as Preserve at Hidden Lake:

1. All turn radiuses including the dead-end turn-around shall accommodate a 40' cab-over truck. We request a response letter from the applicant's design engineer or a turn radius profile that demonstrates apparatus movement. **No further comments**

John Holland
Fire Chief
Charter Township of White Lake
(248)698-3993
jholland@whitelaketwp.com

Plans are reviewed using the International Fire Code (IFC), 2015 Edition and Referenced NFPA Standards.



SIGNAGE LEGEND

(R) – ROAD SIGN (6)

(S) – STOP SIGN (6)

Benchmarks: (NAVD '88)

BM #1: ARROW ON EXISTING HYDRANT LOCATED ON EAST SIDE OF UNION LAKE ROAD, 75' SOUTH OF CONCORD DRIVE. ELEVATION = 968.47

BM #2: ARROW ON EXISTING HYDRANT LOCATED ON EAST SIDE OF UNION LAKE ROAD, 80' SOUTH OF AKEHURST LANE. ELEVATION = 966.70

BM #3: ARROW ON EXISTING HYDRANT LOCATED ON EAST SIDE OF UNION LAKE ROAD, 390' NORTH OF AKEHURST LANE. ELEVATION = 965.29

BM #4: ARROW ON EXISTING HYDRANT LOCATED ON WEST SIDE OF UNION LAKE ROAD, 140' SOUTH OF HUTCHINS ROAD. ELEVATION = 962.01

BM #5: ARROW ON EXISTING HYDRANT LOCATED ON NORTH SIDE OF HUTCHINS ROAD, 380' WEST OF UNION LAKE ROAD. ELEVATION = 958.89

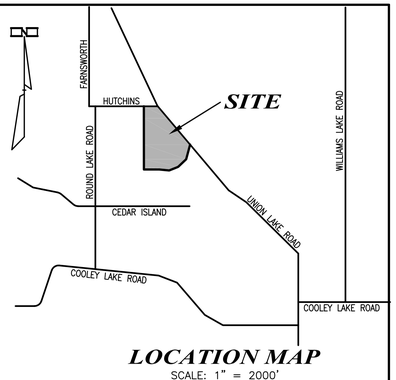
BM #6: NAIL IN SOUTH FACE OF 28" OAK LOCATED 160' EAST OF WEST PROPERTY LINE ADJACENT TO PARCEL 476 ON THE NORTH SIDE OF ASHDOWN STREET. ELEVATION = 945.50

LEGEND

EXISTING / PROPOSED

STORM SEWER
SANITARY SEWER
WATERMAIN
GAS MAIN
ELEC. TELE. CABLE
STORM MANHOLE
CATCH BASIN
INLET
REARYARD CATCH BASIN
END SECTION
SANITARY MANHOLE
GATE VALVE AND WELL
HYDRANT
CONTOURS

LOT #	AREA	LOT #	AREA
1	13,436 SF/0.31 acres	35	11,556 SF/0.27 acres
2	8,811 SF/0.20 acres	36	12,382 SF/0.28 acres
3	9,274 SF/0.21 acres	37	12,167 SF/0.28 acres
4	8,264 SF/0.19 acres	38	11,886 SF/0.27 acres
5	8,752 SF/0.20 acres	39	12,133 SF/0.28 acres
6	8,777 SF/0.20 acres	40	12,652 SF/0.29 acres
7	9,689 SF/0.22 acres	41	14,442 SF/0.33 acres
8	8,449 SF/0.19 acres	42	14,742 SF/0.34 acres
9	9,842 SF/0.23 acres	43	13,610 SF/0.31 acres
10	9,683 SF/0.22 acres	44	10,764 SF/0.25 acres
11	10,659 SF/0.24 acres	45	12,772 SF/0.29 acres
12	9,068 SF/0.21 acres	46	13,793 SF/0.32 acres
13	8,881 SF/0.20 acres	47	9,939 SF/0.23 acres
14	8,040 SF/0.18 acres	48	7,462 SF/0.17 acres
15	8,979 SF/0.21 acres	49	7,686 SF/0.18 acres
16	8,790 SF/0.20 acres	50	8,299 SF/0.19 acres
17	9,100 SF/0.21 acres	51	8,720 SF/0.20 acres
18	9,460 SF/0.22 acres	52	8,454 SF/0.19 acres
19	8,598 SF/0.20 acres	53	8,028 SF/0.18 acres
20	18,607 SF/0.43 acres	54	8,931 SF/0.21 acres
21	10,891 SF/0.25 acres	55	8,604 SF/0.20 acres
22	8,100 SF/0.19 acres	56	7,917 SF/0.18 acres
23	7,490 SF/0.17 acres	57	7,413 SF/0.17 acres
24	9,031 SF/0.21 acres	58	8,001 SF/0.18 acres
25	8,087 SF/0.19 acres	59	7,070 SF/0.16 acres
26	7,968 SF/0.18 acres	60	7,231 SF/0.17 acres
27	7,636 SF/0.18 acres	61	7,063 SF/0.16 acres
28	7,912 SF/0.18 acres	62	7,045 SF/0.16 acres
29	8,540 SF/0.20 acres	63	7,090 SF/0.16 acres
30	8,438 SF/0.19 acres	64	7,371 SF/0.17 acres
31	11,649 SF/0.26 acres	65	7,715 SF/0.18 acres
32	11,863 SF/0.27 acres	66	10,551 SF/0.24 acres
33	12,200 SF/.28 acres	67	9,355 SF/0.21 acres
34	11,860 SF/0.27 acres	68	9,216 SF/0.21 acres



LOCATION MAP

SCALE: 1" = 2000'

UTILITY INFORMATION

A 12' WIDE PERMANENT PRIVATE EASEMENT FOR WATER SUPPLY SYSTEM GRANTED TO WHITE LAKE TOWNSHIP AND CENTERED ON THE UTILITY AS SHOWN.

A 20' WIDE PERMANENT PRIVATE EASEMENT FOR SANITARY SEWER SYSTEM GRANTED TO WHITE LAKE TOWNSHIP AND CENTERED ON THE UTILITY AS SHOWN.

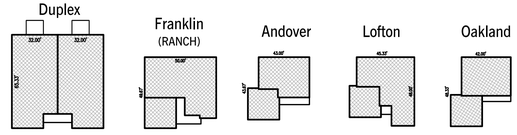
A 20' WIDE PERMANENT PRIVATE EASEMENT FOR STORM SEWER SYSTEM GRANTED TO WHITE LAKE TOWNSHIP AND CENTERED ON THE UTILITY AS SHOWN.

APPROPRIATE EASEMENTS FOR PROPOSED SANITARY SEWER AND WATER MAINS WILL BE DEDICATED TO WHITE LAKE TOWNSHIP BY SEPARATE DOCUMENTS.

ALL PRIVATE ROADWAYS ARE A PERMANENT EASEMENT FOR INGRESS/EGRESS AND OPERATION/MAINTENANCE OF THE WATER SUPPLY SYSTEM AND SANITARY SEWER SYSTEM.

TYPICAL BUILDING FOOTPRINTS

ALL SINGLE FAMILY UNITS AS DESIGNED WILL ACCOMMODATE AT LEAST THE ANDOVER AND OAKLAND FOOTPRINT



As Surveyed (Total Parcel)

PART OF THE NORTHWEST 1/4 OF SECTION 36, TOWN 3 NORTH, RANGE 8 EAST, WHITE LAKE TOWNSHIP, OAKLAND COUNTY, MICHIGAN, BEING MORE PARTICULARLY DESCRIBED AS BEGINNING AT THE NW CORNER OF SECTION 36, T3N, R8E; TH S 89°00'59" E 323.66 FT TO A POINT ON THE CENTERLINE OF UNION LAKE ROAD; TH ALONG SAID CENTERLINE S 24°10'25" E 4.31 FT; TH S 43°23'32" E 463.24 FT; TH N 89°00'59" W 46.17 FT TO A POINT ON THE WESTERLY RIGHT-OF-WAY OF UNION LAKE ROAD; TH ALONG SAID RIGHT-OF-WAY S 43°23'32" E (REC. AS S 43°45'20" E) 839.31 FT; TH ALONG SAID RIGHT-OF-WAY BEING A CURVE TO THE RIGHT 189.89 FT (REC. AS 181.81 FT), SAID CURVE HAVING A RADIUS OF 2831.93 FT, A DELTA OF 03°50'31" AND A LONG CHORD OF S 39°47'49" E 189.86 FT (REC. AS S 41°55'00" E 181.78 FT); TH S 14°57'09" W 400.35 FT (REC. AS S 15°00'00" W 418.26 FT & 412.17 FT); TH S 47°26'59" W (REC. AS S 46°30'00" W) 310.00 FT; TH S 68°27'06" W 229.86 FT TO THE NE CORNER OF "HIDDEN COVE" CONDOMINIUM, O.C.C.P. NO. 1097; TH THE FOLLOWING THREE COURSES ALONG THE NORTH LINE OF SAID "HIDDEN COVE" CONDOMINIUM S 68°27'06" W 43.95 FT (REC. AS S 68°00'00" W 43.57 FT) AND N 84°15'40" W (REC. AS N 84°30'00" W) 280.00 FT AND TH N 89°45'40" W 424.46 FT (REC. AS WEST 426.99 FT) TO THE NW CORNER OF SAID "HIDDEN COVE" CONDOMINIUM BEING A POINT ON THE WEST LINE OF SECTION 36; TH ALONG SAID WEST LINE N 00°12'01" W 1768.32 FT TO THE POINT OF BEGINNING. CONTAINING 37.99 ACRES. SUBJECT TO THE RIGHTS OF THE PUBLIC OVER THE NORTH 33 FT FOR HUTCHINS ROAD AND THE NORTHEASTERLY 33 FT FOR UNION LAKE ROAD. ALSO SUBJECT TO EASEMENTS AND RESTRICTIONS OF RECORD.

Sheet Index:

1. *Overall Site Plan*
2. *Existing Conditions Plan*
3. *Final Site Plan - North*
4. *Final Site Plan - South*
5. *Retention Basin Calculations, Details & Notes*
6. *Storm Sewer Profiles*
7. *Storm Sewer Calculations & Details*

Patrick C. McWilliams
STATE OF MICHIGAN
PATRICK McWILLIAMS
ENGINEER
NO. 31658
LICENSED PROFESSIONAL ENGINEER

STATE OF MICHIGAN
JAMES J. SCHARL
PROFESSIONAL SURVEYOR
NO. 19843
LICENSED PROFESSIONAL SURVEYOR

DATE	ISSUE
11-20-18	PER J & A (11-13-18)
1-11-19	PER J & A (12-19-18), McKenna (12-18-18), DPS
2-24-2021	PER CLIENT REVISED PHASE 2, 3 & 4 (1-22-2021)
3-25-2021	PER DLZ (3-11-2021), & McKENNA (3-11-2021)
5-6-2021	PER DLZ (4-27-2021), & McKENNA (4-26-2021)

PROPRIETOR:
Preserve at Hidden Lake, LLC
8255 CASCADE AVENUE, SUITE 110
COMMERCE TOWNSHIP, MICHIGAN 48382
(248) 842-8613

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PHONE (248) 625-5251 www.kiefteng.com FAX (248) 625-7110

DATE	10-5-18
DRAWN	GF
DESIGN	JJS
SECTION	36

CKD. BY | DATE

T- 3 -N. R- 8 -E.

72 HOURS (3 WORKING DAYS) BEFORE YOU DIG CALL MISS DIG 800-482-7171 (TOLL FREE)

Overall Site Plan

"Preserve at Hidden Lake"

WHITE LAKE TOWNSHIP, OAKLAND COUNTY, MICHIGAN

SCALE 1" = 100'

SHEET 1 OF 7

KE 2017.182

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P.O.B.
NW CORNER
SECTION 36
T3N, R8E

Bm #5

Hutchins Road

S 89°00'59" E 323.66'

S 54°10'25" E 47.12'

IRON W/CAP FD

Bm #4

IRON W/CAP FD

S 43°23'32" E 463.24'

20' SANITARY SEWER EASEMENT L. 20592, P. 129

8" WATER MAIN EASEMENT L. 20592, P. 132

16' MICHIGAN BELL RIGHT OF WAY L. 3571, P. 672 - 673

12-36-101-001
3.83 Acres
R-1D

IRON FD

N 89°00'59" W 46.17'

IRON W/CAP FD

IRON W/CAP FD

Bm #3

IRON W/CAP FD

C/L Union Lake Road

S 43°23'32" E (M)
S 43°45'29" E (R)

16' MICHIGAN BELL RIGHT OF WAY L. 3571, P. 672 - 673

Akehurst Lane

S 43°23'32" E (M)
S 43°45'29" E (R)
839.31'

Bm #2

MON FD

ARC=167.65'
RADIUS=2864.93'
DELTA=3°21'10"
LC=S 40°03'05" E
167.62'

MON FD

Concord Drive

IRON W/CAP FD

Bm #1

ARC=189.89' (M) 181.81' (R)
RADIUS=2831.93' (M) (R)
DELTA=03°50'31"
LC=S 39°47'49" E
189.86' (M)
S 41°55'00" E
181.78' (R)

S 14°57'09" W 400.35'
S 15°00'00" W
418.26' (R) & 417.17' (R)

60' Ut. Convent. & Access. Easmt. L. 1873, P. 925, O.C.R.

IRON FD

IFC

S 47°26'56" W (M)
S 46°30'00" W (R)
310.00'

IRON FD

MON SET

229.86'

S 68°27'06" W 234.81' (M)
S 68°00'00" W 270.00' (R)

MON FD

NE CORNER
"HIDDEN COVE"
IRON SET

S 68°27'06" W
43.95' (M) 43.57' (R)

Hidden Cove Drive 60' wd. - Private

Cove Court - Private

N 84°15'40" W (M)
N 84°30'00" W (R)
280.00'

MON SET

MON FD MON FD MON FD MON FD

N 89°45'40" W 424.46' (M)
WEST 426.99' (R)

NW CORNER
"HIDDEN COVE"
IRON SET

N 00°12'01" E 892.33'

W 1/4 COR
SECTION 36
T3N, R8E

WEST LINE OF SECTION 36 N 00°12'01" E 2660.65'
N 00°12'01" E 1768.32'
1433.24' (M) 1427.32' (R)

S 00°12'01" W 335.68' (M) 335.01' (R)

Blondell Street 40' wd.

Julia Street 40' wd.

Millward Street 40' wd.

Ashdown St. 40' wd.

Mandon Road 40' wd.

Kettering Street 40' wd.

Funston Street 45' wd.

Gladys Street 40' wd.

12-36-101-004
RM-1
3.0 ACRES

Total 37.99
Acres

12-36-101-003
31.50 Acres
RM-1

14B 62B 35A 53A W

Benchmarks: (NAVD '88)

BM #1: ARROW ON EXISTING HYDRANT LOCATED ON EAST SIDE OF UNION LAKE ROAD, 75' SOUTH OF CONCORD DRIVE. ELEVATION = 968.47

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BM #6: NAIL IN SOUTH FACE OF 28" OAK LOCATED 160' EAST OF WEST PROPERTY LINE ADJACENT TO PARCEL 476 ON THE NORTH SIDE OF ASHDOWN STREET. ELEVATION = 945.50

LEGEND

EXISTING

- STORM SEWER
- SANITARY SEWER
- WATERMAIN
- GAS MAIN
- ELEC. TELE. CABLE
- STORM MANHOLE
- CATCH BASIN
- INLET
- REARYARD CATCH BASIN
- END SECTION
- SANITARY MANHOLE
- GATE VALVE AND WELL
- HYDRANT
- 950 CONTOURS

SOILS LEGEND

SYMBOL	*NAME*
14B	*Oakville fine sand, 0-6% slopes*
35A	*Thetford loamy fine sand, 0-3% slopes*
53A	*Tedrow loamy sand, 0-3% slopes*
62B	*Urban land-Spinks complex, 0-8% slopes*
W	*Water*

STATE OF MICHIGAN
PATRICK McWILLIAMS
ENGINEER
NO. 31658
LICENSED PROFESSIONAL ENGINEER

DATE	ISSUE
11-30-18	PER J. & A. (11-13-18)
4-23-19	ADDED EASEMENTS
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DATE	11-8-18	CKD. BY DATE
DRAWN	GF	
DESIGN	PCM	
SECTION	36	T- 3 -N, R- 8 -E.

72 HOURS (3 WORKING DAYS) BEFORE YOU DIG CALL MISS DIG 800-482-7171 (TOLL FREE)

Existing Conditions Plan

"Preserve at Hidden Lake"

WHITE LAKE TOWNSHIP, OAKLAND COUNTY, MICHIGAN

SCALE 1" = 100'

SHEET 2 OF 7

KE 2017.182

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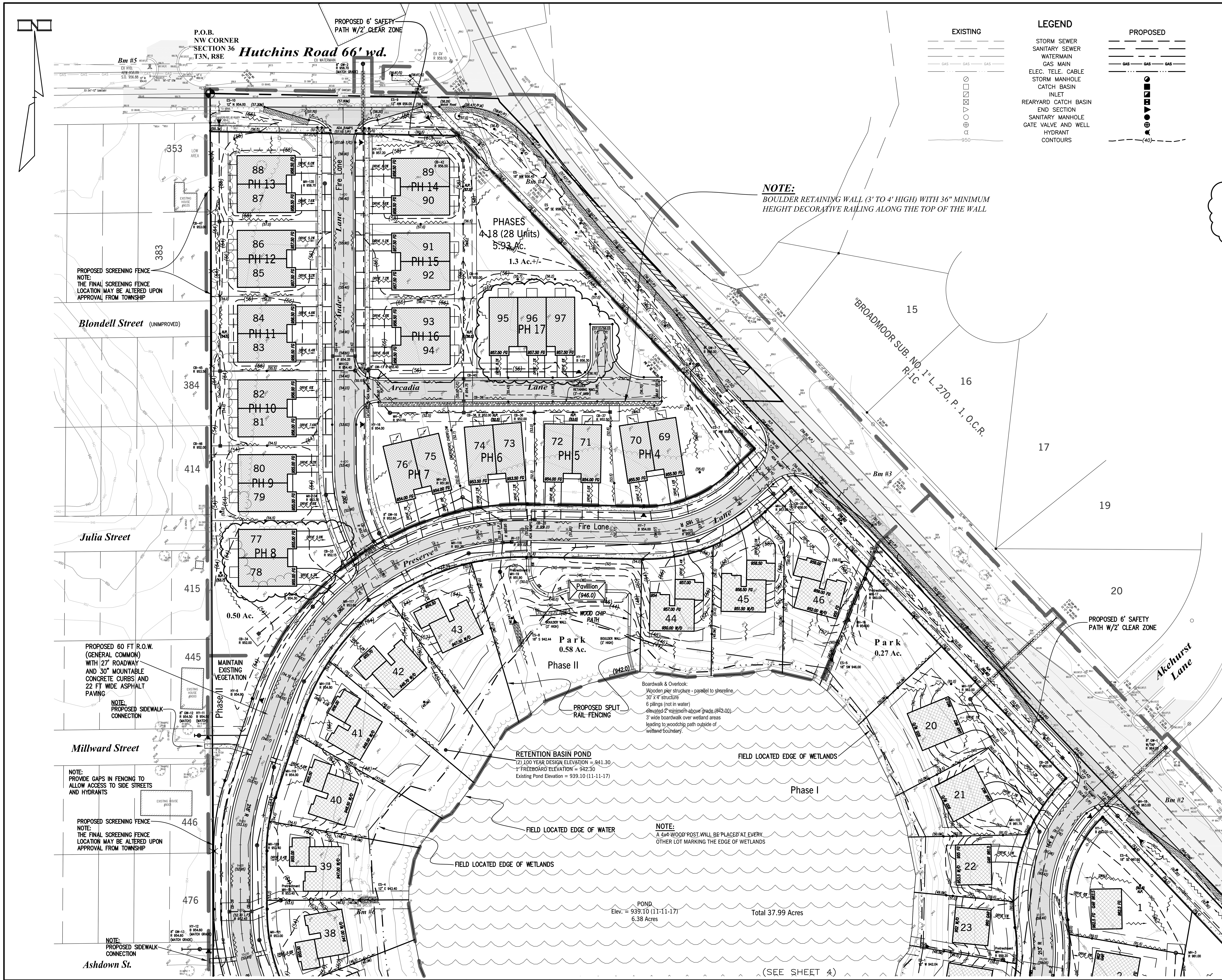

PD Zoning - Planned Development District

SETBACKS: (PER ORDINANCE)
FRONT - 40 FEET
REAR - 30/40 FEET (TO BE DETERMINED BY PLANNING COMMISSION)
SIDES - 25 FEET ONE SIDE
50 FEET TOTAL OF TWO SIDES

RESIDENTIAL:
TOTAL UNITS PROPOSED - 68
FRONT SETBACK - 25 FT
REAR SETBACKS:
POND LOTS MIN. (WATER) - 40 FT
POND LOTS MIN. (WETLANDS) - 25 FT
OFF POND LOTS - 30 FT
SIDE YARD SETBACKS - 10 FT (EACH SIDE)
ALL UNITS HAVE AT LEAST 70 FT OF FRONTAGE AT THE FRONT 25 FT SETBACK

DUPLEX UNITS:
TOTAL DUPLEX UNITS PROPOSED - 26
TOTAL TRI-PLEX UNITS PROPOSED - 1
FRONT SETBACK - 25 FT MIN. (TO SIDEWALK EXCEPT UNIT 78 = 21 FT TO R.O.W.)
REAR SETBACK - 30 FT (EXCEPT UNIT 89 = 25 FT)
SIDE YARD SETBACKS - 10 FT EA (TOTAL 20 FT)

OPEN SPACE - RESIDENTIAL UNITS
OPEN SPACE - 3.32 Ac.
POND AREA - 6.38 Ac.
OPEN SPACE - 9.70 Ac.

OPEN SPACE - DUPLEX UNITS
OPEN SPACE - 1.8 Ac.+/-
TOTAL OPEN SPACE - 11.5 ACRES+/-
TOTAL SITE AREA (NET) - 37.99 ACRES

OPEN SPACE RATIO = 30.0%

DATE	ISSUE
11-30-18	PER J & A (11-13-18)
1-11-19	PER J & A (12-19-18), McKenna (12-18-18), DPS
2-24-2021	PER CLIENT REVISED PHASE 2, 3 & 4 (1-22-2021)
3-25-2021	PER DLZ (3-11-2021), & McKENNA (3-11-2021)
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DATE 11-8-18	CKD. BY	DATE
DRAWN GF		
DESIGN JJS		
SECTION 36	T- 3 -N. R- 8 -E.	

72 HOURS (3 WORKING DAYS) BEFORE YOU DIG CALL MISS DIG 800-482-7171 (TOLL FREE)

Final Site Plan - North
"Preserve at Hidden Lake"
WHITE LAKE TOWNSHIP, OAKLAND COUNTY, MICHIGAN

SCALE 1" = 50'
SHEET 3 OF 7
KE 2017.182

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(SEE SHEET 3)

POND
Elev. = 939.10 (11-11-17)
6.38 Acres

Total 37.99 Acres

NOTE:
PROPOSED SIDEWALK CONNECTION

Ashdown St.

MARJORIE VESTA PARK L. 20, P. 7, O.C.R.
R-1D

NOTE:
PROPOSED SIDEWALK CONNECTION

Mandon Road

PROPOSED SCREENING FENCE
NOTE:
THE FINAL SCREENING FENCE LOCATION MAY BE ALTERED UPON APPROVAL FROM TOWNSHIP

NOTE:
PROVIDE GAPS IN FENCING TO ALLOW ACCESS TO SIDE STREETS AND HYDRANTS

NOTE:
PROPOSED SIDEWALK CONNECTION

Kettering Street

Funston Street

NW CORNER
"HIDDEN COVE"
IRON SET

"HIDDEN COVE" O.C.C.P. NO. 1097
R-1C

Gladys Street

Cove Drive - Private

Cove Court - Private

Union Lake Road

RETENTION BASIN POND
(2) 100 YEAR-DESIGN ELEVATION = 941.30
1' FREEBOARD ELEVATION = 942.30
Existing Pond Elevation = 939.10 (11-11-17)

FIELD LOCATED EDGE OF WETLANDS

FIELD LOCATED EDGE OF WETLANDS

Boardwalk & Overlook:
Wooden pier structure - parallel to shoreline.
20' x 4' structure
6 pilings (not in water)
elevated 2' minimum above grade (942.00)
3' wide boardwalk over wetland areas leading to woodchip path outside of wetland boundary.

PROPOSED SPLIT RAIL FENCING

PROPOSED SPLIT RAIL FENCING

Phase I
Phase II
Phase III

Park
0.37 Ac.

WOOD CHIP PATH

MAINTAIN EXISTING VEGETATION

Commons Area 2.00 Ac.

Preserve Fire Lane

Lane

Fire Lane

Waterside Drive

Sycamore Fire Lane

PROPOSED 5 FT SIDEWALK

MAINTAIN EXISTING VEGETATION

PROPOSED 60 FT R.O.W. (GENERAL-COMMON) WITH 27' ROADWAY AND 30' MOUNTABLE CONCRETE CURBS AND 22 FT WIDE ASPHALT PAVING

60' wd. Easement for Ingress & Egress L. 16734, P. 829, O.C.R.

12-36-176-002
LB

12-36-151-017
R-1A

PROPOSED SCREENING FENCE W/VEGETATED GREENBELT
NOTE:
THE FINAL SCREENING FENCE LOCATION MAY BE ALTERED UPON APPROVAL FROM TOWNSHIP

12-36-151-016
R-1A

12-36-151-015
R-1A

PROPOSED SCREENING FENCE
NOTE:
THE FINAL SCREENING FENCE LOCATION MAY BE ALTERED UPON APPROVAL FROM TOWNSHIP

PROPOSED FIRE PROTECTION SWING GATE (MIN. 20' WIDE) FOR EMERGENCY ACCESS AS PER WHITE LAKE TOWNSHIP FIRE DEPARTMENT REQUIREMENTS

NE CORNER
"HIDDEN COVE"
IRON SET

PATRICK McWILLIAMS ENGINEER NO. 31658 — STATE OF MICHIGAN — REGISTERED PROFESSIONAL ENGINEER

JAMES SCHARL PROFESSIONAL SURVEYOR NO. 19843 — STATE OF MICHIGAN — REGISTERED LAND SURVEYOR

DATE	ISSUE
11-30-18	PER J & A (11-13-18)
1-11-19	PER J & A (12-19-18), McKenna (12-18-18), DPS
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PROFESSIONAL ENGINEERS AND PROFESSIONAL SURVEYORS
5852 SOUTH MAIN STREET, SUITE 1, CLARKSTON, MICHIGAN 48346
PHONE (248) 625-5251 www.kieftenq.com FAX (248) 625-7110

DATE 11-8-18	CKD. BY	DATE
DRAWN GF		
DESIGN JJS		
SECTION 36	T- 3 -N. R- 8 -E.	

72 HOURS (3 WORKING DAYS) BEFORE YOU DIG CALL MISS DIG 800-482-7171 (TOLL FREE)

Final Site Plan - South

"Preserve at Hidden Lake"

WHITE LAKE TOWNSHIP, OAKLAND COUNTY, MICHIGAN

SCALE 1" = 50'
SHEET 4 OF 7
KE 2017.182

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GENERAL NOTES

1) PROPERTY SIDWELL NUMBER 12-36-101-001, -003, -004
2) ZONING PD - PLANNED DEVELOPMENT
3) PROPOSED USE: SINGLE FAMILY RESIDENTIAL (SITE CONDOMINIUM), DUPLEX UNITS & A SINGLE UNIT.
4) MINIMUM UNIT SIZE PROPOSED: 7,045 SF (UNIT 21), WIDTH 70 FEET, AVERAGE UNIT SIZE 9,416 SF.
5) PROPOSED SETBACK REQUIREMENTS:
   RESIDENTIAL:
   TOTAL UNITS PROPOSED - 68
   FRONT SETBACK - 25 FT
   REAR SETBACKS:
   POND UNITS MIN. (WATER) - 40 FT
   POND UNITS MIN. (WETLANDS) - 25 FT
   OFF POND UNITS - 30 FT
   SIDE YARD SETBACKS - 10 FT (EACH SIDE)
   ALL UNITS HAVE AT LEAST 70 FT OF FRONTAGE AT THE FRONT 25 FT SETBACK

   DUPLEX UNITS:
   TOTAL DUPLEX UNITS PROPOSED - 26
   TOTAL TRI-PLEX UNITS PROPOSED - 1
   FRONT SETBACK - 25 FT MIN. (TO SIDEWALK EXCEPT UNIT 78 = 21 FT TO R.O.W.)
   REAR SETBACK - 30 FT (EXCEPT UNIT 89 = 25 FT)
   SIDE YARD SETBACKS - 10 FT EA (TOTAL 20 FT)

6) STREETS ARE 60 FOOT WIDE RIGHT-OF-WAY W/27 FT WIDE ASPHALT W/CONCRETE CURB AND GUTTER (5,600 LF TOTAL ROAD LENGTH). THE DEVELOPER INTENDS ALL ROADS TO BE PRIVATE.
7) NUMBER OF UNITS: SINGLE FAMILY = 68, DUPLEX UNITS = 28, SINGLE UNIT = 1.
8) SEWAGE DISPOSAL: TO BE CONNECTED TO MUNICIPAL SANITARY SEWER SYSTEM ALONG UNION LAKE ROAD.
9) WATER SUPPLY: AN 8" WATERMAIN IS PROPOSED TO BE CONNECTED TO THE MUNICIPAL WATERMAIN AT TWO LOCATIONS, ONE ALONG UNION LAKE ROAD AND ONE ALONG HUTCHINS ROAD.
10) PERMIT REQUIRED FROM OAKLAND ROAD COMMISSION FOR CONNECTIONS TO UNION LAKE ROAD AND HUTCHINS ROAD
11) SOIL EROSION PERMIT REQUIRED FROM OAKLAND COUNTY WATER RESOURCE COMMISSION.
12) ALL ROADWAYS WILL BE 22' WIDE ASPHALT WITH 30" MOUNTABLE CONCRETE CURB AND GUTTER (27' WIDE TOTAL).
13) PUBLIC UTILITIES (GAS, ELECTRIC, TELEPHONE & CABLE) SHALL BE INSTALLED UNDERGROUND.
14) PHOSPHOROUS BASED LAWN FERTILIZERS WILL NOT BE ALLOWED.
15) NO BRUSH OR GRASS CLIPPINGS WILL BE STORED OR DISPOSED OF INTO THE COMMON/PARK AREAS OR WETLANDS.
16) ALL YARD WASTE TO BE REMOVED FROM SITE.
17) PUBLIC SIDEWALKS ARE PROPOSED AS PER EXISTING ORDINANCE REQUIREMENTS.
18) INDIVIDUAL PLOT PLANS AND GRADING SHALL BE PREPARED BY A LICENSED ENGINEER OR SURVEYOR.
19) PROPOSED SITE GRADES SHALL MATCH EXISTING GRADES AT THE PROPERTY LINE WHERE OFF-SITE GRADING RIGHTS DO NOT EXIST.
20) ALL DISTURBED AREAS SHALL BE RE-VEGETATED.
21) POND RETENTION BASIN SIDE SLOPES SHALL BE LEFT NATURAL. IT IS LIKELY THAT TO OBTAIN WALKOUTS ON THE POND UNITS, SOME GRADING MAY BE REQUIRED WITHIN THE 25' WETLANDS SETBACK AREA.
22) REAR AND SIDE-YARD DRAINAGE EASEMENTS WILL BE SHOWN ON THE GRADING PLAN.
23) ALL FINAL ROAD GRADES WILL COMPLY WITH ROAD COMMISSION FOR OAKLAND COUNTY STANDARDS.
24) TYPICAL UNIT COVERAGE; AVERAGE HOUSE FOOTPRINT = 2,100 SF, AVERAGE DRIVEWAY = 750 SF;
    TOTAL UNIT COVERAGE = 2,850 SF
    TYPICAL UNIT COVERAGE % = 2,850 SF/9,416 SF = 30% (OR LESS)
25) REQUIRED PERMITS/APPROVALS:
    -WHITE LAKE TOWNSHIP - ENGINEERING PLANS APPROVAL
    -O.C.W.R.C. - SOIL EROSION PERMIT
    -O.C.W.R.C. - WATERMAIN APPROVAL
    -O.C.W.R.C. - SANITARY SEWER APPROVAL
    -M.D.E.Q. - WATERMAIN PERMIT
    -M.D.E.Q. - SANITARY SEWER PERMIT
    -M.D.E.Q. - NPDES NOTICE OF COVERAGE PERMIT
    -M.D.E.Q. - WETLANDS (STORM DISCHARGE) PERMIT
    -R.C.O.C. - APPROACH & UNDERGROUND PERMITS
26) THERE ARE WETLANDS ON THIS SITE.
27) EACH HOME SHALL HAVE A 2 CAR GARAGE AND DRIVEWAYS WHICH WILL ACCOMMODATE THE REQUIRED OFF-STREET PARKING.
28) OFF-SITE IMPROVEMENTS SHALL BECOME PUBLIC.
29) ALL SIDEWALKS MUST COMPLY WITH ADA STANDARDS.
30) NO STREET LIGHTING IS PROPOSED. EXTERIOR LIGHTS SHALL BE INSTALLED ON INDIVIDUAL HOMES, DUPLEXES & SINGLE UNIT.
31) SCREENING FENCE (6' HIGH VINYL CLAD) SHALL BE PROVIDED ALONG SOME OF THE PROPERTY LINES AS SHOWN ON THE LANDSCAPE PLAN OR AS DETERMINED AFTER SITE CLEARING AND CONSTRUCTION HAS BEEN COMPLETED.
32) TRASH PICKUP FOR THE HOMES AND DUPLEXES WILL BE CURBSIDE.
33) PARKING IS NOT ALLOWED ON THE ROAD CONNECTING TO HUTCHINS ROAD. PARKING IS ALLOWED ON ONE SIDE ONLY ALONG HIDDEN LANE AND PRESERVE LANE (OPPOSITE THE FIRE HYDRANTS/WATERMAIN).
34) FIRE LANES PROVIDED ALONG ALL (3) ROADS & DUPLEX DRIVES (27' WIDE).
35) INDIVIDUAL BUILDING ADDRESSES SHALL BE 6" MINIMUM.

"C" CALCULATION

ROADS & APPROACHES:
ROADS = 151,200 SF
APPROACHES = 6,525 SF
157,725 SF

PARKING AREAS:
36,950 SF

DRIVEWAYS:
80,700 SF

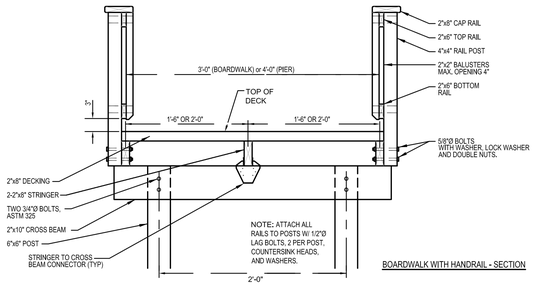
SIDEWALKS:
63,260 SF

TOTAL PAVEMENT WALKS: 338,635 SF = 7.78 ACRES @ C = 0.80

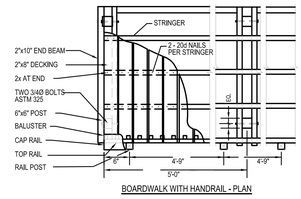
ROOF AREAS:
SINGLE FAMILY = 136,000 SF
3 PLEX HOMES = 5,700 SF
DUPLEX HOMES = 22,800 SF
TOWNHOMES = 25,900 SF
=190,400 SF = 4.37 ACRES @ C = 0.90

RETENTION BASIN/POND AREA: 6.38 ACRES @ C = 1.00
GREENBELT AREAS: 19.46 ACRES @ C = 0.20
TOTAL AREA = 37.99 ACRES

$$"C" = \left(\frac{7.78\ \text{Acres}}{37.99\ \text{Ac.}} \times 0.80\right) + \left(\frac{4.37\ \text{Acres}}{37.99\ \text{Ac.}} \times 0.90\right) + \left(\frac{6.38\ \text{Acres}}{37.99\ \text{Ac.}} \times 1.00\right) + \left(\frac{19.46\ \text{Acres}}{37.99\ \text{Ac.}} \times 0.20\right) = 0.5377 = 0.54$$

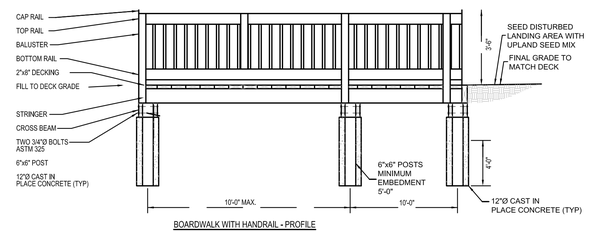


BOARDWALK WITH HANDRAIL - SECTION



BOARDWALK WITH HANDRAIL - PLAN

NOTES:
1. ALL BOARDWALKS SHALL BE SITUATED SO THAT BOTTOM OF BEAM SHALL BE A MINIMUM OF 6 INCHES ABOVE THE 100-YEAR WATER ELEVATION FOR THE SPECIFIC WETLAND/POND.
2. ALL BOARDWALKS SHALL HAVE CONCRETE FOOTINGS THAT EXTEND A MINIMUM DEPTH OF 48 INCHES BELOW FINISH GRADE (FROST DEPTH).
3. ALL BOARDWALKS SHALL HAVE HANDRAILS WITH A MINIMUM HEIGHT OF 36 INCHES AND RAIL OPENINGS NO GREATER THAN 4 INCHES APART.
4. ALL BOARDWALK FINISH DECK ELEVATIONS SHALL MATCH FINISHE GRADE ELEVATIONS OF ABUTTING PAVED PATH SURFACE.
5. ALL BOARDWALK CROSSINGS THROUGH MITIGATION WETLAND AREAS SHALL MINIMIZE DISTURBANCE TO WET LAND PLANTINGS. ALL DISTURBED AREAS SHALL BE RESTORED/ REPLANTED PER WETLAND MITIGATION SPECIFICATIONS FOR THIS PROEJCT.



BOARDWALK WITH HANDRAIL - PROFILE

NOTE:
1. REFER TO MDOT SPECIFICATION SECTION 5.15 - TIMBER STRUCTURES FOR INFORMATION ON MATERIALS AND INSTALLATION. ALL BOARDWALK DESIGN SHALL BE IN ACCORDANCE WITH THE NATIONAL FOREST PRODUCT ASSOCIATIONS NATIONAL DESIGN SPECIFICATION AND THE AMERICAN INSTITUTE OF TIMBER CONSTRUCTIONS TIMBER CONSTRUCTION MANUAL.
2. ALL DECKING AND HANDRAIL TO BE RECYCLED LUMBER (TREX BRAND, "ORIGINS NATURAL" OR APPROVED EQUIVALENT).

(2) 100 YEAR RETENTION POND CALCULATIONS

ON-SITE CONTRIBUTING AREA TO POND (EXCLUDING PROPOSED R.O.W.'S) = 35.19 ACRES
UNION LAKE ROAD PROPOSED R.O.W. AREA = 1.65 ACRES
HUTCHINS ROAD PROPOSED R.O.W. AREA = 0.30 ACRES
OFF-SITE WEST AREAS = 0.27 ACRES
TOTAL ACTUAL CONTRIBUTING AREAS TO POND = 37.41 ACRES

NOTE: WE WILL STILL DESIGN FOR 37.99 ACRES (THE ORIGINAL PROPERTY ACREAGE) TO BE CONSERVATIVE.

ASSUMED DESIGN AREA 37.99 ACRES
TOTAL CONTRIBUTING AREA = 37.99 ACRES
AVERAGE RUNOFF COEFFICIENT (C) = 0.54
VOLUME (2) 100 YR = (2)(A)(C)(16,500) = (2)(37.99)(0.54)(16,500) = 676,982 CF

VOLUME PROVIDED:

@ 939.10: 274,428 SF
@ 940.0: 312,677 SF
} 293,552 SF_{AV} x 0.90' DEPTH = 264,196 CF

@ 941.30: 327,223 SF
@ 942.0: 339,223 SF
} 319,950 SF_{AV} x 1.3' DEPTH = 415,935 CF

680,131 CF PROVIDED

(NOTE: AT ELEVATION 942.0; WE HAVE 916,096 CF OF STORAGE VOLUME)

RETENTION POND/BASIN

EXISTING WATER ELEVATION = 939.10 (11-11-2017)
DESIGN HIGH WATER ELEVATION = 941.30 (2-100 YEAR STORM)
1' FREEBOARD ELEVATION = 942.30
STORAGE REQUIRED = 676,982 C.F.
STORAGE PROVIDED = 680,131 C.F.

Storm Water Facilities Maintenance Plan

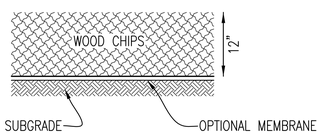
The "Preserve @ Hidden Lake" Homeowners Association shall be responsible for the maintenance of all the storm water facilities. (Note: The developer is responsible until the HOA exists).

These facilities include the following:

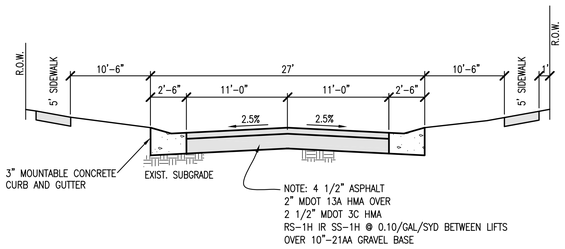
- *Retention Basin Pond*
- *Pretreatment Structure Manholes*
- *Manholes, Rear Yard Catch Basins, End Sections & connecting pipe work*
- *Rear yard swales (within easements)*

The HOA shall hired a qualified contractor to do the following Maintenance Schedule (including report kept on record):

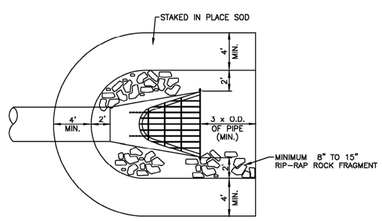
1. *The (6) Pretreatment Structures shall be inspected by a qualified contractor on a semi-annual basis (twice/year) and necessary action taken to clean out the structures in accordance with the manufacturers guidelines.*
2. *The Pond shall be inspected on any annual basis by a qualified contractor and/or civil engineer to insure it is functioning as designed.*
3. *The storm structures & swales shall be inspected on a bi-annual basis (every two years). This is an "above ground" visual inspection to determine if any structures are "failing", (i.e. ground has sank around structure, etc.).*



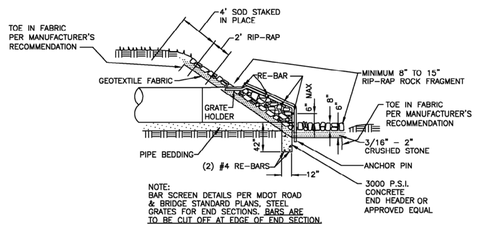
WOOD CHIP PATH



TYPICAL ROAD SECTION

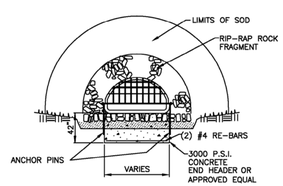


PLAN VIEW



PROFILE VIEW

END SECTION AND BAR SCREEN DETAIL
NO SCALE



END VIEW

STATE OF MICHIGAN
PATRICK McWILLIAMS
ENGINEER
NO. 31658
LICENSED PROFESSIONAL ENGINEER

DATE	ISSUE
11-30-18	PER J & A (11-13-18)
2-24-2021	PER CLIENT REVISED PHASE 2, 3 & 4 (1-22-2021)
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DATE	11-8-18	CKD. BY	DATE
DRAWN	GF		
DESIGN	JJS/PCM		
SECTION	36	T- 3 -N. R- 8 -E.	

72 HOURS (3 WORKING DAYS) BEFORE YOU DIG CALL MISS DIG 800-482-7171 (TOLL FREE)

Retention Basin Calculations, Details & Notes
"Preserve at Hidden Lake"
WHITE LAKE TOWNSHIP, OAKLAND COUNTY, MICHIGAN

SCALE N/A
SHEET 5 OF 7
KE 2017.182

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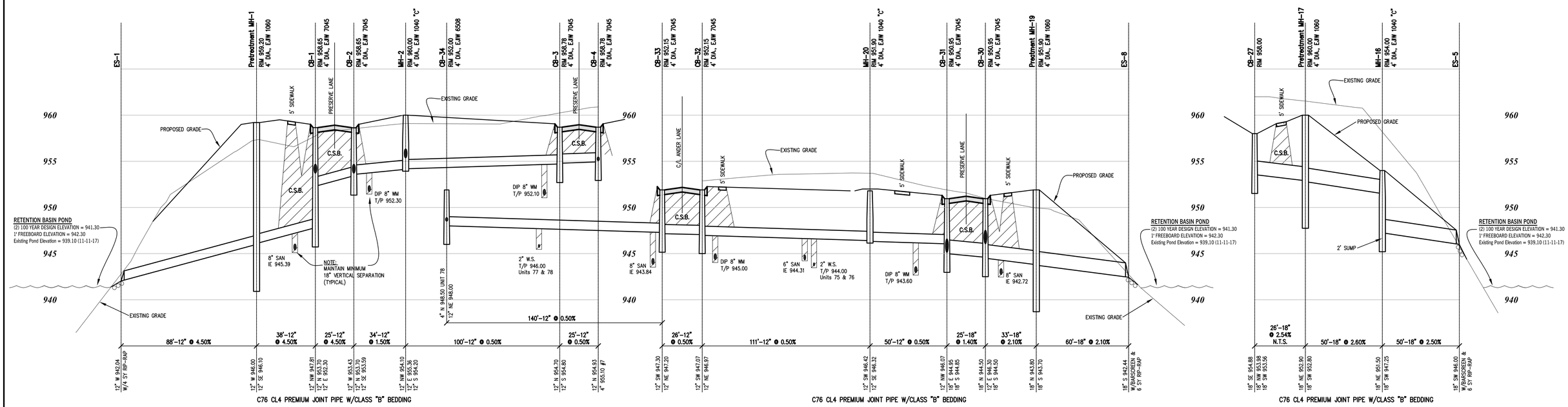

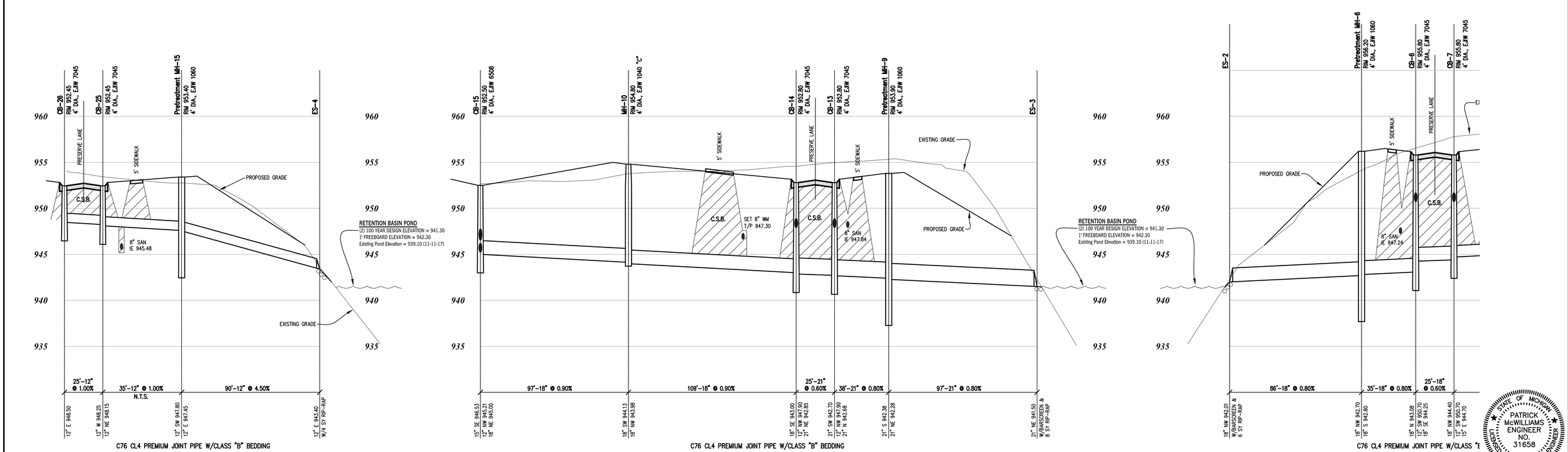

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Storm Sewer Profiles
"Preserve at Hidden Lake"
WHITE LAKE TOWNSHIP, OAKLAND COUNTY, MICHIGAN

SCALE 1" = 30' HORZ.
1" = 5' VERT.
SHEET 6 OF 7
KE 2017.182

STATE OF MICHIGAN
PATRICK McWILLIAMS
ENGINEER NO. 31658
PROFESSIONAL ENGINEER

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Stormceptor®

Stormceptor Sizing Detailed Report

PCSWMM for Stormceptor

Project Information

Date	10/11/2018
Project Name	Preserve at Hidden Lake
Project Number	N/A
Location	White Lake Township

Stormwater Quality Objective

This report outlines how Stormceptor System can achieve a defined water quality objective through the removal of total suspended solids (TSS). Attached to this report is the Stormceptor Sizing Summary.

Stormceptor System Recommendation

The Stormceptor System model STC 450i achieves the water quality objective removing 80% TSS for a User defined particle size distribution.

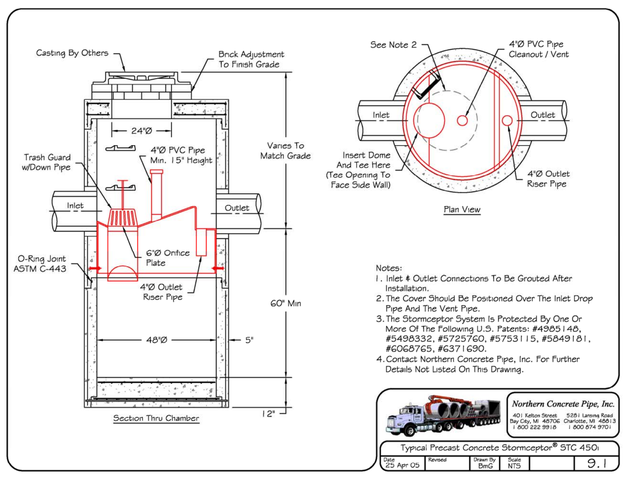
The Stormceptor System

The Stormceptor oil and sediment separator is sized to treat stormwater runoff by removing pollutants through gravity separation and flotation. Stormceptor's patented design generates positive TSS removal for all rainfall events, including large storms. Significant levels of pollutants such as heavy metals, free oils and nutrients are prevented from entering natural water resources and the re-suspension of previously captured sediment (scour) does not occur.

Stormceptor provides a high level of TSS removal for small frequent storm events that represent the majority of annual rainfall volume and pollutant load. Positive treatment continues for large infrequent events, however, such events have little impact on the average annual TSS removal as they represent a small percentage of the total runoff volume and pollutant load.

Stormceptor is the only oil and sediment separator on the market sized to remove TSS for a wide range of particle sizes, including fine sediments (clays and silts), that are often overlooked in the design of other stormwater treatment devices.

Rinker MATERIALS



Pretreatment Structure

MH-1, 6.53 CFS (3.17 Acres, C=0.54)

Stormceptor Rinker MATERIALS

Detailed Stormceptor Sizing Report – Catchment to MH-1

Project Information & Location			
Project Name	Preserve at Hidden Lake	Project Number	KE 2017.182
City	White Lake Tnshp	State/ Province	Michigan
Country	United States of America	Date	10/11/2018
Designer Information		**EOR Information (optional)**	
Name	Daniel Thomson	Name	Patrick McWilliams
Company	Rinker Materials	Company	Kieft Engineering, Inc.
Phone #	414-238-3824	Phone #	248-625-5251
Email	DanielC.Thomson@rinkerpipe.com	Email	

Stormwater Treatment Recommendation

The recommended Stormceptor Model(s) which achieve or exceed the user defined water quality objective for each site within the project are listed in the below Sizing Summary table.

Site Name	Catchment to MH-1
Recommended Stormceptor Model	STC 900
Target TSS Removal (%)	80.0
TSS Removal (%) Provided	80
PSD	D50 = 75 micron
Rainfall Station	DETROIT METRO AP

The recommended Stormceptor model achieves the water quality objectives based on the selected inputs, historical rainfall records and selected particle size distribution.

Stormceptor Sizing Summary	
Stormceptor Model	**% TSS Removal Provided**
STC 450i	72
STC 900	80
STC 1200	81
STC 1800	81
STC 2400	85
STC 3600	86
STC 4800	89
STC 6000	89
STC 7200	91
STC 11000	93
STC 13000	94
STC 16000	95
StormceptorMAX	Custom

Pretreatment Structure

MH-6, 9.06 CFS (4.50 Acres, C = 0.54)

Stormceptor Rinker MATERIALS

Detailed Stormceptor Sizing Report – Catchment to MH-6,

Project Information & Location			
Project Name	Preserve at Hidden Lake	Project Number	KE 2017.182
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Country	United States of America	Date	10/11/2018
Designer Information		**EOR Information (optional)**	
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Email	DanielC.Thomson@rinkerpipe.com	Email	

Stormwater Treatment Recommendation

The recommended Stormceptor Model(s) which achieve or exceed the user defined water quality objective for each site within the project are listed in the below Sizing Summary table.

Site Name	Catchment to MH-6
Recommended Stormceptor Model	STC 2400
Target TSS Removal (%)	80.0
TSS Removal (%) Provided	80
PSD	D50 = 75 micron
Rainfall Station	DETROIT METRO AP

The recommended Stormceptor model achieves the water quality objectives based on the selected inputs, historical rainfall records and selected particle size distribution.

Stormceptor Sizing Summary	
Stormceptor Model	**% TSS Removal Provided**
STC 450i	59
STC 900	69
STC 1200	69
STC 1800	70
STC 2400	80
STC 3600	81
STC 4800	82
STC 7200	83
STC 11000	87
STC 13000	87
STC 16000	89
StormceptorMAX	Custom

Pretreatment Structure

MH-9, 13.41 CFS (6.70 Acres, C = 0.54)

Stormceptor Rinker MATERIALS

Detailed Stormceptor Sizing Report – Catchment to MH-9,

Project Information & Location			
Project Name	Preserve at Hidden Lake	Project Number	KE 2017.182
City	White Lake Tnshp	State/ Province	Michigan
Country	United States of America	Date	10/11/2018
Designer Information		**EOR Information (optional)**	
Name	Daniel Thomson	Name	Patrick McWilliams
Company	Rinker Materials	Company	Kieft Engineering, Inc.
Phone #	414-238-3824	Phone #	248-625-5251
Email	DanielC.Thomson@rinkerpipe.com	Email	

Stormwater Treatment Recommendation

The recommended Stormceptor Model(s) which achieve or exceed the user defined water quality objective for each site within the project are listed in the below Sizing Summary table.

Site Name	Catchment to MH-9
Recommended Stormceptor Model	STC 4800
Target TSS Removal (%)	80.0
TSS Removal (%) Provided	80
PSD	D50 = 75 micron
Rainfall Station	DETROIT METRO AP

The recommended Stormceptor model achieves the water quality objectives based on the selected inputs, historical rainfall records and selected particle size distribution.

Stormceptor Sizing Summary	
Stormceptor Model	**% TSS Removal Provided**
STC 450i	59
STC 900	69
STC 1200	69
STC 1800	70
STC 2400	74
STC 3600	75
STC 4800	80
STC 7200	83
STC 11000	87
STC 13000	87
STC 16000	89
StormceptorMAX	Custom

Pretreatment Structure

MH-15, 2.79 CFS (1.34 Acres, C=0.54)

Stormceptor Rinker MATERIALS

Detailed Stormceptor Sizing Report – Catchment to MH-15

Project Information & Location			
Project Name	Preserve at Hidden Lake	Project Number	KE 2017.182
City	White Lake Tnshp	State/ Province	Michigan
Country	United States of America	Date	10/11/2018
Designer Information		**EOR Information (optional)**	
Name	Daniel Thomson	Name	Patrick McWilliams
Company	Rinker Materials	Company	Kieft Engineering, Inc.
Phone #	414-238-3824	Phone #	248-625-5251
Email	DanielC.Thomson@rinkerpipe.com	Email	

Stormwater Treatment Recommendation

The recommended Stormceptor Model(s) which achieve or exceed the user defined water quality objective for each site within the project are listed in the below Sizing Summary table.

Site Name	Catchment to MH-15
Recommended Stormceptor Model	STC 450i
Target TSS Removal (%)	80.0
TSS Removal (%) Provided	84
PSD	D50 = 75 micron
Rainfall Station	DETROIT METRO AP

The recommended Stormceptor model achieves the water quality objectives based on the selected inputs, historical rainfall records and selected particle size distribution.

Stormceptor Sizing Summary	
Stormceptor Model	**% TSS Removal Provided**
STC 450i	84
STC 900	90
STC 1200	90
STC 1800	91
STC 2400	93
STC 3600	94
STC 4800	95
STC 6000	96
STC 7200	97
STC 11000	98
STC 13000	98
STC 16000	98
StormceptorMAX	Custom

Pretreatment Structure

MH-16, 4.57 CFS (2.00 Acres, C=0.54)

Stormceptor Rinker MATERIALS

Detailed Stormceptor Sizing Report – Catchment to MH-16

Project Information & Location			
Project Name	Preserve at Hidden Lake	Project Number	KE 2017.182
City	White Lake Tnshp	State/ Province	Michigan
Country	United States of America	Date	10/11/2018
Designer Information		**EOR Information (optional)**	
Name	Daniel Thomson	Name	Patrick McWilliams
Company	Rinker Materials	Company	Kieft Engineering, Inc.
Phone #	414-238-3824	Phone #	248-625-5251
Email	DanielC.Thomson@rinkerpipe.com	Email	

Stormwater Treatment Recommendation

The recommended Stormceptor Model(s) which achieve or exceed the user defined water quality objective for each site within the project are listed in the below Sizing Summary table.

Site Name	Catchment to MH-16
Recommended Stormceptor Model	STC 900
Target TSS Removal (%)	80.0
TSS Removal (%) Provided	80
PSD	D50 = 75 micron
Rainfall Station	DETROIT METRO AP

The recommended Stormceptor model achieves the water quality objectives based on the selected inputs, historical rainfall records and selected particle size distribution.

Stormceptor Sizing Summary	
Stormceptor Model	**% TSS Removal Provided**
STC 900	87
STC 1200	87
STC 1800	88
STC 2400	91
STC 3600	92
STC 4800	94
STC 6000	94
STC 7200	95
STC 11000	97
STC 13000	97
STC 16000	97
StormceptorMAX	Custom

Pretreatment Structure

MH-19, 15.11 CFS (6.93 Acres, C = 0.54

Stormceptor Rinker MATERIALS

Detailed Stormceptor Sizing Report – Catchment to MH-19

Project Information & Location			
Project Name	Preserve at Hidden Lake	Project Number	KE 2017.182
City	White Lake Tnshp	State/ Province	Michigan
Country	United States of America	Date	10/11/2018
Designer Information		**EOR Information (optional)**	
Name	Daniel Thomson	Name	Patrick McWilliams
Company	Rinker Materials	Company	Kieft Engineering, Inc.
Phone #	414-238-3824	Phone #	248-625-5251
Email	DanielC.Thomson@rinkerpipe.com	Email	

Stormwater Treatment Recommendation

The recommended Stormceptor Model(s) which achieve or exceed the user defined water quality objective for each site within the project are listed in the below Sizing Summary table.

Site Name	Catchment to MH-19
Recommended Stormceptor Model	STC 4800
Target TSS Removal (%)	80.0
TSS Removal (%) Provided	80
PSD	D50 = 75 micron
Rainfall Station	DETROIT METRO AP

The recommended Stormceptor model achieves the water quality objectives based on the selected inputs, historical rainfall records and selected particle size distribution.

Stormceptor Sizing Summary	
Stormceptor Model	**% TSS Removal Provided**
STC 450i	59
STC 900	69
STC 1200	69
STC 1800	70
STC 2400	74
STC 3600	75
STC 4800	80
STC 7200	83
STC 11000	87
STC 13000	87
STC 16000	89
StormceptorMAX	Custom

STATE OF MICHIGAN
PATRICK McWILLIAMS
ENGINEER
NO. 31658
LICENSED PROFESSIONAL ENGINEER

DATE	ISSUE
11-30-18	PER J & A (11-15-18)
2-24-2021	PER CLIENT REVISED PHASE 2, 3 & 4 (1-22-2021)
3-25-2021	PER DLZ (3-11-2021), & McKENNA (3-11-2021)

PROPRIETOR:
Preserve at Hidden Lake, LLC
8255 CASCADE AVENUE, SUITE 110
COMMERCE TOWNSHIP, MICHIGAN 48382
(248) 842-8613

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KIEFT ENGINEERING

KIEFT ENGINEERING, INC.
PROFESSIONAL ENGINEERS AND PROFESSIONAL SURVEYORS
5852 SOUTH MAIN STREET, SUITE 1, CLARKSTON, MICHIGAN 48346
PHONE (248) 625-5251 www.kiefteng.com FAX (248) 625-7110

DATE	11-8-18	CKD. BY / DATE
DRAWN	GF	
DESIGN	JJS	
SECTION	36	T- 3 -N. R- 8 -E.

72 HOURS (3 WORKING DAYS) BEFORE YOU DIG CALL MISS DIG 800-482-7171 (TOLL FREE)

Storm Sewer Calculations & Details
"Preserve at Hidden Lake"
WHITE LAKE TOWNSHIP, OAKLAND COUNTY, MICHIGAN

SCALE	N/A
SHEET	7 OF 7
	KE 2017.182

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CONSTRUCTION PLANS

"Preserve at Hidden Lake"

PLANNED UNIT DEVELOPMENT

PART OF THE NORTHWEST 1/4 SECTION 36, T-3-N, R-8-E,
WHITE LAKE TOWNSHIP, OAKLAND COUNTY, MICHIGAN

QUANTITIES:

SANITARY SEWER: (PHASE IV)
TAP EXISTING MANHOLE - 0 EA
MANHOLE, 4' DIA., "B" - 1 EA
MANHOLE, W/1' SUMP, 4' DIA., "B" - 0 EA
8" SDR 26 PVC PIPE - 350 LF
8" SDR 26 PVC PIPE W/BORE & JACK & STEEL CASING - 0 LF
6" ABS SDR 23.5 LEADS & RISERS - 386 LF
CLEAN-OUTS - 0 EA

WATER MAIN: (TOTAL SITE)
2" WATER SERVICE - PLASTIC DR-9 (200 PSI RATED) - 718 LF
2" S.O.V. - 14 EA
6" D.I. CL54 PIPE (@ HYDRANTS) - 40 LF
8" D.I. CL54 PIPE - 5,889 LF
8" WATER MAIN DIRECTIONAL BORE (HDPE PIPE) - 156 LF
8" GATE VALVE & WELL - 14 EA
8" GATE VALVE & WELL W/TAP CONNECTION - 3 EA
HYDRANTS, COMPLETE - 18 EA

ENGINEER & SURVEYOR

Kieft Engineering, Inc.
5852 South Main Street, Ste 1
Clarkston, Michigan 48346
Phone (248) 625-5251
Fax # (248) 625-7110
Attn: Patrick C. McWilliams
Email: pmcwilliams@kiefteng.com

Patrick C. McWilliams
STATE OF MICHIGAN
PATRICK COLIN McWILLIAMS
LICENSE NO. 6201031658
LICENSED PROFESSIONAL ENGINEER

PROPERTY DESCRIPTION

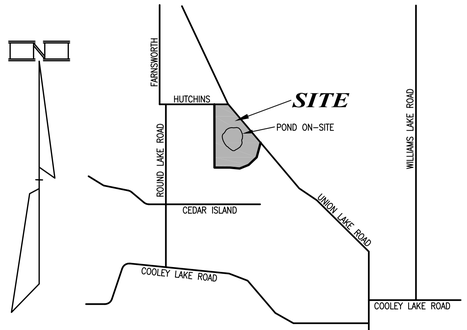
As Surveyed (Total Parcel)

PART OF THE NORTHWEST 1/4 OF SECTION 36, TOWN 3 NORTH, RANGE 8 EAST, WHITE LAKE TOWNSHIP, OAKLAND COUNTY, MICHIGAN, BEING MORE PARTICULARLY DESCRIBED AS BEGINNING AT THE NW CORNER OF SECTION 36, T3N, R8E; TH S 89°00'59" E 323.66 FT TO A POINT ON THE CENTERLINE OF UNION LAKE ROAD; TH ALONG SAID CENTERLINE S 24°10'25" E 4.31 FT; TH S 43°23'32" E 463.24 FT; TH N 89°00'59" W 46.17 FT TO A POINT ON THE WESTERLY RIGHT-OF-WAY OF UNION LAKE ROAD; TH ALONG SAID RIGHT-OF-WAY S 43°23'32" E (REC. AS S 43°45'20" E) 839.31 FT; TH ALONG SAID RIGHT-OF-WAY BEING A CURVE TO THE RIGHT 189.89 FT (REC. AS 181.81 FT), SAID CURVE HAVING A RADIUS OF 2831.93 FT, A DELTA OF 03°50'31" AND A LONG CHORD OF S 39°47'49" E 189.86 FT (REC. AS S 41°55'00" E 181.78 FT); TH S 14°57'09" W 400.35 FT (REC. AS S 15°00'00" W 418.26 FT & 412.17 FT); TH S 47°26'59" W (REC. AS S 46°30'00" W) 310.00 FT; TH S 68°27'06" W 229.86 FT TO THE NE CORNER OF "HIDDEN COVE" CONDOMINIUM, O.C.C.P. NO. 1097; TH THE FOLLOWING THREE COURSES ALONG THE NORTH LINE OF SAID "HIDDEN COVE" CONDOMINIUM S 68°27'06" W 43.95 FT (REC. AS S 68°00'00" W 43.57 FT) AND N 84°15'40" W (REC. AS N 84°30'00" W) 280.00 FT AND TH N 89°45'40" W 424.46 FT (REC. AS WEST 426.99 FT) TO THE NW CORNER OF SAID "HIDDEN COVE" CONDOMINIUM BEING A POINT ON THE WEST LINE OF SECTION 36; TH ALONG SAID WEST LINE N 00°12'01" W 1768.32 FT TO THE POINT OF BEGINNING. CONTAINING 37.99 ACRES. SUBJECT TO THE RIGHTS OF THE PUBLIC OVER THE NORTH 33 FT FOR HUTCHINS ROAD AND THE NORTHEASTERLY 33 FT FOR UNION LAKE ROAD. ALSO SUBJECT TO EASEMENTS AND RESTRICTIONS OF RECORD.

WHITE LAKE TOWNSHIP STANDARD SITE CONSTRUCTION NOTES:

1. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE CURRENT STANDARDS AND SPECIFICATIONS OF WHITE LAKE CHARTER TOWNSHIP.
2. THE DEVELOPER SHALL CONTACT THE TOWNSHIP PLANNING DEPARTMENT AT (248) 698-3300 TO SCHEDULE A PRE-CONSTRUCTION MEETING. THE DEVELOPER'S PRIME SITE CONTRACTOR SHALL ATTEND. A COPY OF ALL PERMITS MUST BE SUBMITTED TO THE PLANNING DEPARTMENT PRIOR TO SCHEDULING THE MEETING.
3. THE CONTRACTOR SHALL CONTACT THE TOWNSHIP ENGINEER AT (248) 681-7800 48 HOURS PRIOR TO THE BEGINNING OF CONSTRUCTION. THE CONTRACTOR SHALL KEEP THE INSPECTOR APPRAISED OF THE NEED FOR INSPECTION ON A DAY BY DAY BASIS. LACKING SPECIFIC SCHEDULING WITH THE INSPECTOR, THE CONTRACTOR SHALL GIVE 48 HOURS NOTICE TO THE TOWNSHIP ENGINEER PRIOR TO RE-COMMENCING WORK REQUIRING INSPECTION. FAILURE TO INFORM THE INSPECTOR OR THE TOWNSHIP ENGINEER OF A WORK CANCELLATION MAY RESULT IN A ONE HALF DAY INSPECTION CHARGE TO THE DEVELOPER. THE CONTRACTOR SHALL CALL (248) 844-5400 TO SCHEDULE SANITARY SEWER MAIN LINE INSPECTION.
4. ALL WATERMAIN OR SANITARY SEWER WORK WILL REQUIRE FULL TIME INSPECTION. FULL TIME INSPECTION WILL GENERALLY BE REQUIRED FOR UNDERGROUND STORM SEWER CONSTRUCTION, CONCRETE CURBING AND PAVING OPERATIONS. SITE GRADING AND DETENTION BASIN CONSTRUCTION WILL GENERALLY BE INSPECTED ON AN INTERMITTENT BASIS.
5. THE CONTRACTOR SHALL CONTACT MISS DIG AT (800) 482-7171 72 HOURS IN ADVANCE OF CONSTRUCTION TO HAVE EXISTING UNDERGROUND FACILITIES LOCATED. CONTRACTOR SHALL CONTACT THE WHITE LAKE TOWNSHIP WATER DEPARTMENT AT (248) 698-3300 EXT 165 SEPARATELY 72 HOURS IN ADVANCE OF CONSTRUCTION TO HAVE WATER UTILITIES LOCATED.

NOTE: ALL OFF-SITE IMPROVEMENTS WILL BECOME PUBLIC PROPERTY.



LOCATION MAP
SCALE: 1" = 2000'

APPROVALS

AGENCY	DESCRIPTION		DATE	EXPIRATION DATE	
WHITE LAKE TOWNSHIP	ENGINEERING APPROVAL (J & A)	- SANITARY	6-10-2019		
		- WATERMAIN	6-10-2019		
		- REMAINDER	6-10-2019		
OAKLAND COUNTY WATER RESOURCE COMMISSION	SOIL EROSION PERMIT NO.	WLT/2019-0491/36/CO			①
OAKLAND COUNTY WATER RESOURCE COMMISSION	SANITARY APPROVAL		7-18-2019		②
OAKLAND COUNTY WATER RESOURCE COMMISSION	WATER MAIN APPROVAL				
MICHIGAN DEPT. OF ENVIRONMENTAL QUALITY	SANITARY PERMIT NO.	P41002175v.1	8-2-2019	8-2-2021	②
MICHIGAN DEPT. OF ENVIRONMENTAL QUALITY	WATER MAIN PERMIT NO.				
MICHIGAN DEPT. OF ENVIRONMENTAL QUALITY	WETLANDS STORM WATER DISCHARGE PERMIT	WRP015765v.1	3-27-2019	3-27-2024	
MICHIGAN DEPT. OF ENVIRONMENTAL QUALITY	N.P.D.E.S. NOTICE TO COVER	HNP-S6FM-E77B-6	5-23-2019		
ROAD COMMISSION FOR OAKLAND COUNTY	APPROACH PERMIT NO. (Includes Safety Path)	19-0127	6-27-2019	6-27-2020	②
	UNDERGROUND PERMIT NO.	19-0128	6-27-2019	6-27-2020	

NOTES

① THE O.C.W.R.C. SOIL EROSION PERMIT CAN BE EXTENDED BY PAYING ADDITIONAL FEES FOR 3 MONTH INTERVALS OR UP TO 1 YEAR.

② CAN BE EXTENDED UPON WRITTEN REQUEST BEFORE PERMIT/APPROVAL EXPIRES

③ THE APPLICATION APPROVAL CAN BE EXTENDED A FEW MONTHS IF YOU CALL AHEAD OF TIME. IF THE PERMIT IS ISSUED WITHIN A YEAR IT IS GOOD AS LONG AS THE (SAME) CONTRACTOR CONTINUES TO PROVIDE THE R.C.O.C. WITH UPDATED INSURANCE CERTIFICATES.

NOTES:

"THE SOIL EROSION CONTROLS WILL BE MAINTAINED WEEKLY AND AFTER EVERY STORM EVENT".

-GENERAL CONTRACTOR WILL BE RESPONSIBLE FOR THE MAINTENANCE OF THE SOIL EROSION CONTROLS.

REVISION INDEX

REV. #	DESCRIPTION	DATE	SHEET NUMBERS 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
1	PER J & A (12-19-18), McKenna (12-18-18), DPS	1-11-19	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X					
2	PER J & A (3-19-19), DPS (3-20-19)	3-26-19	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X					
3	PER J & A (4-16-19), DPS (4-11-19)	4-22-19	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X					
4	PER R.C.O.C. (4-22-19)	4-25-19	X		X	X	X	X		X	X	X	X		X				X	X			X	X		X			X	X	X	X					
5	PER J & A (5-21-19)	5-23-19	X				X				X	X	X						X	X			X	X	X		X	X	X	X								
6	PER RCOC (6-5-19)	6-11-19	X								X																												
7	PER DPS (4-25-19) Shifted HY-10	6-13-19	X		X				X							X										X							X					
8	PER M.D.E.Q. (6-27-19)	6-28-19	X																				X	X	X	X	X	X	X	X								
9	PER O.C.W.R.C. (7-3-19)	7-10-19	X		X	X																						X										
10	PER CLIENT (1-5-21) REVISED GRADES LOTS 47-66	1-8-2021	X						X					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X							
11	REV. PH 4, ETC PER CLIENT (2-25-2021)	3-11-2021	X		X	X	X	X	X		X	X	X	X		X	X		X	X	X	X	X	X	X	X	X	X	X	X		X	X					
12	PER DLZ (4-7-2021)	5-6-2021	X		X		X		X				X	X							X	X	X	X				X	X	X			X					

NOTE:
THE CONDOMINIUM ASSOCIATION WILL BE RESPONSIBLE FOR MAINTAINING THE PRETREATMENT STRUCTURES.

DEVELOPER

Preserve at Hidden Lake, LLC
8255 Cascade Avenue, Suite 110
Commerce, Michigan 48382
Phone: (248) 242-6838/(248) 842-8613
Contact: Craig Piasecki
Email: craigp@myphhome.com

PROPRIETOR/BUILDER

PH Homes
8255 Cascade Avenue, Suite 110
Commerce, Michigan 48382
Phone: (248) 242-6838/(248) 842-8613
Contact: Craig Piasecki
Email: craigp@myphhome.com

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6) GRADING PLAN - MIDDLE
7) GRADING PLAN - SOUTH
8) GRADING PLAN - EAST
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23) WATERMAIN & SANITARY SEWER PLAN & PROFILE - PRESERVE LANE STA 18+00 TO END
24) WATERMAIN & SANITARY SEWER PLAN & PROFILE - SAWGRASS LANE STA 0+00 TO 7+50
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26) WATERMAIN & SANITARY SEWER PLAN & PROFILE - SAWGRASS LANE STA 15+00 TO END
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32) WRC SOIL EROSION & SEDIMENTATION CONTROL DETAILS (1 OF 1)
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DATE: 11-29-18
SHEET 1 OF 36
KE 2017.182

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P.O.B.
NW CORNER
SECTION 36
T3N, R8E

Bm #5

Hutchins Road

S 89°00'59" E 323.66'

S 43°23'32" E 463.24'

20' SANITARY SEWER EASEMENT L. 20592, P. 129

WATER MAIN EASEMENT L. 20592, P. 132

16' MICHIGAN BELL RIGHT OF WAY L. 521, P. 616 & L. 513, P. 573

12-36-101-001
3.83 Acres
R-1D

335.68' (M) 335.01' (R)

Blondell Street 40' wd.

IRON W/CAP FD

353
383
384
414
415
445
446
476
507
508
538
539
569
570
600

14B

"MARJORIE VESTA PARK" L. 20, P. 7, O.C.R.
R-1D

WEST LINE OF SECTION 36 N 00°12'01" W 2660.65'
N 00°12'01" E 1768.32"
1433.24' (M) 1427.33' (R)

Julia Street 40' wd.

Millward Street 40' wd.

Ashdown St. 40' wd.

Mandon Road 40' wd.

Kettering Street 40' wd.

Funston Street 45' wd.

Gladys Street 40' wd.

N 89°00'59" W 46.17'

Bm #3

16' MICHIGAN BELL RIGHT OF WAY L. 521, P. 616 & L. 513, P. 573

S 43°23'32" E (M) S 43°45'29" E (R) 900.00'

S 43°23'32" E (M)
S 43°45'29" E (R)
899.51'

"BROADMOOR SUB. NO. 1" L. 270, P. 1, O.C.R.
R-1C

15
16
17
19
20
21
22

Old Union Lake Road

Akehurst Lane

Bm #2

12-36-102-002
R-1C

MON FD

ARC=167.65'
RADIUS=2864.93'
DELTA=3°21'10"
LC=N 40°03'05" E
167.63'

"HERITAGE HILLS ESTATES" L. 207, P. 23, O.C.R.
R-1C

1
2
3

Concord Drive

IRON W/CAP FD

12-36-126-039
RM-2

Bm #1

ARC=189.89' (M)-181.81' (R)
RADIUS=2831.93' (M & R)
DELTA=03°50'31"
LC=S 39°47'49" E
189.86' (M)
S 41°55'00" E
181.78' (R)

S 14°57'09" W 400.35'
S 15°00'00" W
418.26 (R) & 412.17' (R)

60' Ave. Easement for Ingress & Egress L. 10726, P. 820, O.C.R.

12-36-176-002
LB

IRON FD

IFC

S 47°26'06" W (M)
S 46°30'00" W (R)
310.00'

12-36-151-017
R-1A

12-36-151-016
R-1A

12-36-151-015
R-1A

S 68°27'06" W 229.86'
S 68°00'00" W 270.00' (R)

MON SET

NE CORNER
"HIDDEN COVE"
IRON SET

S 68°27'06" W
43.95' (M) 43.57' (R)

N 89°45'40" W 424.46' (M)
WEST 426.99' (R)

N 84°15'40" W (M)
N 84°30'00" W (R)
280.00'

NW CORNER
"HIDDEN COVE"
IRON SET

"HIDDEN COVE" O.C.C.P. NO. 1097
R-1C

9
8
7
6
5
4
10

Cove Court - Private

Hidden Cove Drive 60' wd. - Private

N 00°12'01" E 892.33'

W 1/4 COR
SECTION 36
T3N, R8E

Total 37.99
Acres

12-36-101-004
3.0 Acres
RM-1

12-36-101-003
31.50 Acres
RM-1

W

SOILS LEGEND

SYMBOL	NAME
14B	Oakville fine sand, 0-6% slopes
35A	Thetford loamy fine sand, 0-3% slopes
53A	Tedrow loamy sand, 0-3% slopes
62B	Urban land-Spinks complex, 0-8% slopes
W	Water

Benchmarks: (NAVD '88)

BM #1: ARROW ON EXISTING HYDRANT LOCATED ON EAST SIDE OF UNION LAKE ROAD, 75' SOUTH OF CONCORD DRIVE. ELEVATION = 968.47

BM #2: ARROW ON EXISTING HYDRANT LOCATED ON EAST SIDE OF UNION LAKE ROAD, 80' SOUTH OF AKEHURST LANE. ELEVATION = 966.70

BM #3: ARROW ON EXISTING HYDRANT LOCATED ON EAST SIDE OF UNION LAKE ROAD, 390' NORTH OF AKEHURST LANE. ELEVATION = 965.29

BM #4: ARROW ON EXISTING HYDRANT LOCATED ON WEST SIDE OF UNION LAKE ROAD, 140' SOUTH OF HUTCHINS ROAD. ELEVATION = 962.01

BM #5: ARROW ON EXISTING HYDRANT LOCATED ON NORTH SIDE OF HUTCHINS ROAD, 380' WEST OF UNION LAKE ROAD. ELEVATION = 958.89

BM #6: NAIL IN SOUTH FACE OF 28" OAK LOCATED 160' EAST OF WEST PROPERTY LINE ADJACENT TO PARCEL 476 ON THE NORTH SIDE OF ASHDOWN STREET. ELEVATION = 945.50

Legal Description - As Surveyed

PART OF THE NORTHWEST 1/4 OF SECTION 36, TOWN 3 NORTH, RANGE 8 EAST, WHITE LAKE TOWNSHIP, OAKLAND COUNTY, MICHIGAN, BEING MORE PARTICULARLY DESCRIBED AS BEGINNING AT THE NW CORNER OF SECTION 36, T3N, R8E; TH S 89°00'59" E 323.66 FT TO A POINT ON THE CENTERLINE OF UNION LAKE ROAD; TH ALONG SAID CENTERLINE S 24°10'25" E 4.31 FT; TH S 43°23'32" E 463.24 FT; TH N 89°00'59" W 46.17 FT TO A POINT ON THE WESTERLY RIGHT-OF-WAY OF UNION LAKE ROAD; TH ALONG SAID RIGHT-OF-WAY S 43°23'32" E (REC. AS S 43°45'29" E) 839.31 FT; TH ALONG SAID RIGHT-OF-WAY BEING A CURVE TO THE RIGHT 189.89 FT (REC. AS 181.81 FT), SAID CURVE HAVING A RADIUS OF 2831.93 FT, A DELTA OF 03°50'31" AND A LONG CHORD OF S 39°47'49" E 189.86 FT (REC. AS S 41°55'00" E 181.78 FT); TH S 14°57'09" W 400.35 FT (REC. AS S 15°00'00" W 418.26 FT & 412.17 FT); TH S 47°26'59" W (REC. AS S 46°30'00" W) 310.00 FT; TH S 68°27'06" W 229.86 FT TO THE NE CORNER OF "HIDDEN COVE" CONDOMINIUM, O.C.C.P. NO. 1097; TH THE FOLLOWING THREE COURSES ALONG THE NORTH LINE OF SAID "HIDDEN COVE" CONDOMINIUM S 68°27'06" W 43.95 FT (REC. AS S 68°00'00" W 43.57 FT) AND N 84°15'40" W (REC. AS N 84°30'00" W 280.00 FT) AND TH N 89°45'40" W 424.46 FT (REC. AS WEST 426.99 FT) TO THE NW CORNER OF SAID "HIDDEN COVE" CONDOMINIUM BEING A POINT ON THE WEST LINE OF SECTION 36; TH ALONG SAID WEST LINE N 00°12'01" W 1768.32 FT TO THE POINT OF BEGINNING. CONTAINING 37.99 ACRES. SUBJECT TO EASEMENTS AND RESTRICTIONS OF RECORD.

STATE OF MICHIGAN
PATRICK McWILLIAMS
ENGINEER
NO. 31658
LICENSED PROFESSIONAL ENGINEER

DATE	ISSUE
3-26-19	PER J & A (3-19-19) & DPS (3-20-19)
4-22-19	PER J & A (4-16-19) & DPS (4-11-19)

PROPRIETOR:
Preserve at Hidden Lake, LLC
8255 CASCADE AVENUE, SUITE 110
COMMERCE TOWNSHIP, MICHIGAN 48382
(248) 842-8613

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PHONE (248) 625-5251 www.kiefteng.com FAX (248) 625-7110

DATE	11-29-18
DRAWN	GF
DESIGN	PCM
SECTION	36

CKD. BY	DATE

T- 3 -N. R- 8 -E.

72 HOURS (3 WORKING DAYS) BEFORE YOU DIG
CALL MISS DIG
800-482-7171
(TOLL FREE)

Existing Conditions Plan
"Preserve at Hidden Lake"
WHITE LAKE TOWNSHIP, OAKLAND COUNTY, MICHIGAN

SCALE	1" = 100'
SHEET	2 OF 36
KE	2017.182

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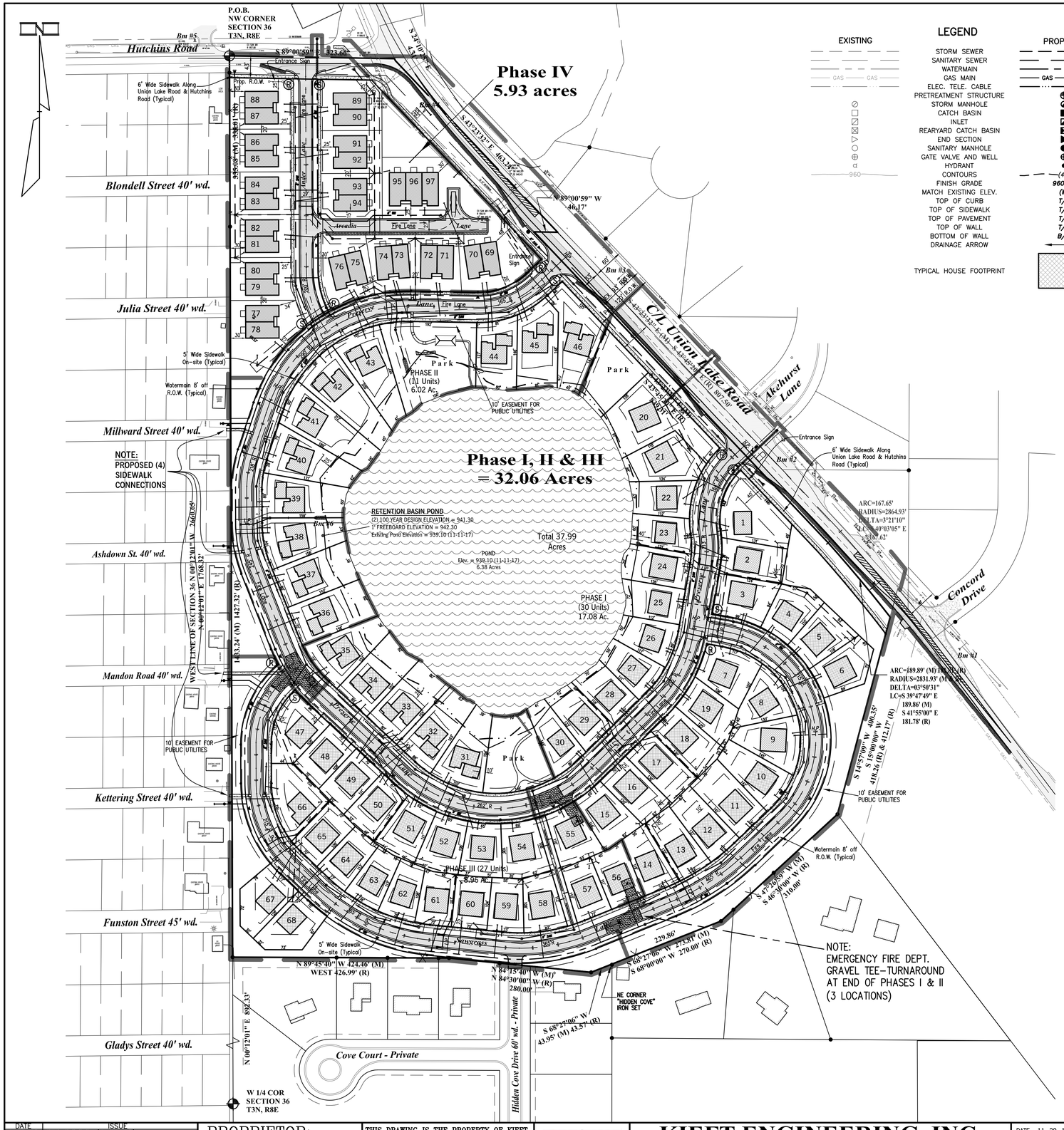

LEGEND

EXISTING		PROPOSED
GAS GAS		GAS GAS
	STORM SEWER	
	SANITARY SEWER	
	WATERMAIN	
	GAS MAIN	
	ELEC. TELE. CABLE	
	PRETREATMENT STRUCTURE	
	STORM MANHOLE	
	CATCH BASIN	
	INLET	
	REARYARD CATCH BASIN	
	END SECTION	
	SANITARY MANHOLE	
	GATE VALVE AND WELL	
	HYDRANT	
960	CONTOURS	(40)
	FINISH GRADE	960 FG
	MATCH EXISTING ELEV.	(M)
	TOP OF CURB	T/C
	TOP OF SIDEWALK	T/S
	TOP OF PAVEMENT	T/P
	TOP OF WALL	T/W
	BOTTOM OF WALL	B/W
	DRAINAGE ARROW	
	TYPICAL HOUSE FOOTPRINT	

UTILITY INFORMATION

A 20' WIDE PERMANENT PRIVATE EASEMENT FOR WATER SUPPLY SYSTEM GRANTED TO WHITE LAKE TOWNSHIP AND CENTERED ON THE UTILITY AS SHOWN. THIS APPLIES WHEN IT IS NOT WITHIN THE 60' PRIVATE ROAD EASEMENT. OTHERWISE 12' WIDE IS ACCEPTABLE.

A 20' WIDE PERMANENT PRIVATE EASEMENT FOR SANITARY SEWER SYSTEM GRANTED TO WHITE LAKE TOWNSHIP AND CENTERED ON THE UTILITY AS SHOWN.

A 20' WIDE PERMANENT PRIVATE EASEMENT FOR STORM SEWER SYSTEM GRANTED TO WHITE LAKE TOWNSHIP AND CENTERED ON THE UTILITY AS SHOWN.

IN ADDITION A STORM SEWER MAINTENANCE AGREEMENT WILL BE PROVIDED BY THE DEVELOPER TO DEFINE RESPONSIBILITIES AND ACCESS RIGHTS SHOULD THE STORM WATER SYSTEM REQUIRE MAINTENANCE, REPAIR OR REPLACEMENT.

APPROPRIATE EASEMENTS FOR PROPOSED SANITARY SEWER AND WATER MAINS WILL BE DEDICATED TO WHITE LAKE TOWNSHIP BY SEPARATE DOCUMENTS.

ALL PRIVATE ROADWAYS ARE A PERMANENT EASEMENT FOR INGRESS/EGRESS AND OPERATION/MAINTENANCE OF THE WATER SUPPLY SYSTEM AND SANITARY SEWER SYSTEM.

Benchmarks: (NAVD '88)

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BM #6: NAIL IN SOUTH FACE OF 28" OAK LOCATED 160' EAST OF WEST PROPERTY LINE ADJACENT TO PARCEL 476 ON THE NORTH SIDE OF ASHDOWN STREET. ELEVATION = 945.50

SIGNAGE LEGEND

(R) – ROAD SIGN (6)

(S) – STOP SIGN (6)

NOTE:
ALL ROAD SIGNS AND STOP SIGNS, ETC. SHALL BE IN ACCORDANCE WITH MMUTCD STANDARDS.

1. POSTING. ALL FIRE LANES SHALL BE CONSPICUOUSLY POSTED WITH UNIFORM "NO PARKING FIRE LANE" SIGNS. THE LOCATIONS AND SPACING SHALL BE ON SITE, UPON COMPLETION OF THE PROPOSED ROADWAYS/PARKING AREAS.

PD Zoning - Planned Development District

SETBACKS: (PER ORDINANCE)
FRONT - 40 FEET
REAR - 30/40 FEET (TO BE DETERMINED BY PLANNING COMMISSION)
SIDES - 25 FEET ONE SIDE
50 FEET TOTAL OF TWO SIDES

RESIDENTIAL:
TOTAL UNITS PROPOSED - 68
FRONT SETBACK - 25 FT
REAR SETBACKS:
POND LOTS MIN. (WATER) - 40 FT
POND LOTS MIN. (WETLANDS) - 25 FT
OFF POND LOTS - 30 FT
SIDE YARD SETBACKS - 10 FT (EACH SIDE)
ALL UNITS HAVE AT LEAST 70 FT OF FRONTAGE AT THE FRONT 25 FT SETBACK

DUPLEX UNITS:
TOTAL DUPLEX UNITS PROPOSED - 26
TOTAL TRI-PLEX UNITS PROPOSED - 1
FRONT SETBACK - 25 FT MIN. (TO SIDEWALK EXCEPT UNIT 78 = 21 FT TO R.O.W.)
REAR SETBACK - 30 FT (EXCEPT UNIT 89 = 25 FT)
SIDE YARD SETBACKS - 10 FT EA (TOTAL 20 FT)

OPEN SPACE - RESIDENTIAL UNITS
OPEN SPACE - 3.32 Ac.
POND AREA - 6.38 Ac.
OPEN SPACE - 9.70 Ac.

OPEN SPACE - DUPLEX UNITS
OPEN SPACE - 1.8 Ac.+/-
TOTAL OPEN SPACE - 11.5 ACRES+/-
TOTAL SITE AREA (NET) - 37.99 ACRES

OPEN SPACE RATIO = 30.0%

STATE OF MICHIGAN
PATRICK McWILLIAMS
ENGINEER NO. 31658
LICENSED PROFESSIONAL ENGINEER

DATE	ISSUE
4-25-19	PER R.C.O.C. (4-22-19)
6-13-19	PER DPS-SHIFTED HY-10 (4-25-19)
6-13-19	PER DDS-SHIFTED HY-10 (4-25-19)
7-10-19	PER O.C.W.R.C. (7-3-19)
3-11-2021	REV. PH 4, ETC. PER CLIENT (2-25-2021)
4-1-2021	PH 4 SANITARY SUBMITTAL
5-6-2021	PER DLZ (4-27-2021) & MCKENNA (4-26-2021)

PROPRIETOR:
Preserve at Hidden Lake, LLC
8255 CASCADE AVENUE, SUITE 110
COMMERCE TOWNSHIP, MICHIGAN 48382
(248) 842-8613

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DATE	11-29-18
DRAWN	GF
DESIGN	PCM
SECTION	36

CKD. BY | DATE

T- 3 -N. R- 8 -E.

72 HOURS (3 WORKING DAYS) BEFORE YOU DIG CALL MISS DIG 800-482-7171 (TOLL FREE)

General Plan & Benchmarks
"Preserve at Hidden Lake"
WHITE LAKE TOWNSHIP, OAKLAND COUNTY, MICHIGAN

SCALE 1" = 100'
SHEET 3 OF 36
KE 2017.182

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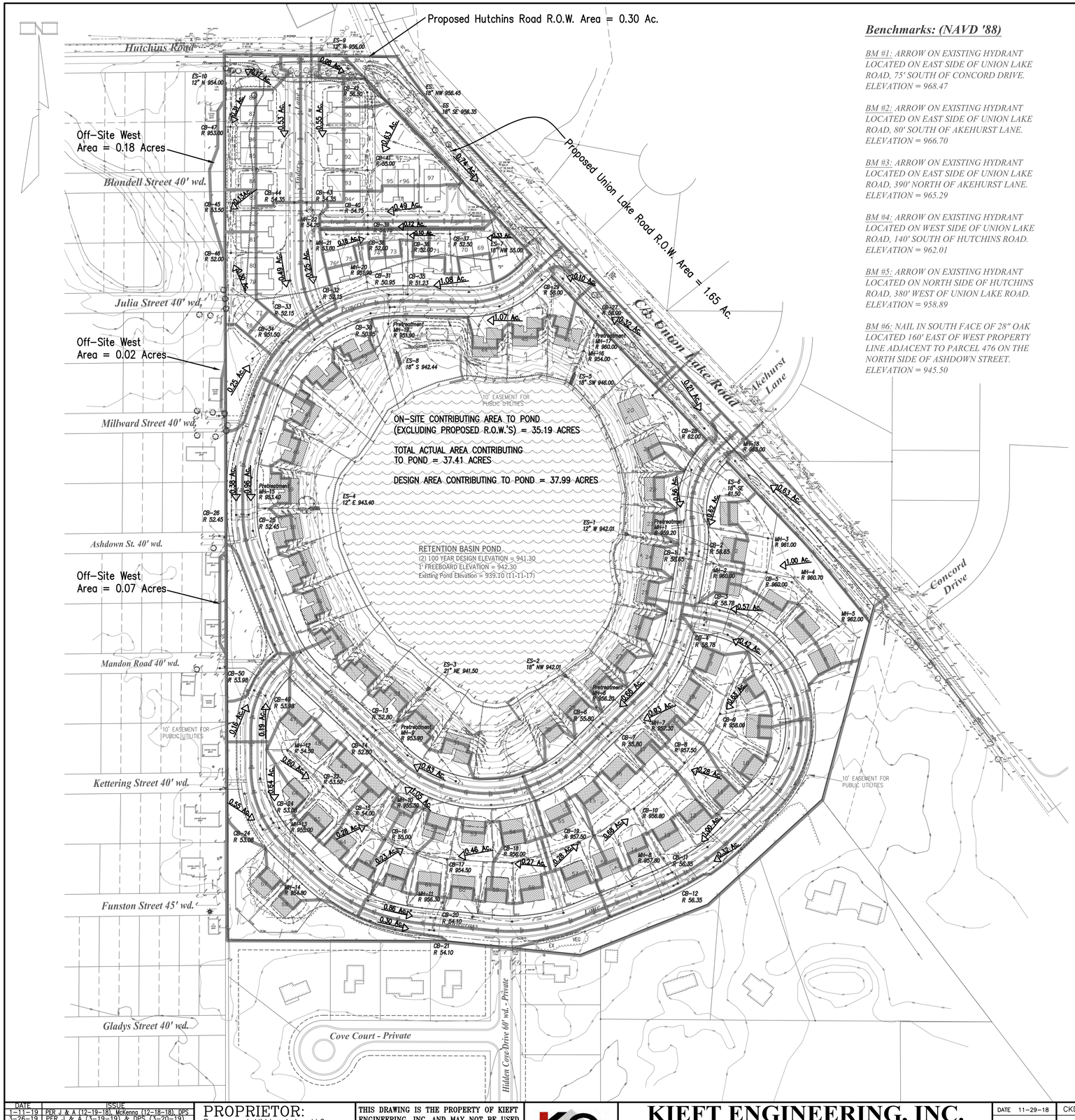

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Quantities (Total Site)

Description	Quantity
DISRUPTION AREA	30 AC
CLEARING AREA (TREES, ETC.)	16.00 AC
GRADING (ROUGH):	
Cuts / Fills	30,000 CY
SOIL EROSION CONTROLS:	
Seed & Mulch	12 AC
Silt Fencing	3,000 LF
Silt Fence Gravel Filter	6 EA
Construction stone access	480 SY
STORM SEWER:	
4" PVC SCH 40 (Sump Leads)	860 LF
8" PVC SCH 40	374 LF
12" C76 CL4, Premium Joint	2,516 LF
12" ADS N-12	1,028 LF
15" C76 CL4, Premium Joint	152 LF
15" ADS N-12	406 LF
18" C76 CL4, Premium Joint	1,166 LF
21" C76 CL4, Premium Joint	151 LF
18" CONC. END SECTION, 6' LENGTH	5 EA
12" CONC. END SECTION, 6' LENGTH	4 EA
21" (24") CONC. END SECTION, 6' LENGTH	1 EA
Grouted Rip-rap	54 SY
Catch Basin, 4' Dia., 7045 Cover	32 EA
Inlet, 2' Dia., "C" Cover	13 EA
Manhole, 4' Dia., "B"	23 EA
Catch Basin, 4' Dia., 6508 Cover	18 EA
STORMCEPTOR PRETREATMENT STRUCTURE	6 EA
Catch Basin / Filters	63 EA
SANITARY SEWER ON-SITE:	
6" ABS SDR 23.5 LEADS & RISERS	3,220 LF
8" SDR 26 PVC PIPE	5,140 LF
8" PVC TRUSS PIPE (BORE & JACK W/STEEL CASING)	120 LF
MANHOLE, STANDARD 4' DIA.	33 EA
MANHOLE, 4' DIA. W/1' SUMP	2 EA
CONNECTION TO EXISTING MANHOLE	2 EA
WATERMAIN:	
2" Water Service-Plastic DR-9 (200 PSI Rated)	718 LF
2" S.O.V.	14 LF
6" D.I. CL54 PIPE FOR HYDRANTS	40 LF
8" D.I. CL54 PIPE	5,889 LF
8" WATERMAIN DIRECTIONAL BORE-HDPE PIPE	156 LF
8" GATE VALVE & WELL	14 EA
8" GATE VALVE & WELL W/TAP CONNECTION	3 EA
HYDRANTS, COMPLETE	18 EA
PAVEMENT & CURBS, ETC.	
UNION LAKE ROAD R.O.W. (INCLUDES PASSING LANE):	
5 1/2" B-2 Standard Curb, 30" Wide	278 LF
"M" Detail, 30" Wide	0 LF
9" Deep Strength Asphalt	1,850 SY
Sawcut & Butt Joint	330 LF
6' Wide, 6"-22A Gravel Shoulder	830 SY
6' Wide, 4" Thick Concrete Safety Path	830 SY
HUTCHINS ROAD R.O.W.:	
5 1/2" B-2 Standard Curb, 30" Wide	84 LF
"M" Detail, 30" Wide	0 LF
9" Deep Strength Asphalt	260 SY
Sawcut & Butt Joint	177 LF
6' Wide, 6"-22A Gravel Shoulder	70 SY
6' Wide, 4" Thick Concrete Safety Path	70 SY
ON-SITE:	
4 1/2" Asphalt over 10" M.D.O.T. 21AA Gravel	18,100 SY
3" Concrete Mountable Curb, 24" Wide	9,500 LF
6" Concrete Curb, 18" Wide	2,630 SY

Sanitary Quantities:

SANITARY SEWER: (PHASE I)
TAP EXISTING MANHOLE - 1 EA
MANHOLE, 4' DIA., "B" - 12 EA
MANHOLE, W/1' SUMP, 4' DIA., "B" - 1 EA
8" SDR 26 PVC PIPE - 1,755 LF
8" SDR 26 PVC PIPE W/BORE & JACK & STEEL CASING - 120 LF
6" ABS SDR 23.5 LEADS & RISERS - 1,261 LF
CLEAN-OUTS - 0 EA

SANITARY SEWER: (PHASE II)
TAP EXISTING MANHOLE - 1 EA
MANHOLE, 4' DIA., "B" - 9 EA
MANHOLE, W/1' SUMP, 4' DIA., "B" - 1 EA
8" SDR 26 PVC PIPE - 1,475 LF
8" SDR 26 PVC PIPE W/BORE & JACK & STEEL CASING - 0 LF
6" ABS SDR 23.5 LEADS & RISERS - 611 LF
CLEAN-OUTS - 0 EA

SANITARY SEWER: (PHASE III)
TAP EXISTING MANHOLE - 0 EA
MANHOLE, 4' DIA., "B" - 11 EA
MANHOLE, W/1' SUMP, 4' DIA., "B" - 0 EA
8" SDR 26 PVC PIPE - 1,574 LF
8" SDR 26 PVC PIPE W/BORE & JACK & STEEL CASING - 0 LF
6" ABS SDR 23.5 LEADS & RISERS - 935 LF
CLEAN-OUTS - 0 EA

SANITARY SEWER: (PHASE IV)
TAP EXISTING MANHOLE - 0 EA
MANHOLE, 4' DIA., "B" - 1 EA
MANHOLE, W/1' SUMP, 4' DIA., "B" - 0 EA
8" SDR 26 PVC PIPE - 350 LF
8" SDR 26 PVC PIPE W/BORE & JACK & STEEL CASING - 0 LF
6" ABS SDR 23.5 LEADS & RISERS - 386 LF
CLEAN-OUTS - 0 EA

SANITARY SEWER: (TOTAL)
TAP EXISTING MANHOLE - 2 EA
MANHOLE, 4' DIA., "B" - 33 EA
MANHOLE, W/1' SUMP, 4' DIA., "B" - 2 EA
8" SDR 26 PVC PIPE - 5,154 LF
8" SDR 26 PVC PIPE W/BORE & JACK & STEEL CASING - 120 LF
6" ABS SDR 23.5 LEADS & RISERS - 3,193 LF
CLEAN-OUTS - 0 EA

LEGEND

EXISTING		PROPOSED
	STORM SEWER	
	SANITARY SEWER	
	WATERMAIN	
GAS GAS GAS	GAS MAIN	GAS GAS GAS
	ELEC. TELE. CABLE	
	DRAINAGE AREA	
	PRETREATMENT STRUCTURE	
	STORM MANHOLE	
	CATCH BASIN	
	INLET	
	REARYARD CATCH BASIN	
	END SECTION	
	SANITARY MANHOLE	
	GATE VALVE AND WELL	
	HYDRANT	
960	MASS GRADING CONTOURS	(40)
	PROPOSED FINISH GRADE	(40.0)
	FINISH GRADE	1001 FG
	WALKOUT ELEVATION	992 W/O
	MATCH EXISTING	(M)
	TYPICAL HOUSE FOOTPRINT	

STATE OF MICHIGAN
PATRICK McWILLIAMS
ENGINEER
NO. 31658
LICENSED PROFESSIONAL ENGINEER

DATE	ISSUE
1-11-19	PER J & A (12-19-18), McKenna (12-18-18), DPS
3-28-19	PER J & A (3-19-19) & DPS (3-20-19)
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7-10-19	PER O.C.W.R.C. (7-3-19)
3-11-2021	REV. PH 4, ETC. PER CLIENT (2-25-2021)

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DATE	11-29-18	CKD. BY	DATE
DRAWN	GF		
DESIGN	PCM		
SECTION	36	T- 3 -N. R- 8 -E.	

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Overall Drainage Area Plan & Quantities
"Preserve at Hidden Lake"
WHITE LAKE TOWNSHIP, OAKLAND COUNTY, MICHIGAN

SCALE 1" = 100'
SHEET 4 OF 36
KE 2017.182

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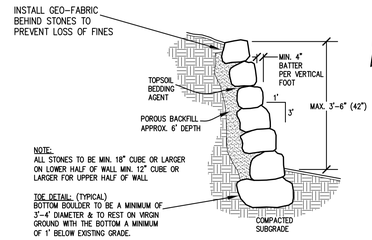
LEGEND

EXISTING		PROPOSED
	STORM SEWER	
	SANITARY SEWER	
	WATERMAIN	
GAS GAS	GAS MAIN	GAS GAS
	ELEC, TELE, CABLE	
	PRETREATMENT STRUCTURE	
	STORM MANHOLE	
	CATCH BASIN	
	INLET	
	REARYARD CATCH BASIN	
	END SECTION	
	SANITARY MANHOLE	
	GATE VALVE AND WELL	
	HYDRANT	
960	CONTOURS	(40)
	FINISH GRADE	*960 FG*
	MATCH EXISTING ELEV.	*(M)*
	TOP OF CURB	*T/C*
	TOP OF SIDEWALK	*T/S*
	TOP OF PAVEMENT	*T/P*
	TOP OF WALL	*T/W*
	BOTTOM OF WALL	*B/W*
	DRAINAGE ARROW	
	SUMP DISCHARGE	*S.D.*

NOTE:
BOULDER RETAINING WALL (3' TO 4' HIGH) WITH 36" MINIMUM HEIGHT DECORATIVE RAILING ALONG THE TOP OF THE WALL



FIELDSTONE RETAINING WALL DETAIL "W-1"
NOT TO SCALE

(SEE SHEET 8)

PATRICK McWILLIAMS ENGINEER NO. 31658 STATE OF MICHIGAN REGISTERED PROFESSIONAL ENGINEER

DATE	ISSUE
3-25-19	PER J & A (3-19-19) & DPS (3-20-19)
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DESIGN	PCM		
SECTION	36	T- 3 -N. R- 8 -E.	

72 HOURS (3 WORKING DAYS) BEFORE YOU DIG CALL MISS DIG 800-482-7171 (TOLL FREE)

Grading Plan - North

"Preserve at Hidden Lake"
WHITE LAKE TOWNSHIP, OAKLAND COUNTY, MICHIGAN

SCALE	1" = 30'
SHEET	5 OF 36
	KE 2017.182

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PROPOSED 60 FT R.O.W. (GENERAL COMMON) WITH 27' ROADWAY AND 30" MOUNTABLE CONCRETE CURBS AND 22 FT WIDE ASPHALT PAVING

Phase II

Union Lake Road

(SEE SHEET 8)

(SEE SHEET 5)

Park Phase II 0.58 Ac.

Park 0.27 Ac.

BOULDER WALL (2' HIGH)

WOOD CHIP PATH

PLACE GROUTED RIP-RAP TO WETLANDS EDGE

PROPOSED SPLIT RAIL FENCING

ES-8 18" S 942.44

ES-5 18" SW 946.00

PROPOSED 8' ASPHALT PATH W/2' CLEAR ZONE

5' SIDEWALK

C/L 20' PRIVATE EASEMENT FOR STORM DRAINAGE

Boardwalk & Overlook:
Wooden pier structure - parallel to shoreline.
30"x 4' structure
6 pilings (not in water)
elevated 2' minimum above grade (942.00)
3' wide boardwalk over wetland areas
leading to woodchip path outside of wetland boundary.

NOTE:
PLACE GROUTED RIP-RAP TO WETLANDS EDGE AT EACH END SECTION (TYPICAL)

RETENTION BASIN POND
(2) 100 YEAR DESIGN ELEVATION = 941.30
1' FREEBOARD ELEVATION = 942.30
Existing Pond Elevation = 939.10 (11-11-17)

FIELD LOCATED EDGE OF WETLANDS

FIELD LOCATED EDGE OF WATER

NOTE:
A 4x4 WOOD POST WILL BE PLACED AT EVERY OTHER LOT MARKING THE EDGE OF WETLANDS

Phase III

Phase I

445 — EXISTING HOUSE #9000

446 — EXISTING HOUSE #9001

476 — EXISTING HOUSE #9038

507 — EXISTING HOUSE #9027

PROPOSED SCREENING FENCE

Preserve Fire Lane

Phase II Commons Area 2.00 Ac.

PROPOSED PH II EMERGENCY FIRE DEPT. GRAVEL TEE-TURNAROUND

ADA RAMPS

(SEE SHEET 7 & 8)

(SEE SHEET 8)

LEGEND

EXISTING		PROPOSED
	STORM SEWER	
	SANITARY SEWER	
	WATERMAIN	
GAS GAS GAS	GAS MAIN	GAS GAS GAS
	ELEC. TELE. CABLE	
	PRETREATMENT STRUCTURE	
	STORM MANHOLE	
	CATCH BASIN	
	INLET	
	REARYARD CATCH BASIN	
	END SECTION	
	SANITARY MANHOLE	
	GATE VALVE AND WELL	
	HYDRANT	
960	CONTOURS	(40)
	FINISH GRADE	960 FG
	MATCH EXISTING ELEV.	(M)
	TOP OF CURB	T/C
	TOP OF SIDEWALK	T/S
	TOP OF PAVEMENT	T/P
	TOP OF WALL	T/W
	BOTTOM OF WALL	B/W
	DRAINAGE ARROW	S.D.
	SUMP DISCHARGE	

PATRICK McWILLIAMS ENGINEER NO. 31658 STATE OF MICHIGAN REGISTERED PROFESSIONAL ENGINEER

DATE	ISSUE
1-11-19	PER J. & A (12-19-18), McKenna (12-18-18), DPS
3-26-19	PER J. & A (3-19-19) & DPS (3-20-19)
4-22-19	PER J. & A (4-16-19) & DPS (4-11-19)
4-25-19	PER R.C.O.C. (4-22-19)
3-11-2021	REV. PH 4, ETC. PER CLIENT (2-25-2021)

PROPRIETOR:
Preserve at Hidden Lake, LLC
8255 CASCADE AVENUE, SUITE 110
COMMERCE TOWNSHIP, MICHIGAN 48382
(248) 842-8613

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5852 SOUTH MAIN STREET, SUITE 1, CLARKSTON, MICHIGAN 48346
PHONE (248) 625-5251 www.kiefteng.com FAX (248) 625-7110

DATE	11-29-18	CKD. BY	DATE
DRAWN	GF		
DESIGN	PCM		
SECTION	36	T- 3 -N. R- 8 -E.	

72 HOURS (3 WORKING DAYS) BEFORE YOU DIG CALL MISS DIG 800-482-7171 (TOLL FREE)

Grading Plan - Middle

"Preserve at Hidden Lake"

WHITE LAKE TOWNSHIP, OAKLAND COUNTY, MICHIGAN

SCALE	1" = 30'
SHEET	6 OF 36
	KE 2017.182

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(SEE SHEET 6)

(SEE SHEET 7)

(SEE SHEET 8)

NOTE:
PLACE GROUTED RIP-RAP TO WETLANDS EDGE AT EACH END SECTION (TYPICAL)

Boardwalk & Overlook:
Wooden pier structure - parallel to shoreline.
20' x 4' structure
6 pilings (not in water)
elevated 2' minimum above grade (942.00)
3' wide boardwalk over wetland areas leading to woodchip path outside of wetland boundary.

PROPOSED SPLIT RAIL FENCING

PROPOSED PH I EMERGENCY FIRE DEPT. GRAVEL TEE-TURNAROUND

PROPOSED SCREENING FENCE

PROPOSED FIRE PROTECTION SWING GATE (MIN. 20' WIDE) FOR EMERGENCY ACCESS AS PER WHITE LAKE TOWNSHIP FIRE DEPARTMENT REQUIREMENTS

REMOVE GUARDRAIL

PROPOSED PH I EMERGENCY FIRE DEPT. GRAVEL TEE-TURNAROUND

PHASE III (27 Units)
8.96 Ac.

Phase I
Phase II
Phase III

Preserve Lane
Sawgrass Fire Lane
Fire Lane
Walkway
Commons Area
Park
0.37 Ac.
0.10 Ac.
2.00 Ac.
WOOD CHIP PATH
Hidden Cove Drive - Private

"HIDDEN COVE" O.C.C.P. NO. 1097
R-1C

12-36-151-015
R-1A

PATRICK McWILLIAMS ENGINEER NO. 31658

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3-26-19	PER J & A (3-19-19) & DPS (3-20-19)
4-22-19	PER J & A (4-16-19) & DPS (4-11-19)
6-13-19	PER DPS-SHIFTED HY-10 (4-25-19)
1-8-2021	PER CLIENT-REVISED GRADES LOTS 47-66 (1-5-2021)
3-11-2021	REV. PH 4, ETC. PER CLIENT (2-25-2021)
5-6-2021	PER DPZ (4-27-2021), & McKENNA (4-26-2021)

PROPRIETOR:
Preserve at Hidden Lake, LLC
8255 CASCADE AVENUE, SUITE 110
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DATE	11-29-18
DRAWN	GF
DESIGN	PCM
SECTION	36

CKD. BY | DATE

T- 3 -N. R- 8 -E.

72 HOURS (3 WORKING DAYS) BEFORE YOU DIG CALL MISS DIG 800-482-7171 (TOLL FREE)

Grading Plan - South
"Preserve at Hidden Lake"
WHITE LAKE TOWNSHIP, OAKLAND COUNTY, MICHIGAN

SCALE	1" = 30'
SHEET	7 OF 36
	KE 2017.182

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(SEE SHEET 7)

(SEE SHEET 6)

(SEE SHEET 5)

NOTE:
PLACE GROUTED RIP-RAP TO WETLANDS EDGE AT EACH END SECTION (TYPICAL)

RETENTION BASIN POND
(2) 100 YEAR DESIGN ELEVATION = 941.30
1' FREEBOARD ELEVATION = 942.30
Existing Pond Elevation = 939.10 (11-11-17)

Phase I

Preserve Lane

Fire Lane

Sawgrass Lane

Union Lake Road

Akehurst Lane

Park
0.27 Ac.

5' SIDEWALK

C/L 20' PRIVATE EASEMENT FOR STORM DRAINAGE

20' PRIVATE EASEMENT FOR STORM DRAINAGE

"HERITAGE HILLS ESTATES" L. 207, P. 23, O.C.R.
R-1C

12-36-102-002
R-1C

21

22

LEGEND

EXISTING		PROPOSED
	STORM SEWER	
	SANITARY SEWER	
	WATERMAIN	
GAS GAS GAS	GAS MAIN	GAS GAS GAS
	ELEC. TELE. CABLE	
	PRETREATMENT STRUCTURE	
	STORM MANHOLE	
	CATCH BASIN	
	INLET	
	REARYARD CATCH BASIN	
	END SECTION	
	SANITARY MANHOLE	
	GATE VALVE AND WELL	
	HYDRANT	
960	CONTOURS	(40)
	FINISH GRADE	960 FG
	MATCH EXISTING ELEV.	(M)
	TOP OF CURB	T/C
	TOP OF SIDEWALK	T/S
	TOP OF PAVEMENT	T/P
	TOP OF WALL	T/W
	BOTTOM OF WALL	B/W
	DRAINAGE ARROW	
	SUMP DISCHARGE	S.D.

PATRICK McWILLIAMS ENGINEER NO. 31658 STATE OF MICHIGAN REGISTERED PROFESSIONAL

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4-22-19	PER J & A (4-16-19) & DPS (4-11-19)
4-25-19	PER R.C.O.C. (4-22-19)

PROPRIETOR:
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Grading Plan - East

"Preserve at Hidden Lake"
WHITE LAKE TOWNSHIP, OAKLAND COUNTY, MICHIGAN

SCALE 1" = 30'
SHEET 8 OF 36
KE 2017.182

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"BROADMOOR SUB. NO. 1" L. 270, P. 1, O.C.R.
R-1C

MAINTAIN NORTHBOUND SIDE OF ROAD

(SEE SHEET 10)

365' NORTHBOUND PASSING LANE TAPER

100' LANE

510' LANE

60' R.O.W.

POND

OBJECT POINT ELEVATION=962.44 (958.94+3.50=962.44)

OBJECT POINT ELEVATION=961.50 (958.00+3.50=961.50)

SIGHT CLEAR VISION LINE (TYPICAL)

SIGHT DISTANCE POINT 15' OFF EDGE OF ROAD ELEVATION=962.70 (959.20+3.50=962.70)

OBJECT POINT ELEVATION=964.40 (960.90+3.50=964.40)

Phase II

Phase I

C/L Union Lake Road

NORTHBOUND LANE

SOUTHBOUND LANE

LEFT TURN LANE TAPER

LEFT TURN LANE

RIGHT TURN LANE

"B" (SEE DETAIL SHEET 10)

PROPOSED 6' WIDE, 6"-22A GRAVEL SHOULDER

SAWCUT & BUTTJOINT

445' REQUIRED SIGHT DISTANCE

650'+ ACTUAL SIGHT DISTANCE

1400'+ ACTUAL SIGHT DISTANCE

1200'+ ACTUAL SIGHT DISTANCE

30"-18" CMP

102"-18"

100"-18"

310"-18"

H.P. (58.48T/C)

H.P. (59.50 H.P.)

H.P. (62.90)

6' SIDEWALK

PROPOSED 6' SAFETY PATH W/2' CLEAR ZONE

Hutchins Road

Proposed 60' R.O.W.

Preserve Lane

Park 0.27 Ac.

20' PRIVATE EASEMENT FOR STORM DRAINAGE

ADA RAMPS

CURB TRANSITION STA. 0+01 (958.05 T/C-5.5") (957.59 C) (957.84 T/C-3")

CURB TRANSITION STA 26+34 (962.92 T/C-5.5") (962.46 C) (962.72 T/C-3")

BOULDER RETAINING WALL (1.5'-4' HIGH)

Phase IV

Phase II

Phase I

89 90 91 97 96 95 70 69 46 45 20

100' TAPER | 50' LANE | 35' RADIUS | 27' B/B | 35' RADIUS | 75' TAPER

(SEE CONTINUATION BOTTOM LEFT)

(SEE CONTINUATION TOP RIGHT)

NOTE:
-A MINIMUM OF 18" VERTICAL SEPARATION IS REQUIRED BETWEEN ALL UTILITIES (SANITARY, STORM & WATERMAIN)

Akehurst Lane

Concord Drive

12-36-102-002 R-1C

12-36-126-039 RM-2

150' LANE

300' NORTHBOUND PASSING LANE TAPER

OBJECT POINT ELEVATION=969.70 (966.20+3.50=969.70)

SIGHT DISTANCE POINT 15' OFF EDGE OF ROAD ELEVATION=967.35 (963.85+3.50=967.35)

SIGHT CLEAR VISION LINE (TYPICAL)

445' REQUIRED SIGHT DISTANCE

950'+ ACTUAL SIGHT DISTANCE

ADD PAVEMENT

NOTE: PLACE 6' WIDE CONCRETE WALK TO PROPERTY LINE & MATCH EXISTING GRADE

PROPOSED 6' WIDE, 6"-22A GRAVEL SHOULDER

480' TAPER

129'-6"

Phase I

Phase II

Phase IV

100' TAPER | 50' LANE | 35' RADIUS | 27' B/B | 35' RADIUS | 50' TAPER

PATRICK McWILLIAMS ENGINEER NO. 31658 PROFESSIONAL ENGINEER STATE OF MICHIGAN REGISTERED

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5-23-19	PER J & A (5-21-19)
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DRAWN	GF		
DESIGN	PCM		
SECTION	36	T- 3 -N. R- 8 -E.	

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Union Lake Road Entrance Plan
"Preserve at Hidden Lake"
WHITE LAKE TOWNSHIP, OAKLAND COUNTY, MICHIGAN

SCALE 1" = 30'
SHEET 9 OF 36
KE 2017.182

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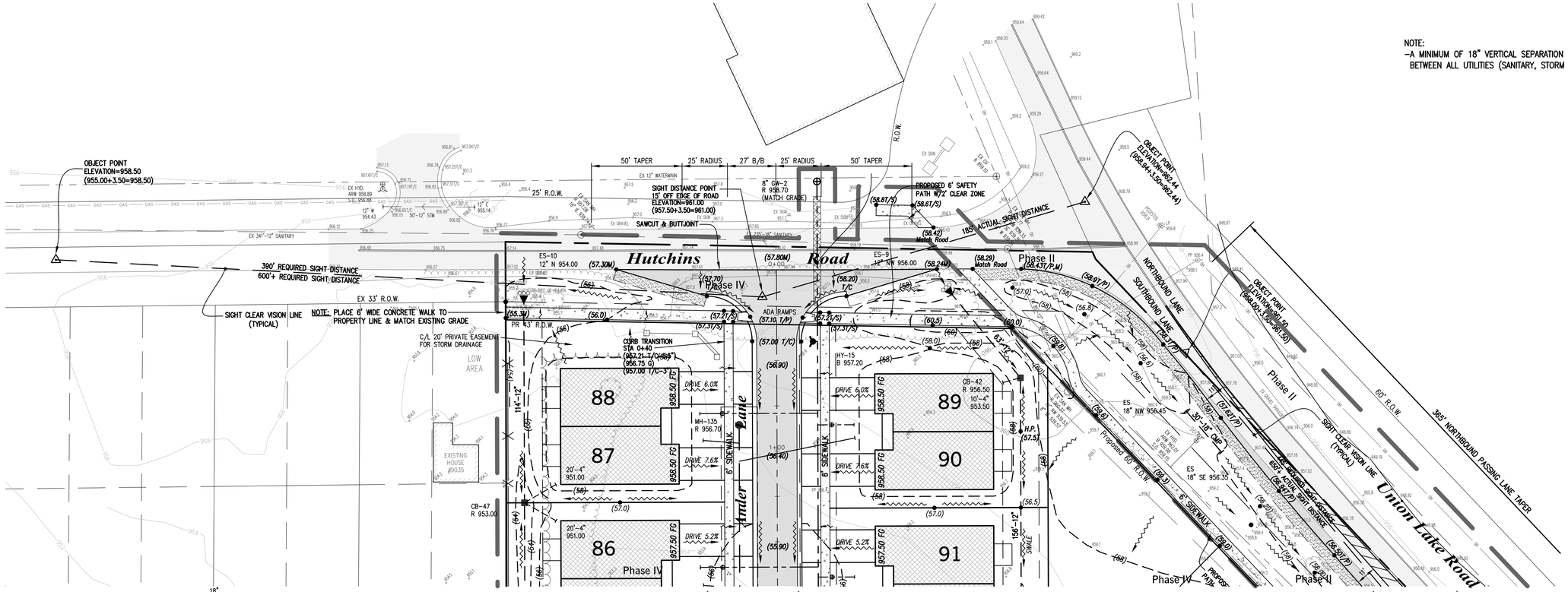
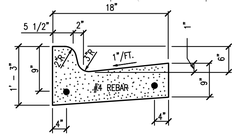
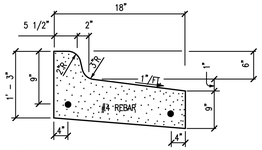




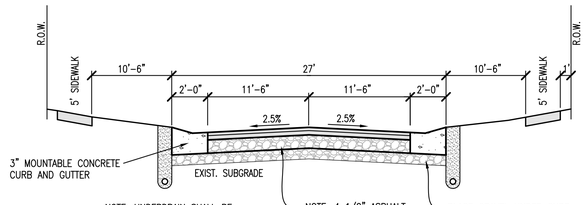
STRAIGHT FACED CURB AND GUTTER

NO SCALE

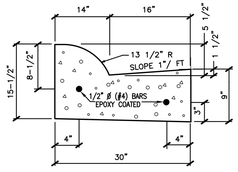


STRAIGHT FACED CURB AND GUTTER (REVERSE)

NO SCALE

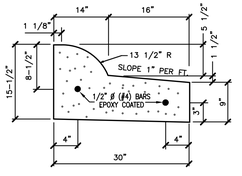


Typical Road Section "A"-"A"



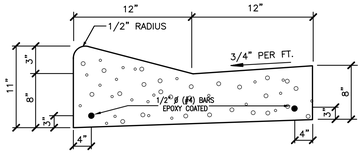
CONCRETE CURB & GUTTER (B-2)

NO SCALE



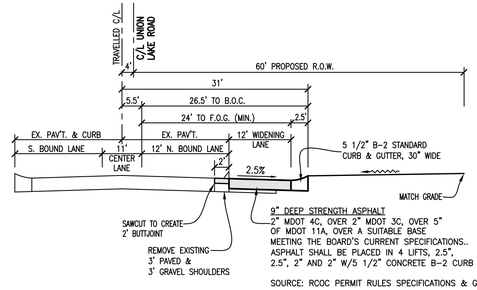
CONCRETE CURB & GUTTER (B-2 REVERSE)

(M.D.O.T. 35P CONCRETE)



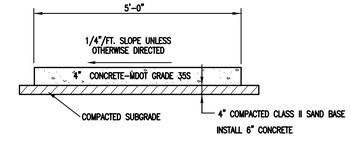
MOUNTABLE CURB AND GUTTER DETAIL

NO SCALE



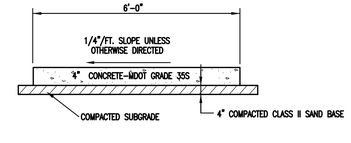
UNION LAKE ROAD DECELERATION "B"–"B"

NO SCALE



5' wd, 4" Thick Concrete Sidewalk

NO SCALE



6' wd, 4" Thick Concrete Sidewalk

NO SCALE

EXISTING / PROPOSED

LEGEND	
STORM SEWER	
SANITARY SEWER	
WATERMAIN	
GAS MAIN	GAS
ELEC. TELE. CABLE	
PRETREATMENT STRUCTURE	
STORM MANHOLE	
CATCH BASIN	
INLET	
REARYARD CATCH BASIN	
END SECTION	
SANITARY MANHOLE	
GATE VALVE AND WELL	
HYDRANT	
CONTOURS	(40)
FINISH GRADE	960 FG
MATCH EXISTING ELEV.	(W)
TOP OF CURB	T/C
TOP OF SIDEWALK	T/S
TOP OF PAVEMENT	T/P
TOP OF WALL	T/W
BOTTOM OF WALL	B/W
DRAINAGE ARROW	

STATE OF MICHIGAN – PATRICK McWILLIAMS – ENGINEER NO. 31658 – REGISTERED PROFESSIONAL ENGINEER

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1-28-19	PER J & A (1-19-19) & DPS (1-20-19)
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PROPRIETOR:
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Hutchins Road Entrance Plan

"Preserve at Hidden Lake"

WHITE LAKE TOWNSHIP, OAKLAND COUNTY, MICHIGAN

SCALE	1" = 30'
SHEET	10 OF 36
	KE 2017.182

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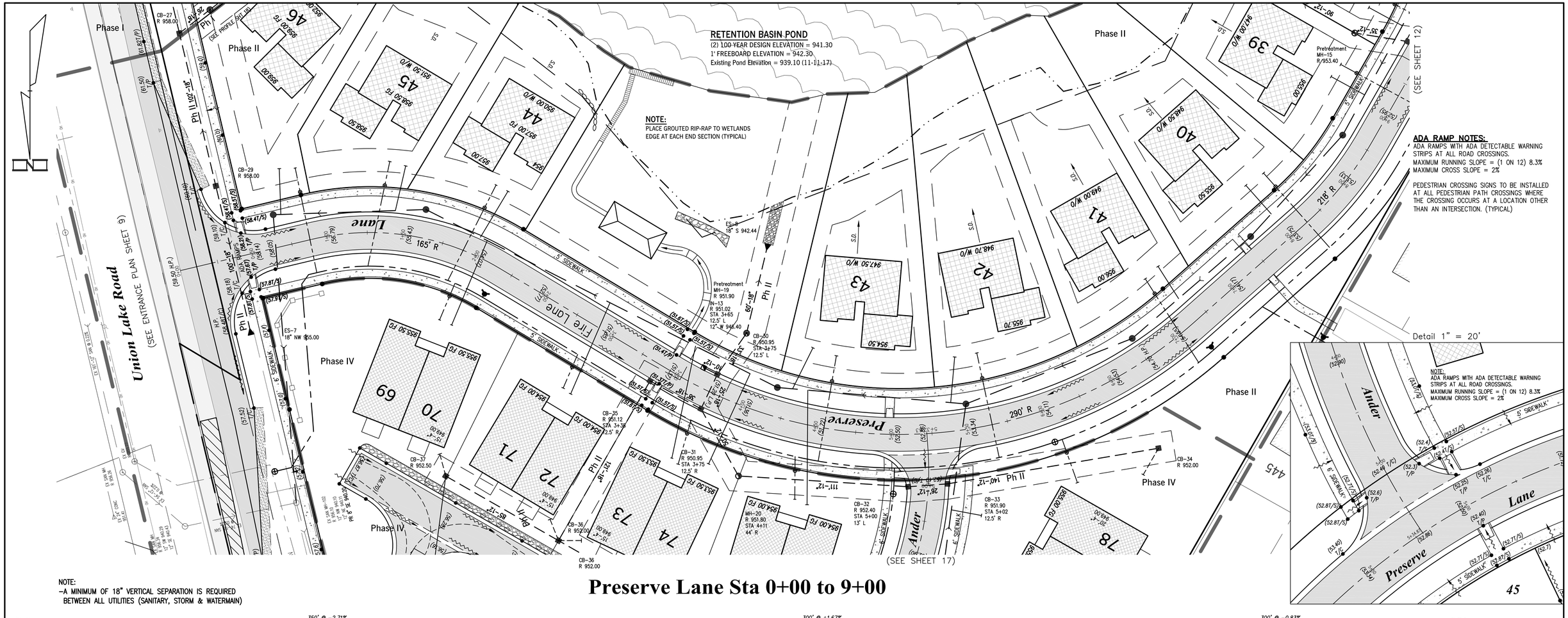
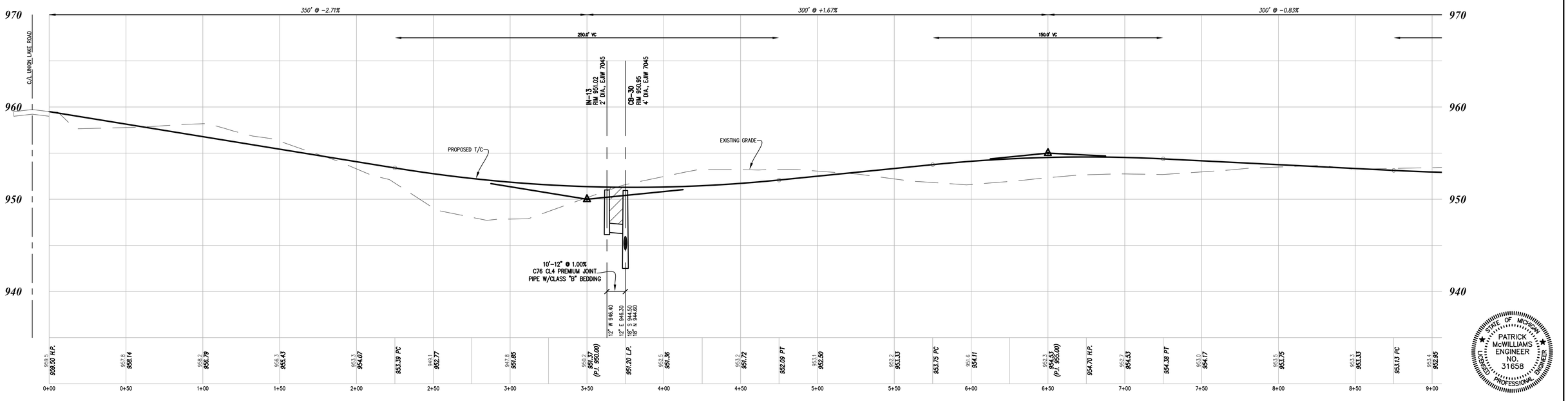


NOTE:
-A MINIMUM OF 18" VERTICAL SEPARATION IS REQUIRED BETWEEN ALL UTILITIES (SANITARY, STORM & WATERMAIN)

Preserve Lane Sta 0+00 to 9+00



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4-25-19	PER R.C.O.C. (4-22-19)
5-23-19	PER J & A (5-21-19)
2-11-2021	REV PH 4, ETC. PER CLIENT (2-25-2021)
5-6-2021	PER DLZ (4-27-2021) & McKENNA (4-26-2021)

PROPRIETOR:
Preserve at Hidden Lake, LLC
8255 CASCADE AVENUE, SUITE 110
COMMERCE TOWNSHIP, MICHIGAN 48382
(248) 842-8613

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PHONE (248) 625-5251 www.kieftenq.com FAX (248) 625-7110

DATE	11-29-18	CKD. BY	DATE
DRAWN	GF		
DESIGN	PCM		
SECTION	36	T- 3 -N. R- 8 -E.	

72 HOURS (3 WORKING DAYS) BEFORE YOU DIG CALL MISS DIG 800-482-7171 (TOLL FREE)

Paving & Storm Sewer Plan & Profile
"Preserve at Hidden Lake"
WHITE LAKE TOWNSHIP, OAKLAND COUNTY, MICHIGAN

SCALE	1" = 30' HORZ. 1" = 5' VERT.
SHEET	11 OF 36
	KE 2017.182

STATE OF MICHIGAN PATRICK McWILLIAMS ENGINEER NO. 31658 PROFESSIONAL ENGINEER

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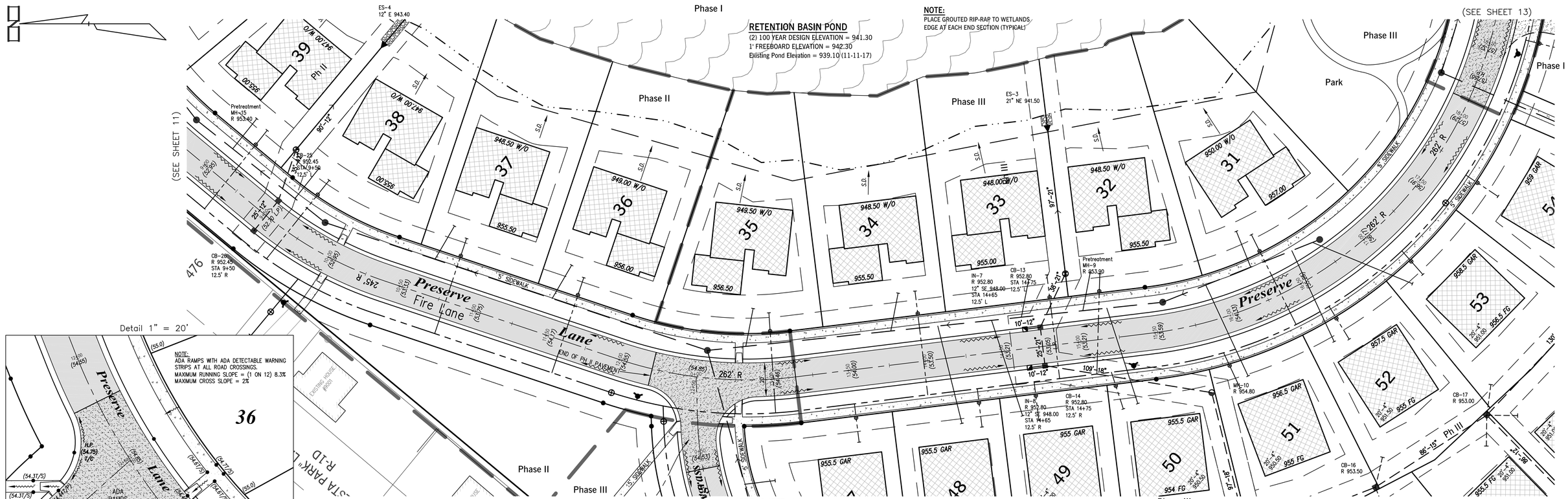


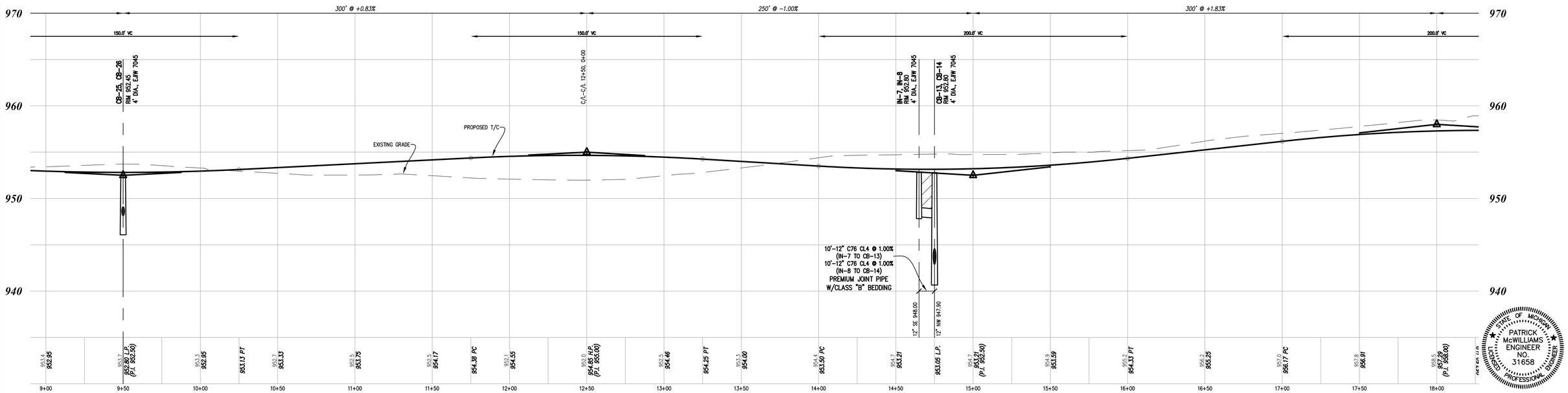
ADA RAMP NOTES:

ADA RAMPS WITH ADA DETECTABLE WARNING STRIPS AT ALL ROAD CROSSINGS.
MAXIMUM RUNNING SLOPE = (1 ON 12) 8.3%
MAXIMUM CROSS SLOPE = 2%

PEDESTRIAN CROSSING SIGNS TO BE INSTALLED AT ALL PEDESTRIAN PATH CROSSINGS WHERE THE CROSSING OCCURS AT A LOCATION OTHER THAN AN INTERSECTION. (TYPICAL)

NOTE:
-A MINIMUM OF 18" VERTICAL SEPARATION IS REQUIRED BETWEEN ALL UTILITIES (SANITARY, STORM & WATERMAIN)

Preserve Lane Sta 9+00 to 18+00



DATE	ISSUE
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3-26-19	PER J & A (3-19-19) & DPS (3-20-19)
4-22-19	PER J & A (4-16-19) & DPS (4-11-19)
1-5-2021	PER CLIENT-REVISED GRADES (LOTS 47-68 (1-5-2021)
3-11-2021	REV. PH 4, ETC. PER CLIENT (2-25-2021)
5-6-2021	PER DLZ (4-27-2021), & McKENNA (4-26-2021)

PROPRIETOR:
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Paving & Storm Sewer Plan & Profile
"Preserve at Hidden Lake"
WHITE LAKE TOWNSHIP, OAKLAND COUNTY, MICHIGAN

SCALE 1" = 30' HORZ. 1" = 5' VERT.
SHEET 12 OF 36
KE 2017.182

STATE OF MICHIGAN PATRICK McWILLIAMS ENGINEER NO. 31658 LICENSED PROFESSIONAL ENGINEER

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RETENTION BASIN POND
(2) 100 YEAR DESIGN ELEVATION = 941.30
1' FREEBOARD ELEVATION = 942.30
Existing Pond Elevation = 939.10 (11-11-17)

NOTE:
PLACE GROUTED RIP-RAP TO WETLANDS EDGE AT EACH END SECTION (TYPICAL)

PROPOSED PHASE I EMERGENCY FIRE DEPT. GRAVEL TEE-TURNAROUND

Phase I

Phase III

Preserve Lane

Fire Lane

Union Lake Road

Sawgrass

(SEE SHEET 12)

(SEE SHEET 15)

(SEE SHEET 16)

(SEE ENTRANCE PLAN SHEET 9)

(SEE DETAIL SHEET 10)

NOTE:
-A MINIMUM OF 18" VERTICAL SEPARATION IS REQUIRED BETWEEN ALL UTILITIES (SANITARY, STORM & WATERMAIN)

ADA RAMP NOTES:
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MAXIMUM RUNNING SLOPE = (1 ON 12) 8.3%
MAXIMUM CROSS SLOPE = 2%

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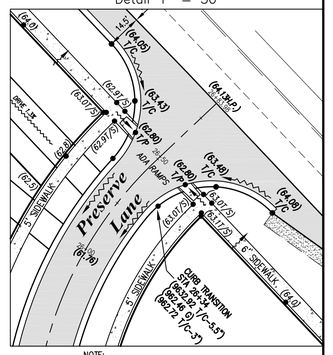
Detail 1" = 30'



NOTE:
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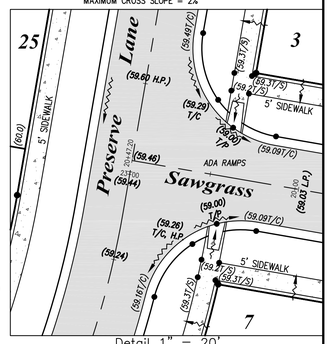
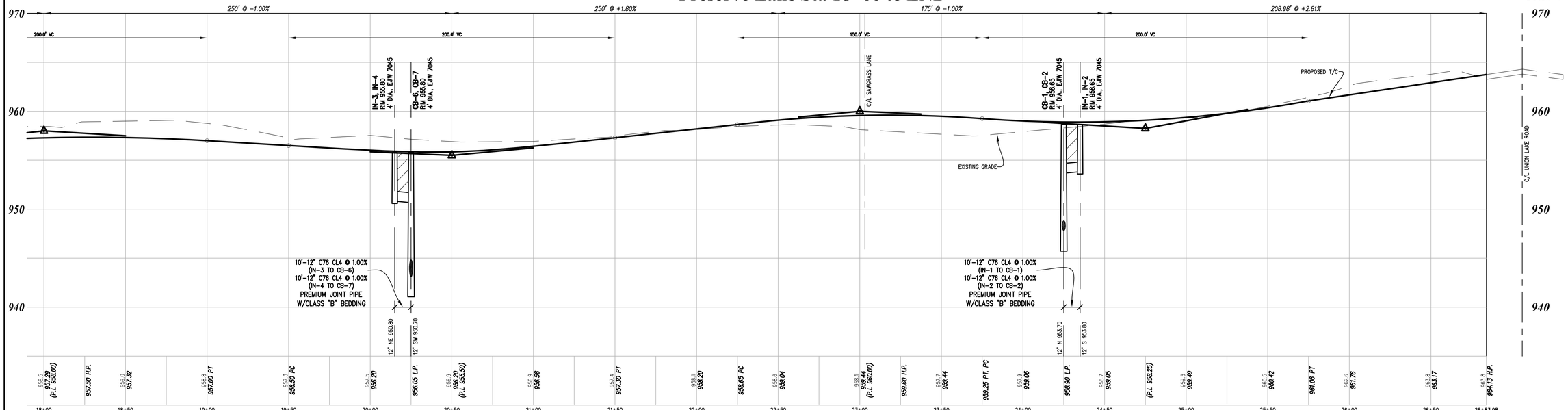
MAXIMUM RUNNING SLOPE = (1 ON 12) 8.3%
MAXIMUM CROSS SLOPE = 2%



Detail 1" = 20'

Preserve Lane Sta 18+00 to END



STATE OF MICHIGAN
PATRICK McWILLIAMS
ENGINEER NO. 31658
PROFESSIONAL ENGINEER

DATE	ISSUE
1-11-19	PER J & A (12-19-18), McKenna (12-18-18), DPS
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4-25-19	PER R.C.O.C. (4-22-19)
1-8-2021	PER CLIENT-REVISED GRADES LOTS 47-66 (1-5-2021)

PROPRIETOR:
Preserve at Hidden Lake, LLC
8255 CASCADE AVENUE, SUITE 110
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(248) 842-8613

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DATE	11-29-18	CKD. BY	DATE
DRAWN	GF		
DESIGN	PCM		
SECTION	36	T- 3 -N. R- 8 -E.	

72 HOURS (3 WORKING DAYS) BEFORE YOU DIG CALL MISS DIG 800-482-7171 (TOLL FREE)

Paving & Storm Sewer Plan & Profile

"Preserve at Hidden Lake"
WHITE LAKE TOWNSHIP, OAKLAND COUNTY, MICHIGAN

SCALE	1" = 30' HORZ. 1" = 5' VERT.
SHEET	13 OF 36
KE 2017.182	

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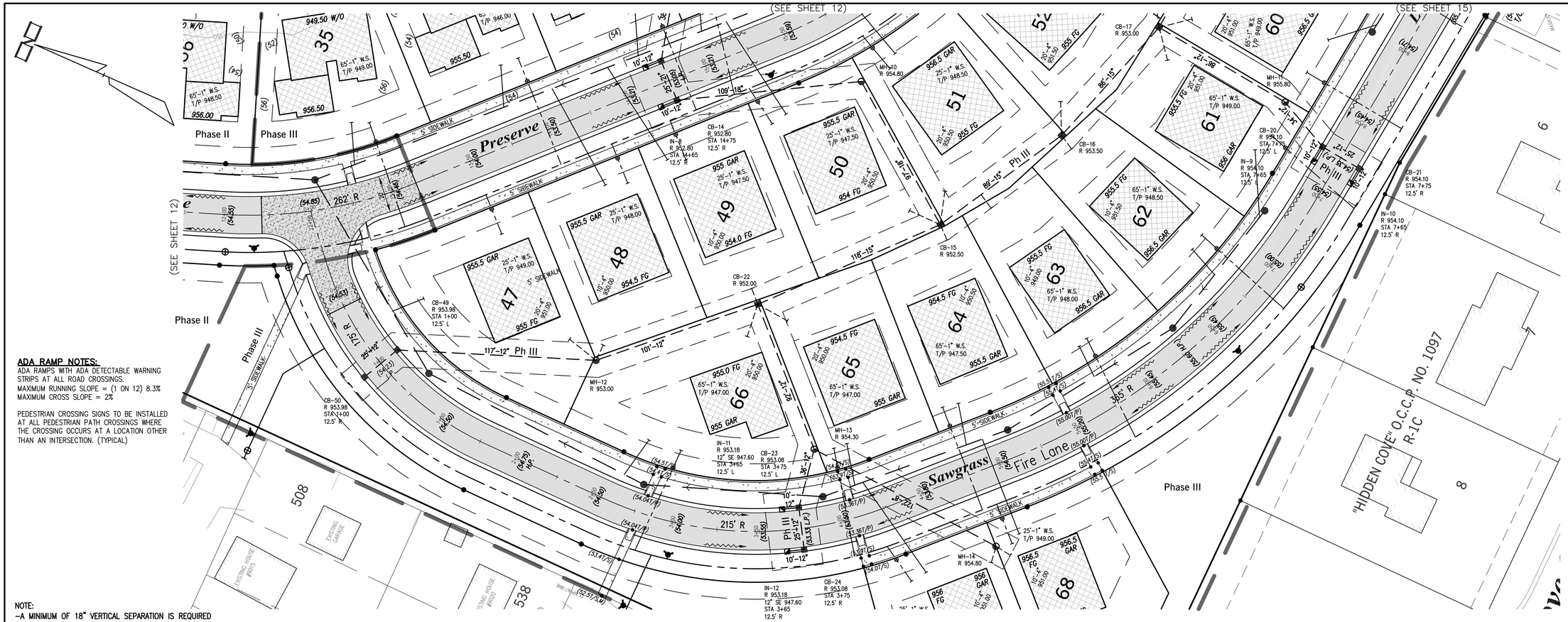
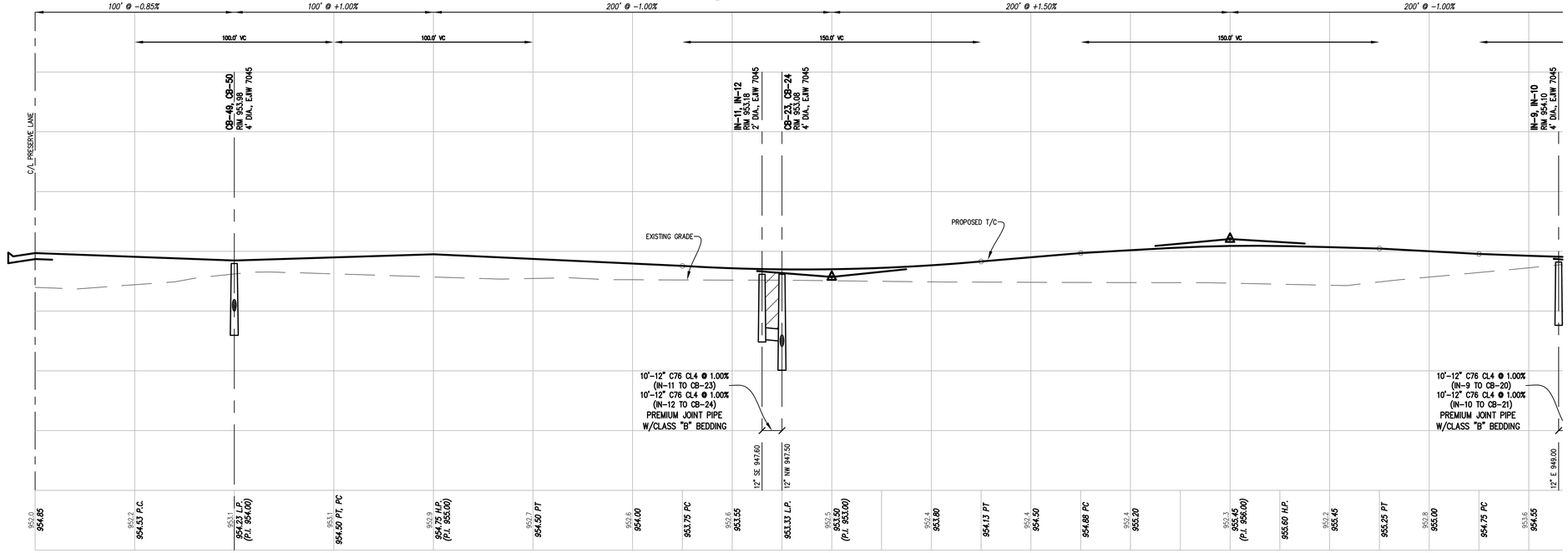


ADA RAMP NOTES:
ADA RAMPS WITH ADA DETECTABLE WARNING STRIPS AT ALL ROAD CROSSINGS.
MAXIMUM RUNNING SLOPE = (1 ON 12) 8.3%
MAXIMUM CROSS SLOPE = 2%

PEDESTRIAN CROSSING SIGNS TO BE INSTALLED AT ALL PEDESTRIAN PATH CROSSINGS WHERE THE CROSSING OCCURS AT A LOCATION OTHER THAN AN INTERSECTION. (TYPICAL)

NOTE:
-A MINIMUM OF 18" VERTICAL SEPARATION IS REQUIRED BETWEEN ALL UTILITIES (SANITARY, STORM & WATERMAIN)

Sawgrass Lane Sta 0+00 to 7+50



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6-13-19	PER DPS-SHIFTED HY-10 (4-25-19)
1-8-2021	PER CLIENT-REVISED GRADES LOTS 47-66 (1-5-2021)

PROPRIETOR:
Preserve at Hidden Lake, LLC
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DESIGN	PCM
SECTION	36

CKD. BY | DATE

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Paving & Storm Sewer Plan & Profile
"Preserve at Hidden Lake"
WHITE LAKE TOWNSHIP, OAKLAND COUNTY, MICHIGAN

SCALE 1" = 30' HORZ. 1" = 5' VERT.
SHEET 14 OF 36
KE 2017.182

STATE OF MICHIGAN PATRICK McWILLIAMS ENGINEER NO. 31658 LICENSED PROFESSIONAL ENGINEER

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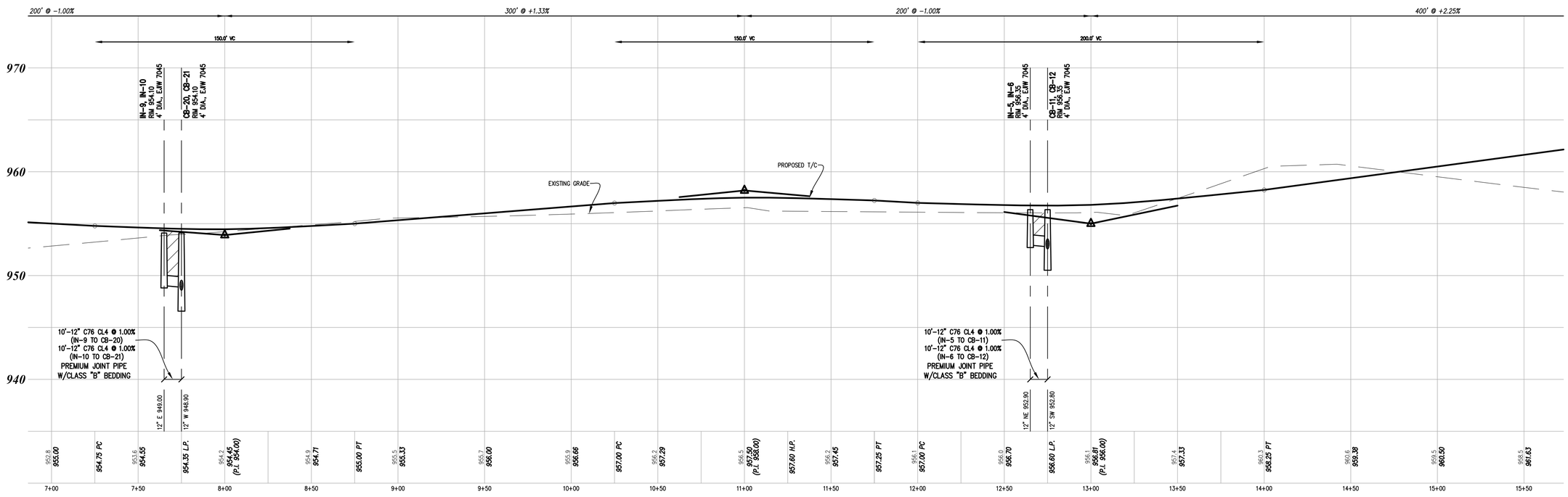
ADA RAMP NOTES:
ADA RAMPS WITH ADA DETECTABLE WARNING STRIPS AT ALL ROAD CROSSINGS.
MAXIMUM RUNNING SLOPE = (1 ON 12) 8.3%
MAXIMUM CROSS SLOPE = 2%

PEDESTRIAN CROSSING SIGNS TO BE INSTALLED AT ALL PEDESTRIAN PATH CROSSINGS WHERE THE CROSSING OCCURS AT A LOCATION OTHER THAN AN INTERSECTION. (TYPICAL)

Sawgrass Lane Sta 7+50 to 15+00

NOTE:
–A MINIMUM OF 18" VERTICAL SEPARATION IS REQUIRED BETWEEN ALL UTILITIES (SANITARY, STORM & WATERMAIN)



STATE OF MICHIGAN
PATRICK McWILLIAMS
ENGINEER
NO. 31658
REGISTERED PROFESSIONAL ENGINEER

DATE	ISSUE
1–11–19	PER J & A (12–19–18), McKenna (12–18–18), DPS
3–26–19	PER J & A (3–19–19) & DPS (3–20–19)
4–22–19	PER J & A (4–16–19) & DPS (4–11–19)
1–8–2021	PER CLIENT–REVISED GRADES LOTS 47–66 (1–5–2021)

PROPRIETOR:
Preserve at Hidden Lake, LLC
8255 CASCADE AVENUE, SUITE 110
COMMERCE TOWNSHIP, MICHIGAN 48382
(248) 842–8613

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DATE	11–29–18	CKD. BY	DATE
DRAWN	GF		
DESIGN	PCM		
SECTION	36	T– 3 –N. R– 8 –E.	

72 HOURS (3 WORKING DAYS) BEFORE YOU DIG CALL MISS DIG 800–482–7171 (TOLL FREE)

Paving & Storm Sewer Plan & Profile
"Preserve at Hidden Lake"
WHITE LAKE TOWNSHIP, OAKLAND COUNTY, MICHIGAN

SCALE	1" = 30' HORZ. 1" = 5' VERT.
SHEET	15 OF 36
	KE 2017.182

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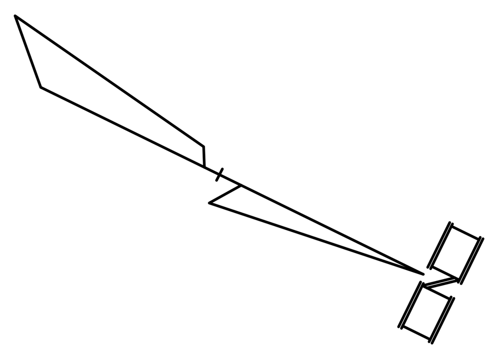

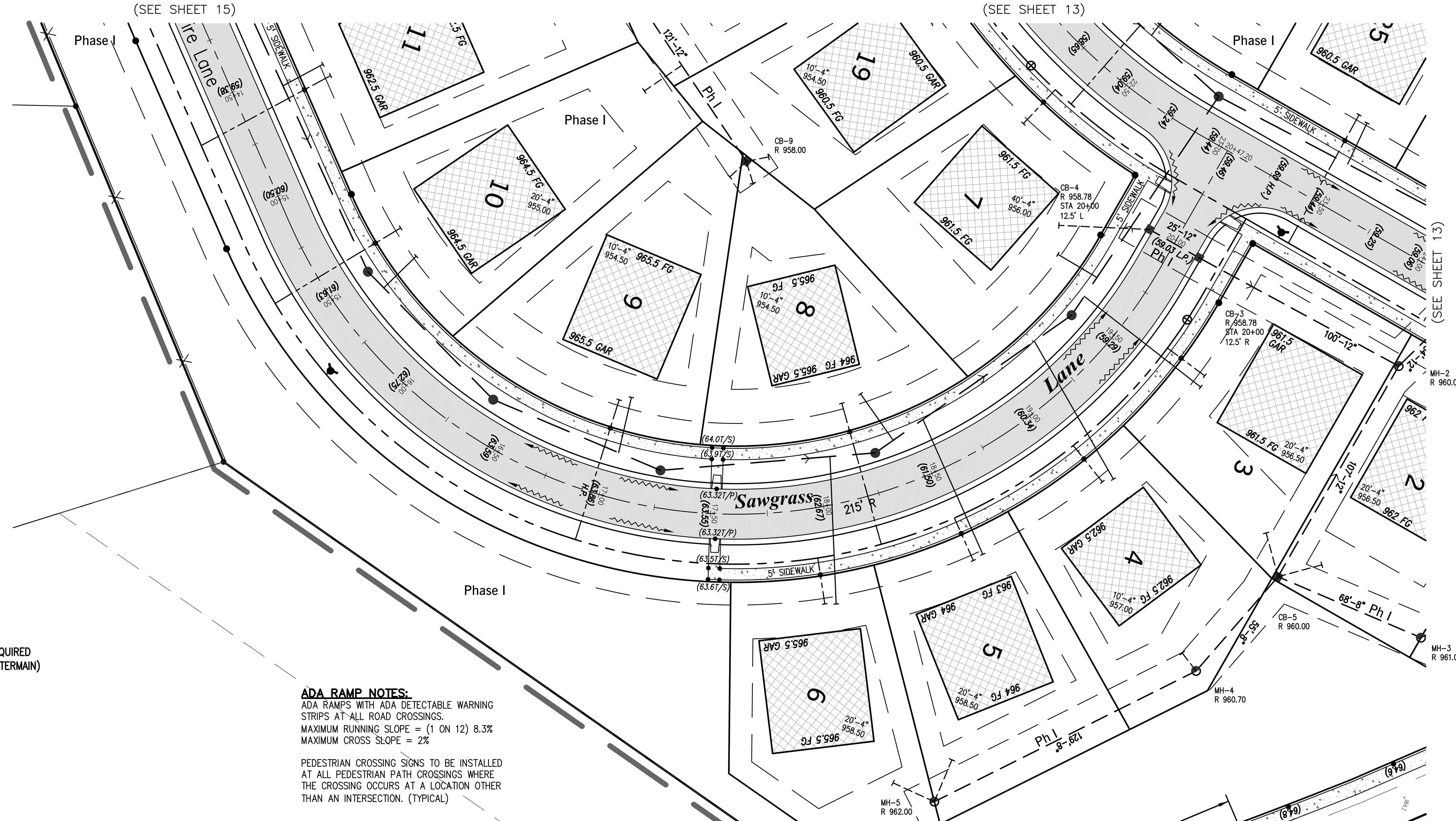

NOTE:
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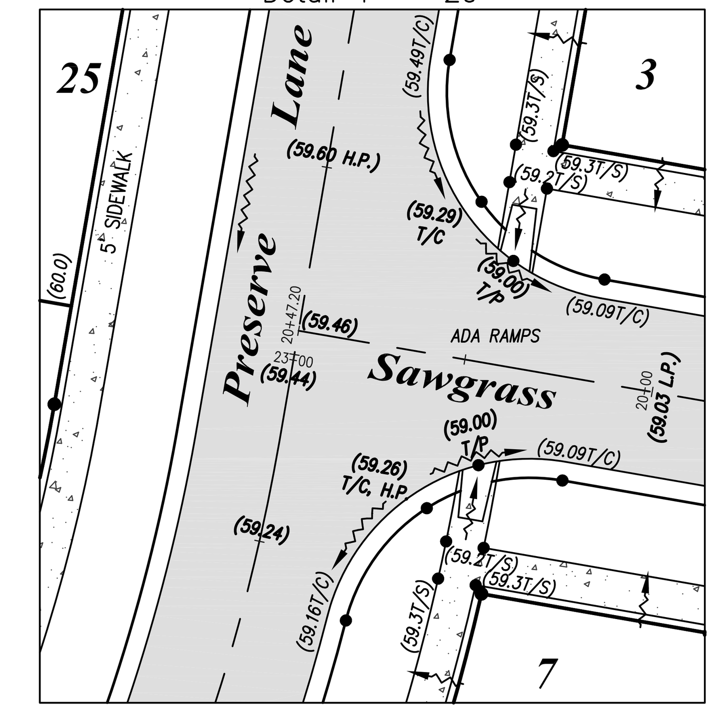
Detail 1" = 20'



NOTE:
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MAXIMUM RUNNING SLOPE = (1 ON 12) 8.3%
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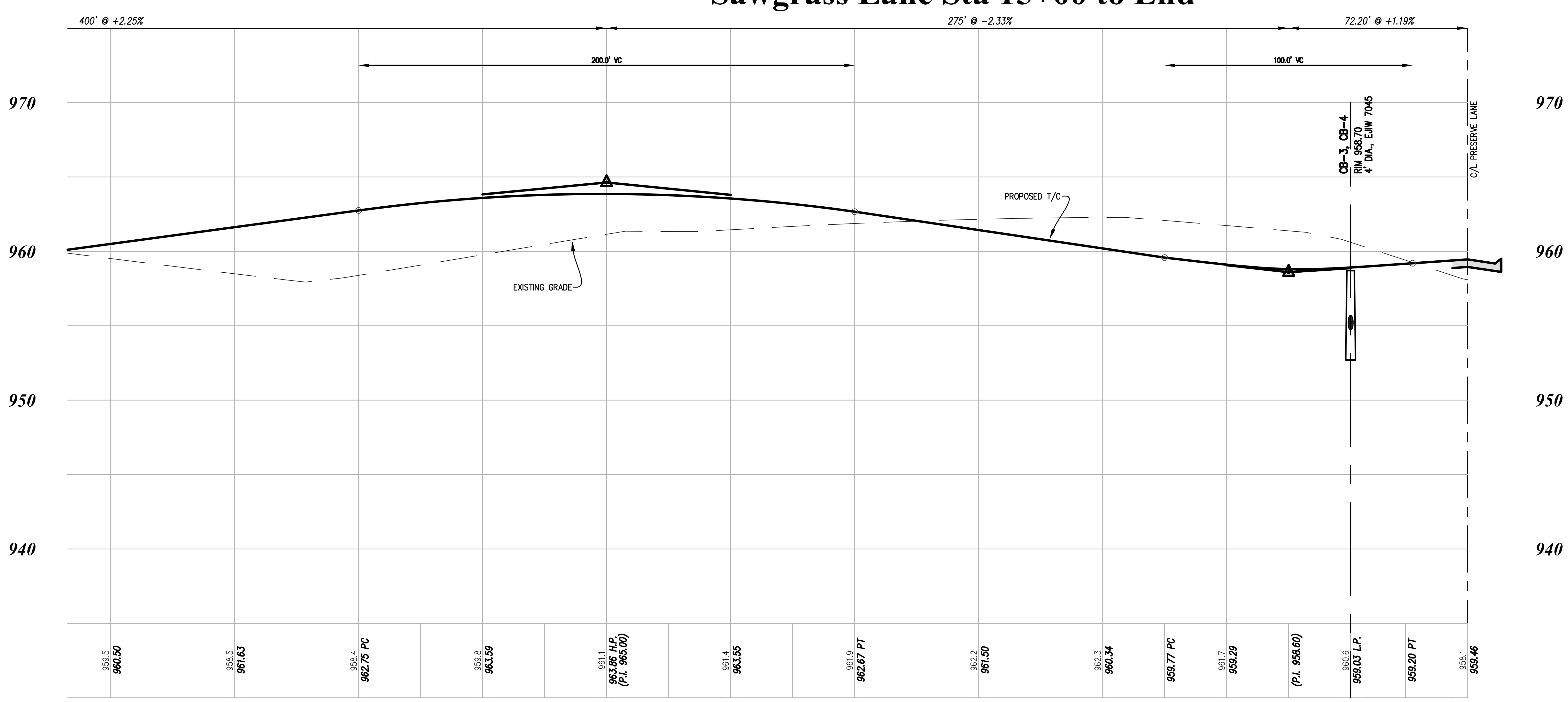
LEGEND

EXISTING		PROPOSED
	STORM SEWER	
	SANITARY SEWER	
	WATERMAIN	
GAS	GAS MAIN	GAS
	ELEC. TELE. CABLE	
	PRETREATMENT STRUCTURE	
	STORM MANHOLE	
	CATCH BASIN	
	INLET	
	REARYARD CATCH BASIN	
	END SECTION	
	SANITARY MANHOLE	
	GATE VALVE AND WELL	
	HYDRANT	
960	CONTOURS	(40)
	FINISH GRADE	960 FG
	MATCH EXISTING ELEV.	(M)
	TOP OF CURB	T/C
	TOP OF SIDEWALK	T/S
	TOP OF PAVEMENT	T/P
	TOP OF WALL	T/W
	BOTTOM OF WALL	B/W
	DRAINAGE ARROW	

Sawgrass Lane Sta 15+00 to End



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PROPRIETOR:
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DATE 11–29–18	CKD. BY	DATE
DRAWN GF		
DESIGN PCM		
SECTION 36	T– 3 –N. R– 8 –E.	

72 HOURS (3 WORKING DAYS) BEFORE YOU DIG CALL MISS DIG 800–482–7171 (TOLL FREE)

Paving & Storm Sewer Plan & Profile
"Preserve at Hidden Lake"
WHITE LAKE TOWNSHIP, OAKLAND COUNTY, MICHIGAN

SCALE 1" = 30' HORZ. 1" = 5' VERT.
SHEET 16 OF 36
KE 2017.182

STATE OF MICHIGAN PATRICK McWILLIAMS ENGINEER NO. 31658 LICENSED PROFESSIONAL ENGINEER

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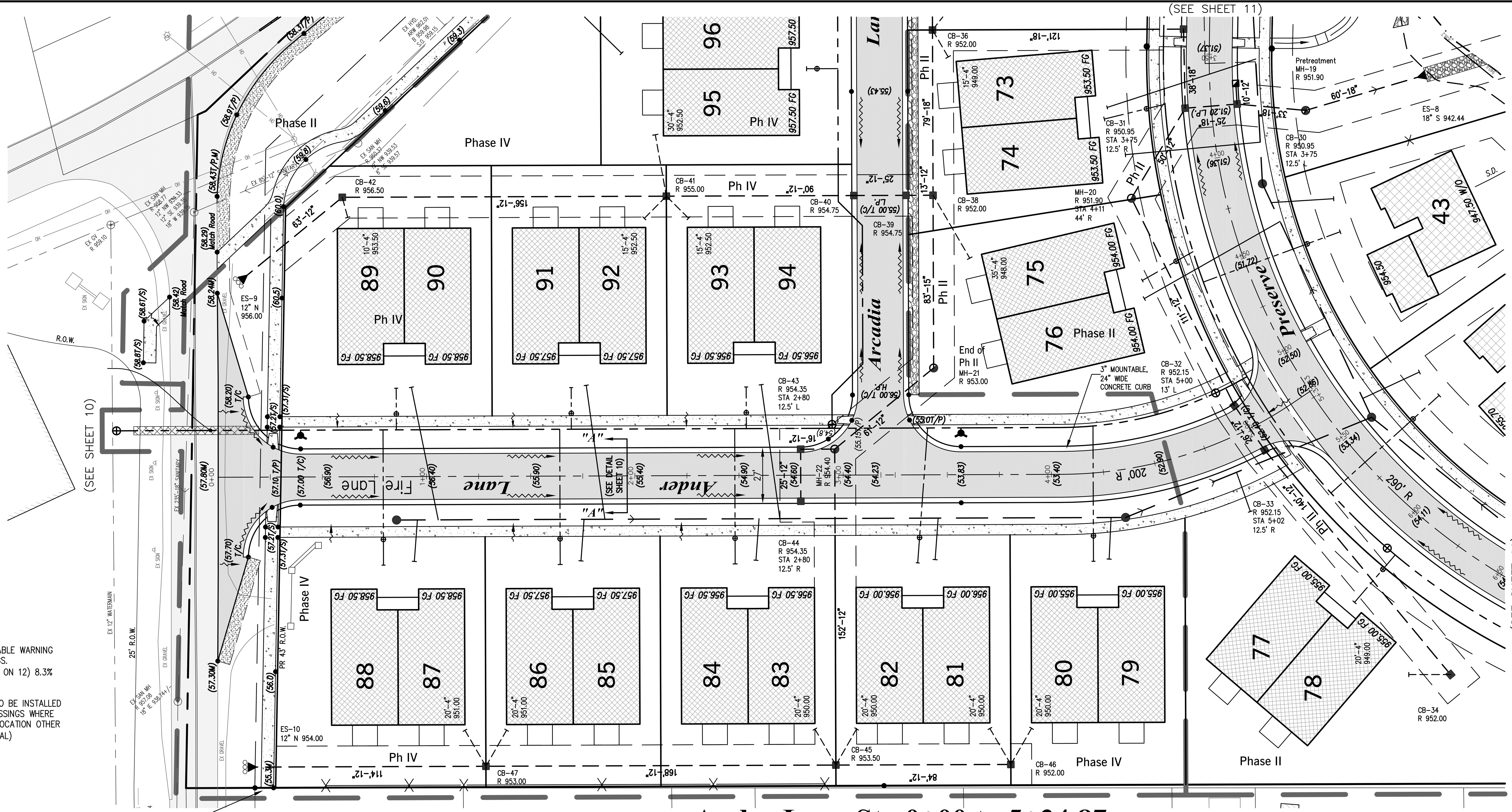

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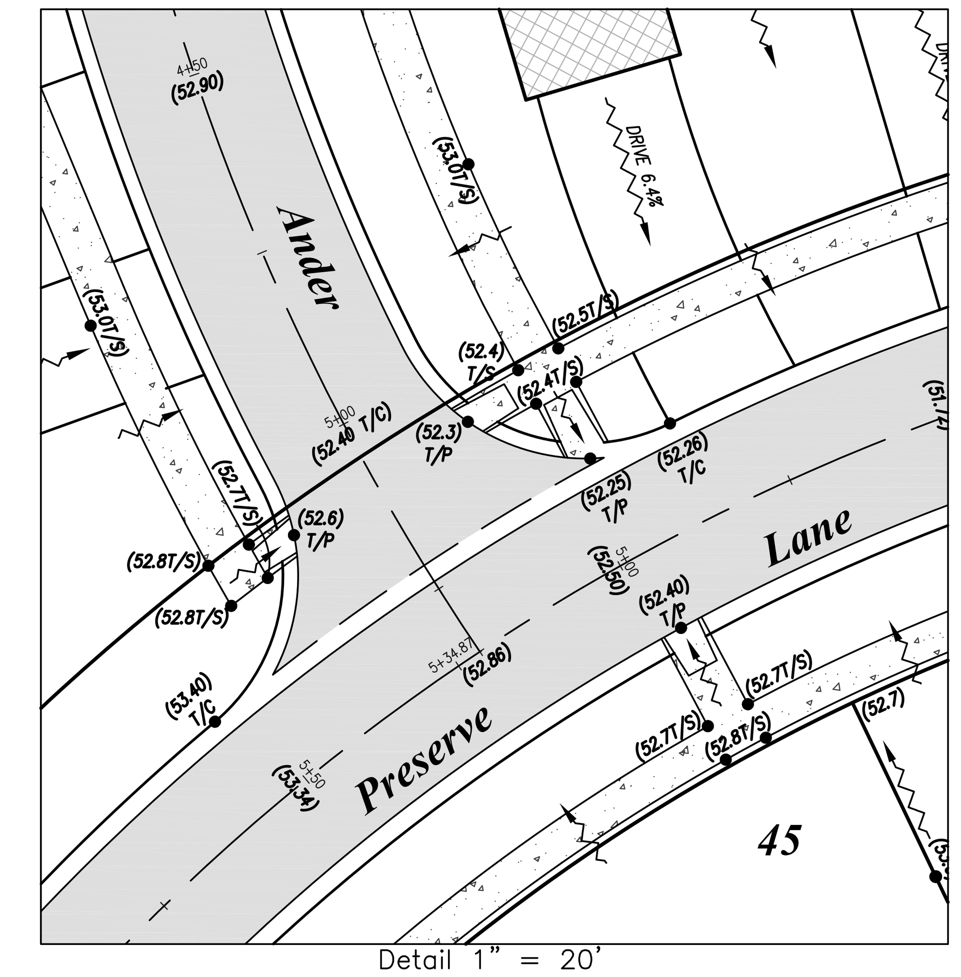


Detail 1" = 20'

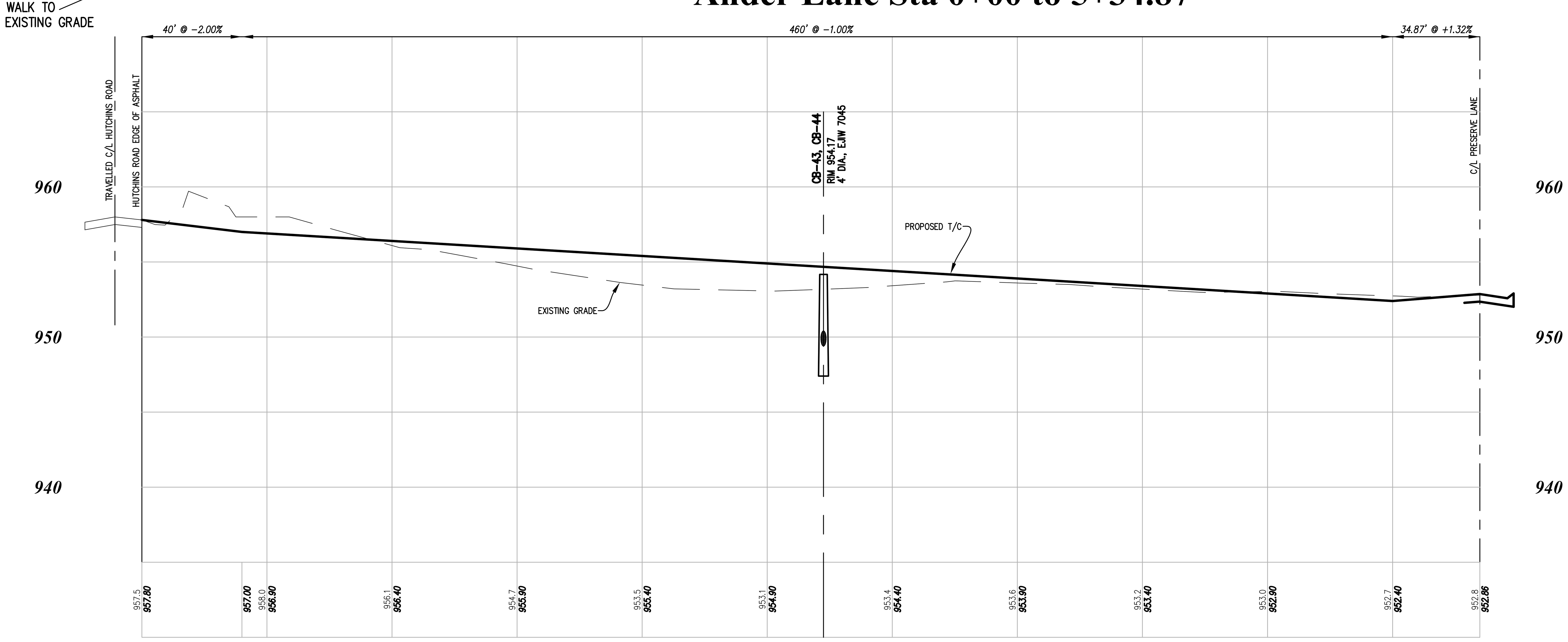
NOTE:
-A MINIMUM OF 18" VERTICAL SEPARATION IS REQUIRED BETWEEN ALL UTILITIES (SANITARY, STORM & WATERMAIN)

LEGEND

EXISTING / PROPOSED

STORM SEWER
SANITARY SEWER
WATERMAIN
GAS MAIN
ELEC. TELE. CABLE
PRETREATMENT STRUCTURE
STORM MANHOLE
CATCH BASIN
INLET
REARYARD CATCH BASIN
END SECTION
SANITARY MANHOLE
GATE VALVE AND WELL
HYDRANT
CONTOURS
FINISH GRADE — 960 FG
MATCH EXISTING ELEV. — (M)
TOP OF CURB — T/C
TOP OF SIDEWALK — T/S
TOP OF PAVEMENT — T/P
TOP OF WALL — T/W
BOTTOM OF WALL — B/W
DRAINAGE ARROW

Ander Lane Sta 0+00 to 5+34.87



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SHEET 17 OF 36
KE 2017.182

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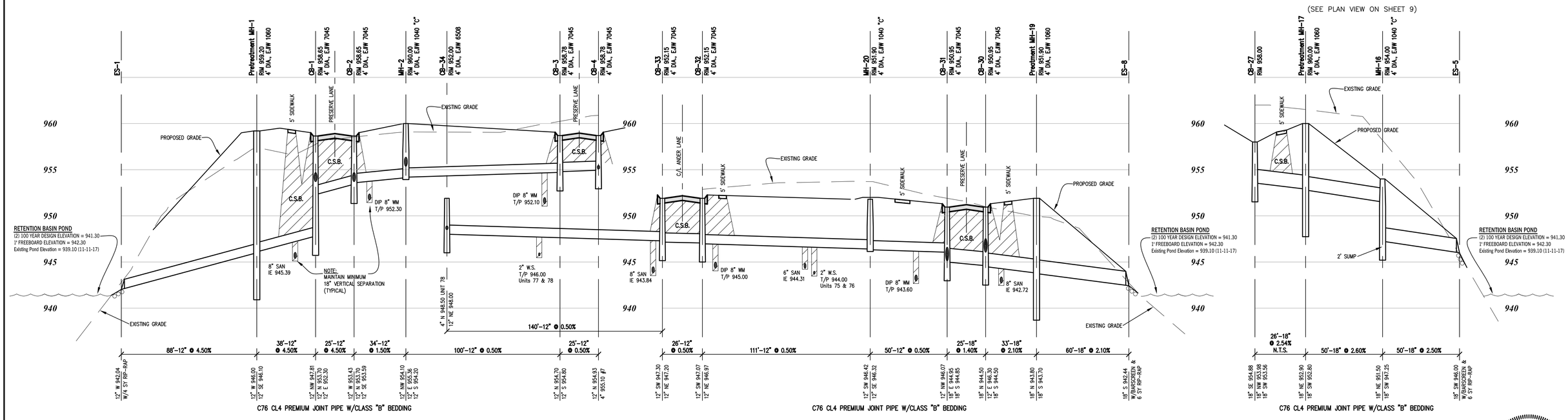
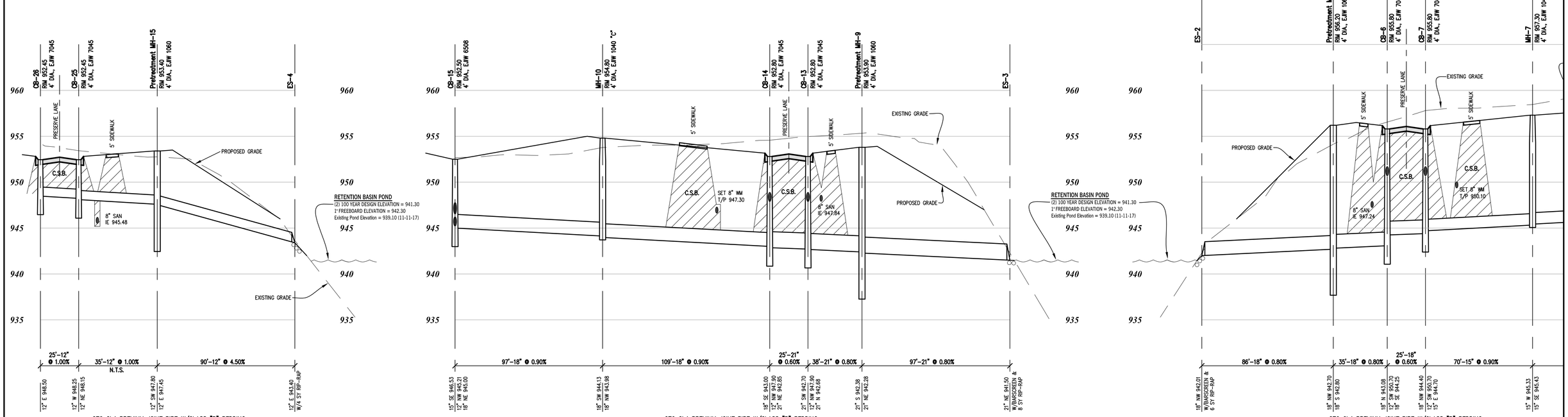


NOTE:
PLACE GROUTED RIP-RAP TO WETLANDS EDGE AT EACH END SECTION (TYPICAL)

NOTE:
–A MINIMUM OF 18" VERTICAL SEPARATION IS REQUIRED BETWEEN ALL UTILITIES (SANITARY, STORM & WATERMAIN)

STATE OF MICHIGAN
PATRICK McWILLIAMS
ENGINEER
NO. 31658
REGISTERED PROFESSIONAL ENGINEER



DATE	ISSUE
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1-8-2021	PER CLIENT-REVISED GRADES LOTS 47-66 (1-5-2021)
3-11-2021	REV. PH 4, ETC. PER CLIENT (2-25-2021)

PROPRIETOR:
Preserve at Hidden Lake, LLC
8255 CASCADE AVENUE, SUITE 110
COMMERCE TOWNSHIP, MICHIGAN 48382
(248) 842-8613

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PHONE (248) 625-5251 www.kiefteng.com FAX (248) 625-7110

DATE	11-29-18	CKD. BY	DATE
DRAWN	GF		
DESIGN	PCM		
SECTION	36	T- 3 -N. R- 8 -E.	

72 HOURS (3 WORKING DAYS) BEFORE YOU DIG CALL MISS DIG 800-482-7171 (TOLL FREE)

Storm Sewer Profiles
"Preserve at Hidden Lake"
WHITE LAKE TOWNSHIP, OAKLAND COUNTY, MICHIGAN

SCALE 1" = 30' HORZ.
1" = 5' VERT.
SHEET 18 OF 36
KE 2017.182

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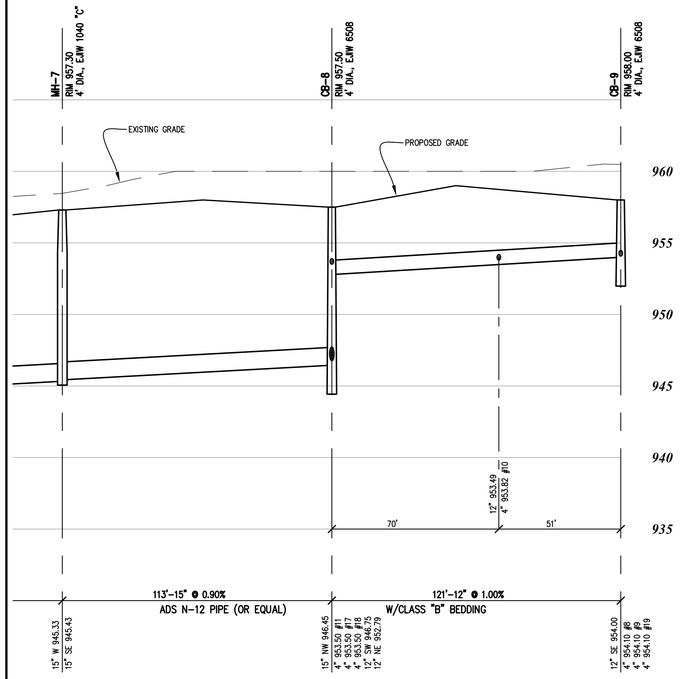

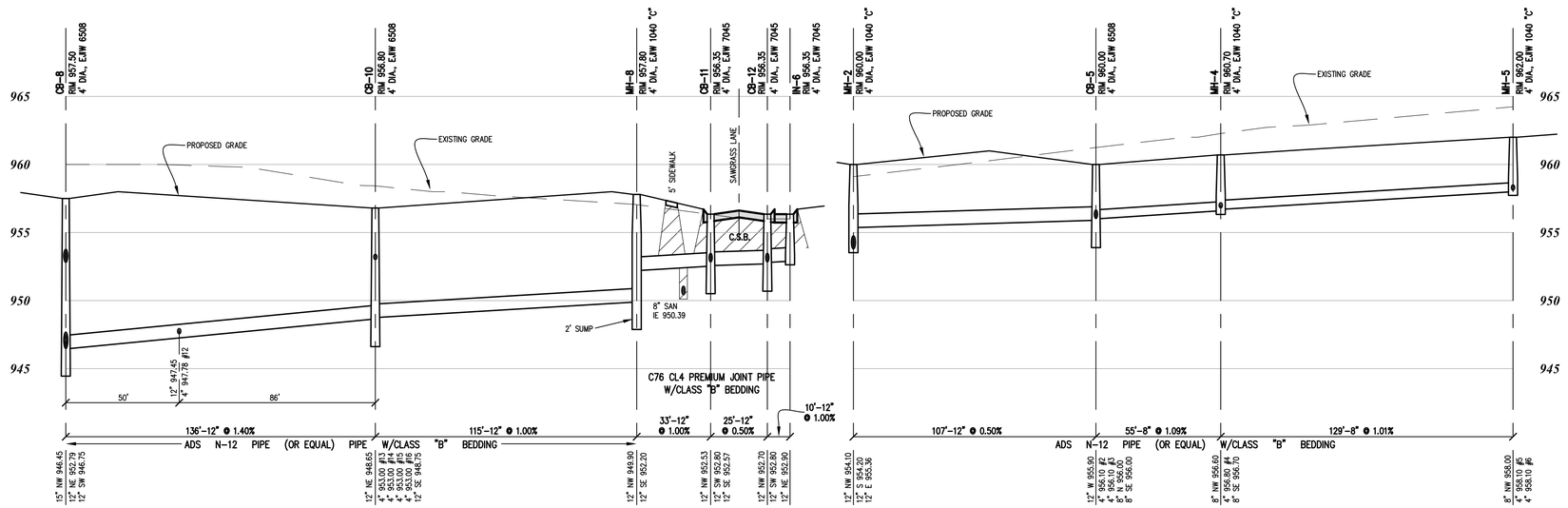

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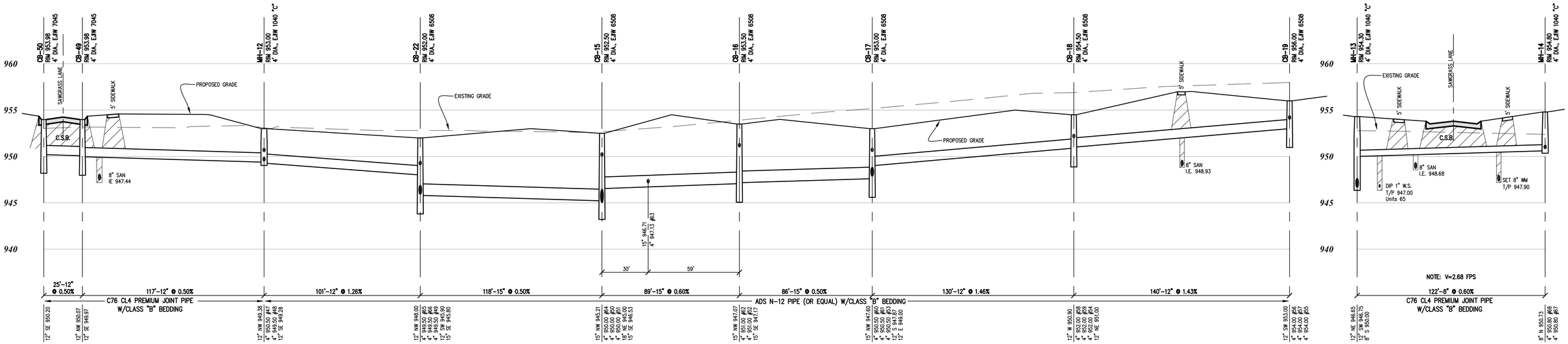

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5-6-2021	PER DLZ (4-27-2021), & McKENNA (4-26-2021)

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SHEET 19 OF 36
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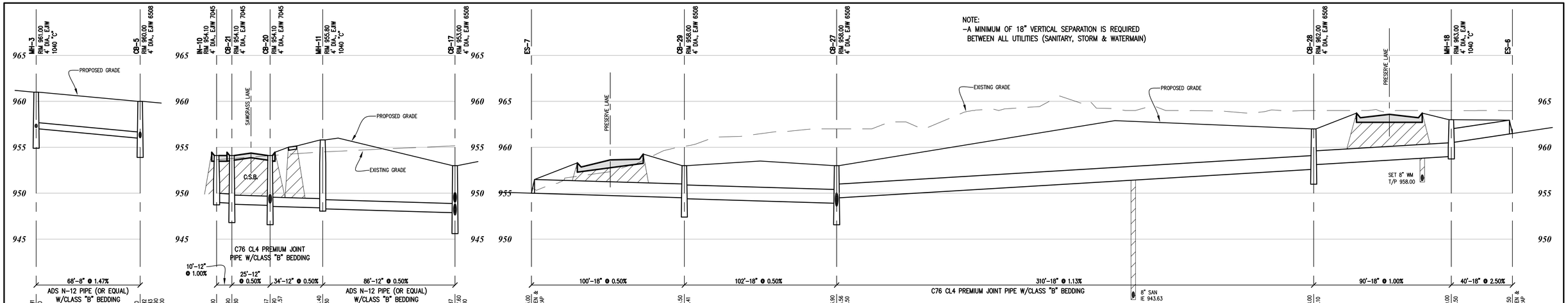

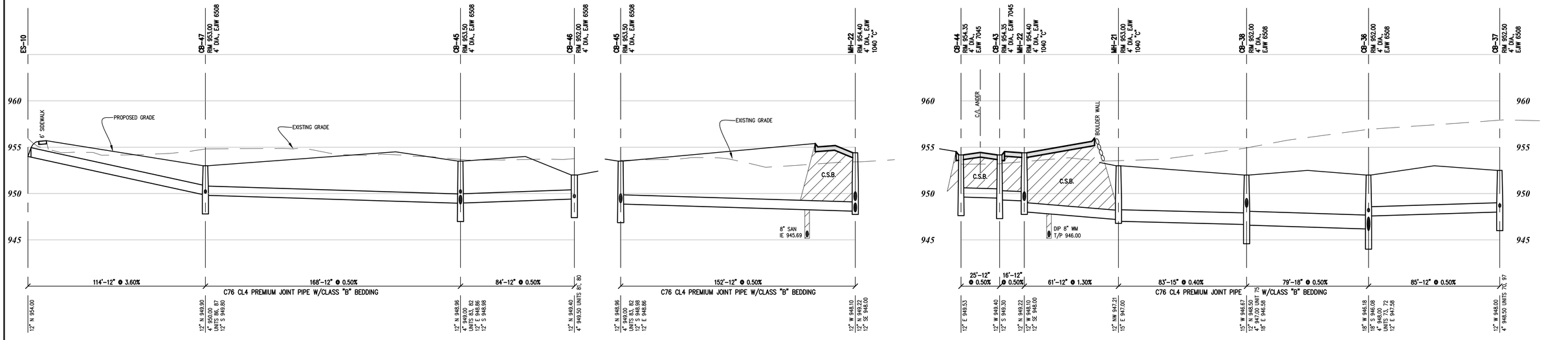

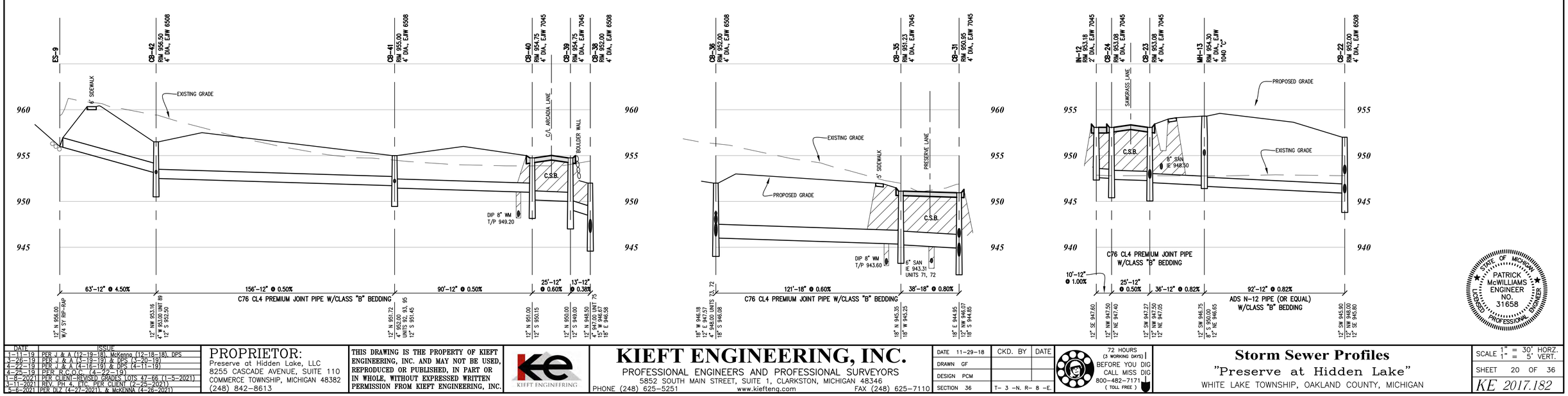

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SHEET 20 OF 36
KE 2017.182

STATE OF MICHIGAN PATRICK McWILLIAMS ENGINEER NO. 31658 PROFESSIONAL ENGINEER

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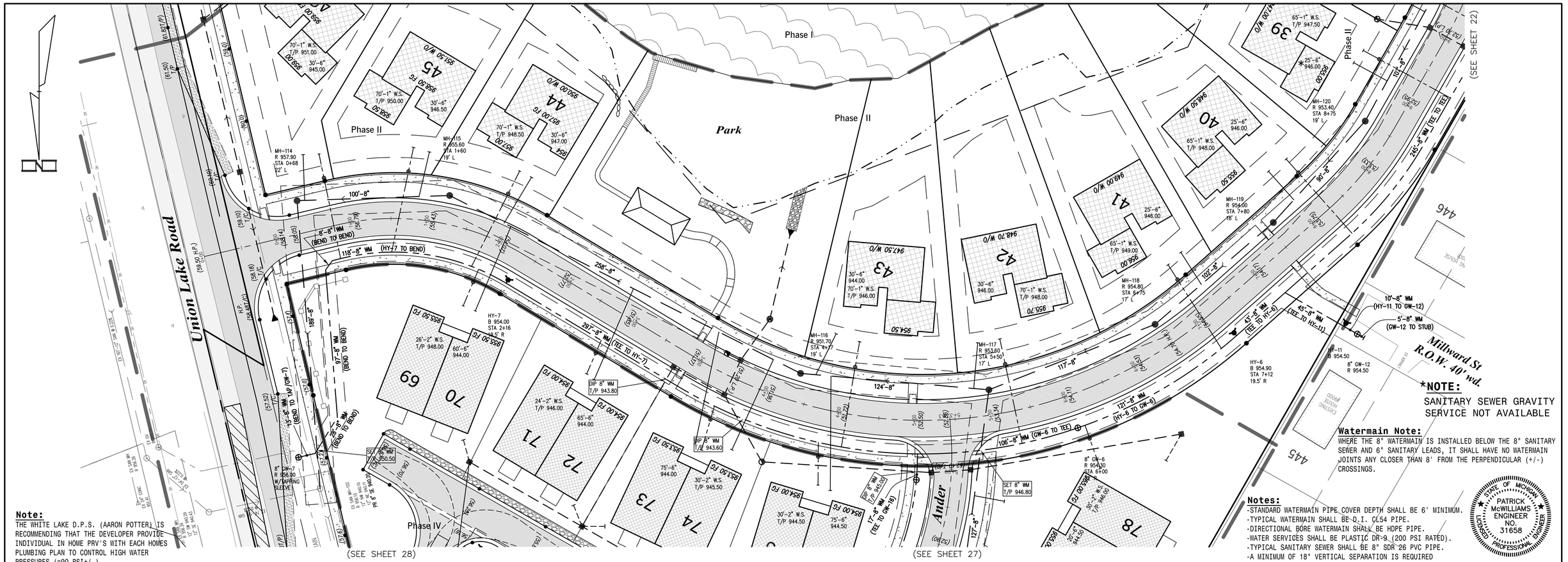

Note:
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***NOTE:**
SANITARY SEWER GRAVITY SERVICE NOT AVAILABLE

Watermain Note:
WHERE THE 8" WATERMAIN IS INSTALLED BELOW THE 8" SANITARY SEWER AND 6" SANITARY LEADS, IT SHALL HAVE NO WATERMAIN JOINTS ANY CLOSER THAN 8' FROM THE PERPENDICULAR (+/-) CROSSINGS.

Notes:
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-TYPICAL WATERMAIN SHALL BE D.I. CL54 PIPE.
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-WATER SERVICES SHALL BE PLASTIC DR-9 (200 PSI RATED).
-TYPICAL SANITARY SEWER SHALL BE 8" SDR 26 PVC PIPE.
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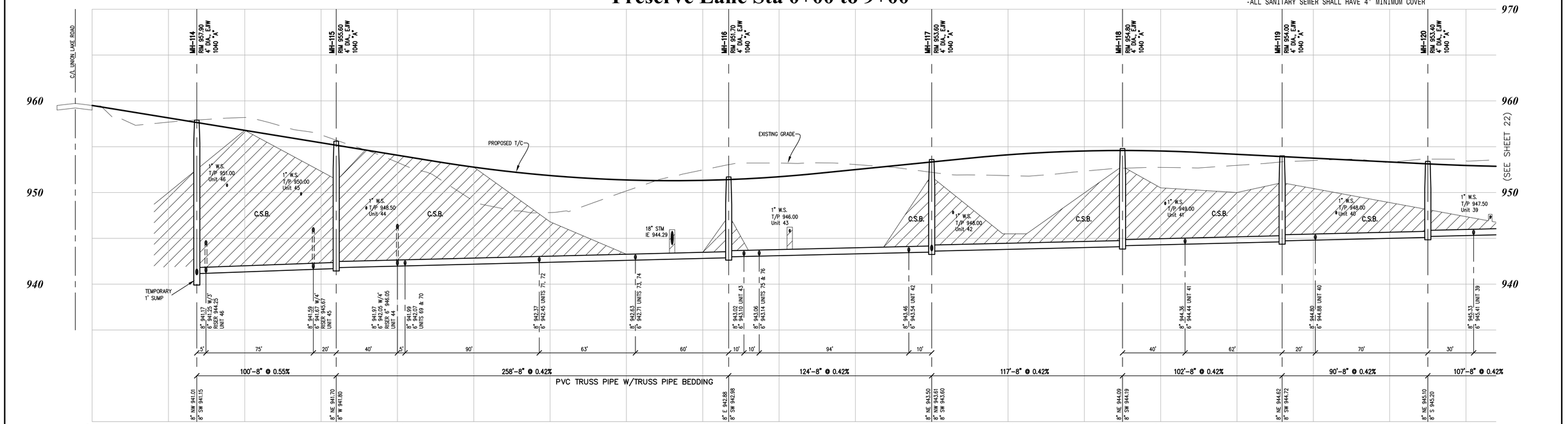
-ALL SANITARY SEWER SHALL HAVE 4' MINIMUM COVER

PATRICK McWILLIAMS ENGINEER NO. 31658 STATE OF MICHIGAN REGISTERED PROFESSIONAL ENGINEER

Preserve Lane Sta 0+00 to 9+00



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4-1-2021	PH 4 SANITARY SUBMITTAL
5-6-2021	PER DLZ (4-27-2021) & McKENNA (4-26-2021)

PROPRIETOR:
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Watermain & Sanitary Sewer Plan & Profile
"Preserve at Hidden Lake"
WHITE LAKE TOWNSHIP, OAKLAND COUNTY, MICHIGAN

SCALE 1" = 30' HORZ.
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SHEET 21 OF 36
KE 2017.182

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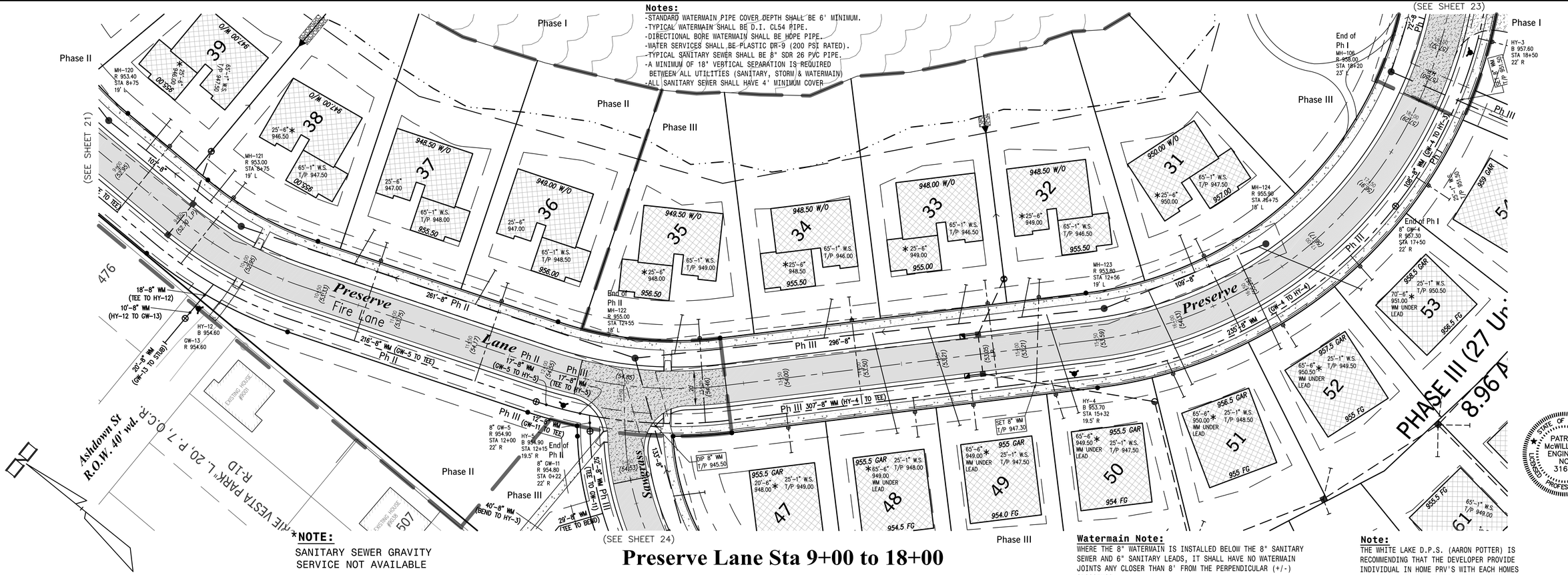

***NOTE:**
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Preserve Lane Sta 9+00 to 18+00

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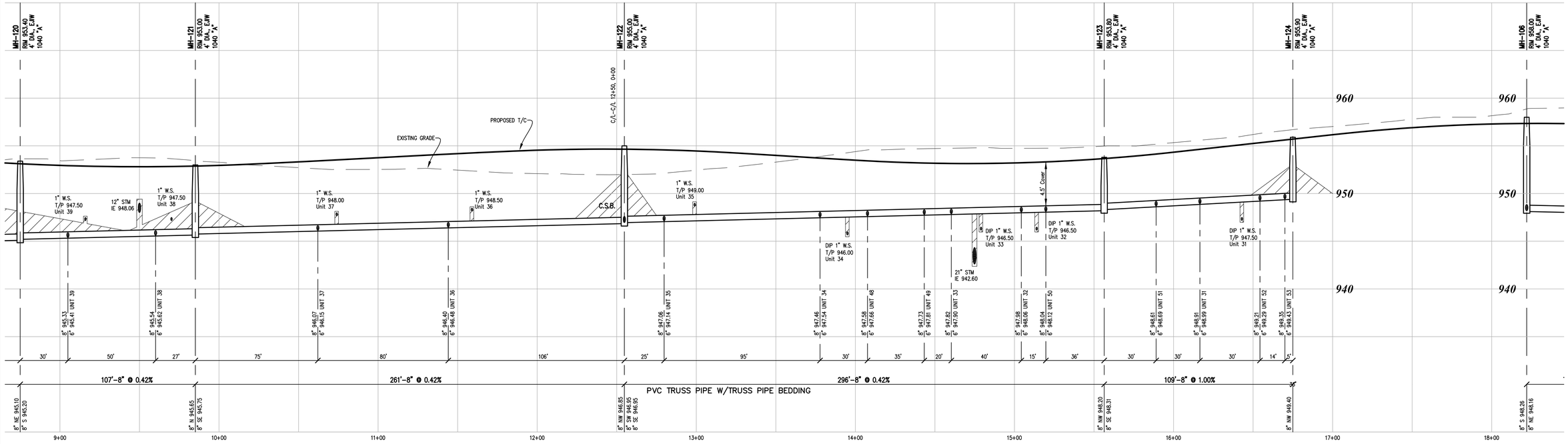
PATRICK McWILLIAMS ENGINEER NO. 31658 STATE OF MICHIGAN REGISTERED PROFESSIONAL ENGINEER



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SHEET	22 OF 36
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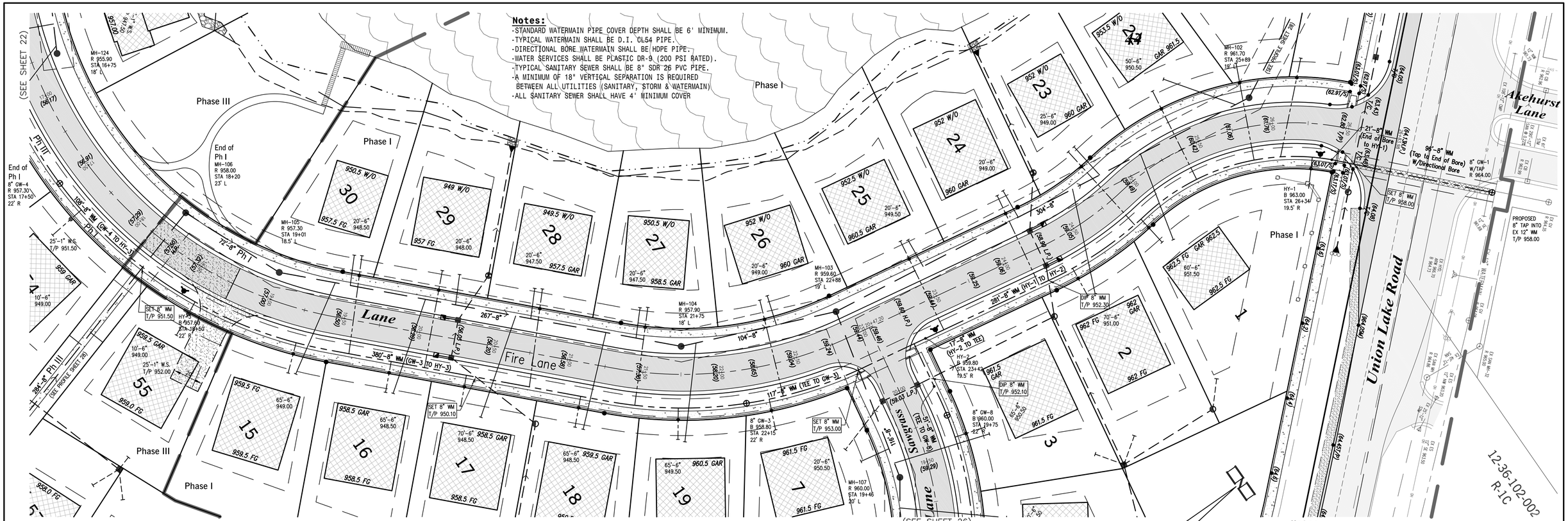

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Preserve Lane Sta 18+00 to END

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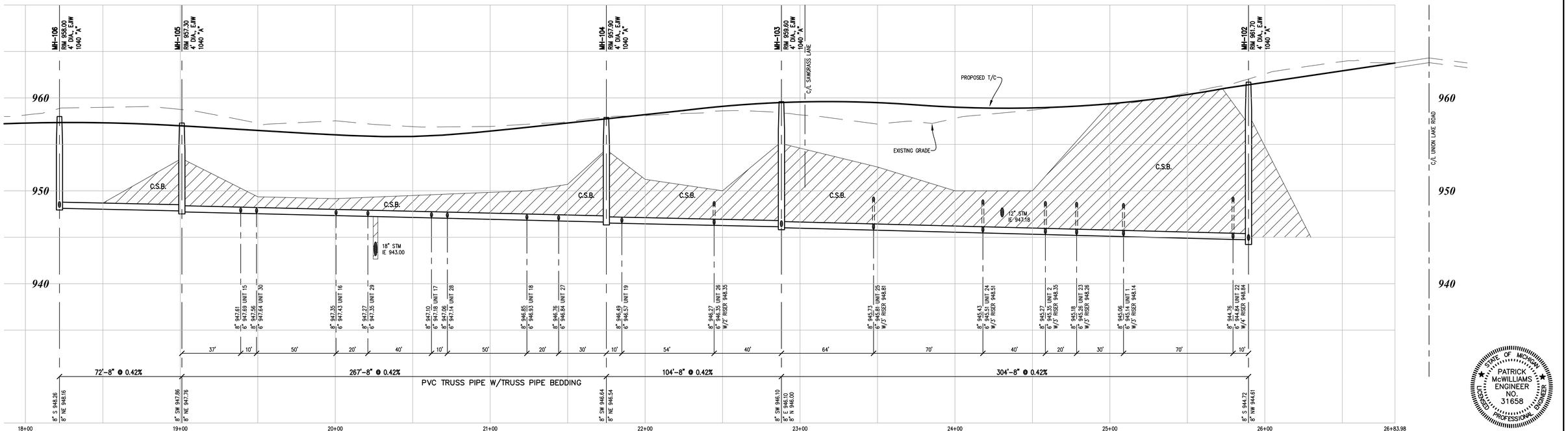

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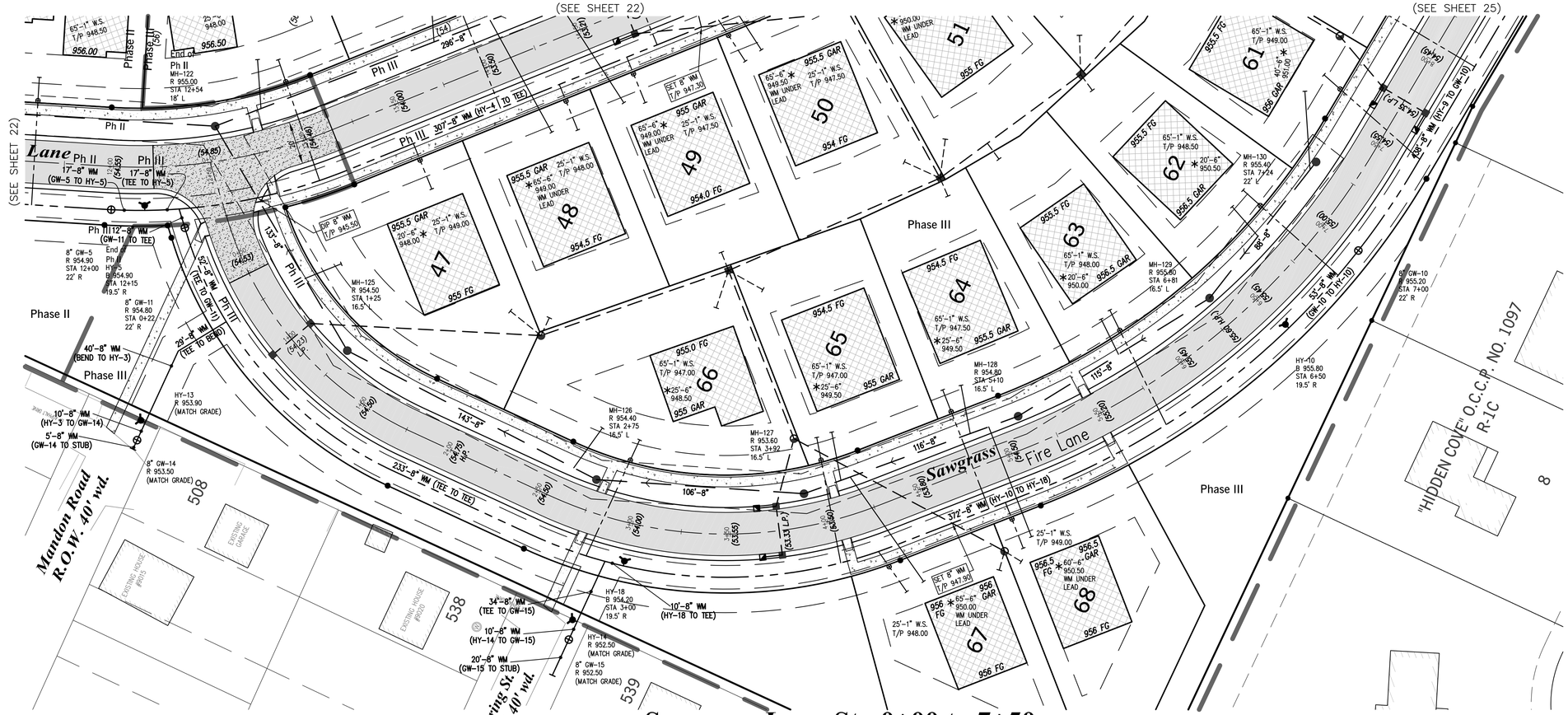
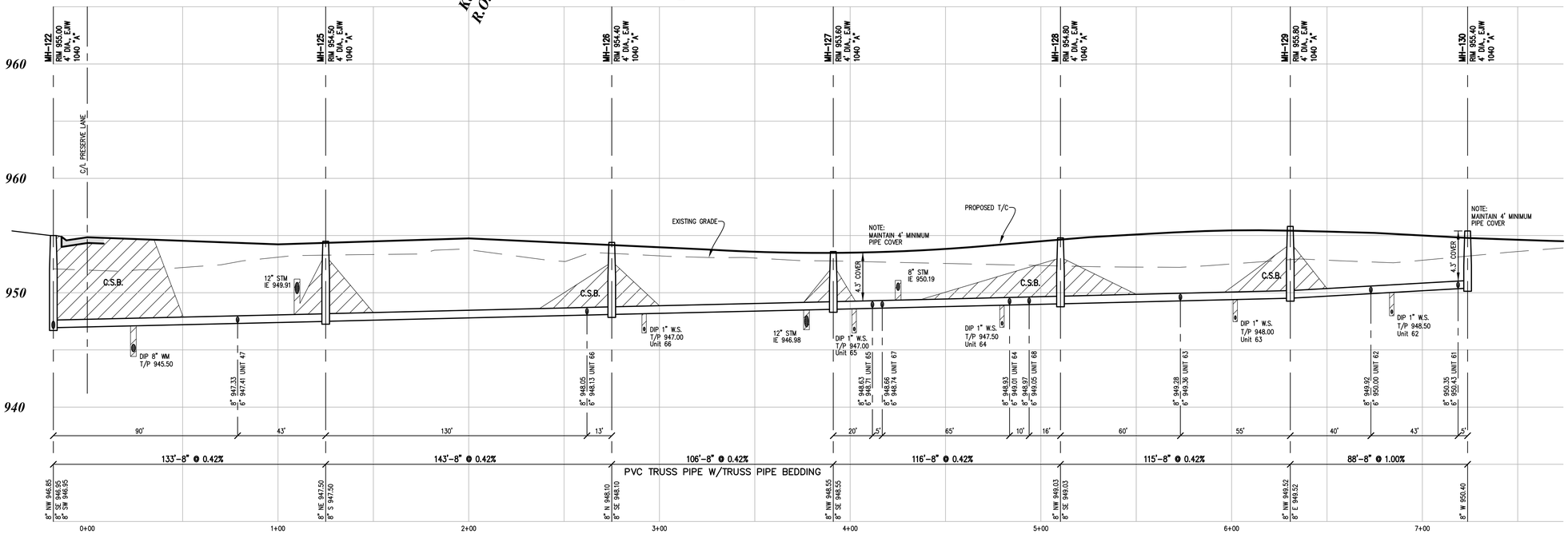


Sawgrass Lane Sta 0+00 to 7+50



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LEGEND

EXISTING		PROPOSED
	STORM SEWER	
	SANITARY SEWER	
	WATERMAIN	
GAS GAS GAS	GAS MAIN	GAS GAS GAS
	ELEC. TELE. CABLE	
	PRETREATMENT STRUCTURE	
	STORM MANHOLE	
	CATCH BASIN	
	INLET	
	REARYARD CATCH BASIN	
	END SECTION	
	SANITARY MANHOLE	
	GATE VALVE AND WELL	
	HYDRANT	
960	CONTOURS	(40)
	FINISH GRADE	960 FG
	MATCH EXISTING ELEV.	(M)
	TOP OF CURB	T/C
	TOP OF SIDEWALK	T/S
	TOP OF PAVEMENT	T/P
	TOP OF WALL	T/W
	BOTTOM OF WALL	B/W
	DRAINAGE ARROW	

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DRAWN	GF		
DESIGN	PCM		
SECTION	36	T- 3 -N. R- 8 -E.	

72 HOURS (3 WORKING DAYS) BEFORE YOU DIG CALL MISS DIG 800-482-7171 (TOLL FREE)

Watermain & Sanitary Sewer Plan & Profile

"Preserve at Hidden Lake"
WHITE LAKE TOWNSHIP, OAKLAND COUNTY, MICHIGAN

SCALE	1" = 30' HORZ. 1" = 5' VERT.
SHEET	24 OF 36
	KE 2017.182

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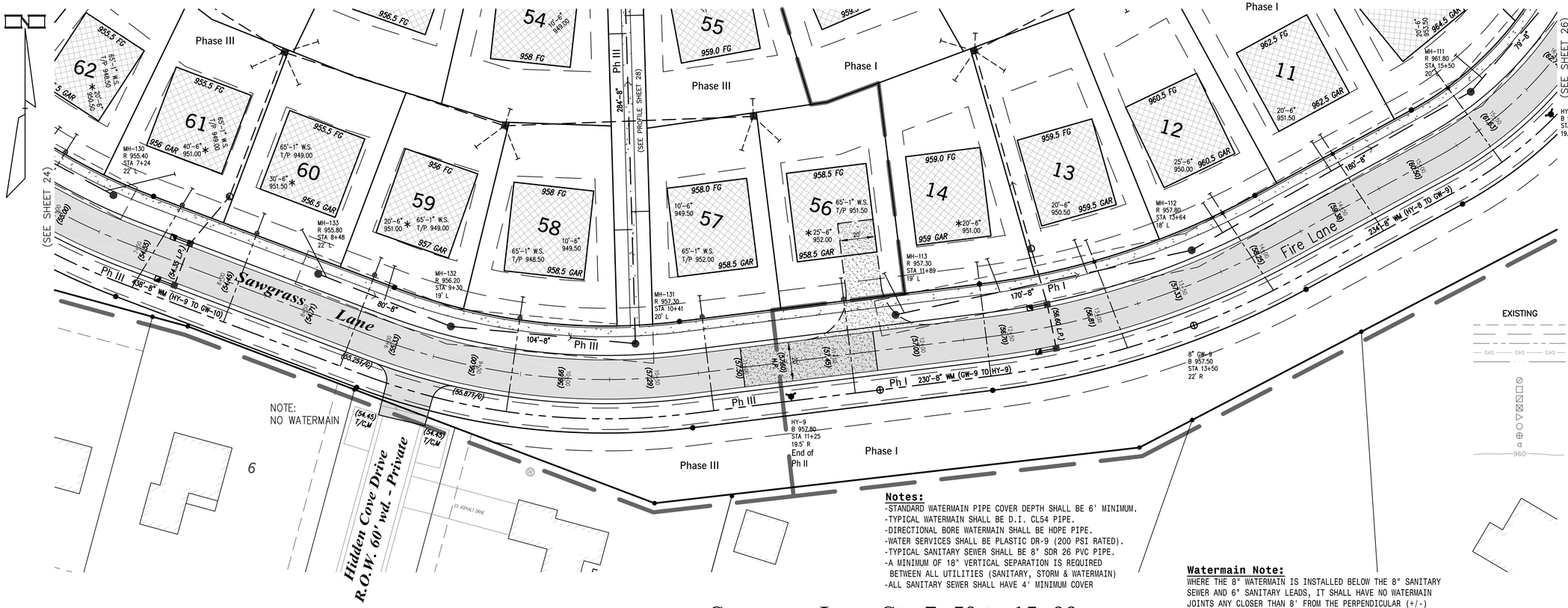


***NOTE:**
SANITARY SEWER GRAVITY SERVICE NOT AVAILABLE

Notes:
-STANDARD WATERMAIN PIPE COVER DEPTH SHALL BE 6' MINIMUM.
-TYPICAL WATERMAIN SHALL BE D.I. CL54 PIPE.
-DIRECTIONAL BORE WATERMAIN SHALL BE HDPE PIPE.
-WATER SERVICES SHALL BE PLASTIC DR-9 (200 PSI RATED).
-TYPICAL SANITARY SEWER SHALL BE 8" SDR 26 PVC PIPE.
-A MINIMUM OF 18" VERTICAL SEPARATION IS REQUIRED BETWEEN ALL UTILITIES (SANITARY, STORM & WATERMAIN)
-ALL SANITARY SEWER SHALL HAVE 4' MINIMUM COVER

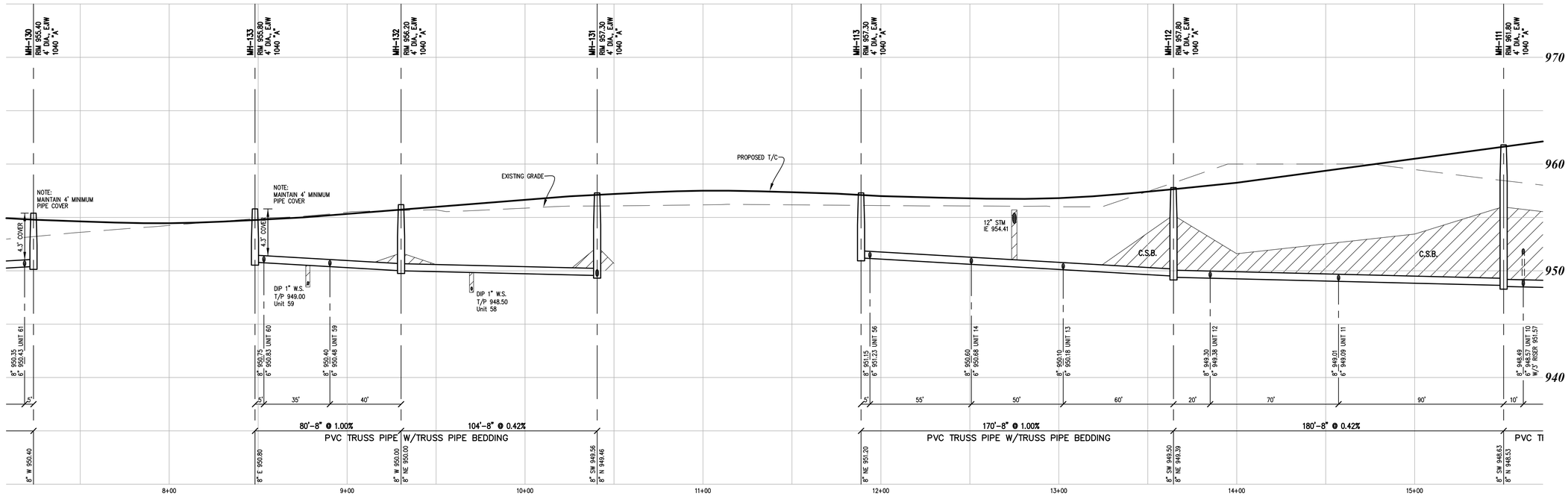
Watermain Note:
WHERE THE 8" WATERMAIN IS INSTALLED BELOW THE 8" SANITARY SEWER AND 6" SANITARY LEADS, IT SHALL HAVE NO WATERMAIN JOINTS ANY CLOSER THAN 8' FROM THE PERPENDICULAR (+/-) CROSSINGS.

LEGEND

EXISTING		PROPOSED
	STORM SEWER	
	SANITARY SEWER	
	WATERMAIN	
GAS GAS GAS	GAS MAIN	GAS GAS GAS
	ELEC. TELE. CABLE	
⊘	PRETREATMENT STRUCTURE	⊘
□	STORM MANHOLE	■
⊠	CATCH BASIN	■
⊠	INLET	■
⊠	REARYARD CATCH BASIN	■
▷	END SECTION	▶
○	SANITARY MANHOLE	●
⊕	GATE VALVE AND WELL	⊕
⊲	HYDRANT	⊲
960	CONTOURS	(40)
	FINISH GRADE	960 FG
	MATCH EXISTING ELEV.	(M)
	TOP OF CURB	T/C
	TOP OF SIDEWALK	T/S
	TOP OF PAVEMENT	T/P
	TOP OF WALL	T/W
	BOTTOM OF WALL	B/W
	DRAINAGE ARROW	

Note:
THE WHITE LAKE D.P.S. (AARON POTTER) IS RECOMMENDING THAT THE DEVELOPER PROVIDE INDIVIDUAL IN HOME PRV'S WITH EACH HOMES PLUMBING PLAN TO CONTROL HIGH WATER PRESSURES (=90 PSI+/-).

Sawgrass Lane Sta 7+50 to 15+00



STATE OF MICHIGAN · PATRICK McWILLIAMS · ENGINEER NO. 31658 · PROFESSIONAL ENGINEER

DATE	ISSUE
1-11-19	PER J & A (12-19-18), McKenna (12-18-18), DPS
2-26-19	PER J & A (2-19-19) & DPS (2-20-19)
4-22-19	PER J & A (4-16-19) & DPS (4-11-19)
5-23-19	PER J & A (5-21-19)
6-27-19	PER ENGR & CLIENT (6-27-19)
1-5-2021	PER CLIENT-REVISED GRADES LOTS 47-66 (1-5-2021)
3-11-2021	REV. PH 4, ETC. PER CLIENT (2-25-2021)

PROPRIETOR:
Preserve at Hidden Lake, LLC
8255 CASCADE AVENUE, SUITE 110
COMMERCE TOWNSHIP, MICHIGAN 48382
(248) 842-8613

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DESIGN	PCM		
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Watermain & Sanitary Sewer Plan & Profile
"Preserve at Hidden Lake"
WHITE LAKE TOWNSHIP, OAKLAND COUNTY, MICHIGAN

SCALE	1" = 30' HORZ. 1" = 5' VERT.
SHEET	25 OF 36
	KE 2017.182

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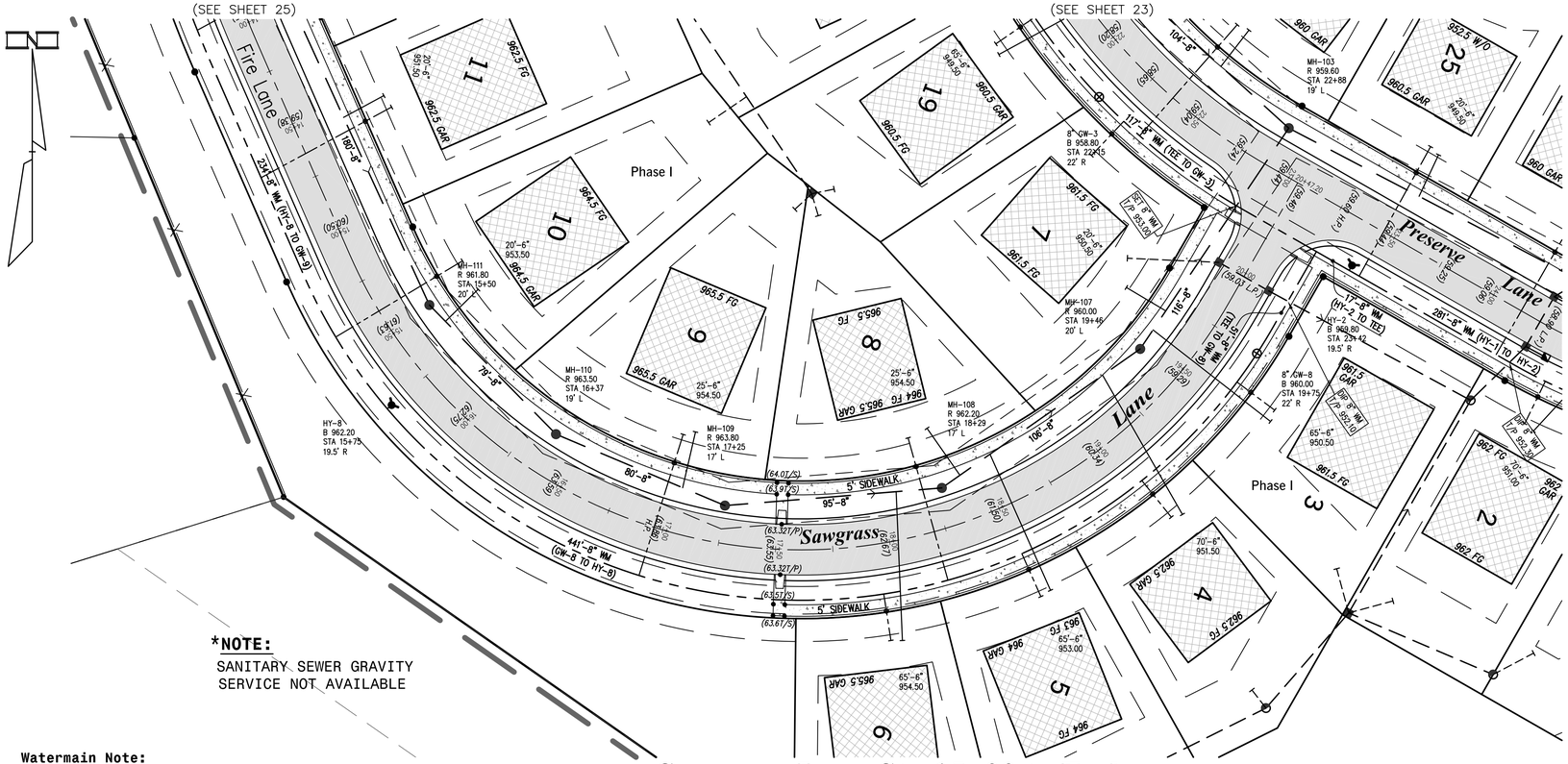
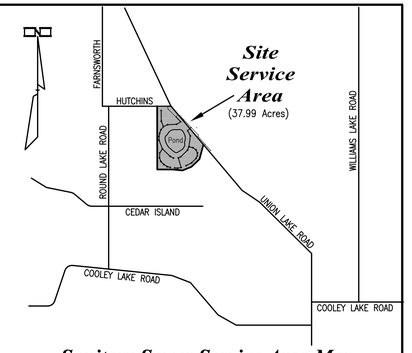


***NOTE:**
SANITARY SEWER GRAVITY SERVICE NOT AVAILABLE

Watermain Note:
WHERE THE 8" WATERMAIN IS INSTALLED BELOW THE 8" SANITARY SEWER AND 6" SANITARY LEADS, IT SHALL HAVE NO WATERMAIN JOINTS ANY CLOSER THAN 8' FROM THE PERPENDICULAR (+/-) CROSSINGS.

Sawgrass Lane Sta 15+00 to End

Note:
THE WHITE LAKE D.P.S. (AARON POTTER) IS RECOMMENDING THAT THE DEVELOPER PROVIDE INDIVIDUAL IN HOME PRV'S WITH EACH HOMES PLUMBING PLAN TO CONTROL HIGH WATER PRESSURES (=90 PSI+/-).



Sanitary Sewer Service Area Map
SCALE: 1" = 2000'

Phase I - 17.08 Acres

PHASE I RESIDENTIAL UNITS = 30 x 1 REU/UNIT = 30 REU'S

SANITARY DESIGN (SOUTH COMMERCE WWTF SERVICE AREA)

"AVERAGE FLOW"
30 REU'S @ 2.70 PERSONS/REU = 81 PERSONS
81 PERSONS x 100 GPCD = 8,100 GPD = 0.0081 MGPD
x 1.55 (conversion)
Q = 0.01255 CFS

"PEAK FLOW"
30 REU'S @ 2.70 PERSONS/REU = 81 PERSONS/1000 = 0.081 = P

$Q = 100 \times (18 + \sqrt{P})/(4 + \sqrt{P}) = 426.75$ GPCD

81 PERSONS x 426.75 GPCD = 34,567 GPD = 0.03456 MGPD
x 1.55 (conversion)
Q = REQUIRED = 0.0535 CFS

NOTE: AN 8" TRUSS PIPE @ 0.40% CAN CARRY 0.765 CFS @ 2.19 FPS.
A 10" TRUSS PIPE @ 0.30% CAN CARRY 1.194 CFS @ 2.19 FPS

Phase II (6.02 Ac)

RESIDENTIAL UNITS = 11 x 1 REU/UNIT = 11 REU'S
DUPLEX UNITS = 5 x 0.60 REU/UNIT = 3 REU'S
SUB-TOTAL = 14 REU'S

Phase III (8.96 Ac)

RESIDENTIAL UNITS = 27 x 1 REU/UNIT = 27 REU'S

Phase IV (5.93 Ac)

DUPLEX UNITS = 9 x 0.60 REU/UNIT = 6 REU'S
SINGLE UNITS = 1 x 1 REU/UNIT = 1 REU'S
SUB-TOTAL = 7 REU'S

OVERALL SANITARY DESIGN (SOUTH COMMERCE WWTF SERVICE AREA)

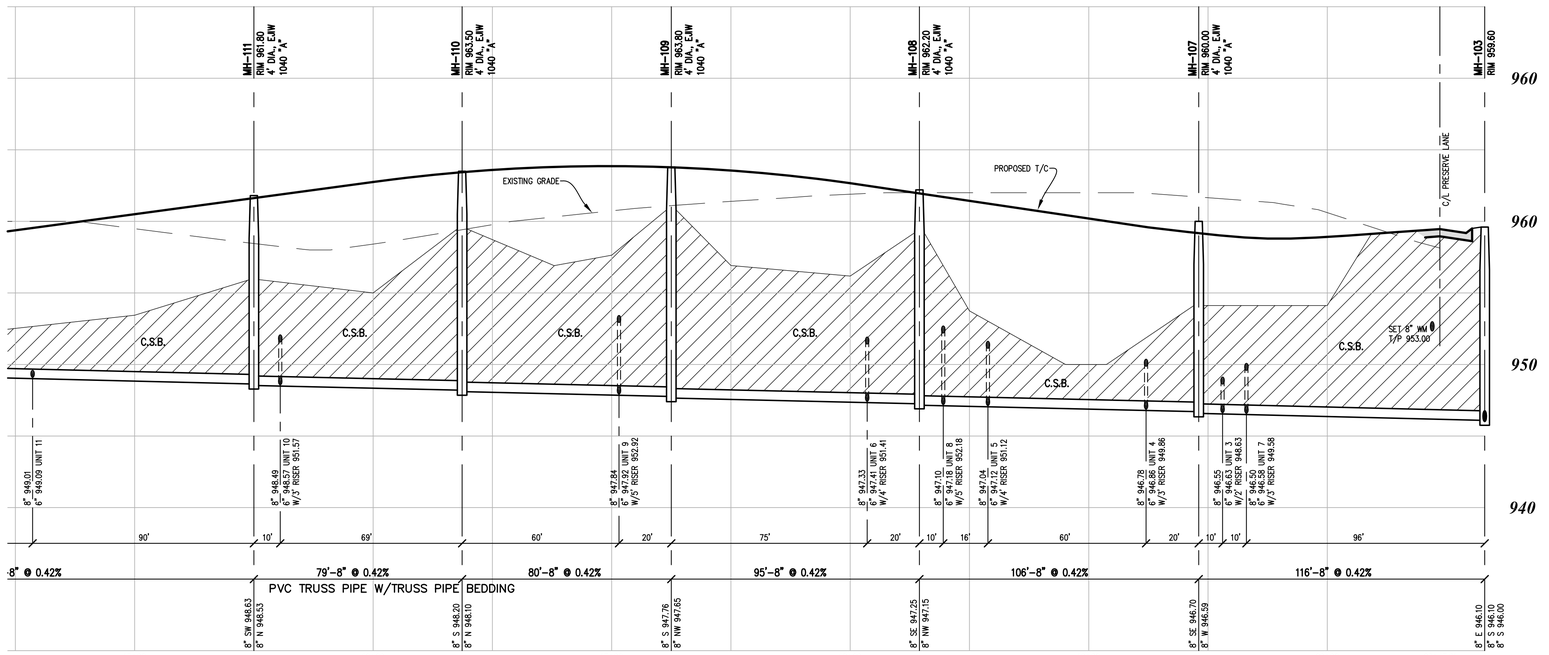
"AVERAGE FLOW"
78 REU'S @ 2.70 PERSONS/REU = 211 PERSONS
211 PERSONS x 100 GPCD = 21,000 GPD = 0.0211 MGPD
x 1.55 (conversion)
Q = 0.0327 CFS

"PEAK FLOW"
78 REU'S @ 2.70 PERSONS/REU = 211 PERSONS/1000 = 0.211 = P

$Q = 100 \times (18 + \sqrt{P})/(4 + \sqrt{P}) = 413.95$ GPCD

211 PERSONS x 413.95 GPCD = 87,344 GPD = 0.0873 MGPD
x 1.55 (conversion)
Q = REQUIRED = 0.1354 CFS

NOTE: AN 8" TRUSS PIPE @ 0.40% CAN CARRY 0.765 CFS @ 2.19 FPS.
A 10" TRUSS PIPE @ 0.30% CAN CARRY 1.194 CFS @ 2.19 FPS



Notes:
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-WATER SERVICES SHALL BE PLASTIC DR-9 (200 PSI RATED).
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-A MINIMUM OF 18" VERTICAL SEPARATION IS REQUIRED BETWEEN ALL UTILITIES (SANITARY, STORM & WATERMAIN)
-ALL SANITARY SEWER SHALL HAVE 4' MINIMUM COVER

LEGEND

EXISTING		PROPOSED
	STORM SEWER	
	SANITARY SEWER	
	WATERMAIN	
GAS GAS GAS	GAS MAIN	GAS GAS GAS
	ELEC. TELE. CABLE	
	PRETREATMENT STRUCTURE	
⊘	STORM MANHOLE	
□	CATCH BASIN	
⊠	INLET	
◪	REARYARD CATCH BASIN	
▷	END SECTION	
○	SANITARY MANHOLE	
⊕	GATE VALVE AND WELL	
ɑ	HYDRANT	
960	CONTOURS	(40)
	FINISH GRADE	960 FG
	MATCH EXISTING ELEV.	(M)
	TOP OF CURB	T/C
	TOP OF SIDEWALK	T/S
	TOP OF PAVEMENT	T/P
	TOP OF WALL	T/W
	BOTTOM OF WALL	B/W
	DRAINAGE ARROW	

STATE OF MICHIGAN
PATRICK McWILLIAMS
ENGINEER
NO. 31658
REGISTERED PROFESSIONAL ENGINEER

DATE	ISSUE
4-25-19	PER R.C.O.C. (4-22-19)
5-23-19	PER J & A (5-21-19)
6-27-19	PER E.G.L.E. (6-27-19)
7-10-19	PER O.C.W.R.C. (7-3-19)
1-8-2021	PER CLIENT-REVISED GRADES (OIS 47-66 (1-5-2021)
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5-6-2021	PER DLZ (4-27-2021) & McKENNA (4-26-2021)

PROPRIETOR:
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DRAWN GF		
DESIGN PCM		
SECTION 36	T- 3 -N. R- 8 -E.	

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Watermain & Sanitary Sewer Plan & Profile
"Preserve at Hidden Lake"
WHITE LAKE TOWNSHIP, OAKLAND COUNTY, MICHIGAN

SCALE 1" = 30' HORZ.
1" = 5' VERT.
SHEET 26 OF 36
KE 2017.182

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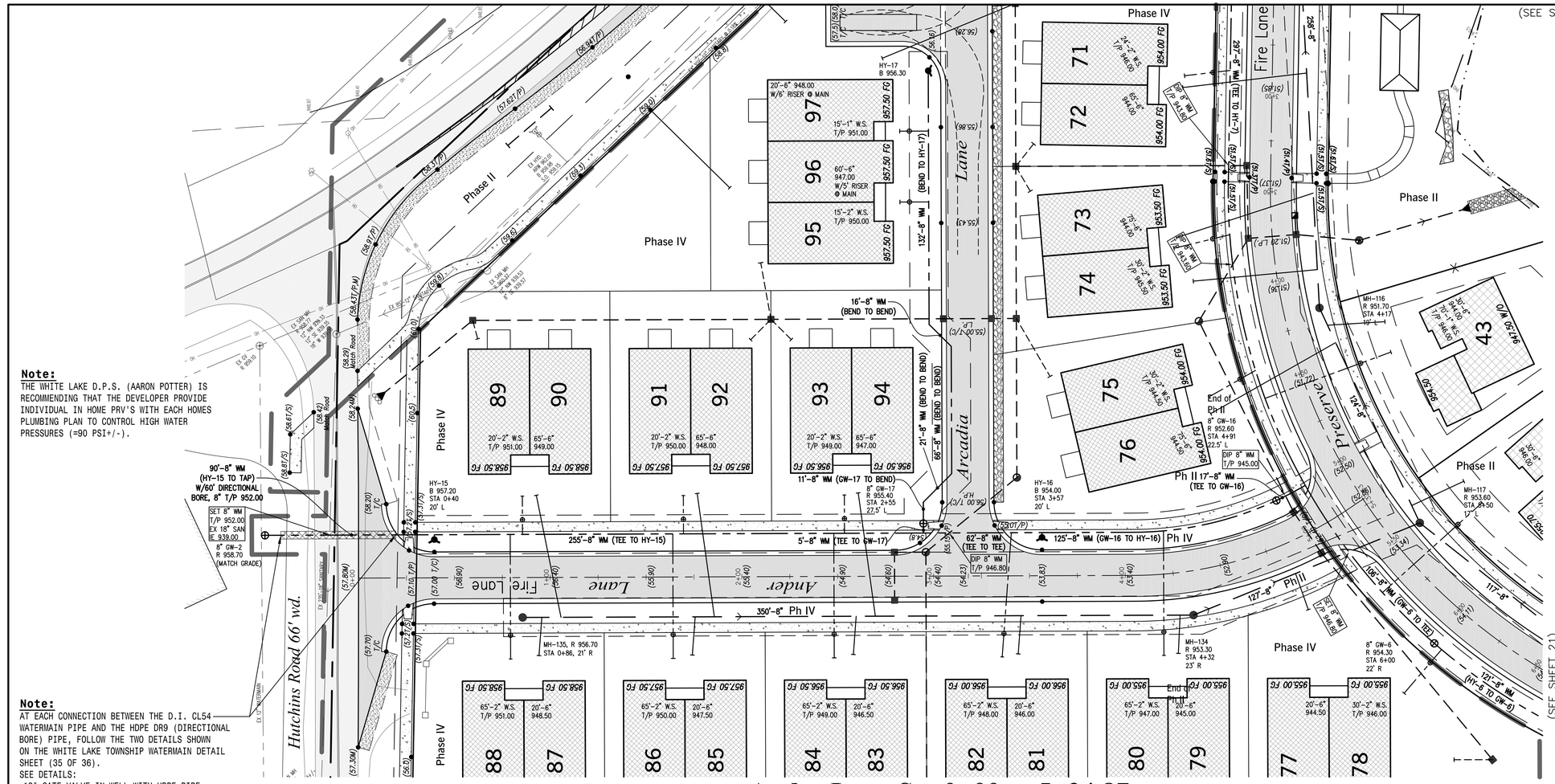

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Note:
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SEE DETAILS:
-12" GATE VALVE IN WELL WITH HDPE PIPE
-HDPE RESTRAINING BLOCK

***NOTE:**
SANITARY SEWER GRAVITY SERVICE NOT AVAILABLE

(SEE SHEET 21)

PATRICK McWILLIAMS ENGINEER NO. 31658 LICENSED PROFESSIONAL ENGINEER STATE OF MICHIGAN

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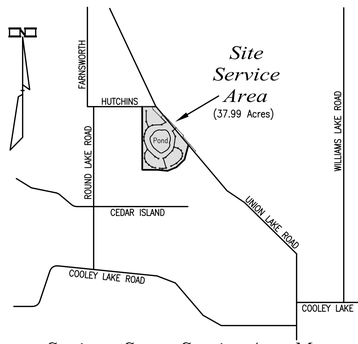


Sanitary Sewer Service Area Map
SCALE: 1" = 2000'

Phase IV (5.93 Acres)

SINGLE UNITS = 1 x 1 REU/UNIT = 1 REU'S
DUPLEX UNITS = 18 x 0.60 REU/UNIT = 11 REU'S
TOTAL = 12 REU'S

SANITARY DESIGN (SOUTH COMMERCE WWTF SERVICE AREA)

"AVERAGE FLOW"
12 REU'S @ 2.70 PERSONS/REU = 33 PERSONS
33 PERSONS x 100 GPCD = 3,300 GPD = 0.0033 MGPD
x 1.55 (conversion)
Q = 0.0051 CFS

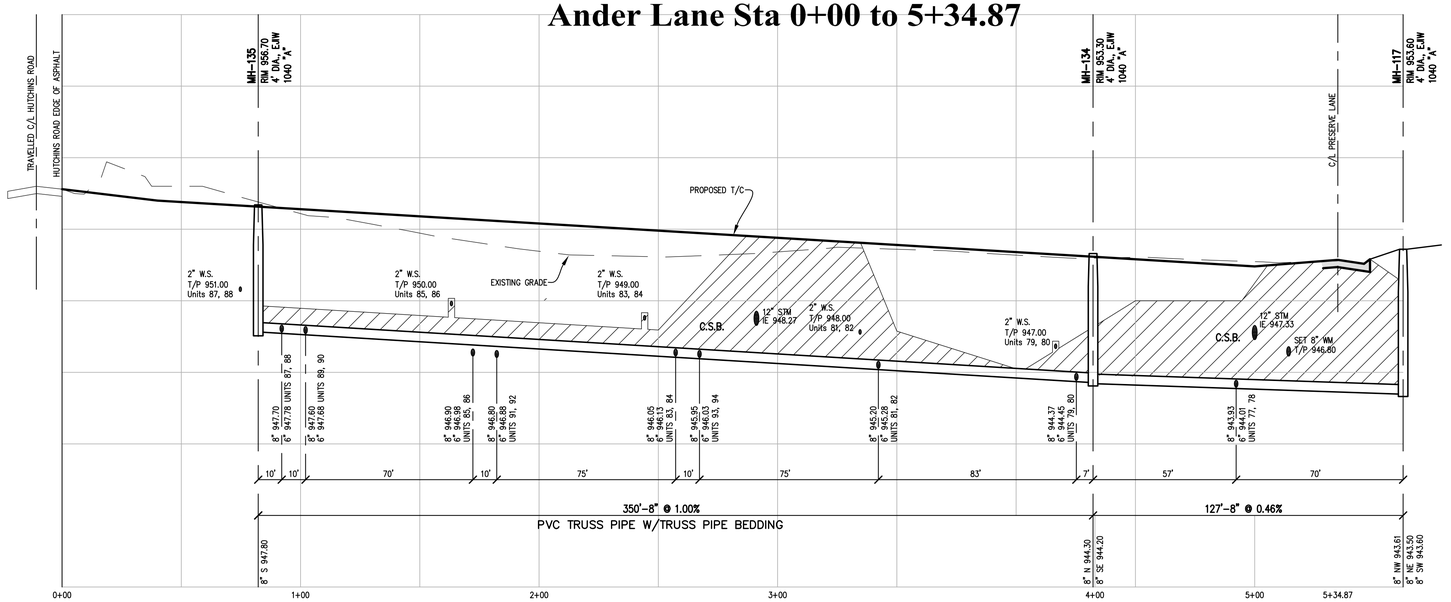
"PEAK FLOW"
12 REU'S @ 2.70 PERSONS/REU = 33 PERSONS/1000 = 0.033 = P

Q = 100 x (18 + √P)/(4 + √P) = 434.80 GPCD

33 PERSONS x 434.80 GPCD = 14,348.4 GPD = 0.0144 MGPD
x 1.55 (conversion)
Q = REQUIRED = 0.0222 CFS

NOTE: AN 8" TRUSS PIPE @ 0.40% CAN CARRY 0.765 CFS @ 2.19 FPS.
A 10" TRUSS PIPE @ 0.30% CAN CARRY 1.194 CFS @ 2.19 FPS

Ander Lane Sta 0+00 to 5+34.87



LEGEND

EXISTING		PROPOSED
	STORM SEWER	
	SANITARY SEWER	
GAS GAS	WATERMAIN	
GAS GAS	GAS MAIN	GAS GAS
	ELEC. TELE. CABLE	
	PRETREATMENT STRUCTURE	
	STORM MANHOLE	
	CATCH BASIN	
	INLET	
	REARYARD CATCH BASIN	
	END SECTION	
	SANITARY MANHOLE	
	GATE VALVE AND WELL	
	HYDRANT	
960	CONTOURS	(40)
	FINISH GRADE	960 FG
	MATCH EXISTING ELEV.	(W)
	TOP OF CURB	T/C
	TOP OF SIDEWALK	T/S
	TOP OF PAVEMENT	T/P
	TOP OF WALL	T/W
	BOTTOM OF WALL	B/W
	DRAINAGE ARROW	

DATE	ISSUE
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2-11-2021	REV. PH 4, ETC. PER CLIENT (2-25-2021)
4-1-2021	PH. 4 SANITARY SUBMITTAL
5-6-2021	PER DLZ (4-27-2021), & McKENNA (4-26-2021)

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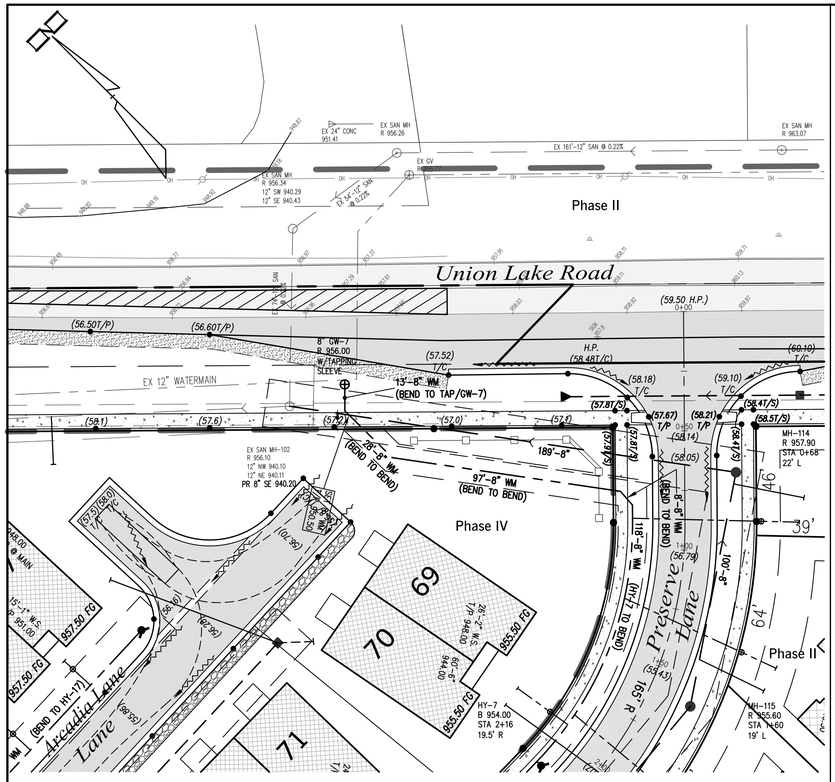

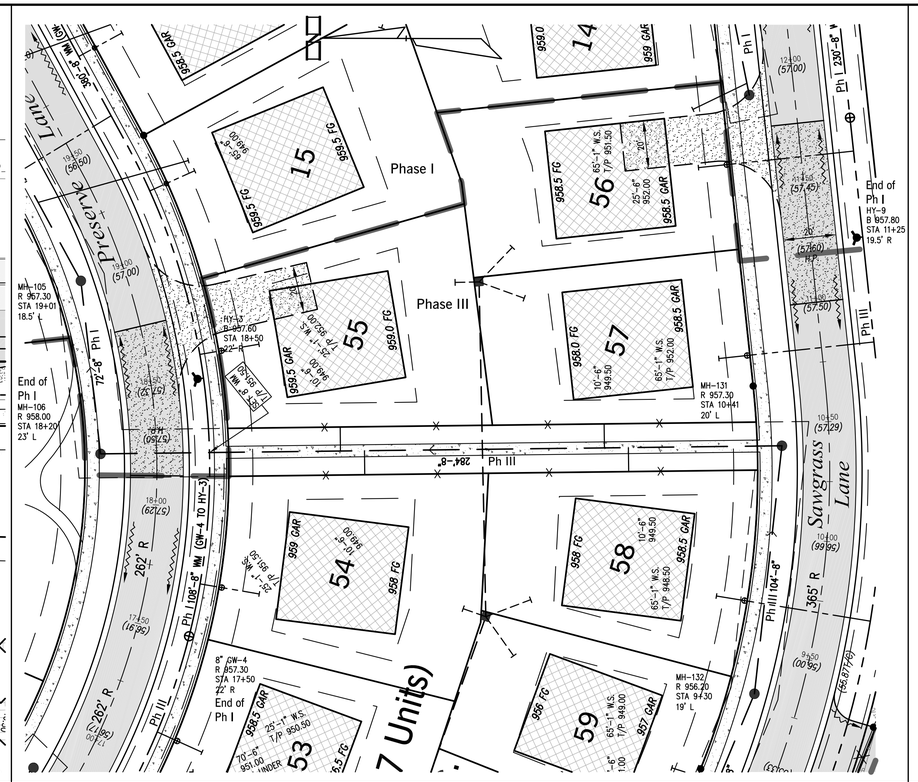

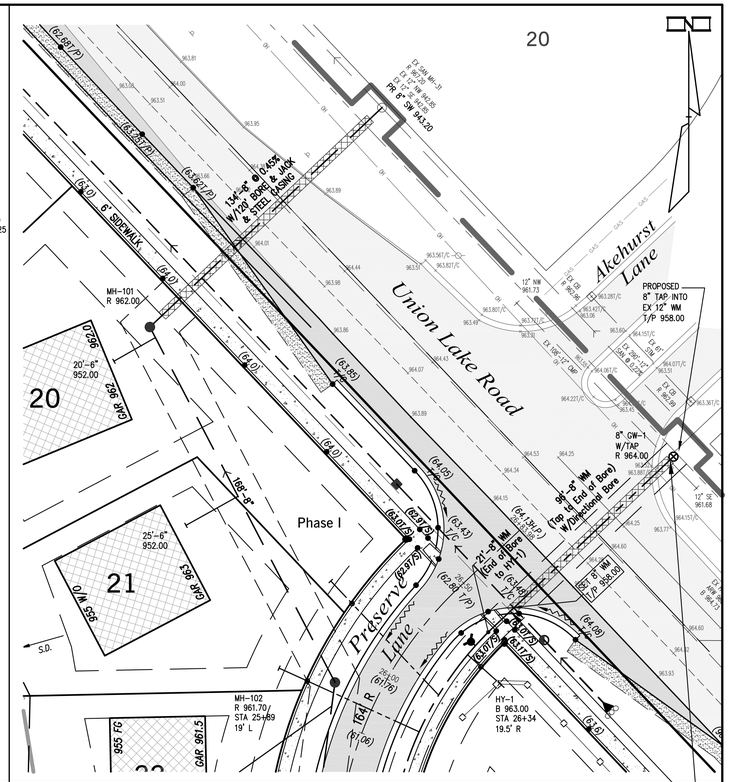

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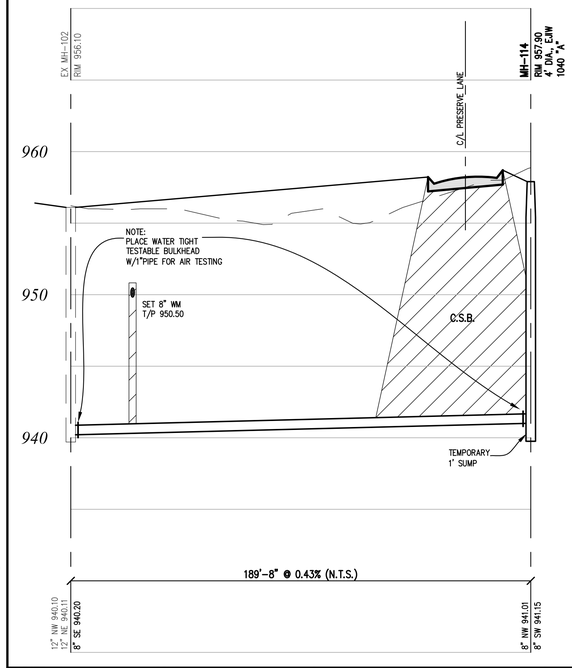

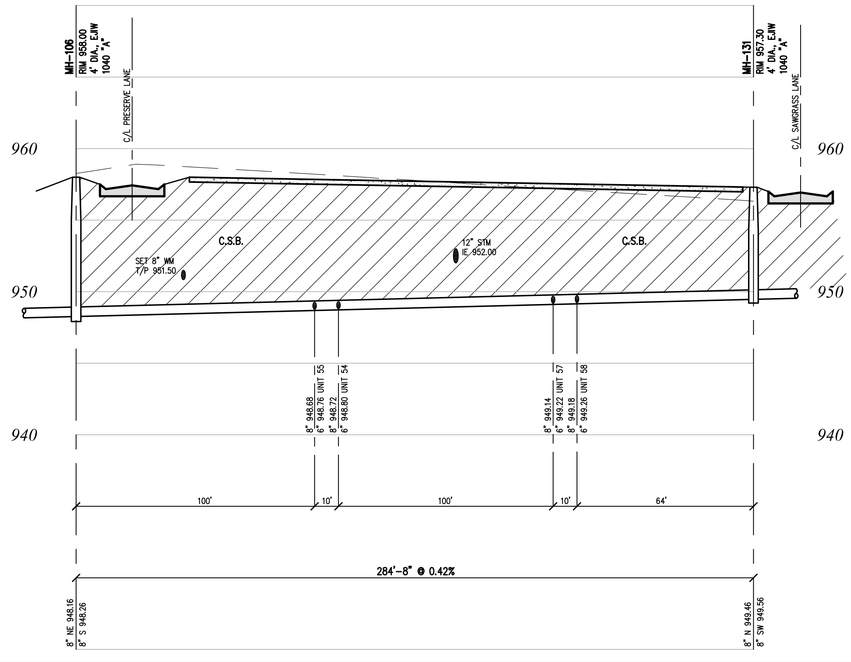

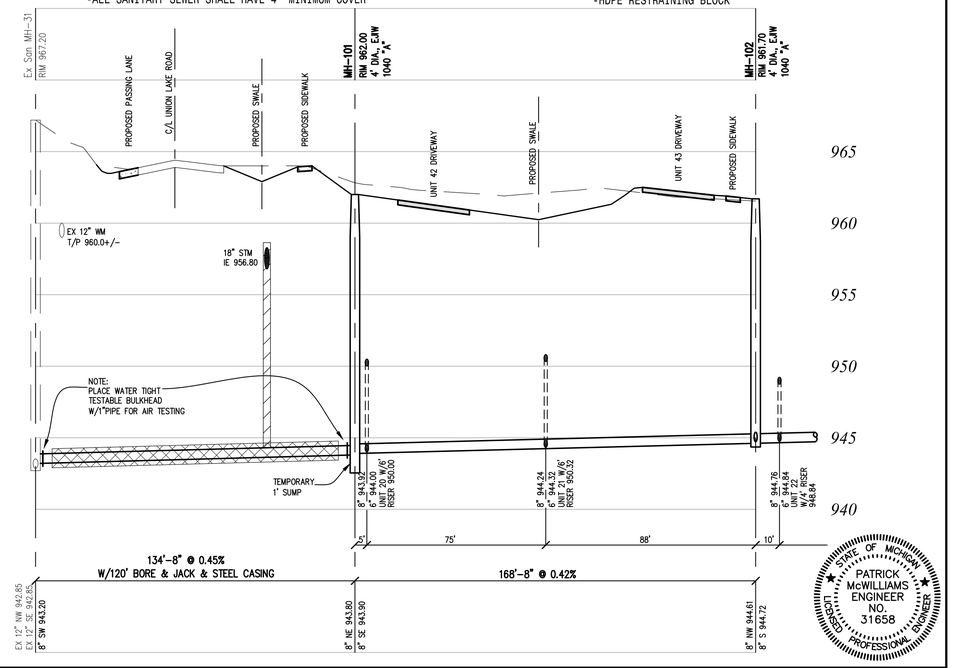

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PATRICK McWILLIAMS
ENGINEER
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PROFESSIONAL ENGINEER

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1-8-2021	PER CLIENT-REVISED GRADES (LOTS 47-66 (1-5-2021)
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DESIGN	PCM		
SECTION	36	T- 3 -N. R- 8 -E.	

72 HOURS (3 WORKING DAYS) BEFORE YOU DIG CALL MISS DIG 800-482-7171 (TOLL FREE)

Offsite Sanitary Sewer Plan & Profile
"Preserve at Hidden Lake"
WHITE LAKE TOWNSHIP, OAKLAND COUNTY, MICHIGAN

SCALE 1" = 30' HORZ.
1" = 5' VERT.
SHEET 28 OF 36
KE 2017.182

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Stormceptor®

Stormceptor Sizing Detailed Report

PCSWMM for Stormceptor

Project Information

Date	10/11/2018
Project Name	Preserve at Hidden Lake
Project Number	N/A
Location	White Lake Township

Stormwater Quality Objective

This report outlines how Stormceptor System can achieve a defined water quality objective through the removal of total suspended solids (TSS). Attached to this report is the Stormceptor Sizing Summary.

Stormceptor System Recommendation

The Stormceptor System model STC 450i achieves the water quality objective removing 80% TSS for a User defined particle size distribution.

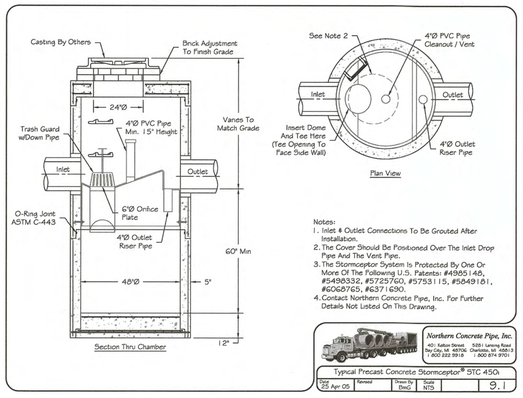
The Stormceptor System

The Stormceptor oil and sediment separator is sized to treat stormwater runoff by removing pollutants through gravity separation and flotation. Stormceptor's patented design generates positive TSS removal for all rainfall events, including large storms. Significant levels of pollutants such as heavy metals, free oils and nutrients are prevented from entering natural water resources and the re-suspension of previously captured sediment (scour) does not occur.

Stormceptor provides a high level of TSS removal for small frequent storm events that represent the majority of annual rainfall volume and pollutant load. Positive treatment continues for large infrequent events, however, such events have little impact on the average annual TSS removal as they represent a small percentage of the total runoff volume and pollutant load.

Stormceptor is the only oil and sediment separator on the market sized to remove TSS for a wide range of particle sizes, including fine sediments (clays and silts), that are often overlooked in the design of other stormwater treatment devices.

Rinker MATERIALS™



Northern Concrete Pipe, Inc.
401 Fulton Street, Box City, MI 48750 (800) 248-3110
5351 Lansing Road Charlotte, MI 48813 (800) 874-3701

Typical Precast Concrete Stormceptor® STC 450i

Date	Revised	Drawn By	Scale	
03 Apr 05		DwG	NTS	9.1

Pretreatment Structure
MH-1, 6.53 CFS (3.17 Acres, C=0.54)

Stormceptor® Rinker MATERIALS™

Detailed Stormceptor Sizing Report – Catchment to MH-1

Project Information & Location			
Project Name	Preserve at Hidden Lake	Project Number	KE 2017.182
City	White Lake Tnshp	State/ Province	Michigan
Country	United States of America	Date	10/11/2018
Designer Information		**EOR Information (optional)**	
Name	Daniel Thomson	Name	Patrick McWilliams
Company	Rinker Materials	Company	Kieft Engineering, Inc.
Phone #	414-238-3824	Phone #	248-625-5251
Email	DanielC.Thomson@rinkerpipe.com	Email	

Stormwater Treatment Recommendation

The recommended Stormceptor Model(s) which achieve or exceed the user defined water quality objective for each site within the project are listed in the below Sizing Summary table.

Site Name	Catchment to MH-1
Recommended Stormceptor Model	STC 900
Target TSS Removal (%)	80.0
TSS Removal (%) Provided	80
PSD	D50 = 75 micron
Rainfall Station	DETROIT METRO AP

The recommended Stormceptor model achieves the water quality objectives based on the selected inputs, historical rainfall records and selected particle size distribution.

Stormceptor Sizing Summary	
Stormceptor Model	**% TSS Removal Provided**
STC 450i	72
STC 900	80
STC 1200	81
STC 1800	81
STC 2400	85
STC 3600	86
STC 4800	89
STC 6000	89
STC 7200	91
STC 11000	93
STC 13000	94
STC 16000	95
StormceptorMAX	Custom

Stormceptor Detailed Sizing Report – Page 1 of 8

Pretreatment Structure
MH-6, 9.06 CFS (4.50 Acres, C = 0.54)

Stormceptor® Rinker MATERIALS™

Detailed Stormceptor Sizing Report – Catchment to MH-6,

Project Information & Location			
Project Name	Preserve at Hidden Lake	Project Number	KE 2017.182
City	White Lake Tnshp	State/ Province	Michigan
Country	United States of America	Date	10/11/2018
Designer Information		**EOR Information (optional)**	
Name	Daniel Thomson	Name	Patrick McWilliams
Company	Rinker Materials	Company	Kieft Engineering, Inc.
Phone #	414-238-3824	Phone #	248-625-5251
Email	DanielC.Thomson@rinkerpipe.com	Email	

Stormwater Treatment Recommendation

The recommended Stormceptor Model(s) which achieve or exceed the user defined water quality objective for each site within the project are listed in the below Sizing Summary table.

Site Name	Catchment to MH-6
Recommended Stormceptor Model	STC 2400
Target TSS Removal (%)	80.0
TSS Removal (%) Provided	80
PSD	D50 = 75 micron
Rainfall Station	DETROIT METRO AP

The recommended Stormceptor model achieves the water quality objectives based on the selected inputs, historical rainfall records and selected particle size distribution.

Stormceptor Sizing Summary	
Stormceptor Model	**% TSS Removal Provided**
STC 450i	59
STC 900	69
STC 1200	69
STC 1800	70
STC 2400	80
STC 3600	81
STC 4800	82
STC 7200	83
STC 11000	87
STC 13000	87
STC 16000	89
StormceptorMAX	Custom

Stormceptor Detailed Sizing Report – Page 1 of 8

Pretreatment Structure
MH-9, 13.41 CFS (6.70 Acres, C = 0.54)

Stormceptor® Rinker MATERIALS™

Detailed Stormceptor Sizing Report – Catchment to MH-9,

Project Information & Location			
Project Name	Preserve at Hidden Lake	Project Number	KE 2017.182
City	White Lake Tnshp	State/ Province	Michigan
Country	United States of America	Date	10/11/2018
Designer Information		**EOR Information (optional)**	
Name	Daniel Thomson	Name	Patrick McWilliams
Company	Rinker Materials	Company	Kieft Engineering, Inc.
Phone #	414-238-3824	Phone #	248-625-5251
Email	DanielC.Thomson@rinkerpipe.com	Email	

Stormwater Treatment Recommendation

The recommended Stormceptor Model(s) which achieve or exceed the user defined water quality objective for each site within the project are listed in the below Sizing Summary table.

Site Name	Catchment to MH-9
Recommended Stormceptor Model	STC 4800
Target TSS Removal (%)	80.0
TSS Removal (%) Provided	80
PSD	D50 = 75 micron
Rainfall Station	DETROIT METRO AP

The recommended Stormceptor model achieves the water quality objectives based on the selected inputs, historical rainfall records and selected particle size distribution.

Stormceptor Sizing Summary	
Stormceptor Model	**% TSS Removal Provided**
STC 450i	59
STC 900	69
STC 1200	69
STC 1800	70
STC 2400	74
STC 3600	75
STC 4800	80
STC 7200	83
STC 11000	87
STC 13000	87
STC 16000	89
StormceptorMAX	Custom

Stormceptor Detailed Sizing Report – Page 1 of 8

Pretreatment Structure
MH-15, 2.79 CFS (1.34 Acres, C=0.54)

Stormceptor® Rinker MATERIALS™

Detailed Stormceptor Sizing Report – Catchment to MH-15

Project Information & Location			
Project Name	Preserve at Hidden Lake	Project Number	KE 2017.182
City	White Lake Tnshp	State/ Province	Michigan
Country	United States of America	Date	10/11/2018
Designer Information		**EOR Information (optional)**	
Name	Daniel Thomson	Name	Patrick McWilliams
Company	Rinker Materials	Company	Kieft Engineering, Inc.
Phone #	414-238-3824	Phone #	248-625-5251
Email	DanielC.Thomson@rinkerpipe.com	Email	

Stormwater Treatment Recommendation

The recommended Stormceptor Model(s) which achieve or exceed the user defined water quality objective for each site within the project are listed in the below Sizing Summary table.

Site Name	Catchment to MH-15
Recommended Stormceptor Model	STC 450i
Target TSS Removal (%)	80.0
TSS Removal (%) Provided	84
PSD	D50 = 75 micron
Rainfall Station	DETROIT METRO AP

The recommended Stormceptor model achieves the water quality objectives based on the selected inputs, historical rainfall records and selected particle size distribution.

Stormceptor Sizing Summary	
Stormceptor Model	**% TSS Removal Provided**
STC 450i	84
STC 900	90
STC 1200	90
STC 1800	91
STC 2400	93
STC 3600	94
STC 4800	95
STC 6000	96
STC 7200	97
STC 11000	98
STC 13000	98
STC 16000	98
StormceptorMAX	Custom

Stormceptor Detailed Sizing Report – Page 1 of 8

Pretreatment Structure
MH-16, 4.57 CFS (2.00 Acres, C=0.54)

Stormceptor® Rinker MATERIALS™

Detailed Stormceptor Sizing Report – Catchment to MH-16

Project Information & Location			
Project Name	Preserve at Hidden Lake	Project Number	KE 2017.182
City	White Lake Tnshp	State/ Province	Michigan
Country	United States of America	Date	10/11/2018
Designer Information		**EOR Information (optional)**	
Name	Daniel Thomson	Name	Patrick McWilliams
Company	Rinker Materials	Company	Kieft Engineering, Inc.
Phone #	414-238-3824	Phone #	248-625-5251
Email	DanielC.Thomson@rinkerpipe.com	Email	

Stormwater Treatment Recommendation

The recommended Stormceptor Model(s) which achieve or exceed the user defined water quality objective for each site within the project are listed in the below Sizing Summary table.

Site Name	Catchment to MH-16
Recommended Stormceptor Model	STC 900
Target TSS Removal (%)	80.0
TSS Removal (%) Provided	80
PSD	D50 = 75 micron
Rainfall Station	DETROIT METRO AP

The recommended Stormceptor model achieves the water quality objectives based on the selected inputs, historical rainfall records and selected particle size distribution.

Stormceptor Sizing Summary	
Stormceptor Model	**% TSS Removal Provided**
STC 900	87
STC 1200	87
STC 1800	88
STC 2400	91
STC 3600	92
STC 4800	94
STC 6000	94
STC 7200	95
STC 11000	97
STC 13000	97
STC 16000	97
StormceptorMAX	Custom

Stormceptor Detailed Sizing Report – Page 1 of 8

Pretreatment Structure
MH-19, 15.11 CFS (6.93 Acres, C = 0.54

Stormceptor® Rinker MATERIALS™

Detailed Stormceptor Sizing Report – Catchment to MH-19

Project Information & Location			
Project Name	Preserve at Hidden Lake	Project Number	KE 2017.182
City	White Lake Tnshp	State/ Province	Michigan
Country	United States of America	Date	10/11/2018
Designer Information		**EOR Information (optional)**	
Name	Daniel Thomson	Name	Patrick McWilliams
Company	Rinker Materials	Company	Kieft Engineering, Inc.
Phone #	414-238-3824	Phone #	248-625-5251
Email	DanielC.Thomson@rinkerpipe.com	Email	

Stormwater Treatment Recommendation

The recommended Stormceptor Model(s) which achieve or exceed the user defined water quality objective for each site within the project are listed in the below Sizing Summary table.

Site Name	Catchment to MH-19
Recommended Stormceptor Model	STC 4800
Target TSS Removal (%)	80.0
TSS Removal (%) Provided	80
PSD	D50 = 75 micron
Rainfall Station	DETROIT METRO AP

The recommended Stormceptor model achieves the water quality objectives based on the selected inputs, historical rainfall records and selected particle size distribution.

Stormceptor Sizing Summary	
Stormceptor Model	**% TSS Removal Provided**
STC 450i	59
STC 900	69
STC 1200	69
STC 1800	70
STC 2400	74
STC 3600	75
STC 4800	80
STC 7200	83
STC 11000	87
STC 13000	87
STC 16000	89
StormceptorMAX	Custom

Stormceptor Detailed Sizing Report – Page 1 of 8

(2) 100 YEAR RETENTION POND CALCULATIONS

ON-SITE CONTRIBUTING AREA TO POND (EXCLUDING PROPOSED R.O.W.'S) = 35.19 ACRES
UNION LAKE ROAD PROPOSED R.O.W. AREA = 1.65 ACRES
HUTCHINS ROAD PROPOSED R.O.W. AREA = 0.30 ACRES
OFF-SITE WEST AREAS = 0.27 ACRES
TOTAL ACTUAL CONTRIBUTING AREAS TO POND = 37.41 ACRES

NOTE: WE WILL STILL DESIGN FOR 37.99 ACRES (THE ORIGINAL PROPERTY ACREAGE) TO BE CONSERVATIVE.

ASSUMED DESIGN AREA 37.99 ACRES
TOTAL CONTRIBUTING AREA = 37.99 ACRES
AVERAGE RUNOFF COEFFICIENT (C) = 0.54
VOLUME (2) 100 YR = (2)(A)(C)(16,500) = (2)(37.99)(0.54)(16,500) = 676,982 CF

VOLUME PROVIDED:

@ 939.10: 274,428 SF
@ 940.0: 312,677 SF → 293,552 SF_{AV} x 0.90' DEPTH = 264,196 CF
@ 941.30: 327,223 SF → 319,950 SF_{AV} x 1.3' DEPTH = 415,935 CF
680,131 CF PROVIDED
@ 942.0: 339,223 SF

(NOTE: AT ELEVATION 942.0; WE HAVE 916,096 CF OF STORAGE VOLUME)

RETENTION POND/BASIN

EXISTING WATER ELEVATION = 939.10 (11-11-2017)
DESIGN HIGH WATER ELEVATION = 941.30 (2-100 YEAR STORM)
1' FREEBOARD ELEVATION = 942.30
STORAGE REQUIRED = 676,982 C.F.
STORAGE PROVIDED = 680,131 C.F.

"C" CALCULATION

ROADS & APPROACHES:
ROADS = 151,200 SF
APPROACHES = 6,525 SF
157,725 SF

PARKING AREAS:
36,950 SF

DRIVEWAYS:
80,700 SF

SIDEWALKS:
63,260 SF

TOTAL PAVEMENT WALKS: 338,635 SF = 7.78 ACRES @ C = 0.80

ROOF AREAS:
SINGLE FAMILY = 136,000 SF
3 PLEX HOMES = 5,700 SF
DUPLEX HOMES = 22,800 SF
TOWNHOMES = 25,900 SF
=190,400 SF = 4.37 ACRES @ C = 0.90

RETENTION BASIN/POND AREA: 6.38 ACRES @ C = 1.00
GREENBELT AREAS: 19.46 ACRES @ C = 0.20
TOTAL AREA = 37.99 ACRES

$$C = \left(\frac{7.78\ \text{Acres} \times 0.80}{37.99\ \text{Ac.}}\right) + \left(\frac{4.37\ \text{Acres} \times 0.90}{37.99\ \text{Ac.}}\right) + \left(\frac{6.38\ \text{Acres} \times 1.00}{37.99\ \text{Ac.}}\right) + \left(\frac{19.46\ \text{Acres} \times 0.20}{37.99\ \text{Ac.}}\right) = 0.5377 = 0.54$$

Storm Water Facilities Maintenance Plan

The "Preserve @ Hidden Lake" Homeowners Association shall be responsible for the maintenance of all the storm water facilities. (Note: The developer is responsible until the HOA exists).

These facilities include the following:

- *Retention Basin Pond*
- *Pretreatment Structure Manholes*
- *Manholes, Rear Yard Catch Basins, End Sections & connecting pipe work*
- *Rear yard swales (within easements)*

The HOA shall hired a qualified contractor to do the following Maintenance Schedule (including report kept on record):

1. *The (6) Pretreatment Structures shall be inspected by a qualified contractor on a semi-annual basis (twice/year) and necessary action taken to clean out the structures in accordance with the manufacturers guidelines.*
2. *The Pond shall be inspected on any annual basis by a qualified contractor and/or civil engineer to insure it is functioning as designed.*
3. *The storm structures & swales shall be inspected on a bi-annual basis (every two years). This is an "above ground" visual inspection to determine if any structures are "failing", (i.e. ground has sank around structure, etc.).*

STATE OF MICHIGAN
PATRICK McWILLIAMS
ENGINEER
NO. 31658
REGISTERED PROFESSIONAL ENGINEER

DATE	ISSUE
3-26-19	PER J & A (3-19-19) & DPS (3-20-19)

PROPRIETOR:
Preserve at Hidden Lake, LLC
8255 CASCADE AVENUE, SUITE 110
COMMERCE TOWNSHIP, MICHIGAN 48382
(248) 842-8613

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KIEFT ENGINEERING, INC.
PROFESSIONAL ENGINEERS AND PROFESSIONAL SURVEYORS
5852 SOUTH MAIN STREET, SUITE 1, CLARKSTON, MICHIGAN 48346
PHONE (248) 625-5251 www.kiefteng.com FAX (248) 625-7110

DATE	11-29-18	CKD. BY	DATE
DRAWN	GF		
DESIGN	PCM		
SECTION	36	T- 3 -N. R- 8 -E.	

72 HOURS (3 WORKING DAYS) BEFORE YOU DIG CALL MISS DIG 800-482-7171 (TOLL FREE)

Retention Basin Calculations & Pretreatment Details
"Preserve at Hidden Lake"
WHITE LAKE TOWNSHIP, OAKLAND COUNTY, MICHIGAN

SCALE	N/A
SHEET	29 OF 36
	KE 2017.182

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STORM SEWER SYSTEM DESIGN

$Q = A \cdot \frac{1.486}{n} \cdot R^{2/3} \cdot S^{1/2}$ $Q = C \cdot I \cdot A$ $I_{10} = \frac{175}{T + 25}$

STRUCTURE NO.	(A1) INCREMENT AREA Ac.	(A) TOTAL AREA Ac.	(C) RUNOFF COEFICIENT	(C·A1) EQUIVALENT AREA	(Σ·A1) TOTAL EQUIV. AREA	(T) TIME MIN.	(I) RAINFALL INTENSITY IN/HR	FLOW (Q = IΣC·A1) C.F.S.	PIPE CAPACITY 0.8 FULL C.F.S.	DIAMETER OF PIPE IN.	LENGTH OF PIPE TO NEXT STRUCTURE FT.	% SLOPE OF PIPE	% SLOPE OF H.G.	VELOCITY OF FLOW FT/SEC	TIME OF FLOW MIN.	H.G. ELEV. UPPER END	H.G. ELEV. LOWER END	INVERT ELEV. UPPER END	INVERT ELEV. LOWER END	RIM ELEVATION COMMENTS
MH-5	0	0	0.54	0	0					8	129	1.01				–			8" NW 958.00	962.00
MH-4	0	0	0.54	0	0					8	55	1.09				–		8" SE 956.70	8" NW 956.60	960.70
CB-5	1.00	1.00	0.54															8" SE 956.00 8" N 956.00	12" W 955.90	960.00
MH-3	0	0	0.54	0	0					8	68	1.47				–			8" S 957.00	961.00
CB-5	1.00	1.00	0.54	0.54	0.54	20.0	3.89	2.10	2.52	12	107	0.50	0.35	3.22	0.56	956.54		8" N 956.00 8" SE 956.00	12" W 955.90	960.00
MH-2	0 / 0.99	1.99	0.54			20.56 NO										956.16 954.86		12" E 955.36 12" S 953.40	12" NW 955.13	960.00
CB-4	0.42	0.42	0.54	0.23	0.23	20.0	3.89	0.90	2.52	12	25	0.50	0.06	3.22	0.13	955.61			12" N 954.93	958.70
CB-3	0.57	0.99	0.54	0.31	0.54	20.13	3.88	2.09	2.52	12	100	0.50	0.34	3.22	0.52	955.60 955.34		12" S 954.80	12" N 954.70	958.70
MH-2	0 / 1.00	1.99	0.54	0.54	1.08	20.65	3.83	4.14	7.57	12	34	4.50	1.35	9.65	0.06	955.00 954.86		12" S 954.20 12" E 955.36	12" NW 954.10	960.00
CB-2 (IN-2)	0.62	2.61	0.54	0.33	1.41	20.71	3.83	5.40	7.57	12	25	4.50	2.29	9.65	0.04	954.40 953.67		12" SE 953.60 12" N 953.70	12" W 953.43	958.65
CB-1 (IN-1)	0.56	3.17	0.54	0.30	1.71	20.75	3.83	6.55	7.57	12	38	4.50	3.37	9.65	0.07	953.10 948.18		12" E 952.30 12" N 953.70	12" NW 947.81	958.65
MH-1	0	3.17	0.54	0	1.71	20.82	3.82	6.53	7.57	12	88	4.50	3.35	9.65	0.15	946.90 945.79		12" SE 946.10	12" W 946.00	959.20
ES-1			0.54			20.97										942.84	(0.80 DIA.)		12" W 942.04	E.S. 942.04

STORM SEWER SYSTEM DESIGN

$Q = A \cdot \frac{1.486}{n} \cdot R^{2/3} \cdot S^{1/2}$ $Q = C \cdot I \cdot A$ $I_{10} = \frac{175}{T + 25}$

STRUCTURE NO.	(A1) INCREMENT AREA Ac.	(A) TOTAL AREA Ac.	(C) RUNOFF COEFICIENT	(C·A1) EQUIVALENT AREA	(Σ·A1) TOTAL EQUIV. AREA	(T) TIME MIN.	(I) RAINFALL INTENSITY IN/HR	FLOW (Q = IΣC·A1) C.F.S.	PIPE CAPACITY 0.8 FULL C.F.S.	DIAMETER OF PIPE IN.	LENGTH OF PIPE TO NEXT STRUCTURE FT.	% SLOPE OF PIPE	% SLOPE OF H.G.	VELOCITY OF FLOW FT/SEC	TIME OF FLOW MIN.	H.G. ELEV. UPPER END	H.G. ELEV. LOWER END	INVERT ELEV. UPPER END	INVERT ELEV. LOWER END	RIM ELEVATION COMMENTS
CB-12 (IN-6)	0.32	0.32	0.54	0.17	0.17	20.0	3.89	0.66	2.52	12	25	0.50	0.04	3.22	0.13	953.38		12" NE 952.80	12" NW 952.70	956.35
CB-11 (IN-5)	1.00	1.32	0.54	0.54	0.71	20.13	3.88	2.76	3.57	12	33	1.00	0.06	4.55	0.14	953.37 953.02		12" SE 952.57 12" NE 952.80	12" NW 952.53	956.35
MH-8	0	1.32	0.54	0	0.71	20.27	3.87	2.75	5.99	12	115	2.82	0.06	7.63	0.25	953.00 949.62		12" SE 952.20	12" NW 949.90	957.80
CB-10	0.68	2.00	0.54	0.37	1.08	20.52	3.84	4.15	4.22	12	136	1.40	1.35	5.38	0.42	949.55 949.39		12" SE 948.75	12" NE 948.65	956.80
CB-8	0.28 / 0.63	2.91	0.54			*20.94 YES										947.55 947.39		12" SW 946.75 12" NE 952.79	15" NW 946.45	957.50
CB-9	0.63	0.63	0.54	0.34	0.34	20.0	3.89	1.32	3.57	12	121	1.00	0.14	4.55	0.44	953.76			12" SE 954.00	958.00
CB-8	0.28 / 2.00	2.91	0.54	1.23	1.57	*20.94	3.89	5.98	6.13	15	113	0.90	0.85	5.00	0.38	953.59 947.39		12" NE 952.79 12" SW 946.75	15" NW 946.45	957.50
MH-7	0	2.91	0.54	0	1.57	21.32	3.78	5.93	6.13	15	70	0.90	0.84	5.00	0.23	946.43 946.29		15" SE 945.43	15" W 945.33	957.30
CB-7 (IN-4)	0.93	3.84	0.54	0.50	2.07	21.55	3.76	7.78	8.13	18	25	0.60	0.55	4.60	0.09	945.70 945.59		15" E 944.70 12" SW 950.70	18" NW 944.40	955.80
CB-6 (IN-3)	0.66	4.50	0.54	0.36	2.43	21.64	3.75	9.12	9.39	18	35	0.80	0.75	5.31	0.11	945.45 944.26		18" SE 944.25 12" SW 950.70	18" N 943.08	955.80
MH-6	0	4.50	0.54	0	2.43	21.75	3.74	9.10	9.39	18	86	0.80	0.75	5.31	0.27	944.00 943.86		18" S 942.80	18" NW 942.70	956.20
ES-2			0.54			22.02										943.21	(0.80 DIA.)		18" NW 942.01	E.S. 942.01

STORM SEWER SYSTEM DESIGN

$Q = A \cdot \frac{1.486}{n} \cdot R^{2/3} \cdot S^{1/2}$ $Q = C \cdot I \cdot A$ $I_{10} = \frac{175}{T + 25}$

STRUCTURE NO.	(A1) INCREMENT AREA Ac.	(A) TOTAL AREA Ac.	(C) RUNOFF COEFICIENT	(C·A1) EQUIVALENT AREA	(Σ·A1) TOTAL EQUIV. AREA	(T) TIME MIN.	(I) RAINFALL INTENSITY IN/HR	FLOW (Q = IΣC·A1) C.F.S.	PIPE CAPACITY 0.8 FULL C.F.S.	DIAMETER OF PIPE IN.	LENGTH OF PIPE TO NEXT STRUCTURE FT.	% SLOPE OF PIPE	% SLOPE OF H.G.	VELOCITY OF FLOW FT/SEC	TIME OF FLOW MIN.	H.G. ELEV. UPPER END	H.G. ELEV. LOWER END	INVERT ELEV. UPPER END	INVERT ELEV. LOWER END	RIM ELEVATION COMMENTS
MH-14	0	0	0.54	0	0					8	122	0.50				–			8" N 950.61	954.80
MH-13	0 / 1.54	1.54	0.54													–		8" S 950.00 12" SW 946.75	12" NE 946.65	955.00
CB-24 (IN-12)	0.55	0.55	0.54	0.38	0.38	20.0	3.89	1.48	2.52	12	25	0.50	0.17	3.22	0.13	948.11		12" NW 947.50	12" NE 947.40	953.08
CB-23 (IN-11)	0.64	1.19	0.54	0.45	0.83	20.13	3.88	3.22	3.23	12	36	0.82	0.81	4.11	0.14	948.07 947.84		12" SW 947.27 12" NW 947.50	12" NE 947.05	953.08
MH-13	0 / 0	1.19	0.54	0	0.83	20.27	3.87	3.22	3.23	12	92	0.82	0.81	4.11	0.36	947.55 947.49		12" SW 946.75 8" S 948.30	12" NE 946.65	955.00
CB-22	0.60 / 0.35	2.14	0.54			*20.63 NO										946.74 946.74		12" SW 945.90 12" NW 948.00	12" SE 945.80	953.50
CB-21 (IN-10)	0.30	0.30	0.54	0.16	0.16	20.0	3.89	0.62	2.52	12	25	0.50	0.03	3.22	0.13	949.48		12" W 948.90	12" N 948.80	954.10
CB-20 (IN-9)	0.86	1.16	0.54	0.46	0.62	20.13	3.88	2.41	2.52	12	34	0.50	0.46	3.22	0.18	949.37 949.36		12" S 948.67 12" W 948.90	12" NE 948.57	954.10
MH-11	0	1.16	0.54	0	0.62	20.31	3.86	2.40	2.52	12	86	0.50	0.45	3.22	0.46	949.20 949.06		12" SW 948.40	12" N 948.30	956.30
CB-17	0.46 / 0.55	2.17	0.54			20.77 NO										948.67 948.58		12" S 947.87 12" E 949.00	15" NW 947.60	954.50

STORM SEWER SYSTEM DESIGN

$Q = A \cdot \frac{1.486}{n} \cdot R^{2/3} \cdot S^{1/2}$ $Q = C \cdot I \cdot A$ $I_{10} = \frac{175}{T + 25}$

STRUCTURE NO.	(A1) INCREMENT AREA Ac.	(A) TOTAL AREA Ac.	(C) RUNOFF COEFICIENT	(C·A1) EQUIVALENT AREA	(Σ·A1) TOTAL EQUIV. AREA	(T) TIME MIN.	(I) RAINFALL INTENSITY IN/HR	FLOW (Q = IΣC·A1) C.F.S.	PIPE CAPACITY 0.8 FULL C.F.S.	DIAMETER OF PIPE IN.	LENGTH OF PIPE TO NEXT STRUCTURE FT.	% SLOPE OF PIPE	% SLOPE OF H.G.	VELOCITY OF FLOW FT/SEC	TIME OF FLOW MIN.	H.G. ELEV. UPPER END	H.G. ELEV. LOWER END	INVERT ELEV. UPPER END	INVERT ELEV. LOWER END	RIM ELEVATION COMMENTS
CB-19	0.28	0.28	0.54	0.15	0.15	20.0	3.89	0.58	4.27	12	140	1.43	0.03	5.43	0.43	951.84			12" SW 953.00	957.50
CB-18	0.27	0.55	0.54	0.15	0.30	20.43	3.85	1.16	4.32	12	130	1.46	0.11	5.50	0.39	951.80 949.94		12" NE 951.00	12" W 950.90	956.00
CB-17	0.46 / 1.16	2.17	0.54	0.87	1.17	20.82	3.82	4.47	4.57	15	86	0.50	0.48	3.72	0.38	949.80 948.58		12" E 949.00 12" S 947.87	15" NW 947.60	954.50
CB-16	0.23	2.40	0.54	0.13	1.30	21.20	3.79	4.93	5.01	15	89	0.60	0.58	4.08	0.36	948.17 948.05		15" SE 947.17	15" NW 947.07	955.00
CB-15	0.28 / 2.14	4.82	0.54	1.30	2.60	21.56	3.76	9.78	9.96	18	97	0.90	0.87	5.64	0.29	947.53 946.17		15" SE 946.53 12" NW 945.21	18" NE 945.00	954.00
MH-10	0	4.82	0.54	0	2.60	21.85	3.74	9.72	9.96	18	109	0.90	0.86	5.64	0.32	945.33 945.18		18" SW 944.13	18" NW 943.98	955.30
CB-14 (IN-8)	1.05	5.87	0.54	0.57	3.17	22.17	3.71	11.76	12.24	21	25	0.60	0.55	5.09	0.08	944.24 944.24		18" SE 943.00 12" NW 947.90	21" NE 942.85	952.80
CB-13 (IN-7)	0.83	6.70	0.54	0.45	3.62	22.25	3.70	13.41	14.13	21	38	0.80	0.72	5.88	0.10	944.10 944.03		21" SW 942.70 12" NW 947.90	21" N 942.68	952.80
MH-9	0	6.70	0.54	0	3.62	22.35	3.70	13.41	14.13	21	97	0.80	0.72	5.88	0.27	943.78 943.60		21" S 942.38	21" NE 942.28	953.90
ES-3			0.54			22.62										942.90	(0.80 DIA.)		21" NE 941.50	E.S. 941.50
CB-26	0.38	0.38	0.54	0.21	0.21	20.0	3.89	0.82	3.57	12	25	1.00	0.05	4.55	0.09	949.06			12" E 948.50	952.45
CB-25	0.96	1.34	0.54	0.52	0.72	20.09	3.88	2.79	3.57	12	35	1.00	0.61	4.55	0.19	949.05 948.72		24" W 948.25	24" NE 948.15	952.45
MH-15	0	1.34	0.54	0	0.72	20.28	3.87	2.79	7.57	12	90	4.50	0.61	9.65	0.17	948.41 944.75		12" SW 947.80	12" E 947.45	953.40
ES-4			0.54			20.45										944.20	(0.80 DIA.)		12" E 943.40	E.S. 943.40

STORM SEWER SYSTEM DESIGN

$Q = A \cdot \frac{1.486}{n} \cdot R^{2/3} \cdot S^{1/2}$ $Q = C \cdot I \cdot A$ $I_{10} = \frac{175}{T + 25}$

STRUCTURE NO.	(A1) INCREMENT AREA Ac.	(A) TOTAL AREA Ac.	(C) RUNOFF COEFICIENT	(C·A1) EQUIVALENT AREA	(Σ·A1) TOTAL EQUIV. AREA	(T) TIME MIN.	(I) RAINFALL INTENSITY IN/HR	FLOW (Q = IΣC·A1) C.F.S.	PIPE CAPACITY 0.8 FULL C.F.S.	DIAMETER OF PIPE IN.	LENGTH OF PIPE TO NEXT STRUCTURE FT.	% SLOPE OF PIPE	% SLOPE OF H.G.	VELOCITY OF FLOW FT/SEC	TIME OF FLOW MIN.	H.G. ELEV. UPPER END	H.G. ELEV. LOWER END	INVERT ELEV. UPPER END	INVERT ELEV. LOWER END	RIM ELEVATION COMMENTS
ES-7	0.74	0.74	0.54	0.40	0.40	15.0	4.38	1.75	7.42	18	100	0.50	0.02	4.20	0.40	955.72			18" NW 955.00	E.S. 955.00
CB-29	0.10	0.84	0.54	0.05	0.45	15.40	4.33	1.95	7.42	18	102	0.50	0.03	4.20	0.40	955.70 955.13		18" NW 954.50	18" SE 954.41	958.00
CB-27	0.32 / 0.84	2.00	0.54													955.10 954.16		18" NW 953.90 18" SE 954.50	18" SW 953.56	958.00
ES-6	0.63	0.63	0.54	0.34	0.34	15.0	4.38	1.49	16.60	18	40	2.50	0.02	9.40	0.07	961.71			18" SE 961.50	E.S. 961.50
MH-18	0	0.63	0.54	0	0.34	15.07	4.37	1.49	10.50	18	90	1.00	0.02	5.94	0.25	961.70 959.32		18" SE 960.50	18" NW 959.00	963.00
CB-28	0.21	0.84	0.54	0.11	0.45	15.32	4.34	1.95	10.50	18	310	1.13	0.03	5.94	0.88	959.30 956.17		18" SE 958.10	18" NW 958.00	962.00
CB-27	0.32 / 0.84	2.00	0.54	0.63	1.08	16.20	4.25	4.59	14.85	18	26	2.54	0.19	8.40	0.07	956.08 954.16		18" SE 954.50 18" NW 953.98	18" SW 953.56	958.00
MH-17	0	2.00	0.54	0	1.08	16.27	4.24	4.58	16.93	18	50	2.60	0.19	9.58	0.09	954.10 952.80		18" NE 952.90	18" SW 952.80	960.00
MH-16	0	2.00	0.54	0	1.08	16.36	4.23	4.57	16.60	18	50	2.50	0.19	9.40	0.09	952.70 947.30		18" NE 951.50	18" SW 947.25	954.00
ES-5			0.54			16.45										947.20	(0.80 DIA.)		18" SW 946.00	E.S. 946.00
CB-50	0.16	0.16	0.54	0.09	0.09	20.0	3.89	0.35	2.52	12	25	0.50	0.01	3.22	0.13	950.88			12" SE 950.20	953.98
CB-49	0.19	0.35	0.54	0.10	0.19	20.13	3.88	0.74	2.52	12	117	0.50	0.04	3.22	0.60	950.87 950.23		12" NW 950.07	12" SE 949.97	953.98
MH-12	0	0.35	0.54	0	0.19	20.73	3.83	0.73	4.00	12	101	1.26	0.04	5.10	0.33	950.18 948.84		12" NW 949.38	12" SE 949.28	954.50
CB-22	0.60 / 1.14	2.14	0.54	0.97	1.16	21.06	3.84	4.49	4.58	15	118	0.50	0.48	3.73	0.50	948.80 946.74		12" NW 948.00 12" SW 945.90	12" SE 945.80	953.50
CB-15	0.28 / 2.40	4.82	0.54			21.56										946.17 946.17		12" NW 945.21 15" SE 946.53	18" NE 945.00	954.00

STORM SEWER SYSTEM DESIGN

$Q = A \cdot \frac{1.486}{n} \cdot R^{2/3} \cdot S^{1/2}$ $Q = C \cdot I \cdot A$ $I_{10} = \frac{175}{T + 25}$

STRUCTURE NO.	(A1) INCREMENT AREA Ac.	(A) TOTAL AREA Ac.	(C) RUNOFF COEFICIENT	(C·A1) EQUIVALENT AREA	(Σ·A1) TOTAL EQUIV. AREA	(T) TIME MIN.	(I) RAINFALL INTENSITY IN/HR	FLOW (Q = IΣC·A1) C.F.S.	PIPE CAPACITY 0.8 FULL C.F.S.	DIAMETER OF PIPE IN.	LENGTH OF PIPE TO NEXT STRUCTURE FT.	% SLOPE OF PIPE	% SLOPE OF H.G.	VELOCITY OF FLOW FT/SEC	TIME OF FLOW MIN.	H.G. ELEV. UPPER END	H.G. ELEV. LOWER END	INVERT ELEV. UPPER END	INVERT ELEV. LOWER END	RIM ELEVATION COMMENTS
ES-10	0.17	0.17	0.54	0.09	0.09	20.0	3.89	0.35	6.77	12	114	3.60	0.01	8.62	0.22	950.71			12" N 954.00	E.S. 954.00
CB-47	0.31	0.48	0.54	0.17	0.26	20.22	3.87	1.01	2.52	12	168	0.50	0.08	3.22	0.87	950.70 949.89		12" N 949.90	12" S 949.80	953.00
CB-45	0.13 / 0.30	0.91	0.54			*21.09 YES										949.76 949.31		12" N 948.96 12" S 948.98	12" E 948.86	953.50
CB-46	0.30	0.30	0.54	0.16	0.16	20.0	3.89	0.62	2.52	12	84	0.50	0.03	3.22	0.43	949.80			12" N 949.40	952.00
CB-45	0.13 / 0.48	0.91	0.54	0.33	0.49	*21.09	3.80	1.86	2.52	12	152	0.50	0.27	3.22	0.79	949.78 949.31		12" S 948.98 12" N 948.96	12" E 948.86	953.50
MH-22	0 / 1.08	1.99	0.54			*21.88 YES										948.90 948.82		12" W 948.10 12" N 949.22	12" SE 948.00	954.20
CB-44	0.53	0.53	0.54	0.29	0.29	20.0	3.89	1.13	2.52	12	25	0.50	0.10	3.22	0.13	950.23			12" E 949.53	954.35
CB-43	0.55	1.08	0.54	0.29	0.58	20.13	3.88	2.25	2.52	12	16	0.50	0.40	3.22	0.08	950.20 950.08		12" W 949.40	12" S 949.30	954.35
MH-22	0 / 0.91	1.99	0.54	0.49	1.07	*21.88	3.73	4.00	4.07	12	61	1.30	1.25	5.18	0.20	950.02 948.82		12" N 949.22 12" W 948.10	12" SE 948.00	954.20
MH-21	0	1.99	0.54	0	1.07	22.08	3.72	3.98	4.09	15	83	0.40	0.38	3.33	0.41	948.06 948.06		12" NW 947.21	15" E 947.00	953.00
CB-38	0.18 / 1.42	3.59	0.54			*22.49 YES										947.74 947.74		15" W 946.67 12" N 948.50	18" E 946.58	952.00
ES-9	0.08	0.08	0.54	0.04	0.04	20.0	3.89	0.16	7.57	12	63	4.50	0.01	9.65	0.10	953.97			12" NW 956.00	E.S. 956.00
CB-42	0.10	0.18	0.54	0.06	0.10	20.10	3.88	0.39	2.52	12	156	0.50	0.01	3.22	0.79	953.96 952.54		12" NW 953.16	12" S 952.50	956.50
CB-41	0.63	0.81	0.54	0.34	0.44	20.89	3.81	1.68	2.52	12	90	0.50	0.22	3.22	0.47	952.52 952.00		12" N 951.72	12" S 951.45	955.00
CB-40	0.49	1.30	0.54	0.26	0.70	21.36	3.77	2.64	2.76	12	25	0.60	0.54	3.52	0.12	951.80 951.69		12" N 951.00	12" S 950.15	954.75

STORM SEWER SYSTEM DESIGN

$Q = A \cdot \frac{1.486}{n} \cdot R^{2/3} \cdot S^{1/2}$ $Q = C \cdot I \cdot A$ $I_{10} = \frac{175}{T + 25}$

STRUCTURE NO.	(A1) INCREMENT AREA Ac.	(A) TOTAL AREA Ac.	(C) RUNOFF COEFICIENT	(C·A1) EQUIVALENT AREA	(Σ·A1) TOTAL EQUIV. AREA	(T) TIME MIN.	(I) RAINFALL INTENSITY IN/HR	FLOW (Q = IΣC·A1) C.F.S.	PIPE CAPACITY 0.8 FULL C.F.S.	DIAMETER OF PIPE IN.	LENGTH OF PIPE TO NEXT STRUCTURE FT.	% SLOPE OF PIPE	% SLOPE OF H.G.	VELOCITY OF FLOW FT/SEC	TIME OF FLOW MIN.	H.G. ELEV. UPPER END	H.G. ELEV. LOWER END	INVERT ELEV. UPPER END	INVERT ELEV. LOWER END	RIM ELEVATION COMMENTS
CB-39	0.12	1.42	0.54	0.07	0.77	21.48	3.77	2.90	6.96	12	13	0.38	0.66	8.86	0.02	951.55 949.39		12" N 950.00	12" S 949.00	954.75
CB-38	0.18 / 1.99	3.59	0.54	1.17	1.94	*22.49	3.69	7.15	7.42	18	79	0.50	0.46	4.20	0.31	949.30 947.74		12" N 948.50 15" W 946.67	18" E 946.58	952.00
CB-36	0.10 / 0.33	4.02	0.54			*22.86 YES										947.38 947.24		18" W 946.18 12" E 947.58	18" S 946.08	952.00
CB-37	0.33	0.33	0.54	0.18	0.18	20.0	3.89	0.70	2.52	12	85	0.50	0.04	3.22	0.44	948.40			12" W 948.00	952.50
CB-36	0.10 / 3.59	4.02	0.54	1.99	2.17	*22.80	3.66	7.95	8.13	18	121	0.60	0.57	4.60	0.44	948.37 947.24		12" E 947.57 18" W 946.18	18" S 946.08	952.00
CB-35	0.54	4.56	0.54	0.29	2.46	23.24	3.63	8.92	9.39	18	38	0.80	0.72	5.31	0.12	946.55 946.42		18" N 945.35	18" W 945.25	951.23
CB-31	0.54 / 0.99	6.09	0.54			*23.36 YES										946.15 946.02		18" E 944.95 12" NW 946.07	18" S 944.85	950.95
CB-34	0.25	0.25	0.54	0.14	0.14	20.0	3.89	0.55	2.52	12	140	0.50	0.02	3.22	0.72	948.13			12" NE 948.00	952.00
CB-33	0.49	0.74	0.54	0.26	0.40	20.72	3.82	1.53	2.52	12	26	0.50	0.18	3.22	0.13	948.10 947.92		12" SW 947.30	12" NE 947.20	952.15
CB-32	0.25	0.99	0.54	0.13	0.53	20.85	3.82	2.02	2.52	12	111	0.50	0.32	3.22	0.57	947.87 947.58		12" SW 947.07	12" NE 946.97	952.15
MH-20	0	0.99	0.54	0	0.53	21.42	3.77	2.00	2.52	12	50	0.50	0.31	3.22	0.26	947.22 947.03		12" SW 946.42	12" SE 946.32	951.90
CB-31	0.54 / 4.56	6.09	0.54	2.76	3.29	*23.36	3.62	11.91	12.42	18	25	1.40	1.29	7.03	0.06	946.87 946.02		12" NW 946.07 18" E 944.95	18" S 944.85	950.95
CB-30 IN-13	1.07	7.16	0.54	0.58	3.87	23.42	3.61	13.99	15.22	18	33	2.10	1.77	8.61	0.06	945.70 945.58		18" N 944.50 12" E 946.30	18" S 944.50	950.95
MH-19	0	7.16	0.54		3.87	23.48	3.61	13.99	15.22	18	60	2.10	1.77	8.61	0.12	945.00 944.70		18" N 943.80	18" S 943.70	951.90
ES-8			0.54			23.60										943.64	(0.80 DIA.)		18" S 942.44	E.S. 942.44

STATE OF MICHIGAN ★ PATRICK McWILLIAMS ENGINEER NO. 31658 ★ LICENSED PROFESSIONAL ENGINEER

DATE	ISSUE
3-26-19	PER J & A (3-19-19) & DPS (3-20-19)
4-22-19	PER J & A (4-16-19) & DPS (4-11-19)
4-25-19	PER R.C.O.C. (4-22-19)
3-11-2021	REV. PH 4, ETC. PER CLIENT (2-25-2021)

PROPRIETOR:
Preserve at Hidden Lake, LLC
8255 CASCADE AVENUE, SUITE 110
COMMERCE TOWNSHIP, MICHIGAN 48382
(248) 842-8613

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KIEFT ENGINEERING

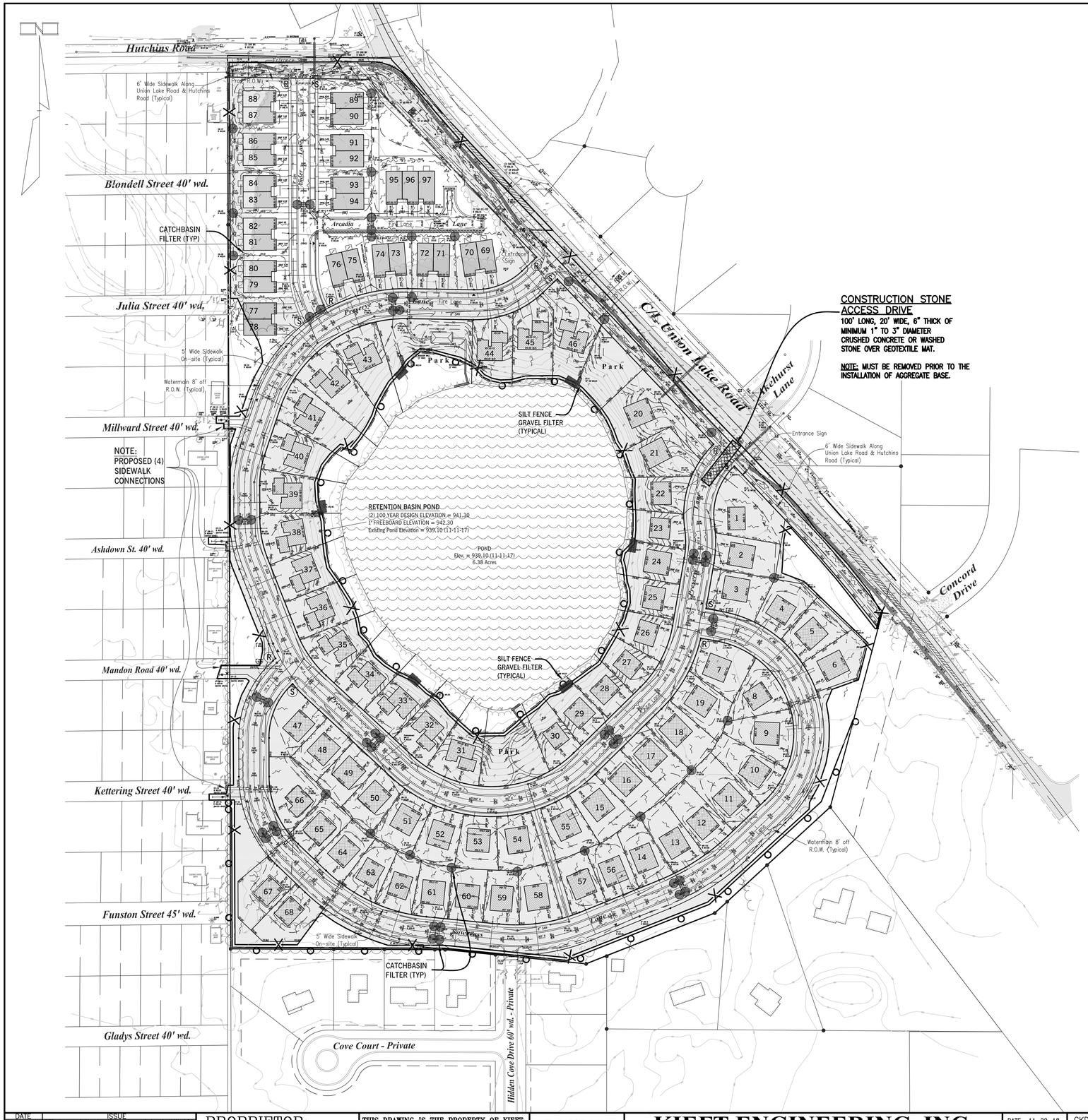
KIEFT ENGINEERING, INC.
PROFESSIONAL ENGINEERS AND PROFESSIONAL SURVEYORS
5852 SOUTH MAIN STREET, SUITE 1, CLARKSTON, MICHIGAN 48346
PHONE (248) 625-5251 www.kiefteng.com FAX (248) 625-7110

DATE 11-29-18 | DRAWN GF | DESIGN PCM | SECTION 36 | CKD. BY | DATE | T- 3 -N. R- 8 -E.

72 HOURS (3 WORKING DAYS) BEFORE YOU DIG CALL MISS DIG 800-482-7171 (TOLL FREE)

Storm Sewer Calculations
"Preserve at Hidden Lake"
WHITE LAKE TOWNSHIP, OAKLAND COUNTY, MICHIGAN

SCALE N/A
SHEET 30 OF 36
KE 2017.182



CONSTRUCTION/SOIL EROSION SEQUENCE

A) INSTALL SILT FENCING AS PER PLAN.
B) CLEAR SITE FOR ROAD AND UTILITY CONSTRUCTION. INSTALL STONE ACCESS DRIVE.
C) STRIP AND STOCKPILE TOPSOIL; MASS GRADE SITE AS PER PLANS,
D) CONSTRUCT SANITARY SEWER, STORM SEWER AND WATER MAIN, IMMEDIATELY INSTALL CATCH BASIN FILTERS AND RESTORE DISRUPTION AREAS AROUND POND AND SEED & MULCH SLOPES WHERE NECESSARY.
E) CONSTRUCT CONCRETE CURBS AND ASPHALT PAVEMENT. REPAIR AND/OR REPLACE CATCH BASIN FILTERS.
F) INSTALL PUBLIC UTILITIES – GAS, ELECTRICITY, TELEPHONE AND CABLE TELEVISION.
G) FINE GRADE ROAD RIGHT-OF-WAY AREAS.
H) CLEAN PAVEMENTS AND STORM SEWER SYSTEM, INCLUDING DITCHES, OF ALL ACCUMULATED SEDIMENT IN CONJUNCTION WITH THE REMOVAL OF ALL TEMPORARY EROSION CONTROLS.
I) REESTABLISH VEGETATION AS NECESSARY BY SEEDING AND MULCHING.

NOTES: SOIL EROSION PERMIT IS REQUIRED FROM O.C.W.R.C..

"THE SOIL EROSION CONTROLS WILL BE MAINTAINED WEEKLY AND AFTER EVERY STORM EVENT"

–GENERAL CONTRACTOR WILL BE RESPONSIBLE FOR THE MAINTENANCE OF THE SOIL EROSION CONTROLS.

LEGEND

EXISTING		PROPOSED
	STORM SEWER	
	SANITARY SEWER	
	WATERMAIN	
GAS GAS	GAS MAIN	GAS GAS
	ELEC. TELE. CABLE	
	STORM MANHOLE	
	CATCH BASIN	
	INLET	
	REARYARD CATCH BASIN	
	END SECTION	
	SANITARY MANHOLE	
	GATE VALVE AND WELL	
	HYDRANT	
1040	MASS GRADING CONTOURS	(40)
	PROPOSED FINISH GRADE	(40.0)
	PROP. FINISH GRADE	1019 FG
	PROP. BSMT. WALKOUT ELEV.	1004 W/O
	MATCH EXIST. ELEV.	(M)
	WETLANDS BOUNDARY	
	25' WETLANDS BUFFER	
	CATCHBASIN FILTER	
	SILT FENCING	
	DISRUPTION LIMITS	
	SILT FENCE GRAVEL FILTER	
	LIMITS OF CLEARING	

STATE OF MICHIGAN
PATRICK McWILLIAMS
ENGINEER
NO. 31658
LICENSED PROFESSIONAL ENGINEER

DATE	ISSUE
1-11-19	PER J & A (12-19-18), McKenna (12-18-18), DPS
3-26-19	PER J & A (3-19-19) & DPS (3-20-19)
4-22-19	PER J & A (4-16-19) & DPS (4-11-19)
4-25-19	PER R.C.O.C. (4-22-19)
6-13-19	PER DPS-SHIFTED HY-10 (4-25-19)
5-11-2021	REV. PH 4, EUC PER CLIENT (2-25-2021)
5-6-2021	PER DLZ (4-27-2021) & McKENNA (4-28-2021)

PROPRIETOR:
Preserve at Hidden Lake, LLC
8255 CASCADE AVENUE, SUITE 110
COMMERCE TOWNSHIP, MICHIGAN 48382
(248) 842-8613

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KIEFT ENGINEERING, INC.
PROFESSIONAL ENGINEERS AND PROFESSIONAL SURVEYORS
5852 SOUTH MAIN STREET, SUITE 1, CLARKSTON, MICHIGAN 48346
PHONE (248) 625-5251 www.kiefteng.com FAX (248) 625-7110

DATE	11-29-18
DRAWN	GF
DESIGN	PCM
SECTION	36

CKD. BY	DATE
T- 3 -N. R- 8 -E.	

72 HOURS (3 WORKING DAYS) BEFORE YOU DIG CALL MISS DIG 800-482-7171 (TOLL FREE)

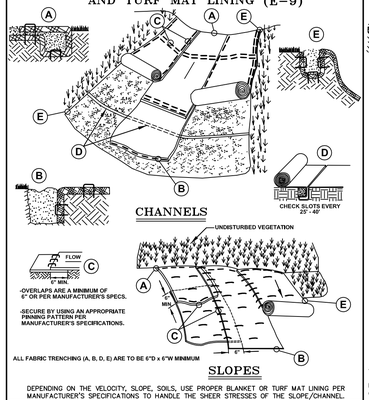
Soil Erosion Control & Disruption Plan

"Preserve at Hidden Lake"
WHITE LAKE TOWNSHIP, OAKLAND COUNTY, MICHIGAN

SCALE	1" = 100'
SHEET	31 OF 36
KE 2017.182	

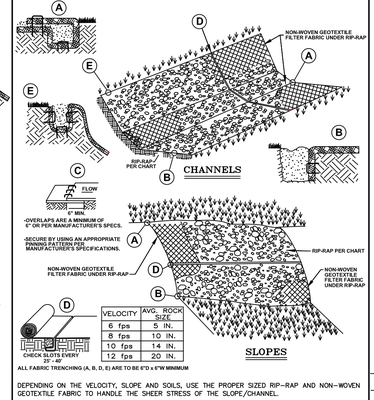
G:\2017\182\dwg\Construction Plans PHL.dwg, 5/6/2021 9:37:16 AM, Adobe dave PDF land2.pc3

EROSION CONTROL BLANKETS AND TURF MAT LINING (E-9)



DEPENDING ON THE VELOCITY, SLOPE, SOILS, USE PROPER BLANKET OR TURF MAT LINING PER MANUFACTURER'S SPECIFICATIONS TO HANDLE THE SHEER STRESSES OF THE SLOPE/CHANNEL.

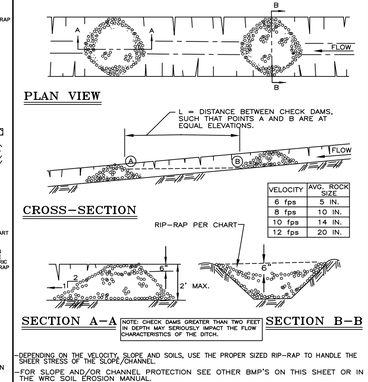
RIP-RAP: CHANNELS AND SLOPES (E-10)



VELOCITY	AVG. ROCK SIZE
6 fps	5 IN.
8 fps	10 IN.
10 fps	14 IN.
12 fps	20 IN.

DEPENDING ON THE VELOCITY, SLOPE AND SOILS, USE THE PROPER SIZED RIP-RAP AND NON-WOVEN GEOTEXTILE FABRIC TO HANDLE THE SHEER STRESS OF THE SLOPE/CHANNEL.

CHECK DAMS (E-3)



VELOCITY	AVG. ROCK SIZE
6 fps	5 IN.
8 fps	10 IN.
10 fps	14 IN.
12 fps	20 IN.

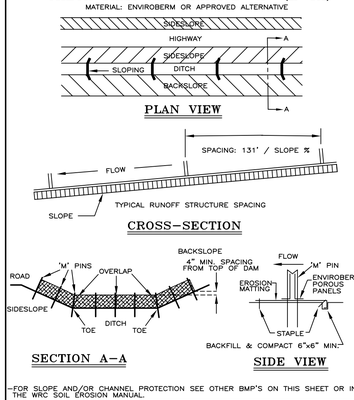
NOTE: CHECK DAMS GREATER THAN TWO FEET IN DEPTH MAY SERIOUSLY IMPACT THE FLOW CHARACTERISTICS OF THE DITCH.

-DEPENDING ON THE VELOCITY, SLOPE AND SOILS, USE THE PROPER SIZED RIP-RAP TO HANDLE THE SHEER STRESS OF THE SLOPE/CHANNEL.

-FOR SLOPE AND/OR CHANNEL PROTECTION SEE OTHER BMP'S ON THIS SHEET OR IN THE WRC SOIL EROSION MANUAL.

CHECK DAMS ALTERNATIVE "A" (E-3A)

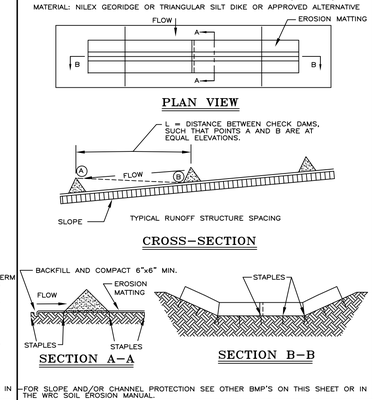
MATERIAL: ENVIROBERM OR APPROVED ALTERNATIVE



-FOR SLOPE AND/OR CHANNEL PROTECTION SEE OTHER BMP'S ON THIS SHEET OR IN THE WRC SOIL EROSION MANUAL.

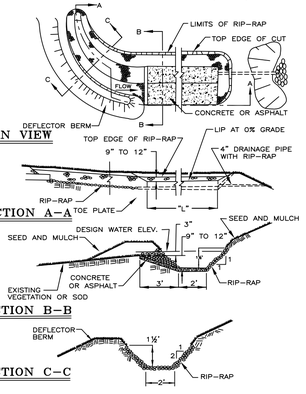
CHECK DAMS ALTERNATIVE "B" (E-3B)

MATERIAL: NILEX GEORIDGE OR TRIANGULAR SILT DIKE OR APPROVED ALTERNATIVE

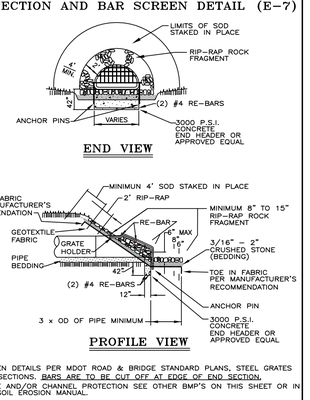


-FOR SLOPE AND/OR CHANNEL PROTECTION SEE OTHER BMP'S ON THIS SHEET OR IN THE WRC SOIL EROSION MANUAL.

LEVEL SPREADER (E-4)



RIP-RAP, END SECTION AND BAR SCREEN DETAIL (E-7)

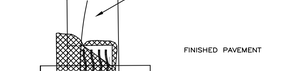


NOTE:
-BAR SCREEN DETAILS PER MDOT ROAD & BRIDGE STANDARD PLANS, STEEL GRATES FOR END SECTIONS. BARS ARE TO BE CUT OFF AT EDGE OF END SECTION.
-FOR SLOPE AND/OR CHANNEL PROTECTION SEE OTHER BMP'S ON THIS SHEET OR IN THE WRC SOIL EROSION MANUAL.

VEGETATIVE BUFFER ZONE (SP-1)

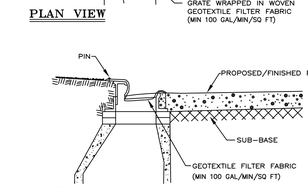
THE GRAPH SHOWN BELOW IS USED TO DETERMINE THE ADEQUACY OF AN EXISTING VEGETATIVE BUFFER ZONE FOR USE AS A SEDIMENT FILTER. THIS GRAPH IS ONLY APPLICABLE IF THE VEGETATION IS 90% DENSE AND AT LEAST 1" IN LENGTH OVER EVERY SQUARE FOOT OF DISTURBED SOIL. AN AREA COVERED WITH WEEDS, OR BUSHES AND TREES WITHOUT A GOOD GROUND COVER IS NOT ACCEPTABLE.

EXAMPLE



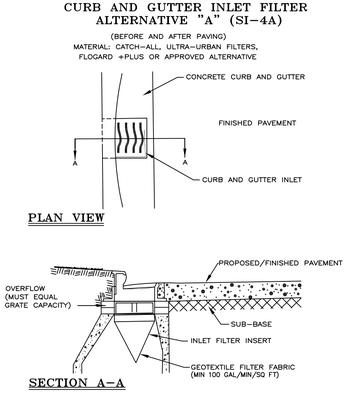
LENGTH OF BUFFER ZONE = ?
% OF SLOPE OF BUFFER ZONE = 5%
WHAT IS THE ACCEPTABLE LENGTH OF THE BUFFER ZONE?

PLOT IN GRAPH BELOW
BUFFER ZONE IS ACCEPTABLE AT 65'



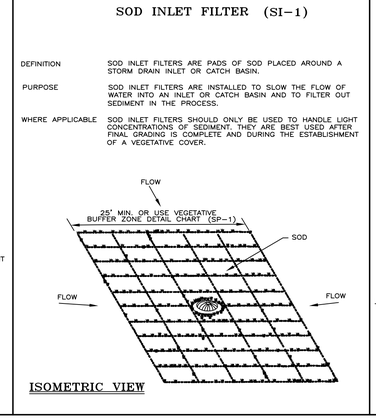
SILT FENCE (SP-2)

(MATERIAL: AMOCO PRO PEX 2130 OR APPROVED EQUIVALENT)



SILT FENCE ALTERNATIVE "A" (SP-2A)

(MATERIAL: SILT SHIELD OR APPROVED EQUIVALENT)



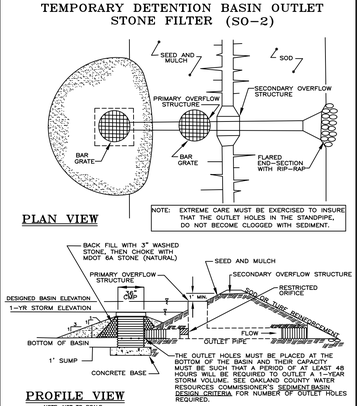
2% GRADE MAXIMUM SLOPE

Splicing Procedure:
Splicing EXTRUDED SEDIMENT FILTER FENCE is achieved beginning with an overlap of a min. of 6" of the EXTRUDED SEDIMENT FILTER FENCE ends being spliced. Then use plastic retainer type push-in fasteners to locate through the ends of the material vertically, at least 3" from each edge of the splice.

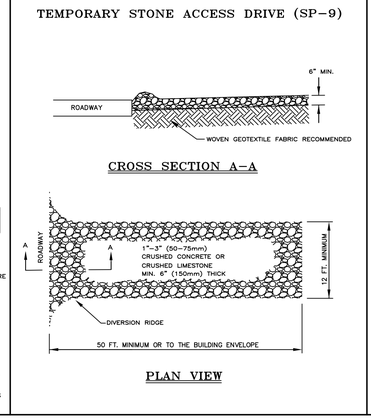
Optional Heat Splicing:
Overlap a minimum of 6" inches. Melt a thin layer of EXTRUDED SEDIMENT FILTER FENCE with torch from top to bottom, immediately press both layers together for a minimum of 5 second. Check for total lamination from top to bottom of material. (Do not apply heat to filter)

WINTER/FROZEN GROUND SILT FENCE (SP-2W)

(MATERIAL: AMOCO PRO PEX 2130 OR APPROVED EQUIVALENT)

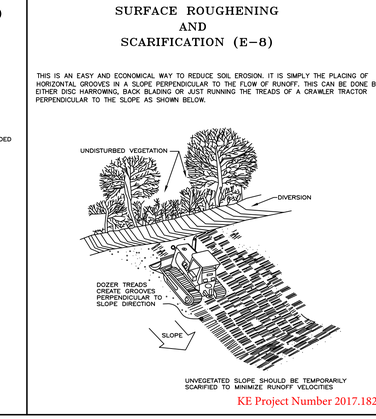


RYCB INLET FILTER (SI-3)



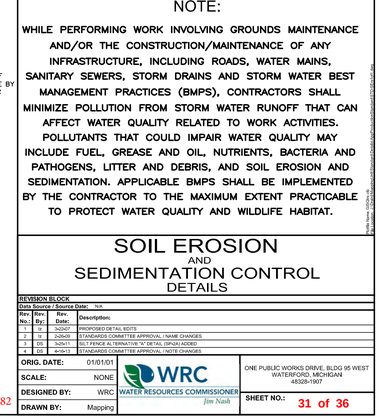
NOTE: MATERIAL IS NOT SILT FENCE MATERIAL

RYCB INLET FILTER ALTERNATIVE "A" (SI-3A)



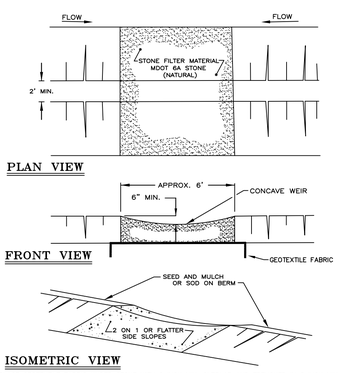
RYCB INLET FILTER ALTERNATIVE "B" (SI-3B)

MATERIAL: SILT SAVER OR APPROVED ALTERNATIVE



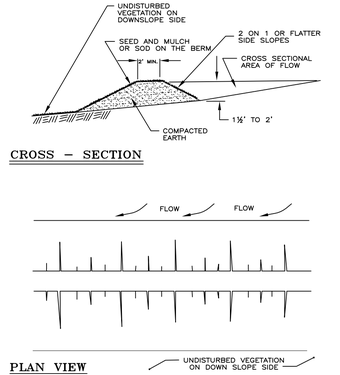
(NOTE: NO PIT REQUIRED WHEN FRAME AND COVER OR GRATE AND COVER ARE IN PLACE.)

EARTH DIVERSION BERM WITH STONE OUTLET FILTER (SP-4)

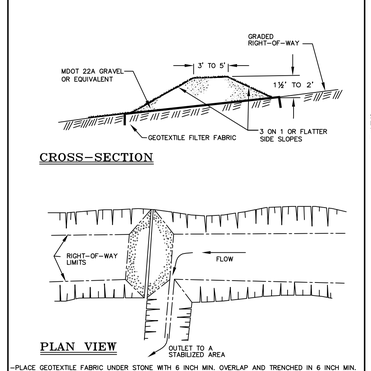


-PLACE GEOTEXTILE FABRIC UNDER STONE WITH 6 INCH MIN. OVERLAP AND TRENCHED IN 6 INCH MIN.

EARTH DIVERSION BERM (E-2)



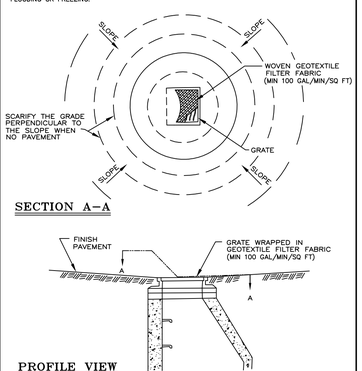
GRAVEL INTERCEPTOR DIKE (SP-6)



-PLACE GEOTEXTILE FABRIC UNDER STONE WITH 6 INCH MIN. OVERLAP AND TRENCHED IN 6 INCH MIN.
-FOR SLOPE AND/OR CHANNEL PROTECTION SEE OTHER BMP'S ON THIS SHEET OR IN THE WRC SOIL EROSION MANUAL.

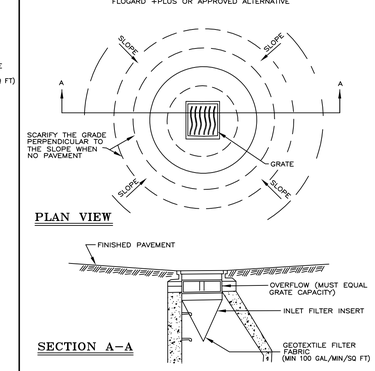
LOW POINT INLET FILTER (SI-2)

ALTERNATIVE INLET FILTER MUST BE USED IN AREAS THAT MAY BECOME A SAFETY HAZARD DUE TO FLOODING OR FREEZING.

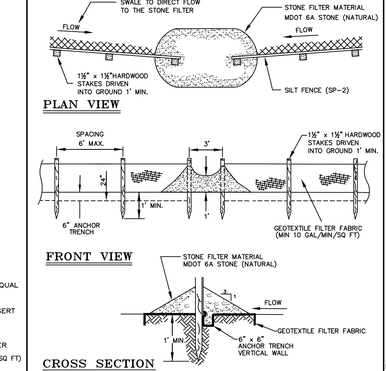


LOW POINT INLET FILTER ALT. "A" (SI-2A)

MATERIAL: CATCH-ALL, ULTRA-URBAN FILTERS, FLOGARD +PLUS OR APPROVED ALTERNATIVE

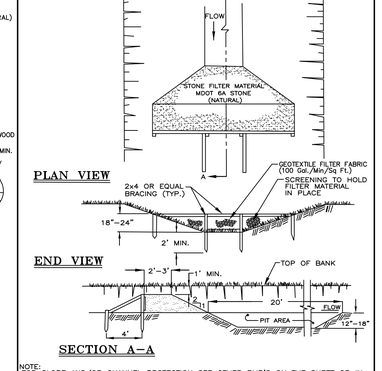


SILT FENCE GRAVEL FILTER (SP-3)



-PLACE GEOTEXTILE FABRIC UNDER STONE WITH 6 INCH MIN. OVERLAP AND TRENCHED IN 6 INCH MIN.

DITCH SEDIMENT TRAP (SO-4)



NOTE:
-FOR SLOPE AND/OR CHANNEL PROTECTION SEE OTHER BMP'S ON THE SHEET OR IN THE WRC SOIL EROSION MANUAL.

CURB AND GUTTER INLET FILTER (SI-4)

(BEFORE AND AFTER PAVING)

ALTERNATIVE INLET FILTER MUST BE USED IN AREAS THAT MAY BECOME A SAFETY HAZARD DUE TO FLOODING OR FREEZING.

CURB AND GUTTER INLET FILTER ALTERNATIVE "A" (SI-4A)

(BEFORE AND AFTER PAVING)

MATERIAL: CATCH-ALL, ULTRA-URBAN FILTERS, FLOGARD +PLUS OR APPROVED ALTERNATIVE

SOD INLET FILTER (SI-1)

DEFINITION — SOD INLET FILTERS ARE PADS OF SOD PLACED AROUND A STORM DRAIN INLET OR CATCH BASIN.

PURPOSE — SOD INLET FILTERS ARE INSTALLED TO SLOW THE FLOW OF WATER INTO AN INLET OR CATCH BASIN AND TO FILTER OUT SEDIMENT IN THE PROCESS.

WHERE APPLICABLE — SOD INLET FILTERS SHOULD ONLY BE USED TO HANDLE LIGHT CONCENTRATIONS OF SEDIMENT. THEY ARE BEST USED AFTER FINAL GRADING IS COMPLETE AND DURING THE ESTABLISHMENT OF A VEGETATIVE COVER.

TEMPORARY DETENTION BASIN OUTLET STONE FILTER (SO-2)

TEMPORARY STONE ACCESS DRIVE (SP-9)

SURFACE ROUGHENING AND SCARIFICATION (E-8)

THIS IS AN EASY AND ECONOMICAL WAY TO REDUCE SOIL EROSION. IT IS SIMPLY THE PLACING OF HORIZONTAL GROOVES IN A SLOPE PERPENDICULAR TO THE FLOW OF RUNOFF. THIS CAN BE DONE BY EITHER DISC HARROWING, BACK BLADING OR JUST RUNNING THE TREADS OF A CRAWLER TRACTOR PERPENDICULAR TO THE SLOPE AS SHOWN BELOW.

UNVEGETATED SLOPE SHOULD BE TEMPORARILY SCARIFIED TO MINIMIZE RUNOFF VELOCITIES

NOTE:

WHILE PERFORMING WORK INVOLVING GROUNDS MAINTENANCE AND/OR THE CONSTRUCTION/MAINTENANCE OF ANY INFRASTRUCTURE, INCLUDING ROADS, WATER MAINS, SANITARY SEWERS, STORM DRAINS AND STORM WATER BEST MANAGEMENT PRACTICES (BMPS), CONTRACTORS SHALL MINIMIZE POLLUTION FROM STORM WATER RUNOFF THAT CAN AFFECT WATER QUALITY RELATED TO WORK ACTIVITIES. POLLUTANTS THAT COULD IMPAIR WATER QUALITY MAY INCLUDE FUEL, GREASE AND OIL, NUTRIENTS, BACTERIA AND PATHOGENS, LITTER AND DEBRIS, AND SOIL EROSION AND SEDIMENTATION. APPLICABLE BMPS SHALL BE IMPLEMENTED BY THE CONTRACTOR TO THE MAXIMUM EXTENT PRACTICABLE TO PROTECT WATER QUALITY AND WILDLIFE HABITAT.

SOIL EROSION AND SEDIMENTATION CONTROL DETAILS

REVISION BLOCK			
Date Source / Source Date: N/A			
Rev. No.:	Rev. By:	Rev. Date:	Description:
1	M	3-23-07	PROPOSED DETAIL EDITS
2	M	3-29-07	STANDARDS COMMITTEE APPROVAL / NAME CHANGES
3	SS	3-29-13	SILT FENCE ALTERNATIVE "A" DETAIL (SP-2A) ADDED
4	DS	4-16-13	STANDARDS COMMITTEE APPROVAL / NOTE CHANGES

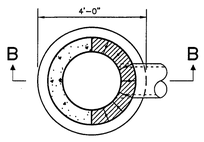
ORIG. DATE:	01/01/01
SCALE:	NONE
DESIGNED BY:	WRC
DRAWN BY:	Mapping

WRC WATER RESOURCES COMMISSIONER — Jim Nash

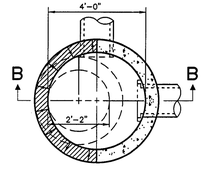
ONE PUBLIC WORKS DRIVE, BLDG 95 WEST WATERFORD, MICHIGAN 48328-1907

SHEET NO.: 31 of 36

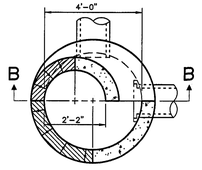
KE Project Number 2017.182



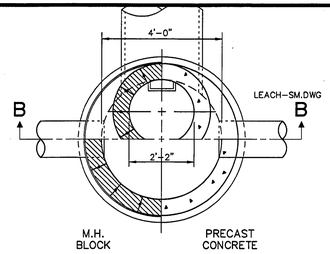
SECTION A–A



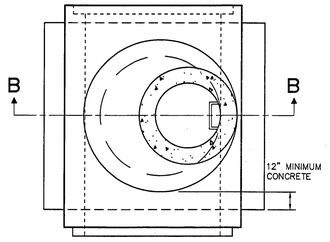
SECTION A–A



SECTION A–A

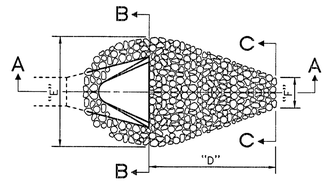


SECTION A–A



SECTION A–A

PIPE DIA.	"D"	"E"	"F"	S.Y.
12"	5'-0"	6'-6"	3'-0"	4
15"	5'-0"	7'-0"	3'-0"	4
18"	5'-0"	7'-6"	3'-6"	4
21"	5'-6"	8'-0"	4'-0"	5
24"	6'-0"	8'-6"	4'-6"	6
27"	6'-6"	9'-0"	5'-0"	7
30"	7'-0"	9'-9"	5'-6"	8
33"	7'-6"	10'-3"	5'-6"	9
36"	8'-0"	10'-9"	6'-0"	10
42"	9'-0"	11'-9"	6'-6"	12
48"	10'-0"	13'-0"	7'-0"	14



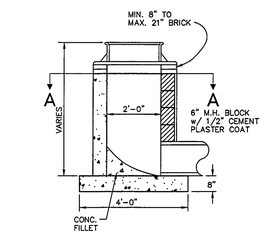
PLAN VIEW

STORM SEWER NOTES

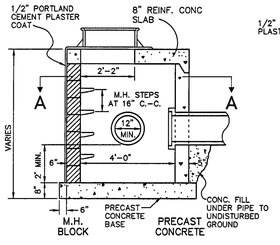
1. PRECAST CONC. RISERS SHALL MEET A.S.T.M. C478
2. DIAMETER OF CONC. BASE: I.D. + 2(WALL) + 8"
3. MANHOLE STEP SPACING SHALL MEET MIOSHA REQUIREMENTS. NO MORE THAN 21" FROM RIM TO FIRST STEP. MAX. 16" O.C. STEPS SHALL BE CAST POLYPROPYLENE REINFORCED WITH A 1/2" STEEL ROD.
4. WALL THICKNESS OF BLOCK STRUCTURES SHALL BE:

DEPTH	THICKNESS
0–8'	6"
8–15'	8"
OVER 15'	12"

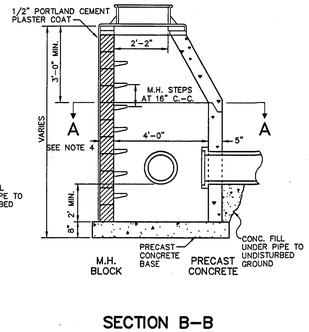
5. MINIMUM I.D. OF STRUCTURE FOR: 36"to 42" = 5'–0" 48"to 54" = 6'–0"
   LARGER DIAMETER STRUCTURES MAY BE REQUIRED DEPENDING ON PIPING CONFIGURATION.
6. ALL LIFTING HOLES AND VOIDS IN INTERIOR JOINTS SHALL BE FILLED BY MORTAR.
7. THE FINGER DRAIN DETAIL SHALL BE USED AT ALL LOW POINT CATCH BASINS IN PAVEMENT AREAS. THE DETAIL MAY BE OMITTED WITH THE APPROVAL OF THE TOWNSHIP ENGINEER IN AREAS WITH VERY POROUS SOILS AND NO GROUNDWATER PROBLEMS.
8. PRECAST ONE PIECE BASES AND RISERS ARE ACCEPTABLE FOR INLETS, CATCH BASINS AND MANHOLES
9. FRAMES & COVERS WITH INLET CAPACITY (1.0 CFS/90 SQ IN)
   –TRAFFIC AND PARKING AREAS: MDOT "D" (EJIW 5105) 1.9 CFS*
   –REAR YARD AND DITCH INLETS: (EJIW 1040–02) 2.1 CFS*
   –MANHOLES: MDOT "A" (EJIW 1060)
   –CURB AND GUTTER INLETS: MDOT "K" (EJIW 7045) 1.8 CFS**
   –MOUNTABLE CURB & GUTTER: (EJIW 7065) 2.2 CFS*
   –*MAY VARY DUE TO MANUFACTURER CHANGES
10. CONTACT THE TOWNSHIP ENGINEER 48 HOURS PRIOR TO CONSTRUCTION TO SCHEDULE INSPECTION. FULL TIME INSPECTION WILL BE REQUIRED FOR ALL UNDERGROUND STORM SEWER CONSTRUCTION. PHONE (248) 334–9901
11. THE CONTRACTOR SHALL CONTACT MISS DIG 72 HOURS BEFORE CONSTRUCTION AT (800) 482–7171 TO LOCATE EXISTING UNDERGROUND UTILITIES.
12. PRIOR TO START OF CONSTRUCTION, CONTRACTOR SHALL HAVE IN HIS POSSESSION A CURRENT SOIL EROSION CONTROL PERMIT AS ISSUED BY WHITE LAKE TOWNSHIP.
13. A 2' DEEP SUMP SHALL BE USED IN ANY STRUCTURE SUBJECT TO A WATER DROP GREATER THAN 2.0' FROM AN INLET PIPE.
14. ALLOWABLE STORM SEWER PIPE TYPES:
   –12" AND UP: RCP ASTM C–76 MIN. CLASS 3, MIN CLASS 4 UNDER TRAFFIC AREAS, RUBBER JOINT
   –6" TO 15": SCH 40 PVC OR SDR 23.5 PVC WITH RUBBER OR GLUE JOINT
   –6" TO 48": SMOOTH BORE CORRUGATED HIGH DENSITY POLYETHYLENE WITH NEOPRENE LINED JOINTS OR BETTER
15. THE MINIMUM PIPE SIZE IN PUBLIC RIGHT–OF–WAY OR EASEMENTS AND FOR PIPES CARRYING OFF–SITE STORM WATER SHALL BE 12"
16. ALL PIPE ENDS NOT WITHIN A STRUCTURE SHALL HAVE A CONCRETE OR METAL FLARE END SECTION (FES) WITH A BAR SCREEN ON PIPES 18" AND LARGER EXCEPT THOSE WITHIN A SECURE FENCED AREA NEED NO BAR SCREEN.
17. ALL DRAINAGE STRUCTURES WITHIN THE ROAD SHALL BE SEALED WITH WRAPPED GEOTEXTILE PER RCOC STANDARDS



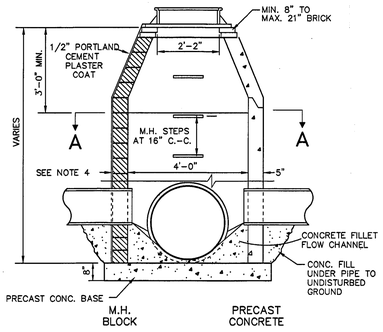
SECTION B–B
24" INLET



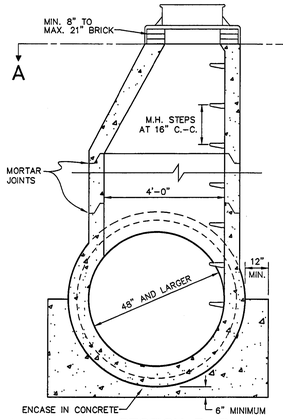
SECTION B–B
STRUCTURE WITH SLAB COVER
(CATCH BASIN SHOWN)



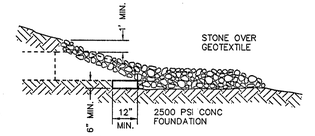
SECTION B–B
STANDARD CATCH BASIN



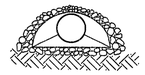
SECTION B–B
STANDARD STORM MANHOLE



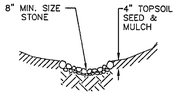
SECTION B–B
STANDARD PRECAST CONCRETE MANHOLE TEE



SECTION A–A

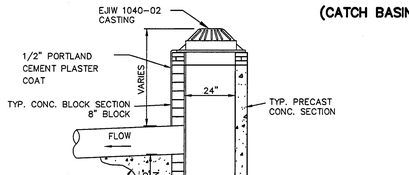


SECTION B–B

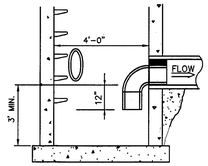


SECTION C–C

PLAIN STONE RIP–RAP



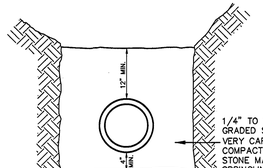
STANDARD REAR YARD CATCH BASIN



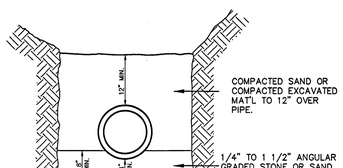
TRAP SHALL BE BULKHEADED IN OUTLET PIPE AND SHALL BE A SCH 40 PVC ASSY WITH A PIPE AREA NO LESS THAN 50% OF THE OUTLET PIPE.

ALTERNATE: USE "THE SNOUT" BASIN TRAP SYSTEM

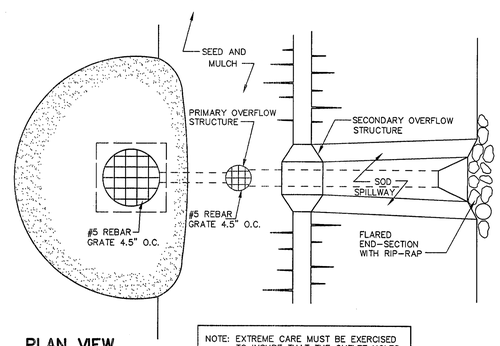
TRAPPED CATCH BASIN



PIPE BEDDING
FOR PLASTIC PIPE

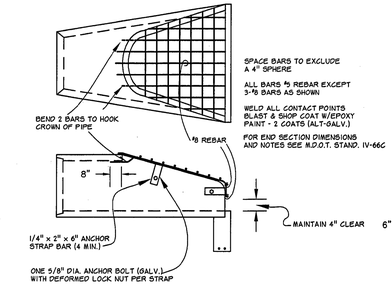


CLASS "B" BEDDING
FOR SEWER PIPE
LESS THAN 48"

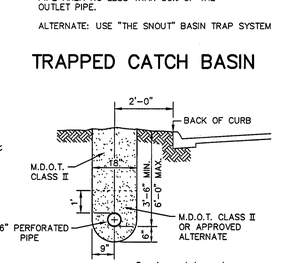


PLAN VIEW

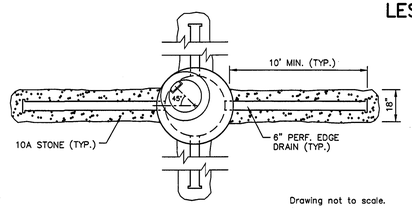
NOTE: EXTREME CARE MUST BE EXERCISED TO INSURE THAT THE OUTLET HOLES IN THE STANDPIPE, DO NOT BECOME CLOGGED WITH SEDIMENT.



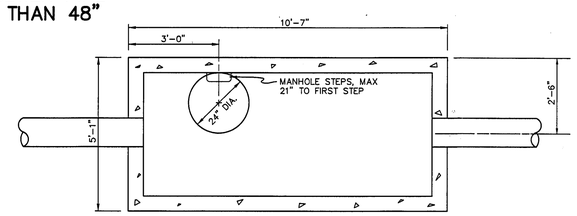
BAR SCREEN DETAIL

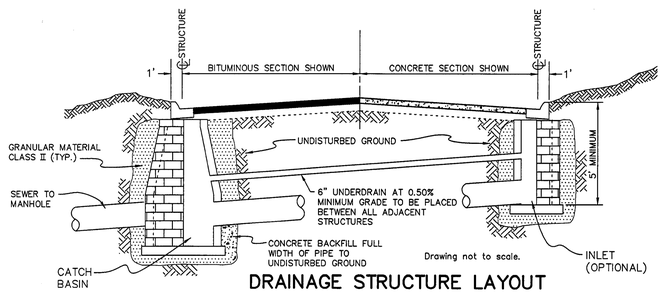


EDGE DRAIN DETAIL

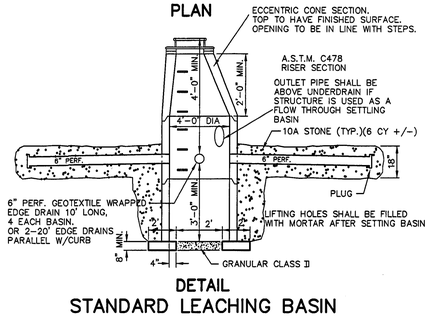


PLAN

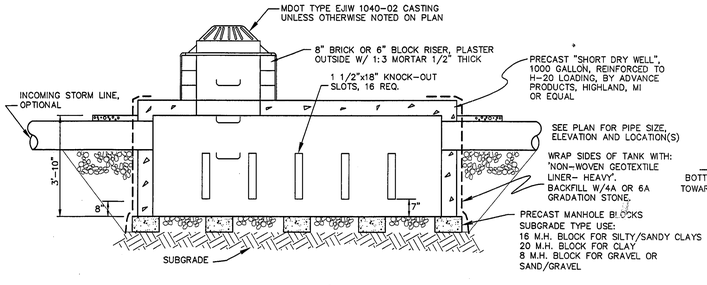




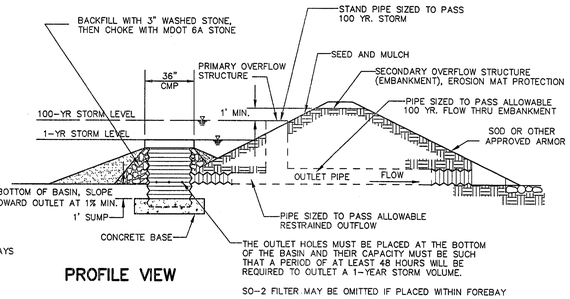
DRAINAGE STRUCTURE LAYOUT



DETAIL
STANDARD LEACHING BASIN



1000 GALLON LEACHING/SETTLING BASIN



PROFILE VIEW

SO–2 FILTER MAY BE OMITTED IF PLACED WITHIN FOREBAY

SO–2 DETENTION BASIN OUTLET FILTER (CMP)
(SEE OCDC STANDARD DETAILS FOR SEDIMENT BASIN OR FOREBAY OUTLET STRUCTURE)

DRAWN: CAD
DESIGN: OA
CHECKED: –

SCALE: VERT. –
HORZ. AS NOTED

REVISIONS

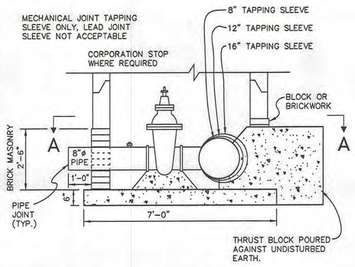
MARK	ADDENDUM/CHANGE ORDER	DATE	MARK	ADDENDUM/CHANGE ORDER	DATE	MARK	ADDENDUM/CHANGE ORDER	DATE
	FIRST ISSUE	08/16/95		REVISE	10–03–02		REVISE	06–01–07
	ADD SO–1	06–17–96		REVISE	12–17–03		UPDATED TITLE BLOCK	04/30/13
	NEW BAR GRATE	11–03–97		SEC REFERENCE	05–17–05			

Johnson&Anderson
4494 Elizabeth Lake Road, Waterford, Michigan 48328, tel (248) 681-7800 fax (248) 681-2660
1060 W. Norton Avenue, Suite 7, Muskegon, Michigan 49441, tel (231) 780-3100 fax (231) 780-3115
3910 Lapeer Road, Port Huron, Michigan 48060, tel (810) 987-7820 fax (810) 987-7895

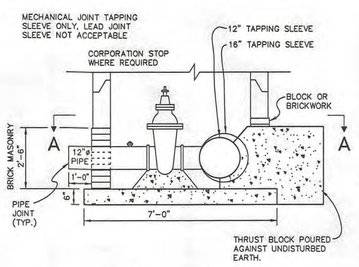
White Lake Township
7525 Highland Road (M-59)
White Lake, Michigan 48383
248-698-3300

STORM SEWER
STANDARD DETAILS

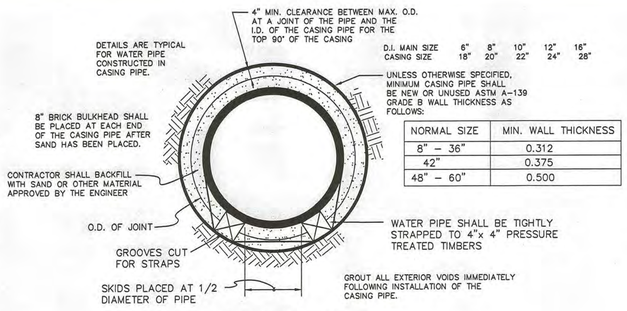
JOB NO. 2017.182
DATE ISSUED 08/16/95
SHEET NO. 33 of 36



16" X 8", 12" X 8", 8" X 8"
TAPPING SLEEVE, VALVE & WELL
(B-B)



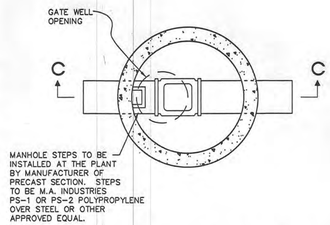
16" X 12", 12" X 12"
TAPPING SLEEVE, VALVE & WELL
(B-B)



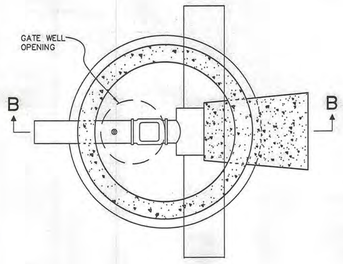
NORMAL SIZE	MIN. WALL THICKNESS
8" – 36"	0.312
42"	0.375
48" – 60"	0.500

Drawing not to scale.

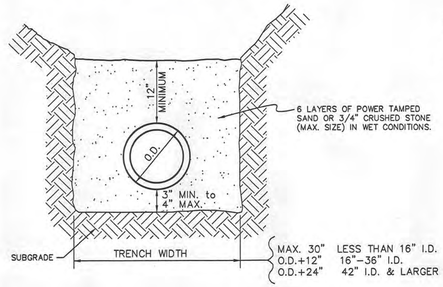
PIPE BARREL SUPPORT FOR WATERMAIN CONSTRUCTED IN CASING



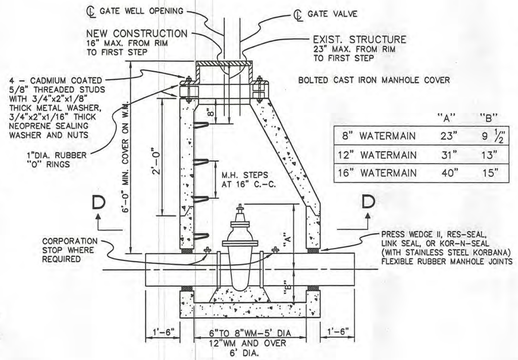
PLAN GATE WELL –TYPICAL
(D-D)



PLAN TAPPING SLEEVE, VALVE & WELL –TYPICAL
(A-A)



Drawing not to scale.
STANDARD BEDDING FOR WATER PIPE



	"A"	"B"
8" WATERMAIN	23"	9 1/2"
12" WATERMAIN	31"	13"
16" WATERMAIN	40"	15"

GATE WELL
(C-C)

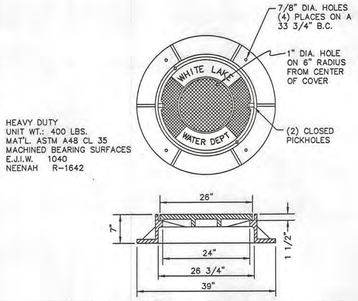
WATER MAIN NOTES

1. All construction procedures and materials used on this project shall conform to White Lake Township current standards and specifications.
2. All hydrants shall be East Jordan Iron Works 5BR–250 traffic model. Self–draining hydrants shall not be used. Valve shall have 1–1/2" pentagon nut and shall open counter–clockwise. Provide two 4.5" pumper outlets with 5" Storz quick connect nozzles (Harrington Integral Hydrant Storz, Model HIHS) as manufactured by Harrington, Inc. of Erie, PA.
3. All hydrants shall be field painted with a heavy coat of bright safety red polyurethane or alkyd gloss enamel, except for the Storz fittings and caps, which shall be left unpainted.
4. Johnson and Anderson, Inc. field personnel will affix to the fixed collar of each Storz connection 1" wide 3M Scotch reflective tape, color coded per NFPA 291 guidelines flow capacity.
5. All watermains shall be ductile iron pipe Class 54, cement lined with push on joints. Mechanical joints allowed only for tapping sleeves, hydrants & hydrant valves. Only Cor–Blue bolts shall be used for assembling mechanical joints. All bends, tees, valves and hydrant tees shall have a poured concrete thrust block as detailed on this sheet. Joints which have thrust blocks bearing on soil of questionable stability shall be fully restrained utilizing Tyler swivel ells and adapters or a system approved by the Township Engineer. HDPE pipe for directional boring, if approved by the Township Engineer, shall meet all of the requirements of the MDEQ and shall be DR9 (200 psi), and shall have two #8 tracer wires, terminated in the nearest gate well at the highest step.
6. Tapping sleeve shall be mechanical joint or approved equal. Ductile Iron or Stainless steel are allowed.
7. Specifications shall include direction of operation of all valves. All valves shall be counter clockwise open.
8. All necessary easements shall be provided in the name of White Lake Township before acceptance of the water distribution system.
9. The design engineer shall furnish White Lake Township with one reproducible sets of "As–Built" watermain plans or an AutoCAD file upon completion of the job.
10. All required cross–connection devices shall be installed as required by the local plumbing inspector and in accordance with the standards of the Michigan Department of Public Health.
11. Gate well frame and cover shall be as follows: East Jordan heavy manhole cover, base flange type #1040 or Neenah Foundry heavy duty #R–1642 Manhole frame, solid lid cover shall be non–rocking and marked "White Lake Water Department"
12. Gate valves shall be AWWA approved and of a double disc or resilient wedge design with push on joints, 16" gate valves may be mechanical joint provided Cor–Blue bolts are used. All gate valves with operating nuts greater than 5' below ground surface shall be provided with an extension stem. The length of the extension shall be such that it will be within 5' of the ground surface when an extension is used it shall be held in place by an extension stem guide suitably fastened to the wall of the gate well.
13. 1" corporation stops are to placed on the main at each side of each main line gate valve and at such other locations as may be required by the engineer.
14. All pipe and fittings shall be subjected to a hydro–static pressure test of 150 PSI for a 2 hour duration; Township Engineer must be present. Maximum segment 2000 feet except that longer segments may be tested with allowable leakage based on 2000 feet.
15. 2 consecutive safe bacteria samples shall be taken from the water system approx. 24 hours apart at points established by the Township Engineer. Samples shall be taken by the Township Engineer.
16. Filling, flushing and sampling of watermain can only be performed with a "Jumper" Line, the jumper shall be equipped with an approved RPZ type of backflow preventer.
17. Adjustments on gate wells shall be limited to 23" maximum from top of rim to first step in accordance with MIOSHA Rule 341.
18. All new water service lines shall have a minimum nominal size of 1". Services from 1" to 2" may be type K copper tubing or plastic DR–9 (200 PSI rated) meeting ASTM D2737–03 (Standard Specification for Polyethylene (PE) plastic tubing). ASTM Designation and pressure rating shall be stamped on the pipe by the manufacturer. Plastic pipe shall also meet AWWA C–901 Specifications. All sizes shall relate to the copper tubing outside diameter standard size (CTS). Copper pipe joints shall be flared. Fittings shall adapt to the plastic pipe with compression to iron pipe thread adapter. Plastic pipes shall be either compression style with a steel insert or may be fusion welded in the larger sizes.

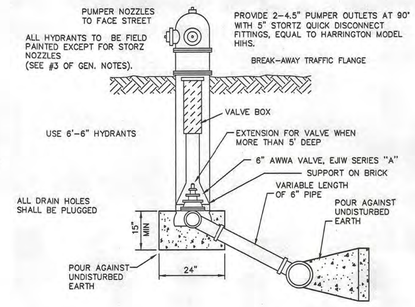
    Plastic water service pipes shall be traced with two #10 copper tracer wires or two #12 copper coated steel or stainless steel wires insulated with a minimum of 30 mils of polyethylene insulation. The tracer wires shall be terminated to supply line so as to be locatable at the building and the curb box without digging.

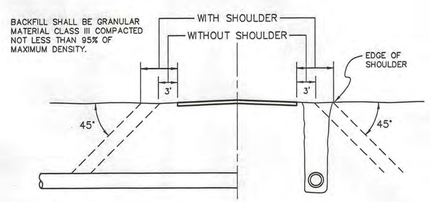
    Water services sizes 3" and greater shall be Class 54 cement lined ductile iron with push on joints or HDPE DR–9 (200 PSI rated) with fusion welded joints and fittings, DIPS (Ductile Iron Pipe Size).

    A stop box shall be installed at the property or easement line and shall be equivalent to an A.Y. McDonald Mfg. 6100 flare regular pattern ball valve. The curb box shall have a 1" riser pipe with an Erie 2–hole pattern cover equivalent to A.Y. McDonald Mfg. 5601L. Stop box shall be protected with a 2"x4" painted blue extending 4 feet above ground.
19. Standard pipe cover shall be 6'–0".
20. Air release manholes shall consist of a standard 5' diameter gate well style structure with a ValMatic Model 25C air release valve mounted on a 1" corporation stop. Air release shall be equipped with the vacuum check option. A 1/2" diameter galvanized pipe air discharge shall be extended to within 12" of the top of the structure. A gooseneck trap shall be installed at the top of the riser to prevent debris & water from entering the valve.

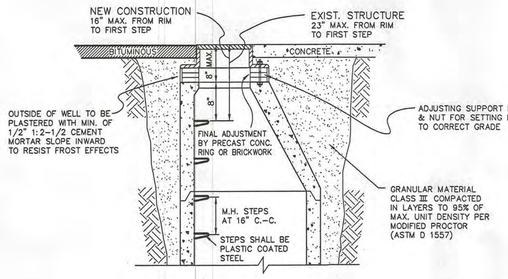


GATE WELL COVER & FRAME

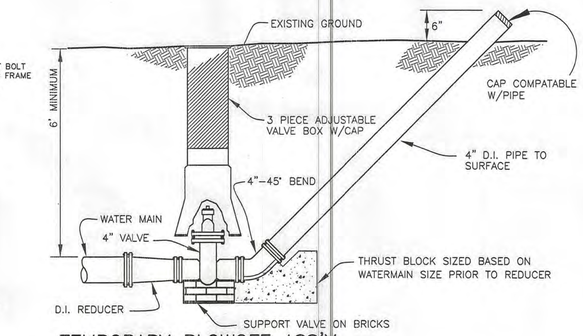




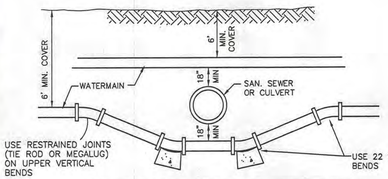
BACKFILL IN THE AREA OF STREETS, ALLEYS, SIDEWALKS, DRIVES & PARKING AREAS



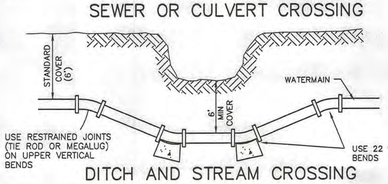
GATE WELL TOPS WITHIN PAVEMENT AREAS



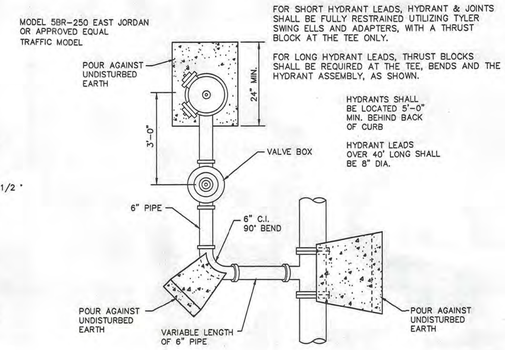
TEMPORARY BLOWOFF ASS'Y



SEWER OR CULVERT CROSSING

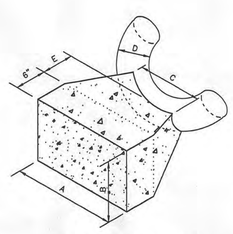


DITCH AND STREAM CROSSING



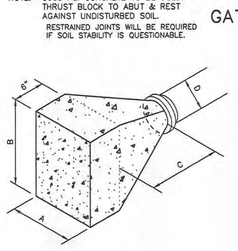
DETAIL OF HYDRANT SETTINGS

NOTE: 3000 PSI CONCRETE TO BE USED. THRUST BLOCK TO ABUT & REST AGAINST UNDISTURBED SOIL. RESTRAINED JOINTS WILL BE REQUIRED IF SOIL STABILITY IS QUESTIONABLE.



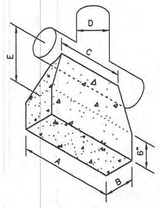
FOR 90° BENDS OR SMALLER

D	A	B	C	E MIN
20"	8'	6.5'	3.5'	2.5'
16"	6'	4'	2.5'	2'
12"	4'	3'	2'	1.75'
10"	3'	3'	2'	1.5'
8"	3'	2'	2'	1.5'
6"	2'	1.5'	2'	1.25'



FOR PLUGS

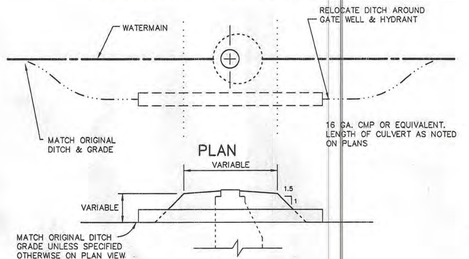
D	A	B	C MIN
20"	7'	5'	3'
16"	4.8'	4.8'	2'
12"	4.3'	3'	1.75'
10"	3'	2'	1.5'
8"	2.8'	2.5'	1.5'
6"	1.5'	1.5'	0.25'



FOR TEES

D	A	B	C	E MIN
20"	6.5'	4.5'	3.5'	3'
16"	4.7'	4.7'	2.5'	2.75'
12"	4'	3'	2.5'	2.5'
10"	3'	2'	2'	2.25'
8"	2.7'	2'	2'	2.25'
6"	2'	2'	2'	2.25'

THRUST BLOCK DETAILS



PROFILE
DITCH ENCLOSURE AT GATE WELL

DRAWN: CAD
DESIGN: OA
CHECKED: –

SCALE: VERT. –
HORZ. AS NOTED

REVISIONS	MARK	ADDENDUM/CHANGE ORDER	DATE	MARK	ADDENDUM/CHANGE ORDER	DATE	MARK	ADDENDUM/CHANGE ORDER	DATE	MARK	ADDENDUM/CHANGE ORDER	DATE
		GENERAL REVISION TO CAD	12/29/95		GW & NUT SIZE	07/23/98		CLARIFY HYD. SPEC	02/07/01		REV. HYD, THRUST, AIR REL.	03/29/04
		ADD NOTE 17	11/04/97		PIPE CIVER & FLANGE TAPE	05/12/99		5–BR HYD, WS STAKE	02/27/02		HDPE, HYD, VALVES	07/18/05
		REVISE HYD. & THRUSTING	05/18/98		ADD BLOWOFF	07/06/99		ADD NOTE 19	07/23/03		UPDATED TITLE BLOCK	04/30/13

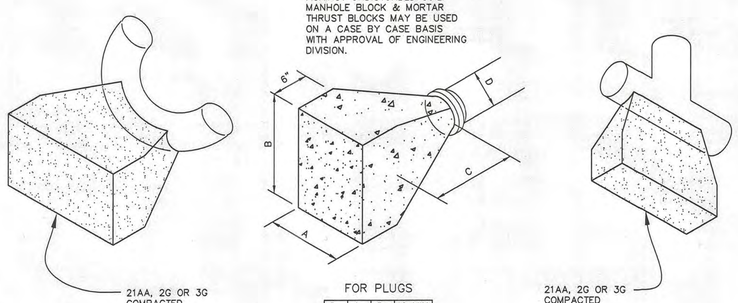
Johnson&Anderson
4494 Elizabeth Lake Road
Waterford, Michigan 48328
tel (248) 681-7800 fax (248) 681-2660
1060 W. Norton Avenue, Suite 7
Muskegon, Michigan 49441
tel (231) 780-3100 fax (231) 780-3115
3910 Lapeer Road
Port Huron, Michigan 48060
tel (810) 987-7820 fax (810) 987-7895

White Lake Township
7525 Highland Road (M-59)
White Lake, Michigan 48383
248-698-3300

WATER MAIN STANDARD DETAILS

JOB NO. 2017.182
DATE ISSUED
SHEET NO. 34 of 36

NOTE: 3000 PSI CONCRETE TO BE USED. THRUST BLOCK TO ABUT & REST AGAINST UNDISTURBED SOIL. MANHOLE BLOCK & MORTAR THRUST BLOCKS MAY BE USED ON A CASE BY CASE BASIS WITH APPROVAL OF ENGINEERING DIVISION.

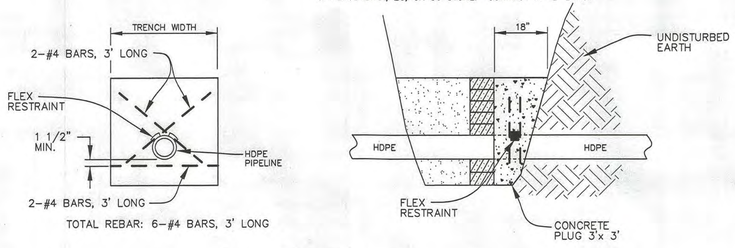


FOR PLUGS

D	A	B	C MIN
20"	7'	5'	2.5'
16"	4.8'	4.8'	2'
12"	4.3'	3'	1.75'
10"	3'	2'	1.5'
8"	2.8'	2.5'	1.5'
6"	1.5'	1.5'	0.25'

HDPE THRUST BLOCK DETAILS

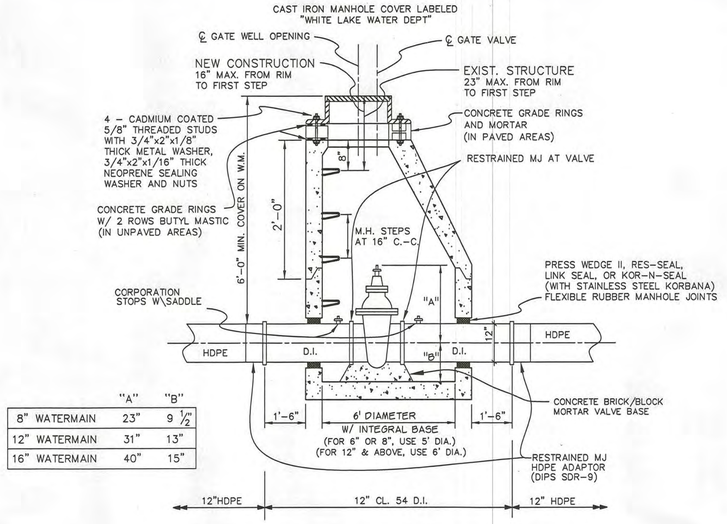
A. INSTALL "RESTRAINING BLOCK" ON THE HDPE PIPELINE.
1. ELECTROFUSE TWO (2) CENTRAL "FLEX RESTRAINTS" ON THE 8" HDPE PIPELINE WHERE DIRECTED OR AS SHOWN ON PLANS.
2. PLACE CONCRETE BLOCK FORM.
3. PLACE 5 SACK CONCRETE OR "BAGGED PREMIX" CONCRETE.
3. PLACE 21AA, 2G, OR 3G STONE. COMPACT IN 12' LIFTS.



OPERATING TEMPERATURE 45° > 55°

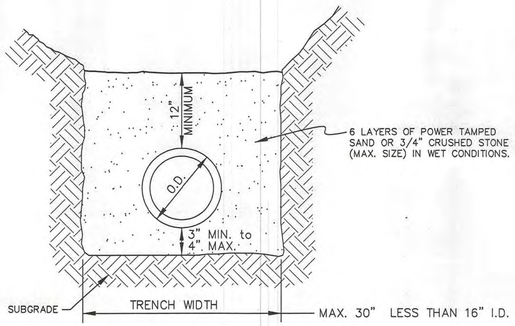
HDPE RESTRAINING BLOCK

NO SCALE



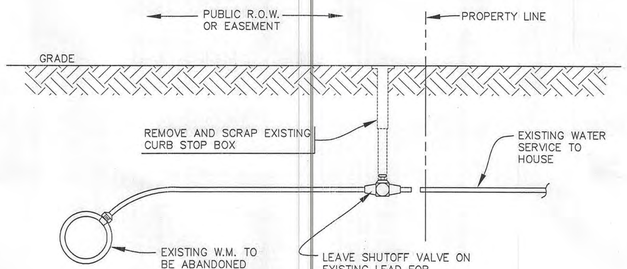
	"A"	"B"
8" WATERMAIN	23"	9 1/2"
12" WATERMAIN	31"	13"
16" WATERMAIN	40"	15"

12" GATE VALVE IN WELL WITH HDPE PIPE



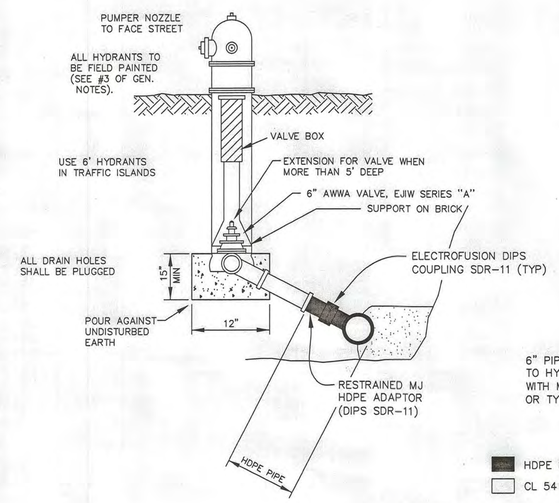
STANDARD BEDDING - OPEN CUT FOR HDPE WATER PIPE

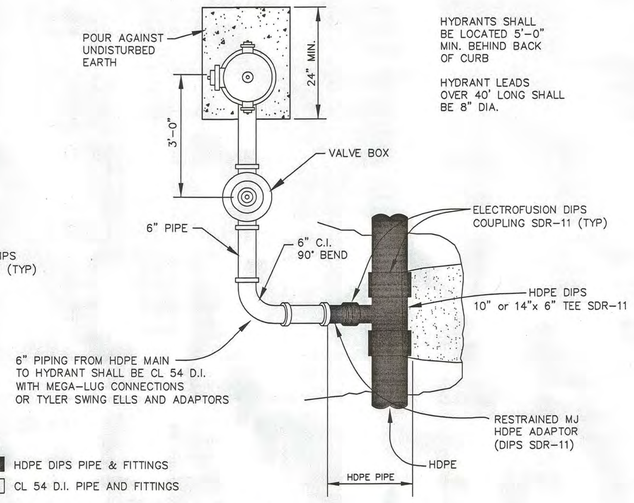
NO SCALE



ABANDON EXISTING WATER SERVICE BY TOWNSHIP

NO SCALE



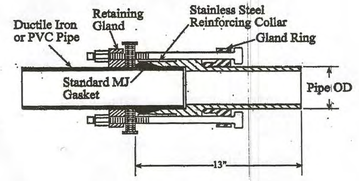


HYDRANTS SHALL BE LOCATED 5'-0" MIN. BEHIND BACK OF CURB

HYDRANT LEADS OVER 40' LONG SHALL BE 8" DIA.

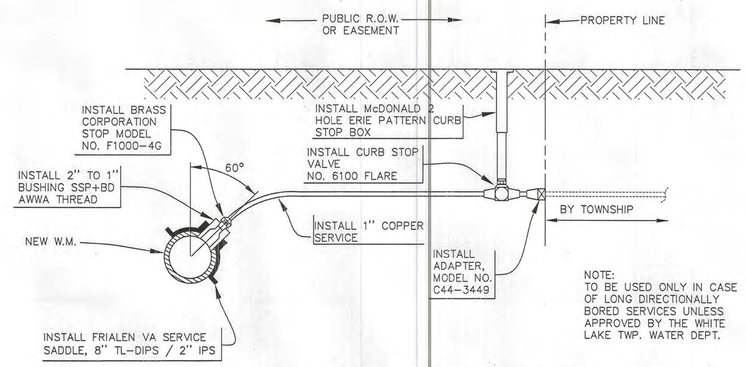
HYDRANT SETTING FOR HDPE MAINS

NO SCALE



DETAIL FOR RESTRAINED MJ HDPE ADAPTER

NO SCALE



NOTE: TO BE USED ONLY IN CASE OF LONG DIRECTIONALLY BORED SERVICES UNLESS APPROVED BY THE WHITE LAKE TWP. WATER DEPT.

NOTE: ELECTROFUSE WITH PNEUMATIC TOP LOADING TOOL

NEW HDPE WATER SERVICE TAP TO HDPE WATER MAIN

NO SCALE

Apr 08, 2014 Layout = Water_hdpe Det
L:\Acad\Standard Details\White Lake Twp\WLT-water HDPE.dwg

DRAWN: S.T.
DESIGN:
CHECKED:

SCALE: VERT.
HORZ. NONE

REVISIONS	MARK	ADDENDUM/CHANGE ORDER	DATE	MARK	ADDENDUM/CHANGE ORDER	DATE	MARK	ADDENDUM/CHANGE ORDER	DATE

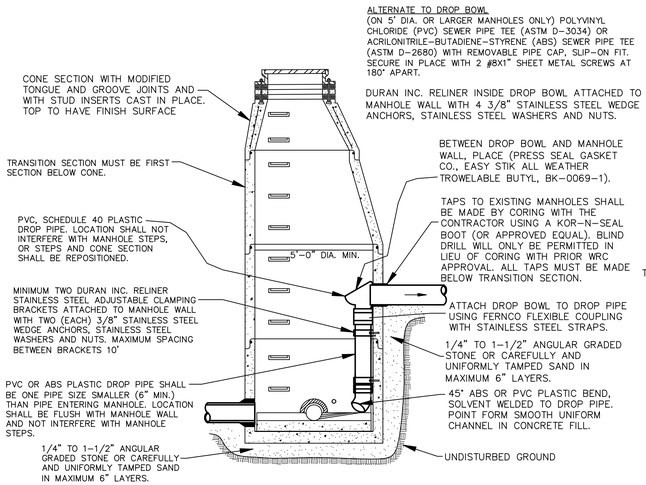
Johnson&Anderson
4494 Elizabeth Lake Road, Waterford, Michigan 48328, tel (248) 681-7800 fax (248) 681-2660
1060 W. Norton Avenue, Suite 7, Muskegon, Michigan 49441, tel (231) 780-3100 fax (231) 780-3115
3910 Lapeer Road, Port Huron, Michigan 48060, tel (810) 987-7920 fax (810) 987-7895

White Lake Charter Township
7525 Highland Road, White Lake, Michigan 48383-2900
(248) 698-3300

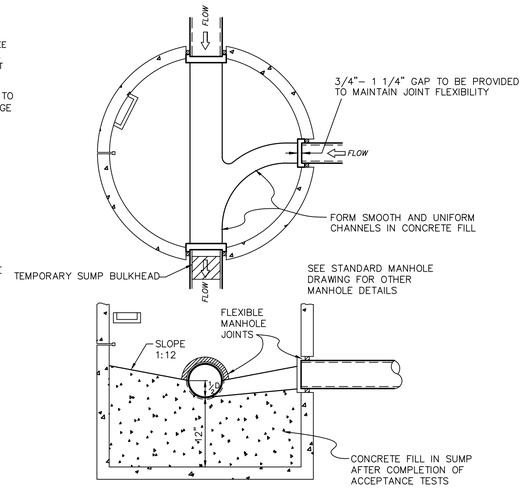
WATERMAIN HDPE DETAILS

JOB NO. _ 2017.182
DATE ISSUED 3-9-10
SHEET NO. 35 of 36

L:\Acad\Standard Details\White Lake Twp\WLT-water HDPE.dwg, Water_hdpe Det, 4/8/2014 3:29:56 PM, tseitz, ColorPDF Wittec 2010

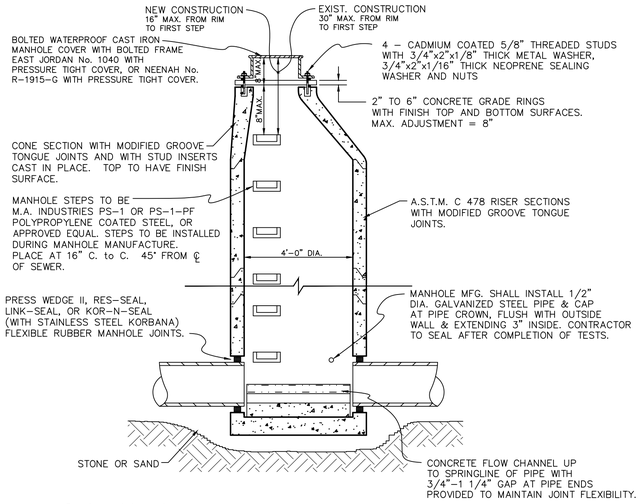


INTERIOR DROP CONNECTION



Drawing not to scale.

SUMP MANHOLE FOR
TESTING, CLEANING, AND DEWATERING



Drawing not to scale.

STANDARD MANHOLE
ON 8" THROUGH 24" DIAMETER SEWERS

SANITARY SEWER CONSTRUCTION NOTES

1. All construction shall conform to the current standards and specifications of the local unit of government and the Oakland County Water Resources Commissioner (OCWRC). All sanitary sewer construction shall have full time inspection supervised by a professional engineer provided by or caused to be provided by the local unit of government.

2. At all connections to Oakland County Water Resources Commissioner's sewers or extensions, and before start of construction, the Contractor must obtain a Sewer Inspection Permit issued by the OCWRC. Gravity sewer permit charges are $250.00 for each connection plus $25.00 for each manhole constructed. Pressure sewer permit charges are $250.00 per 2460 L.F. of force main with a minimum permit fee of $250.00. Failure to pass any test segment will result in an additional charge to the Contractor for each retest, in accordance with the above price schedule. The Contractor shall also have posted with the OCWRC a $5,000.00 surety bond and $500.00 cash deposit. The Contractor shall notify the local unit of government and the OCWRC (248-858-1110) 24 hours prior to the beginning of any construction. Final acceptance tests must be witnessed by County personnel and must be scheduled by Municipality or it's consultant in advance with 24 hour notice at 248-858-1110.

3. No sewer installation shall have an infiltration or exfiltration exceeding 100 gallons per inch diameter per mile of pipe in a 24 hour period, and no single run of sewer between manholes shall exceed 100 gallons per inch diameter per mile. Air tests in lieu of infiltration tests shall be as specified in the OCWRC "Acceptance Tests", dated September, 1972. Only pipe and pipe joints approved by the Oakland County Water Resources Commissioner may be used for sanitary sewer construction.

4. Located in the first manhole upstream from the point of all connections to an existing OCWRC sewer, or extension thereto, a temporary 12-inch deep sump shall be provided in the first manhole above the connection which will be filled in after such successful completion of any acceptance test up to the standard fillet provided for the flow channel. A watertight bulkhead shall be provided on the downstream of the sump manhole.

5. All building leads and risers shall be 6-inch S.D.R. 23.5 ABS OR PVC pipe with chemically fused joints, or an approved equal pipe and joint. Sewer pipe wye shall contain factory installed premium joint material of an approved type compatible with that of the building lead pipe used. Building leads to be furnished with removable air tight and water-tight stoppers.

6. All rigid sewer pipe shall be installed in Class "B" bedding or better. All flexible, semi-flexible or composite sewer pipe shall be installed in conformance to the Oakland County Water Resources Commissioner specifications.

7. All new manholes shall have Oakland County Water Resources Commissioner approved flexible, water-tight seals where pipes pass through walls. Manholes shall be of precast sections with modified groove tongue and rubber gasket type joints. Precast manhole cone sections shall be Oakland County Water Resources Commissioner approved modified eccentric cone type. All manholes shall be provided with bolted, water-tight covers.

8. At all connections to manholes on Oakland County Water Resources Commissioner's sewers or extensions thereto drop connections will be required when the difference in invert elevations exceeds 18-inches. Outside drop connections only will be approved.

9. Taps to existing manholes shall be made by coring. The Contractor shall place a KOR-N-SEAL boot (or OCWRC approved equal) after coring is completed. Blind drilling will not be permitted in lieu of coring.

10. New manholes constructed directly on Oakland County Water Resources Commissioner's sewers shall be provided with covers reading "Oakland County - Sanitary" in raised letters. New manholes built over an existing sanitary sewer shall have monolithic poured bottoms.

11. No ground water, storm water, construction water, downspout drainage or weep tile drainage shall be allowed to enter any sanitary sewer installation.

12. Prior to excavation, the Contractor shall telephone MISS DIG (647-7344) for the location of underground pipeline and cable facilities, and shall also notify representatives of other utilities located in the vicinity of the work.

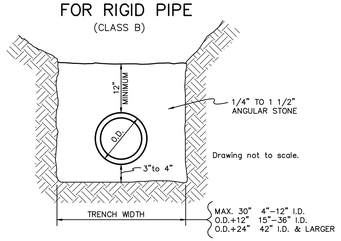
13. 18" minimum vertical separation and 10' minimum horizontal separation must be maintained between sanitary sewer and water main.

14. Manhole frame and cover shall be as follows: East Jordan heavy manhole cover, base flange type #1040 or Neenah Foundry heavy duty #R-1642 manhole frame. Solid lid cover shall be non-rocking and marked "WHITE LAKE TOWNSHIP SEWER DEPARTMENT."

Drawing not to scale.

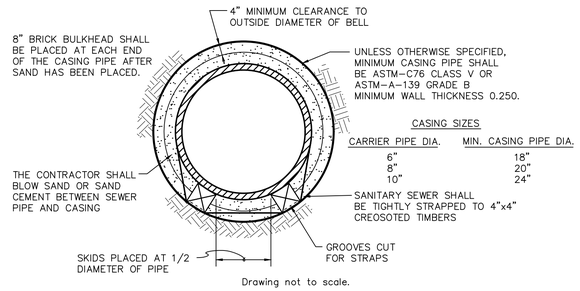
HOUSE/BUILDING LEAD DETAIL

BEDDING DETAIL
FOR RIGID PIPE
(CLASS B)



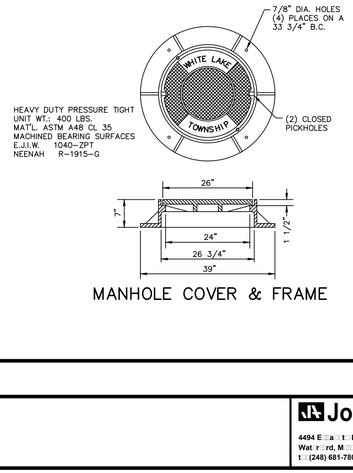
Drawing not to scale.

BEDDING DETAIL
FOR FLEXIBLE PIPE

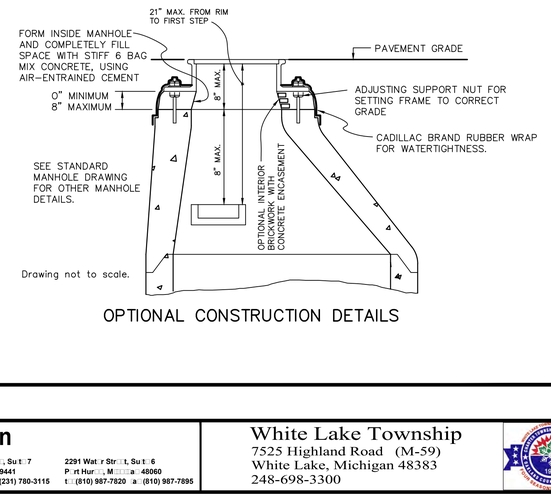


Drawing not to scale.

PIPE BARREL SUPPORT FOR SEWER

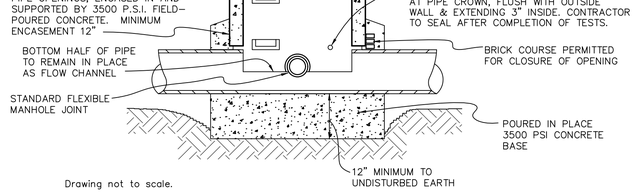


MANHOLE COVER & FRAME



Drawing not to scale.

OPTIONAL CONSTRUCTION DETAILS



Drawing not to scale.

SKETCH OF MINIMUM MANHOLE REQUIREMENTS
ON MANHOLES CONSTRUCTED OVER EXISTING SEWERS

DRAWN: CAD
DESIGN: OA
CHECKED: -

SCALE: VERT. -
HORZ. AS NOTED

REVISIONS	MARK	ADDENDUM/CHANGE ORDER	DATE	MARK	ADDENDUM/CHANGE ORDER	DATE	MARK	ADDENDUM/CHANGE ORDER	DATE
		FIRST ISSUE	09/11/97		OCWRC COMMENTS	11/06/15			
		UPDATED TITLE BLOCK	04/30/13						
		UPDATED NOTES	02/17/15						

Johnson&Anderson
4494 E[illegible]t La[illegible]R ad
Wat[illegible]rd, M[illegible]a 48328
t[illegible](248) 681-7600 a[illegible](248) 681-2660
1060 W. N[illegible]rt[illegible]A[illegible]u., Su[illegible]7
Mu[illegible], M[illegible]a 49441
t[illegible](231) 780-3100 a[illegible](231) 780-3115
2291 Wat[illegible]r Str[illegible]t, Su[illegible]6
P[illegible]rt Hur[illegible], M[illegible]a 48060
t[illegible](810) 987-7820 a[illegible](810) 987-7895

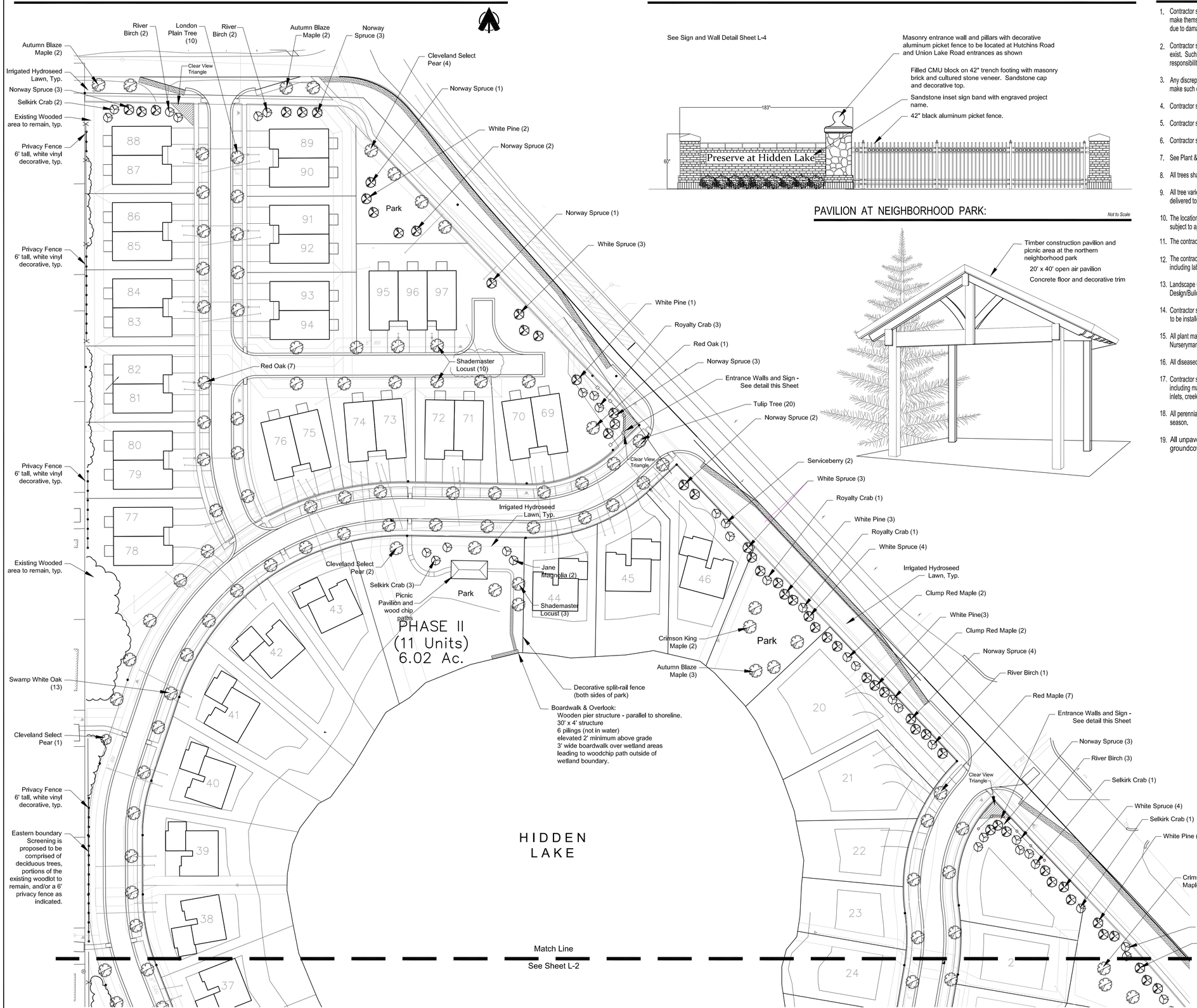
White Lake Township
7525 Highland Road (M-59)
White Lake, Michigan 48383
248-698-3300

SANITARY SEWER STANDARD DETAILS

JOB NO. 2017.182
DATE ISSUED 09/11/97
SHEET NO. 36 OF 36

LANDSCAPE PLANTING PLAN:

1" = 50'



ENTRANCE FEATURE & SIGN:

Not to Scale

PAVILION AT NEIGHBORHOOD PARK:

Not to Scale

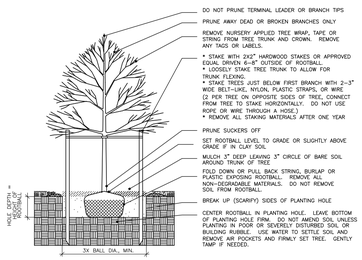
LANDSCAPE PLANTING NOTES:

1. Contractor shall be responsible for contacting and coordinating with all pertinent utility companies 72 hours in advance of any digging to make themselves familiar with all underground utilities, pipes and structures. Contractor shall take sole responsibility for any cost incurred due to damage of said utilities or structures.
2. Contractor shall not willfully proceed with construction as designed when it is obvious that unknown obstructions and/or grade differences exist. Such conditions shall immediately be brought to the attention of the Owner's Representative. The contractor shall assume full responsibility for all necessary revisions due to failure to give such notification.
3. Any discrepancies between dimensioned layout and actual field conditions shall be reported to the Owner's Representative. Failure to make such discrepancies known will result in contractor's responsibility and liability for any changes and associated costs.
4. Contractor shall be responsible for any coordination with subcontractors as required to accomplish construction installation operations.
5. Contractor shall provide and maintain positive surface drainage.
6. Contractor shall be responsible for any existing materials that are damaged during construction.
7. See Plant & Material List and Planting Details for planting requirements, materials and execution.
8. All trees shall have a clay loam or clay root ball. Trees with sand root balls will not be accepted.
9. All tree varieties and substitutions to be approved by he Owners Representative prior to being delivered to site. Any plant material delivered to site not previously approved may be rejected and are the sole responsibility of the contractor.
10. The location of all plant material shall be scaled from drawings or interpreted from plant list. Final location of all plant material shall be subject to approval from the Owner's Representative.
11. The contractor shall "water in" and fertilize all plants immediately after planting.
12. The contractor shall guarantee all trees, shrubs, ground cover and other plant materials for two years from the date of installation, including labor and removal and disposal of dead material.
13. Landscape Contractor shall install an automated irrigation system at all common area, frontage, park and entrance lawn areas on a Design/Build basis.
14. Contractor shall install 3" depth Shredded Hardwood Mulch in all shrub and tree planting beds unless otherwise indicated. Peat Moss is to be installed in all annual flower, perennial flower and ground cover planting beds. Such beds shall have no shredded mulch, typ.
15. All plant material shall be nursery grown. All trees and plant material shall meet the current standards of the American Society of Nurseryman.
16. All diseased, damaged, or dead landscape material shall be replaced by the end of the following growing season.
17. Contractor shall adhere to all soil erosion prevention methods as directed within civil engineering drawings and Municipal Ordinance including maintaining silt fencing and ensuring that soil, silt and other debris is prevented from leaving site or entering area drains, sewer inlets, creeks or natural areas.
18. All perennials and ornamental grasses shall be planted on close centers so as to form a single mass appearance within one planting season.
19. All unpaved areas within impacted development zones to be hydro-seed lawn areas, mulch beds or groundcover, typ.

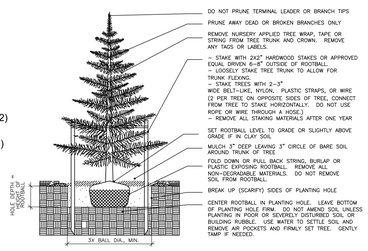
FENCE & PLANTING DETAILS:

6' TALL VINYL PRIVACY FENCE:
MFG: BUFFTECH, INC.
CERTAINTEED CORP FENCE
231 SHIP CANAL PARKWAY
BUFFALO, NY 14218
1-800-333-0569
XXX.CERTAINTEED.COM
(OR APPROVED EQUAL)
STYLE: CHESTERFIELD — SMOOTH
STEEL REINFORCED BOTTOM RAIL
TONGUE & GROOVE PICKET DESIGN
HEIGHT: 6' TALL
COLOR: WHITE
INSTALLATION: PER MFG SPECIFICATIONS
POSTS SET IN CONCRETE
42" DEEP MIN.
INSTALL FENCE IN LOCATIONS PER LANDSCAPE PLANTING PLAN, TYP.

6' TALL VINYL PRIVACY FENCE DETAIL, TYP.
NOT TO SCALE



DECIDUOUS TREE PLANTING DETAIL, TYP.
NOT TO SCALE



EVERGREEN TREE PLANTING DETAIL, TYP.
NOT TO SCALE

STATE OF MICHIGAN
REGISTERED LANDSCAPE ARCHITECT
JAMES T. EPPINK LANDSCAPE ARCHITECT No. 1309

J EPPINK PARTNERS, INC
Urban Design Studio

Urban Retail Design
Landscape Architecture
Traditional Town Planning

9336 Sashabaw Road
Clarkston, Michigan 48348
248.922.0415 fax
248.922.0789

The ideas and design concepts expressed herein and the graphically displayed arrangement of their components represented by this drawing have been developed for the exclusive use of the specified project and are the sole property of J EPPINK PARTNERS, INC. Any conveyance or disclosure of the ideas or design concepts or use of any graphically displayed arrangements of their components shall be at the discretion of and only through the expressed written consent of J EPPINK PARTNERS, INC

© 2018 J EPPINK PARTNERS, INC

Project:

Preserve at Hidden Lake

White Lake, Michigan

Owner:

Preserve at Hidden Lake, LLC

8255 Cascade Avenue, Suite 110
Commerce Twp, Michigan 48382

Sheet:

Landscape Planting Plan

Issues / Revisions

TWP REVIEW UPDATE	3-18-19
MKA REVIEW UPDATE	4-08-19
SITE PLAN UPDATE	3-26-21
FINAL REVIEW UPDATE	5-10-21

Drawn by:

Checked By
JTE

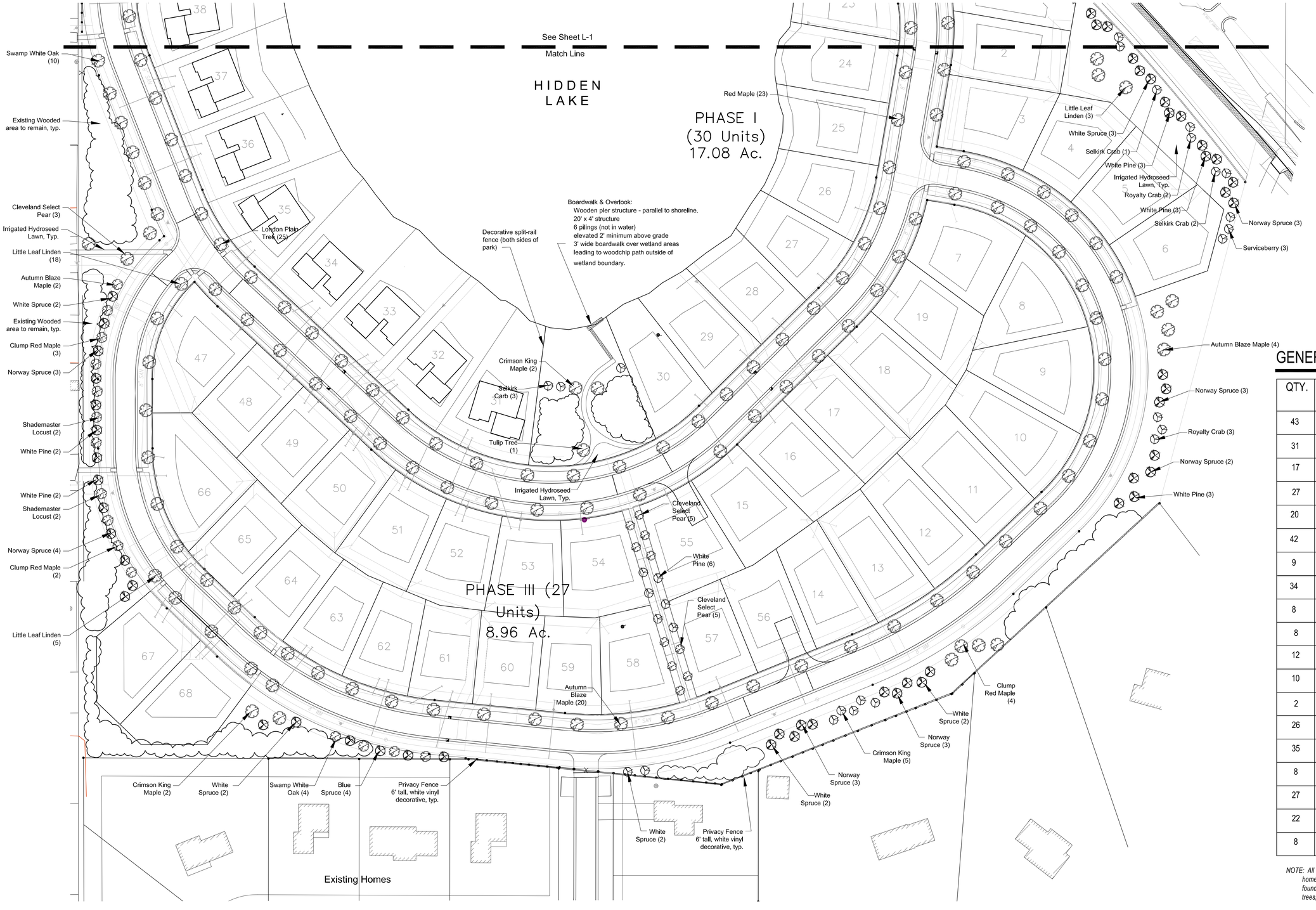
Date
November 1, 2018

Scale
AS NOTED

Sheet
L-1

LANDSCAPE PLANTING PLAN:

1" = 50'



GENERAL AREA PLANT LIST:

QTY.	DESCRIPTION	SIZE / ROOT
43	Picea abies Norway Spruce	8', B&B
31	Picea glauca White Spruce	8', B&B
17	Gleditsia triacanthos Shademaster Locust	2-1/2" cal., B&B
27	Pinus strobus White Pine	8', B&B
20	Pyrus callaryana Cleveland Select Pear	2-1/2" cal., B&B
42	Acer rubrum Red Maple	2-1/2" cal., B&B
9	Acer rubrum 'multi-stem' Clump Red Maple	2-1/2" cal., B&B, multi-stem
34	Acer rubrum 'Autumn Blaze' Autumn Blaze Maple	2-1/2" cal., B&B
8	Acer plantanoides Crimson King Maple	2-1/2" cal., B&B
8	Amilanchier Serviceberry	8', B&B
12	Malus 'Selkirk' Selkirk Crab	2-1/2" cal., B&B
10	Malus 'Royalty' Royalty Crab	2-1/2" cal., B&B
2	Magnolia, spp. Jane Magnolia	5', B&B
26	Tilia cordata Little Leaf Linden	2-1/2" cal., B&B
35	Plantanoidus occidentalis London Plain Tree	2-1/2" cal., B&B
8	Quercus rubra Red Oak	2-1/2" cal., B&B
27	Quercus bicolor Swamp White Oak	2-1/2" cal., B&B
22	Liriodendron tulipifera Tulip Tree	2-1/2" cal., B&B
8	Betula nigra River Birch	2-1/2" cal., B&B, multi-stem

NOTE: All Single Family, Two Family Attached and Multi Family homes will be landscaped to include a minimum of front foundation landscape plantings, 1 shade and 1 flowering trees, and will have a hydroseed or sod lawn, typ.

3 WORKING DAYS
BEFORE YOU DIG
CALL MISS DIG
1-800-482-7171
FOR THE LOCATION OF UNDERGROUND FACILITIES

STATE OF MICHIGAN
REGISTERED LANDSCAPE ARCHITECT
JAMES T. EPPINK
LANDSCAPE ARCHITECT
No. 1309

J EPPINK PARTNERS, INC
Urban Design Studio

Urban Retail Design
Landscape Architecture
Traditional Town Planning

9336 Sashabaw Road
Clarkston, Michigan 48348
248.922.0415 fax
248.922.0789

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Project:

Preserve at Hidden Lake

White Lake, Michigan

Owner:

Preserve at Hidden Lake, LLC

8255 Cascade Avenue, Suite 110
Commerce Twp, Michigan 48382

Sheet:

Landscape Planting Plan

Issues / Revisions

TWP REVIEW UPDATE	3-18-19
MKA REVIEW UPDATE	4-08-19
SITE PLAN UPDATE	3-26-21
FINAL REVIEW UPDATE	5-10-21

Drawn by:

Checked By
JTE

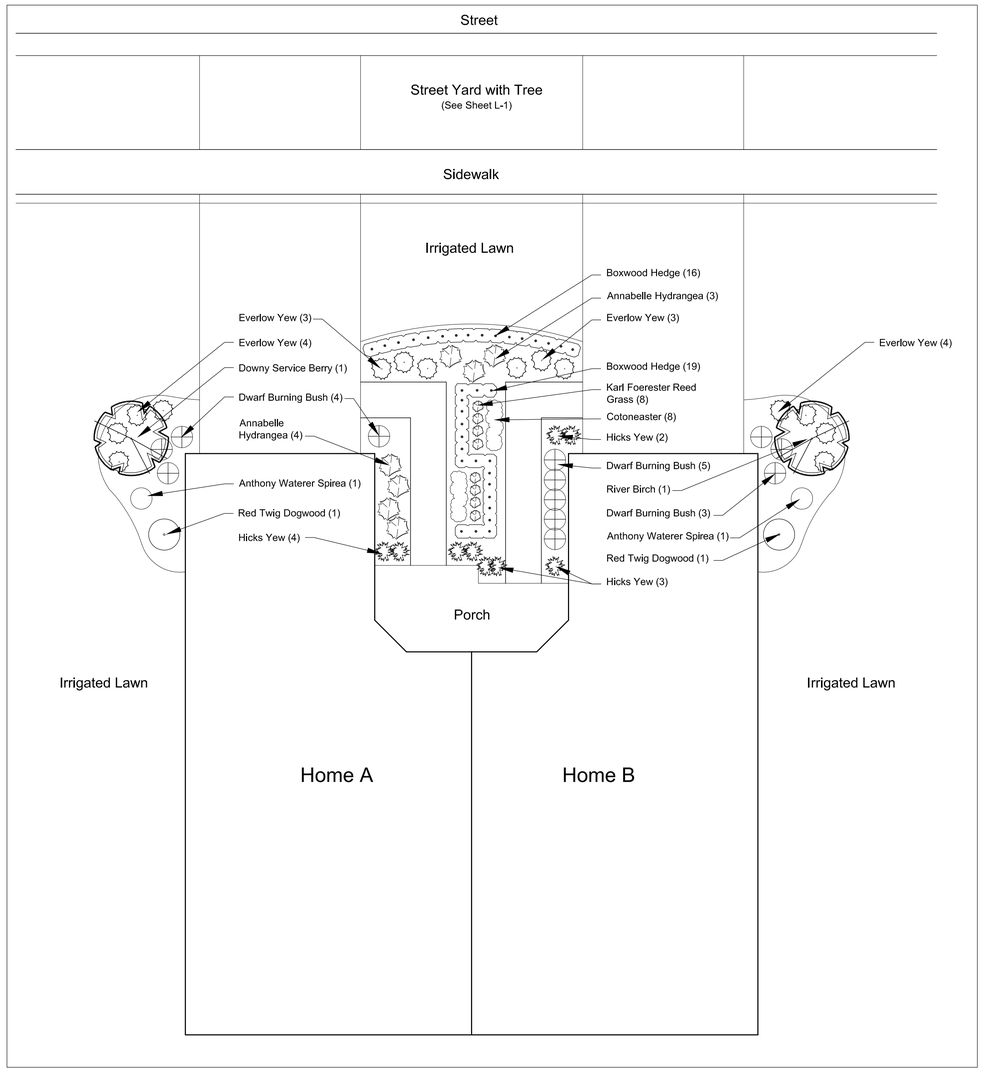
Date
November 1, 2018

Scale
AS NOTED

Sheet
L-2

DUPLEX UNIT - TYPICAL FOUNDATION PLANTING PLAN:

Scale: 1" = 8'



DUPLEX PLANT LIST:

QTY.	DESCRIPTION	SIZE / ROOT
1	Betula nigra River Birch	8', B&B, multi-stem
1	Amilanchier Downy Serviceberry	8', B&B, multi-stem
35	Buxus sempervirens Green Velvet Boxwood	18-24", container
9	Taxus Hicksii Hicks Yew	30-36", B&B
14	Taxus Densa 'Everlow' Everlow Yew	30-36", B&B
7	Hydrangea arborescens Annabelle Hydrangea	36", B&B
12	Eunoymus alatus compactus Dwarf Burning Bush	30-36", B&B
2	Spirea japonica Anthony Waterer Spirea	30-36", B&B
2	Cornus sericea Red Twig Dogwood	36-42", B&B
8	Cotoneaster apiculata Cotoneaster	15-18", Container
8	Calamagrostis acutifolia Karl Foerster Reed Grass	2 gal, Container

Typical plant list per 2 unit residential building.
Final landscape planting plan and plant list will vary from building to building in order to provide design and plant material variety.

3 WORKING DAYS
BEFORE YOU DIG
CALL MISS DIG
1-800-482-7171
FOR THE LOCATION OF UNDERGROUND FACILITIES

STATE OF MICHIGAN
REGISTERED LANDSCAPE ARCHITECT
JAMES T. EPPINK
LANDSCAPE ARCHITECT
No. 1309

J EPPINK PARTNERS, INC
Urban Design Studio

Urban Retail Design
Landscape Architecture
Traditional Town Planning

9336 Sashabaw Road
Clarkston, Michigan 48348
248.922.0415 fax
248.922.0789

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Project:

Preserve at Hidden Lake

White Lake, Michigan

Owner:

Preserve at Hidden Lake, LLC

8255 Cascade Avenue, Suite 110
Commerce Twp, Michigan 48382

Sheet:

Landscape Planting Plan - Duplex & Townhouse Units

Issues / Revisions

TWP REVIEW UPDATE	3-18-19
MKA REVIEW UPDATE	4-08-19
SITE PLAN UPDATE	3-26-21
FINAL REVIEW UPDATE	5-10-21

Drawn by:

Checked By
JTE

Date
November 1, 2018

Scale
AS NOTED

Sheet
L-3

Director's Report

Project Name: Preserve at Hidden Lake

Description: Amended Planned Development Agreement

Date on Agenda this packet pertains to: June 3rd, 2021

- ☐ Public Hearing
- ☑ Initial Submittal
- ☑ Revised Plans
- ☐ Preliminary Approval
- ☑ Final Approval

- ☐ Special Land Use
- ☐ Rezoning
- ☐ Tentative Preliminary Plat
- ☐ Final Preliminary Plat
- ☐ Other : Amended PDA

Contact	Consultants & Departments	Approval	Denial	Approved w/ Conditions	Comments
DLZ	Engineering	☐	☐	☑	See letter dated 05/20/21
McKenna & Associates	Planning Consultant	☐	☐	☑	See letter dated 05/24/21
Lisa Hamameh	Township Attorney	☐	☐	☑	See letter dated 05/20/21
Sean O'Neil	Planning Director	☐	☐	☑	Per reviewer's comments.

DLZ
ARCHITECTURE • ENGINEERING • PLANNING
SURVEYING • CONSTRUCTION SERVICES

INNOVATIVE IDEAS
EXCEPTIONAL DESIGN
UNMATCHED CLIENT SERVICE

May 18, 2021

Sean O' Neil, Director
Community Development Department
Charter Township of White Lake
7525 Highland Road
White Lake, Michigan 48383

RE: Preserve at Hidden Lake – Planned Development Agreement –First Amendment- 1st Review

DLZ Job No. 1845-0886-00

Dear Mr. O' Neil,

The applicant is proposing a 68 unit detached single family and a 29 unit attached single family development on a 37.99 acre parcel located off Union Lake Road. This is a review of the first amendment to the original PDA documents that were prepared for Preserve at Hidden Lake, LLC. and were submitted to this office on May 7, 2021 via Dropbox.

The following items were submitted as part of this review:

- Draft PDA Agreement- First Amendment
- Exhibit 1- Site Plan (with no date included)
- Exhibit 2- Development Schedule

We offer the following comments for your consideration:

<u>General</u>

1. Exhibit 1, Sheet 1 will require correction for the number of total units listed for PH.4-17. The Exhibit sheet lists 28 units. We count 29 units. Please verify.
2. The revised Final Site Plan is currently under review by our office. Since the approved revised Final Site Plan will be Exhibit 1 for the above PDA amendment, the PDA amendment approval will need to be conditioned on approval of the revised Final Site Plan.

Recommendation-

We recommend approval of the PDA Amendment subject to review and approval of the Revised Final Site Plan by our office and the resolution of the above referenced item #1.

If you have any questions, please feel free to call me.

Sincerely,

DLZ Michigan

Michael Leuffgen, P.E.
Department Manager

Victoria Loemker, P. E.
Senior Engineer

Cc: Aaron Potter, DPS Director, *via email*
Hannah Micallef, Community Development, *via email*
Lisa Hamameh, RSJA Law, *via email*

X:\Projects\GFL\2018\1845\088600 White Lk Twp Prese\Acceptance and Closeout Documents\PDA Review\1st Amendment to PDA-Review.01\Review.01.docx

MCKENNA

May 21, 2021

Planning Commission
Charter Township of White Lake
7525 Highland Road
White Lake, MI 48383

Subject: Preserve at Hidden Lake Planned Development
Development Agreement Amendment Review #1

Location: West side of Union Lake Road, between Cooley Lake and Hutchins Roads

Dear Planning Commissioners:

Preserve at Hidden Lake, LLC has submitted revised plans to develop a 97-unit residential development on a site consisting of 38.33 gross acres for PD zoning. The site contains a 6.38-acre lake. The plans previously proposed a mixture of 37 townhouse units, 12 duplex units, 3 units in a three-plex configuration, and 68 single-family lots. The revised final site plan proposes 68 single-family lots in a similar configuration to the previously submitted plans, with 29 duplex units. The applicant is no longer proposing the 37 townhouse units as was previously considered by the planning Commission in May of 2019.

The Planned Development review process involves the following three (3) steps:

1. Preliminary Site Plan Review: This is the step in which the number of units and road layout are established, the amount of open space is determined, and other project details are decided upon. At the preliminary review step the Planning Commission holds a public hearing. The Planning Commission must review the PD proposal and make a recommendation to the Township Board for the preliminary site plan. The Township Board is required to take action, approving or denying the preliminary site plan. The property is rezoned to PD at the end of this step.
2. Final Site Plan Review: Final site plan review is the step at which all of the details are included on the final site plan and all of the conditions of preliminary site plan review must be satisfied. The Planning Commission is required to review the final site plan and take action, approving or denying the final site plan. It is at this step where the Planning Commission also reviews the proposed Development Agreement and makes a recommendation to the Township Board
3. Development Agreement Review: Upon recommendation of the Development Agreement by the Planning Commission, the Township Board takes final action on the Development Agreement.

Review Comments

We have the following comments on the Development Agreement:

1. Information Required per Zoning Ordinance, Section 6.7(B)(i)(c):

DETROIT
28 West Adams Street
Suite 1000
Detroit, Michigan 48226

O 313.888.9882
F 248.596.0930
MCKA.COM

a. Any other information deemed necessary by the Township, the Township Attorney, or Township Engineer.
b. Along with the revised site plan, we believe the revised landscape plan should be included as an exhibit.

Recommendation

We recommend that once these outstanding comments are addressed to the satisfaction of the Planning Commission, the agreement be recommended for approval.

If you have any questions about this report or require additional information, please do not hesitate to contact us.

Respectfully submitted,

McKENNA

Chris Madigan, AICP
Associate Planner

cc: Mr. Sean O'Neal, AICP
Mr. Justin Quaqliata
Ms. Hannah Micallef

LISA J. HAMAMEH
lhamameh@rsjalaw.com

27555 Executive Drive, Suite 250
Farmington Hills, Michigan 48331
P 248.489.4100 | F 248.489.1726
rsjalaw.com

ROSATI | SCHULTZ
JOPPICH | AMTSBUECHLER

May 17, 2021

via Email soneil@whitelaketwp.com

Sean O'Neil
White Lake Township
7525 Highland Road
White Lake, Michigan 48383

RE: Review of First Amendment to Planned Development Agreement
Preserve at Hidden Lake

Dear Sean:

You asked that we review of the proposed First Amendment to the Planned District Development Agreement for the Preserve at Hidden Lake sent by transmittal sheet dated May 7, 2021. Our comments follow:

1. Prior to the execution of this Amendment, the Developer must provide documentation evidencing ownership of the Property. In addition, a company resolution authorizing the signer to execute the Agreement on behalf of the LLC is required.
2. The Liber and Page of the PD Agreement in Paragraph A is incorrect. The correct Page is 549.
3. In Paragraph 1, the date of the Final Site Plan attached as Exhibit B to the PD Agreement is incorrect. It should be November 30, 2018.
4. In accordance with the Township's updated policy, Paragraph 4 should be revised to require recordation of the Amendment.
5. We defer comments on the Exhibit B to the Township Engineer.

If you have any additional questions or would like to discuss this matter further, please call or email.

Very truly yours,

ROSATI SCHULTZ JOPPICH
& AMTSBUECHLER PC

Lisa J. Hamameh

cc: Mike Leuffgen

FIRST AMENDMENT TO

PRESERVE AT HIDDEN LAKE

PLANNED DISTRICT DEVELOPMENT AGREEMENT

This is the First Amendment to the Preserve at Hidden Lake Planned District Development Agreement dated September 10, 2019 ("PD Agreement") by and between Preserve at Hidden Lake, LLC, a Michigan limited liability company ("Developer") having its principal office at 8255 Cascade Ave., Suite 110, Commerce, MI 48382, and the Charter Township of White Lake, a Michigan municipal corporation ("Township"), having its principal office at 7525 Highland Rd., White Lake, MI 48383. This amendment is effective _____.

Recitals

A. Developer and Township entered into the PD Agreement in order to allow Developer to develop, or cause to be developed pursuant to and in accordance with the Township Zoning Ordinance, the property described on Exhibit A of the PD Agreement and as shown in the Final Site Plan on Exhibit B of the PD Agreement, according to the Development Schedule set forth on Exhibit C of the PD Agreement. The PD Agreement was recorded in the office of the Oakland County Register of Deeds on September 13, 2019 at Liber 53248 Page 511.

B. Developer has revised the Final Site Plan, which revision is dated _____ ("Site Plan No. 2"). Site Plan No. 2 was approved by the Township Planning Commission ("Planning Commission") on _____. Site Plan No. 2 was approved by the Township Board of Trustees on _____. A copy of Site Plan No. 2 is attached hereto as Exhibit 1.

C. Developer has revised the Development Schedule, which revision is attached hereto as Exhibit 2.

D. Developer and Township desire to amend the PD Agreement by replacing the Final Site Plan (Exhibit B of the PD Agreement) with Site Plan No. 2, attached hereto as Exhibit 1, and by replacing the Development Schedule (Exhibit C of the PD Agreement) with the Development Schedule attached hereto as Exhibit 2.

NOW, THEREFORE, Developer and Township agree as follows:

1. The Final Site Plan dated October 5, 2018 attached as Exhibit B to the PD Agreement is hereby deleted, and Site Plan No. 2, attached hereto as Exhibit 1, shall be substituted in its place and stead as Exhibit B to the PD Agreement.

2. The Development Schedule attached as Exhibit C to the PD Agreement is hereby deleted, and the Development Schedule attached hereto as Exhibit 2 shall be substituted in its place and stead as Exhibit B to the PD Agreement.

3. The remainder of the PD Agreement is hereby reaffirmed in its entirety.

4. This First Amendment to Preserve at Hidden Lake Planned District Development Agreement, or a notice of its existence, shall be executed by the Developer and the Township and recorded by the Developer in the office of the Oakland County Register of Deeds, and may be recorded by the Township following the execution of this Amendment.

(SIGNATURES ON NEXT PAGE)

The undersigned have executed this First Amendment to Preserve at Hidden Lake Planned District Development Agreement effective as of the day and year first written above.

DEVELOPER:

Preserve at Hidden Lake, LLC, Michigan limited liability company

By: _____
Craig Piasecki
Its: Member

STATE OF MICHIGAN)
) SS
COUNTY OF OAKLAND)

The foregoing First Amendment to Preserve at Hidden Lake Planned District Development Agreement was acknowledged before me on _____ by Craig Piasecki, Member of Preserve at Hidden Lake, LLC, a Michigan limited liability company, on behalf of said limited liability company.

_____
Notary Public,
Oakland County, Michigan
My Commission Expires:
Acting in _____ County

TOWNSHIP:

CHARTER TOWNSHIP OF WHITE LAKE, a Michigan municipal corporation

By: _____
Rik Kowall
Its: Supervisor

By: _____
Anthony Noble
Its: Clerk

STATE OF MICHIGAN)
) SS
COUNTY OF OAKLAND)

The foregoing First Amendment to Preserve at Hidden Lake Planned District Development Agreement was acknowledged before me on _____ by Rik Kowall, Supervisor of the Charter Township of White Lake, a Michigan municipal corporation, on behalf of said municipal corporation.

_____
Notary Public,
Oakland County, Michigan
My Commission Expires:
Acting in _____ County

STATE OF MICHIGAN)
) SS
COUNTY OF OAKLAND)

The foregoing First Amendment to Preserve at Hidden Lake Planned District Development Agreement was acknowledged before me on _____ by Anthony Noble, Clerk of the Charter Township of White Lake, a Michigan municipal corporation, on behalf of said municipal corporation.

_____
Notary Public,
Oakland County, Michigan
My Commission Expires:
Acting in _____ County

Prepared by:

Bruce M. Hug
Attorney and Counselor
PO Box 600
Union Lake, MI 48387

Return to:

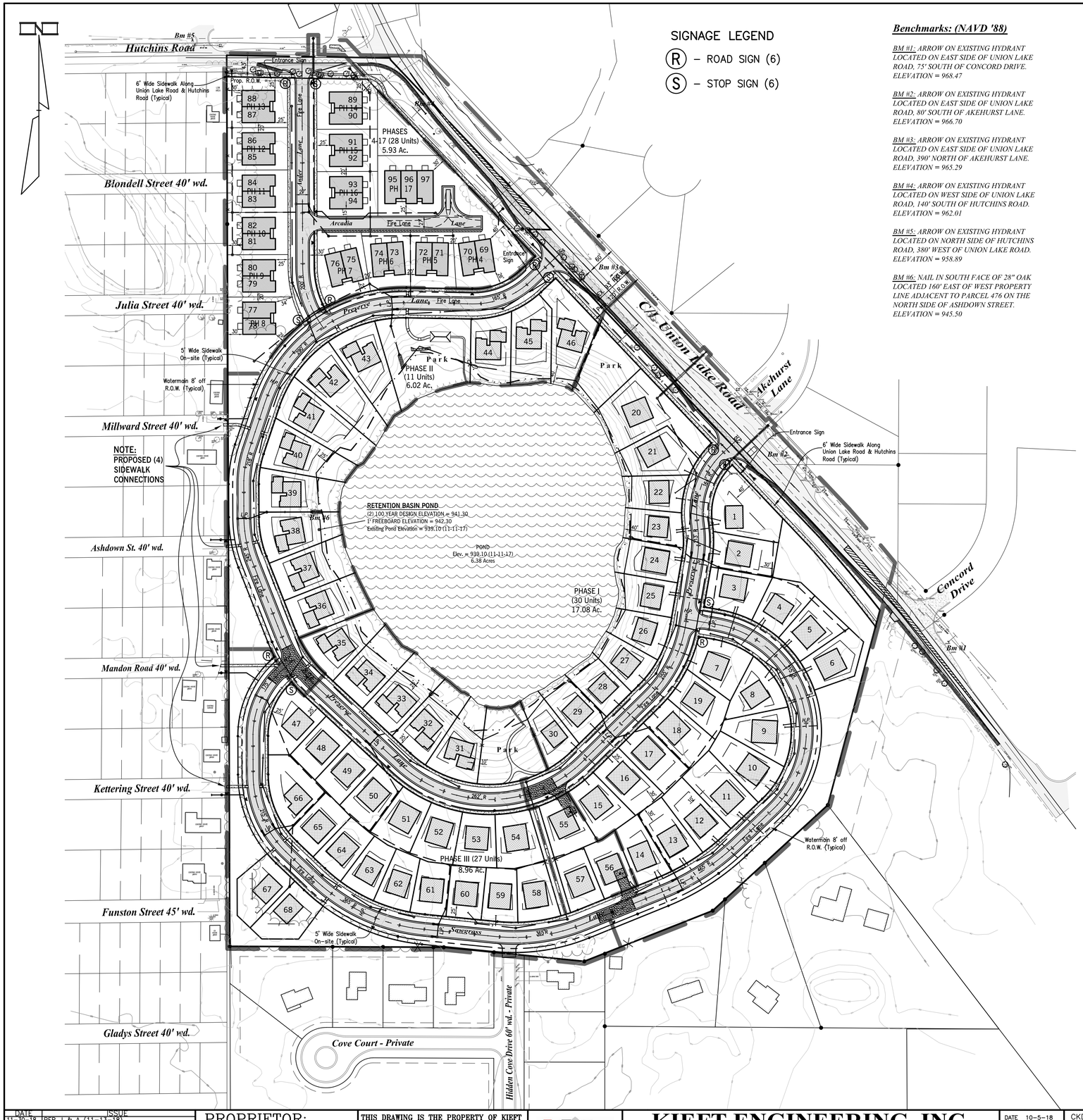
Craig Piasecki
Preserve at Hidden Lake, LLC
8255 Cascade
Suite 110
Commerce, MI 48382

FIRST AMENDMENT TO

PRESERVE AT HIDDEN LAKE

PLANNED DISTRICT DEVELOPMENT AGREEMENT

EXHIBIT 1 – SITE PLAN DATED _____



SIGNAGE LEGEND

(R) – ROAD SIGN (6)

(S) – STOP SIGN (6)

Benchmarks: (NAVD '88)

BM #1: ARROW ON EXISTING HYDRANT LOCATED ON EAST SIDE OF UNION LAKE ROAD, 75' SOUTH OF CONCORD DRIVE. ELEVATION = 968.47

BM #2: ARROW ON EXISTING HYDRANT LOCATED ON EAST SIDE OF UNION LAKE ROAD, 80' SOUTH OF AKEHURST LANE. ELEVATION = 966.70

BM #3: ARROW ON EXISTING HYDRANT LOCATED ON EAST SIDE OF UNION LAKE ROAD, 390' NORTH OF AKEHURST LANE. ELEVATION = 965.29

BM #4: ARROW ON EXISTING HYDRANT LOCATED ON WEST SIDE OF UNION LAKE ROAD, 140' SOUTH OF HUTCHINS ROAD. ELEVATION = 962.01

BM #5: ARROW ON EXISTING HYDRANT LOCATED ON NORTH SIDE OF HUTCHINS ROAD, 380' WEST OF UNION LAKE ROAD. ELEVATION = 958.89

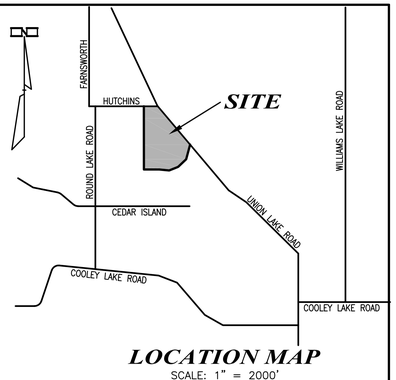
BM #6: NAIL IN SOUTH FACE OF 28" OAK LOCATED 160' EAST OF WEST PROPERTY LINE ADJACENT TO PARCEL 476 ON THE NORTH SIDE OF ASHDOWN STREET. ELEVATION = 945.50

LEGEND

EXISTING / PROPOSED

STORM SEWER
SANITARY SEWER
WATERMAIN
GAS MAIN
ELEC. TELE. CABLE
STORM MANHOLE
CATCH BASIN
INLET
REARYARD CATCH BASIN
END SECTION
SANITARY MANHOLE
GATE VALVE AND WELL
HYDRANT
CONTOURS

LOT #	AREA	LOT #	AREA
1	13,436 SF/0.31 acres	35	11,556 SF/0.27 acres
2	8,811 SF/0.20 acres	36	12,382 SF/0.28 acres
3	9,274 SF/0.21 acres	37	12,167 SF/0.28 acres
4	8,264 SF/0.19 acres	38	11,886 SF/0.27 acres
5	8,752 SF/0.20 acres	39	12,133 SF/0.28 acres
6	8,777 SF/0.20 acres	40	12,652 SF/0.29 acres
7	9,689 SF/0.22 acres	41	14,442 SF/0.33 acres
8	8,449 SF/0.19 acres	42	14,742 SF/0.34 acres
9	9,842 SF/0.23 acres	43	13,610 SF/0.31 acres
10	9,683 SF/0.22 acres	44	10,764 SF/0.25 acres
11	10,659 SF/0.24 acres	45	12,772 SF/0.29 acres
12	9,068 SF/0.21 acres	46	13,793 SF/0.32 acres
13	8,881 SF/0.20 acres	47	9,939 SF/0.23 acres
14	8,040 SF/0.18 acres	48	7,462 SF/0.17 acres
15	8,979 SF/0.21 acres	49	7,686 SF/0.18 acres
16	8,790 SF/0.20 acres	50	8,299 SF/0.19 acres
17	9,100 SF/0.21 acres	51	8,720 SF/0.20 acres
18	9,460 SF/0.22 acres	52	8,454 SF/0.19 acres
19	8,598 SF/0.20 acres	53	8,028 SF/0.18 acres
20	18,607 SF/0.43 acres	54	8,931 SF/0.21 acres
21	10,891 SF/0.25 acres	55	8,604 SF/0.20 acres
22	8,100 SF/0.19 acres	56	7,917 SF/0.18 acres
23	7,490 SF/0.17 acres	57	7,413 SF/0.17 acres
24	9,031 SF/0.21 acres	58	8,001 SF/0.18 acres
25	8,087 SF/0.19 acres	59	7,070 SF/0.16 acres
26	7,968 SF/0.18 acres	60	7,231 SF/0.17 acres
27	7,636 SF/0.18 acres	61	7,063 SF/0.16 acres
28	7,912 SF/0.18 acres	62	7,045 SF/0.16 acres
29	8,540 SF/0.20 acres	63	7,090 SF/0.16 acres
30	8,438 SF/0.19 acres	64	7,371 SF/0.17 acres
31	11,649 SF/0.26 acres	65	7,715 SF/0.18 acres
32	11,863 SF/0.27 acres	66	10,551 SF/0.24 acres
33	12,200 SF/.28 acres	67	9,355 SF/0.21 acres
34	11,860 SF/0.27 acres	68	9,216 SF/0.21 acres



LOCATION MAP

SCALE: 1" = 2000'

UTILITY INFORMATION

A 12' WIDE PERMANENT PRIVATE EASEMENT FOR WATER SUPPLY SYSTEM GRANTED TO WHITE LAKE TOWNSHIP AND CENTERED ON THE UTILITY AS SHOWN.

A 20' WIDE PERMANENT PRIVATE EASEMENT FOR SANITARY SEWER SYSTEM GRANTED TO WHITE LAKE TOWNSHIP AND CENTERED ON THE UTILITY AS SHOWN.

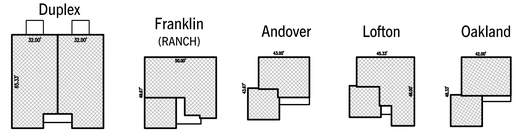
A 20' WIDE PERMANENT PRIVATE EASEMENT FOR STORM SEWER SYSTEM GRANTED TO WHITE LAKE TOWNSHIP AND CENTERED ON THE UTILITY AS SHOWN.

APPROPRIATE EASEMENTS FOR PROPOSED SANITARY SEWER AND WATER MAINS WILL BE DEDICATED TO WHITE LAKE TOWNSHIP BY SEPARATE DOCUMENTS.

ALL PRIVATE ROADWAYS ARE A PERMANENT EASEMENT FOR INGRESS/EGRESS AND OPERATION/MAINTENANCE OF THE WATER SUPPLY SYSTEM AND SANITARY SEWER SYSTEM.

TYPICAL BUILDING FOOTPRINTS

ALL SINGLE FAMILY UNITS AS DESIGNED WILL ACCOMMODATE AT LEAST THE ANDOVER AND OAKLAND FOOTPRINT



As Surveyed (Total Parcel)

PART OF THE NORTHWEST 1/4 OF SECTION 36, TOWN 3 NORTH, RANGE 8 EAST, WHITE LAKE TOWNSHIP, OAKLAND COUNTY, MICHIGAN, BEING MORE PARTICULARLY DESCRIBED AS BEGINNING AT THE NW CORNER OF SECTION 36, T3N, R8E; TH S 89°00'59" E 323.66 FT TO A POINT ON THE CENTERLINE OF UNION LAKE ROAD; TH ALONG SAID CENTERLINE S 24°10'25" E 4.31 FT; TH S 43°23'32" E 463.24 FT; TH N 89°00'59" W 46.17 FT TO A POINT ON THE WESTERLY RIGHT-OF-WAY OF UNION LAKE ROAD; TH ALONG SAID RIGHT-OF-WAY S 43°23'32" E (REC. AS S 43°45'20" E) 839.31 FT; TH ALONG SAID RIGHT-OF-WAY BEING A CURVE TO THE RIGHT 189.89 FT (REC. AS 181.81 FT), SAID CURVE HAVING A RADIUS OF 2831.93 FT, A DELTA OF 03°50'31" AND A LONG CHORD OF S 39°47'49" E 189.86 FT (REC. AS S 41°55'00" E 181.78 FT); TH S 14°57'09" W 400.35 FT (REC. AS S 15°00'00" W 418.26 FT & 412.17 FT); TH S 47°26'59" W (REC. AS S 46°30'00" W) 310.00 FT; TH S 68°27'06" W 229.86 FT TO THE NE CORNER OF "HIDDEN COVE" CONDOMINIUM, O.C.C.P. NO. 1097; TH THE FOLLOWING THREE COURSES ALONG THE NORTH LINE OF SAID "HIDDEN COVE" CONDOMINIUM S 68°27'06" W 43.95 FT (REC. AS S 68°00'00" W 43.57 FT) AND N 84°15'40" W (REC. AS N 84°30'00" W) 280.00 FT AND TH N 89°45'40" W 424.46 FT (REC. AS WEST 426.99 FT) TO THE NW CORNER OF SAID "HIDDEN COVE" CONDOMINIUM BEING A POINT ON THE WEST LINE OF SECTION 36; TH ALONG SAID WEST LINE N 00°12'01" W 1768.32 FT TO THE POINT OF BEGINNING. CONTAINING 37.99 ACRES. SUBJECT TO THE RIGHTS OF THE PUBLIC OVER THE NORTH 33 FT FOR HUTCHINS ROAD AND THE NORTHEASTERLY 33 FT FOR UNION LAKE ROAD. ALSO SUBJECT TO EASEMENTS AND RESTRICTIONS OF RECORD.

Sheet Index:

1. *Overall Site Plan*
2. *Existing Conditions Plan*
3. *Final Site Plan - North*
4. *Final Site Plan - South*
5. *Retention Basin Calculations, Details & Notes*
6. *Storm Sewer Profiles*
7. *Storm Sewer Calculations & Details*

Patrick C. McWilliams
STATE OF MICHIGAN
PATRICK McWILLIAMS
ENGINEER
NO. 31658
LICENSED PROFESSIONAL ENGINEER

STATE OF MICHIGAN
JAMES J. SCHARL
PROFESSIONAL SURVEYOR
NO. 19843
LICENSED PROFESSIONAL SURVEYOR

DATE	ISSUE
11-20-18	PER J & A (11-13-18)
1-11-19	PER J & A (12-19-18), McKenna (12-18-18), DPS
2-24-2021	PER CLIENT REVISED PHASE 2, 3 & 4 (1-22-2021)
3-25-2021	PER DLZ (3-11-2021), & McKENNA (3-11-2021)
5-6-2021	PER DLZ (4-27-2021), & McKENNA (4-26-2021)

PROPRIETOR:
Preserve at Hidden Lake, LLC
8255 CASCADE AVENUE, SUITE 110
COMMERCE TOWNSHIP, MICHIGAN 48382
(248) 842-8613

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PHONE (248) 625-5251 www.kiefteng.com FAX (248) 625-7110

DATE	10-5-18
DRAWN	GF
DESIGN	JJS
SECTION	36

CKD. BY | DATE

T- 3 -N. R- 8 -E.

72 HOURS (3 WORKING DAYS) BEFORE YOU DIG CALL MISS DIG 800-482-7171 (TOLL FREE)

Overall Site Plan

"Preserve at Hidden Lake"

WHITE LAKE TOWNSHIP, OAKLAND COUNTY, MICHIGAN

SCALE 1" = 100'

SHEET 1 OF 7

KE 2017.182

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P.O.B.
NW CORNER
SECTION 36
T3N, R8E

Bm #5

Hutchins Road

S 89°00'59" E 323.66'

S 54°10'25" E 47.12'

IRON W/CAP FD

Bm #4

IRON W/CAP FD

S 43°23'32" E 463.24'

20' SANITARY SEWER EASEMENT L. 20592, P. 129

8" WATER MAIN EASEMENT L. 20592, P. 132

16' MICHIGAN BELL RIGHT OF WAY L. 3571, P. 672 - 673

12-36-101-001
3.83 Acres
R-1D

IRON FD

N 89°00'59" W 46.17'

IRON W/CAP FD

IRON W/CAP FD

Bm #3

IRON W/CAP FD

C/L Union Lake Road

S 43°23'32" E (M)
S 43°45'29" E (R)

16' MICHIGAN BELL RIGHT OF WAY L. 3571, P. 672 - 673

Akehurst Lane

S 43°23'32" E (M)
S 43°45'29" E (R)
839.31'

Bm #2

MON FD

ARC=167.65'
RADIUS=2864.93'
DELTA=3°21'10"
LC=S 40°03'05" E
167.62'

MON FD

Concord Drive

IRON W/CAP FD

Bm #1

ARC=189.89' (M) 181.81' (R)
RADIUS=2831.93' (M) (R)
DELTA=03°50'31"
LC=S 39°47'49" E
189.86' (M)
S 41°55'00" E
181.78' (R)

S 14°57'09" W 400.35'
S 15°00'00" W
418.26' (R) & 417.17' (R)

60' Ut. Convent. & Access. Easmt. L. 1873, P. 925, O.C.R.

IRON FD

IFC

S 47°26'56" W (M)
S 46°30'00" W (R)
310.00'

IRON FD

MON SET

229.86'

S 68°27'06" W 234.81' (M)
S 68°00'00" W 270.00' (R)

MON FD

NE CORNER
"HIDDEN COVE"
IRON SET

S 68°27'06" W
43.95' (M) 43.57' (R)

Hidden Cove Drive 60' wd. - Private

Cove Court - Private

N 84°15'40" W (M)
N 84°30'00" W (R)
280.00'

MON SET

MON FD MON FD MON FD MON FD

N 89°45'40" W 424.46' (M)
WEST 426.99' (R)

NW CORNER
"HIDDEN COVE"
IRON SET

N 00°12'01" E 892.33'

W 1/4 COR
SECTION 36
T3N, R8E

WEST LINE OF SECTION 36 N 00°12'01" E 2660.65'
N 00°12'01" E 1768.32'
1433.24' (M) 1427.32' (R)

S 00°12'01" W 335.68' (M) 335.01' (R)

Blondell Street 40' wd.

Julia Street 40' wd.

Millward Street 40' wd.

Ashdown St. 40' wd.

Mandon Road 40' wd.

Kettering Street 40' wd.

Funston Street 45' wd.

Gladys Street 40' wd.

12-36-101-004
RM-1
3.0 ACRES

Total 37.99
Acres

12-36-101-003
31.50 Acres
RM-1

14B 62B 35A 53A W

Benchmarks: (NAVD '88)

BM #1: ARROW ON EXISTING HYDRANT LOCATED ON EAST SIDE OF UNION LAKE ROAD, 75' SOUTH OF CONCORD DRIVE. ELEVATION = 968.47

BM #2: ARROW ON EXISTING HYDRANT LOCATED ON EAST SIDE OF UNION LAKE ROAD, 80' SOUTH OF AKEHURST LANE. ELEVATION = 966.70

BM #3: ARROW ON EXISTING HYDRANT LOCATED ON EAST SIDE OF UNION LAKE ROAD, 390' NORTH OF AKEHURST LANE. ELEVATION = 965.29

BM #4: ARROW ON EXISTING HYDRANT LOCATED ON WEST SIDE OF UNION LAKE ROAD, 140' SOUTH OF HUTCHINS ROAD. ELEVATION = 962.01

BM #5: ARROW ON EXISTING HYDRANT LOCATED ON NORTH SIDE OF HUTCHINS ROAD, 380' WEST OF UNION LAKE ROAD. ELEVATION = 958.89

BM #6: NAIL IN SOUTH FACE OF 28" OAK LOCATED 160' EAST OF WEST PROPERTY LINE ADJACENT TO PARCEL 476 ON THE NORTH SIDE OF ASHDOWN STREET. ELEVATION = 945.50

LEGEND

EXISTING

- STORM SEWER
- SANITARY SEWER
- WATERMAIN
- GAS MAIN
- ELEC. TELE. CABLE
- STORM MANHOLE
- CATCH BASIN
- INLET
- REARYARD CATCH BASIN
- END SECTION
- SANITARY MANHOLE
- GATE VALVE AND WELL
- HYDRANT
- 950 CONTOURS

SOILS LEGEND

SYMBOL	*NAME*
14B	*Oakville fine sand, 0-6% slopes*
35A	*Thetford loamy fine sand, 0-3% slopes*
53A	*Tedrow loamy sand, 0-3% slopes*
62B	*Urban land-Spinks complex, 0-8% slopes*
W	*Water*

STATE OF MICHIGAN
PATRICK McWILLIAMS
ENGINEER
NO. 31658
LICENSED PROFESSIONAL ENGINEER

DATE	ISSUE
11-30-18	PER J. & A. (11-13-18)
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SECTION	36	T- 3 -N, R- 8 -E.

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Existing Conditions Plan

"Preserve at Hidden Lake"

WHITE LAKE TOWNSHIP, OAKLAND COUNTY, MICHIGAN

SCALE 1" = 100'

SHEET 2 OF 7

KE 2017.182

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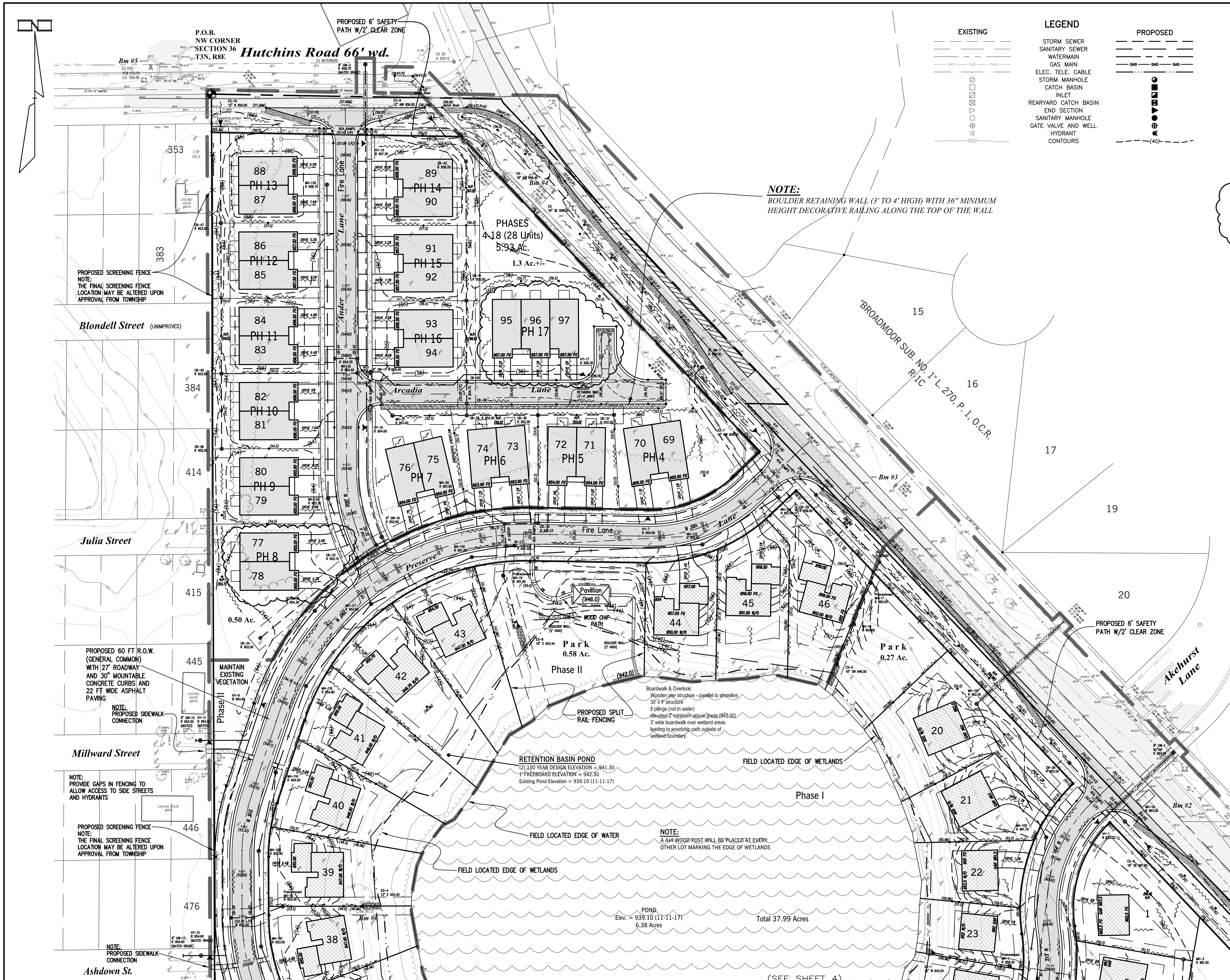

PD Zoning - Planned Development District

SETBACKS: (PER ORDINANCE)
FRONT - 40 FEET
REAR - 30/40 FEET (TO BE DETERMINED BY PLANNING COMMISSION)
SIDES - 25 FEET ONE SIDE
50 FEET TOTAL OF TWO SIDES

RESIDENTIAL:
TOTAL UNITS PROPOSED - 68
FRONT SETBACK - 25 FT
REAR SETBACKS:
POND LOTS MIN. (WATER) - 40 FT
POND LOTS MIN. (WETLANDS) - 25 FT
OFF POND LOTS - 30 FT
SIDE YARD SETBACKS - 10 FT (EACH SIDE)
ALL UNITS HAVE AT LEAST 70 FT OF FRONTAGE AT THE FRONT 25 FT SETBACK

DUPLEX UNITS:
TOTAL DUPLEX UNITS PROPOSED - 26
TOTAL TRI-PLEX UNITS PROPOSED - 1
FRONT SETBACK - 25 FT MIN. (TO SIDEWALK EXCEPT UNIT 78 = 21 FT TO R.O.W.)
REAR SETBACK - 30 FT (EXCEPT UNIT 89 = 25 FT)
SIDE YARD SETBACKS - 10 FT EA (TOTAL 20 FT)

OPEN SPACE - RESIDENTIAL UNITS
OPEN SPACE - 3.32 Ac.
POND AREA - 6.38 Ac.
OPEN SPACE - 9.70 Ac.

OPEN SPACE - DUPLEX UNITS
OPEN SPACE - 1.8 Ac.+/-
TOTAL OPEN SPACE - 11.5 ACRES+/-
TOTAL SITE AREA (NET) - 37.99 ACRES

OPEN SPACE RATIO = 30.0%

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Final Site Plan - North
"Preserve at Hidden Lake"
WHITE LAKE TOWNSHIP, OAKLAND COUNTY, MICHIGAN

SCALE 1" = 50'
SHEET 3 OF 7
KE 2017.182

STATE OF MICHIGAN PATRICK McWILLIAMS ENGINEER NO. 31658 LICENSED PROFESSIONAL ENGINEER

STATE OF MICHIGAN JAMES J. SCHARL PROFESSIONAL SURVEYOR NO. 19843 LICENSED LAND SURVEYOR

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(SEE SHEET 3)

POND
Elev. = 939.10 (11-11-17)
6.38 Acres

Total 37.99 Acres

NOTE:
PROPOSED SIDEWALK CONNECTION

Ashdown St.

MARJORIE VESTA PARK L. 20, P. 7, O.C.R.
R-1D

NOTE:
PROPOSED SIDEWALK CONNECTION

Mandon Road

PROPOSED SCREENING FENCE
NOTE:
THE FINAL SCREENING FENCE LOCATION MAY BE ALTERED UPON APPROVAL FROM TOWNSHIP

NOTE:
PROVIDE GAPS IN FENCING TO ALLOW ACCESS TO SIDE STREETS AND HYDRANTS

NOTE:
PROPOSED SIDEWALK CONNECTION

Kettering Street

Funston Street

NW CORNER
"HIDDEN COVE"
IRON SET

"HIDDEN COVE" O.C.C.P. NO. 1097
R-1C

Gladys Street

Cove Drive - Private

Cove Court - Private

Union Lake Road

RETENTION BASIN POND
(2) 100 YEAR-DESIGN ELEVATION = 941.30
1' FREEBOARD ELEVATION = 942.30
Existing Pond Elevation = 939.10 (11-11-17)

FIELD LOCATED EDGE OF WETLANDS

FIELD LOCATED EDGE OF WETLANDS

Boardwalk & Overlook:
Wooden pier structure - parallel to shoreline.
20' x 4' structure
6 pilings (not in water)
elevated 2' minimum above grade (942.00)
3' wide boardwalk over wetland areas leading to woodchip path outside of wetland boundary.

PROPOSED SPLIT RAIL FENCING

PROPOSED SPLIT RAIL FENCING

Phase I
Phase II
Phase III

Park
0.37 Ac.

WOOD CHIP PATH

MAINTAIN EXISTING VEGETATION

Commons Area 2.00 Ac.

Preserve Fire Lane

Lane

Fire Lane

Waterside Drive

Sycamore Fire Lane

PROPOSED 5 FT SIDEWALK

MAINTAIN EXISTING VEGETATION

PROPOSED 60 FT R.O.W. (GENERAL-COMMON) WITH 27' ROADWAY AND 30' MOUNTABLE CONCRETE CURBS AND 22 FT WIDE ASPHALT PAVING

60' wd. Easement for Ingress & Egress L. 16734, P. 829, O.C.R.

12-36-176-002
LB

12-36-151-017
R-1A

PROPOSED SCREENING FENCE W/VEGETATED GREENBELT
NOTE:
THE FINAL SCREENING FENCE LOCATION MAY BE ALTERED UPON APPROVAL FROM TOWNSHIP

12-36-151-016
R-1A

12-36-151-015
R-1A

PROPOSED SCREENING FENCE
NOTE:
THE FINAL SCREENING FENCE LOCATION MAY BE ALTERED UPON APPROVAL FROM TOWNSHIP

PROPOSED FIRE PROTECTION SWING GATE (MIN. 20' WIDE) FOR EMERGENCY ACCESS AS PER WHITE LAKE TOWNSHIP FIRE DEPARTMENT REQUIREMENTS

NE CORNER
"HIDDEN COVE"
IRON SET

PATRICK McWILLIAMS ENGINEER NO. 31658 — STATE OF MICHIGAN — REGISTERED PROFESSIONAL ENGINEER

JAMES SCHARL PROFESSIONAL SURVEYOR NO. 19843 — STATE OF MICHIGAN — REGISTERED LAND SURVEYOR

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Final Site Plan - South

"Preserve at Hidden Lake"

WHITE LAKE TOWNSHIP, OAKLAND COUNTY, MICHIGAN

SCALE 1" = 50'
SHEET 4 OF 7
KE 2017.182

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GENERAL NOTES

1) PROPERTY SIDWELL NUMBER 12-36-101-001, -003, -004
2) ZONING PD - PLANNED DEVELOPMENT
3) PROPOSED USE: SINGLE FAMILY RESIDENTIAL (SITE CONDOMINIUM), DUPLEX UNITS & A SINGLE UNIT.
4) MINIMUM UNIT SIZE PROPOSED: 7,045 SF (UNIT 21), WIDTH 70 FEET, AVERAGE UNIT SIZE 9,416 SF.
5) PROPOSED SETBACK REQUIREMENTS:
   RESIDENTIAL:
   TOTAL UNITS PROPOSED - 68
   FRONT SETBACK - 25 FT
   REAR SETBACKS:
   POND UNITS MIN. (WATER) - 40 FT
   POND UNITS MIN. (WETLANDS) - 25 FT
   OFF POND UNITS - 30 FT
   SIDE YARD SETBACKS - 10 FT (EACH SIDE)
   ALL UNITS HAVE AT LEAST 70 FT OF FRONTAGE AT THE FRONT 25 FT SETBACK

   DUPLEX UNITS:
   TOTAL DUPLEX UNITS PROPOSED - 26
   TOTAL TRI-PLEX UNITS PROPOSED - 1
   FRONT SETBACK - 25 FT MIN. (TO SIDEWALK EXCEPT UNIT 78 = 21 FT TO R.O.W.)
   REAR SETBACK - 30 FT (EXCEPT UNIT 89 = 25 FT)
   SIDE YARD SETBACKS - 10 FT EA (TOTAL 20 FT)

6) STREETS ARE 60 FOOT WIDE RIGHT-OF-WAY W/27 FT WIDE ASPHALT W/CONCRETE CURB AND GUTTER (5,600 LF TOTAL ROAD LENGTH). THE DEVELOPER INTENDS ALL ROADS TO BE PRIVATE.
7) NUMBER OF UNITS: SINGLE FAMILY = 68, DUPLEX UNITS = 28, SINGLE UNIT = 1.
8) SEWAGE DISPOSAL: TO BE CONNECTED TO MUNICIPAL SANITARY SEWER SYSTEM ALONG UNION LAKE ROAD.
9) WATER SUPPLY: AN 8" WATERMAIN IS PROPOSED TO BE CONNECTED TO THE MUNICIPAL WATERMAIN AT TWO LOCATIONS, ONE ALONG UNION LAKE ROAD AND ONE ALONG HUTCHINS ROAD.
10) PERMIT REQUIRED FROM OAKLAND ROAD COMMISSION FOR CONNECTIONS TO UNION LAKE ROAD AND HUTCHINS ROAD
11) SOIL EROSION PERMIT REQUIRED FROM OAKLAND COUNTY WATER RESOURCE COMMISSION.
12) ALL ROADWAYS WILL BE 22' WIDE ASPHALT WITH 30" MOUNTABLE CONCRETE CURB AND GUTTER (27' WIDE TOTAL).
13) PUBLIC UTILITIES (GAS, ELECTRIC, TELEPHONE & CABLE) SHALL BE INSTALLED UNDERGROUND.
14) PHOSPHOROUS BASED LAWN FERTILIZERS WILL NOT BE ALLOWED.
15) NO BRUSH OR GRASS CLIPPINGS WILL BE STORED OR DISPOSED OF INTO THE COMMON/PARK AREAS OR WETLANDS.
16) ALL YARD WASTE TO BE REMOVED FROM SITE.
17) PUBLIC SIDEWALKS ARE PROPOSED AS PER EXISTING ORDINANCE REQUIREMENTS.
18) INDIVIDUAL PLOT PLANS AND GRADING SHALL BE PREPARED BY A LICENSED ENGINEER OR SURVEYOR.
19) PROPOSED SITE GRADES SHALL MATCH EXISTING GRADES AT THE PROPERTY LINE WHERE OFF-SITE GRADING RIGHTS DO NOT EXIST.
20) ALL DISTURBED AREAS SHALL BE RE-VEGETATED.
21) POND RETENTION BASIN SIDE SLOPES SHALL BE LEFT NATURAL. IT IS LIKELY THAT TO OBTAIN WALKOUTS ON THE POND UNITS, SOME GRADING MAY BE REQUIRED WITHIN THE 25' WETLANDS SETBACK AREA.
22) REAR AND SIDE-YARD DRAINAGE EASEMENTS WILL BE SHOWN ON THE GRADING PLAN.
23) ALL FINAL ROAD GRADES WILL COMPLY WITH ROAD COMMISSION FOR OAKLAND COUNTY STANDARDS.
24) TYPICAL UNIT COVERAGE; AVERAGE HOUSE FOOTPRINT = 2,100 SF, AVERAGE DRIVEWAY = 750 SF;
    TOTAL UNIT COVERAGE = 2,850 SF
    TYPICAL UNIT COVERAGE % = 2,850 SF/9,416 SF = 30% (OR LESS)
25) REQUIRED PERMITS/APPROVALS:
    -WHITE LAKE TOWNSHIP - ENGINEERING PLANS APPROVAL
    -O.C.W.R.C. - SOIL EROSION PERMIT
    -O.C.W.R.C. - WATERMAIN APPROVAL
    -O.C.W.R.C. - SANITARY SEWER APPROVAL
    -M.D.E.Q. - WATERMAIN PERMIT
    -M.D.E.Q. - SANITARY SEWER PERMIT
    -M.D.E.Q. - NPDES NOTICE OF COVERAGE PERMIT
    -M.D.E.Q. - WETLANDS (STORM DISCHARGE) PERMIT
    -R.C.O.C. - APPROACH & UNDERGROUND PERMITS
26) THERE ARE WETLANDS ON THIS SITE.
27) EACH HOME SHALL HAVE A 2 CAR GARAGE AND DRIVEWAYS WHICH WILL ACCOMMODATE THE REQUIRED OFF-STREET PARKING.
28) OFF-SITE IMPROVEMENTS SHALL BECOME PUBLIC.
29) ALL SIDEWALKS MUST COMPLY WITH ADA STANDARDS.
30) NO STREET LIGHTING IS PROPOSED. EXTERIOR LIGHTS SHALL BE INSTALLED ON INDIVIDUAL HOMES, DUPLEXES & SINGLE UNIT.
31) SCREENING FENCE (6' HIGH VINYL CLAD) SHALL BE PROVIDED ALONG SOME OF THE PROPERTY LINES AS SHOWN ON THE LANDSCAPE PLAN OR AS DETERMINED AFTER SITE CLEARING AND CONSTRUCTION HAS BEEN COMPLETED.
32) TRASH PICKUP FOR THE HOMES AND DUPLEXES WILL BE CURBSIDE.
33) PARKING IS NOT ALLOWED ON THE ROAD CONNECTING TO HUTCHINS ROAD. PARKING IS ALLOWED ON ONE SIDE ONLY ALONG HIDDEN LANE AND PRESERVE LANE (OPPOSITE THE FIRE HYDRANTS/WATERMAIN).
34) FIRE LANES PROVIDED ALONG ALL (3) ROADS & DUPLEX DRIVES (27' WIDE).
35) INDIVIDUAL BUILDING ADDRESSES SHALL BE 6" MINIMUM.

"C" CALCULATION

ROADS & APPROACHES:
ROADS = 151,200 SF
APPROACHES = 6,525 SF
157,725 SF

PARKING AREAS:
36,950 SF

DRIVEWAYS:
80,700 SF

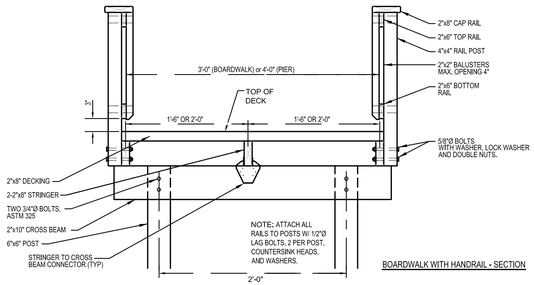
SIDEWALKS:
63,260 SF

TOTAL PAVEMENT WALKS: 338,635 SF = 7.78 ACRES @ C = 0.80

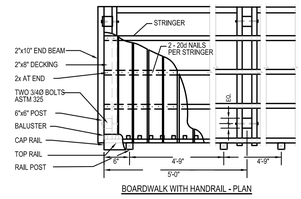
ROOF AREAS:
SINGLE FAMILY = 136,000 SF
3 PLEX HOMES = 5,700 SF
DUPLEX HOMES = 22,800 SF
TOWNHOMES = 25,900 SF
=190,400 SF = 4.37 ACRES @ C = 0.90

RETENTION BASIN/POND AREA: 6.38 ACRES @ C = 1.00
GREENBELT AREAS: 19.46 ACRES @ C = 0.20
TOTAL AREA = 37.99 ACRES

$$"C" = \left(\frac{7.78\ \text{Acres}}{37.99\ \text{Ac.}} \times 0.80\right) + \left(\frac{4.37\ \text{Acres}}{37.99\ \text{Ac.}} \times 0.90\right) + \left(\frac{6.38\ \text{Acres}}{37.99\ \text{Ac.}} \times 1.00\right) + \left(\frac{19.46\ \text{Acres}}{37.99\ \text{Ac.}} \times 0.20\right) = 0.5377 = 0.54$$

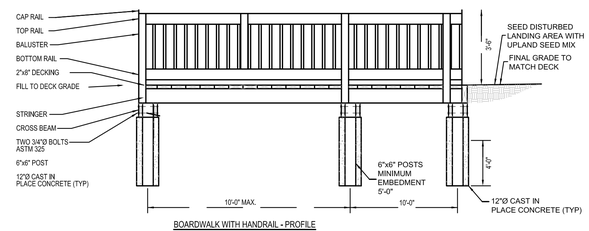


BOARDWALK WITH HANDRAIL - SECTION



BOARDWALK WITH HANDRAIL - PLAN

NOTES:
1. ALL BOARDWALKS SHALL BE SITUATED SO THAT BOTTOM OF BEAM SHALL BE A MINIMUM OF 6 INCHES ABOVE THE 100-YEAR WATER ELEVATION FOR THE SPECIFIC WETLAND/POND.
2. ALL BOARDWALKS SHALL HAVE CONCRETE FOOTINGS THAT EXTEND A MINIMUM DEPTH OF 48 INCHES BELOW FINISH GRADE (FROST DEPTH).
3. ALL BOARDWALKS SHALL HAVE HANDRAILS WITH A MINIMUM HEIGHT OF 36 INCHES AND RAIL OPENINGS NO GREATER THAN 4 INCHES APART.
4. ALL BOARDWALK FINISH DECK ELEVATIONS SHALL MATCH FINISHE GRADE ELEVATIONS OF ABUTTING PAVED PATH SURFACE.
5. ALL BOARDWALK CROSSINGS THROUGH MITIGATION WETLAND AREAS SHALL MINIMIZE DISTURBANCE TO WET LAND PLANTINGS. ALL DISTURBED AREAS SHALL BE RESTORED/ REPLANTED PER WETLAND MITIGATION SPECIFICATIONS FOR THIS PROEJCT.



BOARDWALK WITH HANDRAIL - PROFILE

NOTE:
1. REFER TO MDOT SPECIFICATION SECTION 5.15 - TIMBER STRUCTURES FOR INFORMATION ON MATERIALS AND INSTALLATION. ALL BOARDWALK DESIGN SHALL BE IN ACCORDANCE WITH THE NATIONAL FOREST PRODUCT ASSOCIATIONS NATIONAL DESIGN SPECIFICATION AND THE AMERICAN INSTITUTE OF TIMBER CONSTRUCTIONS TIMBER CONSTRUCTION MANUAL.
2. ALL DECKING AND HANDRAIL TO BE RECYCLED LUMBER (TREX BRAND, "ORIGINS NATURAL" OR APPROVED EQUIVALENT).

(2) 100 YEAR RETENTION POND CALCULATIONS

ON-SITE CONTRIBUTING AREA TO POND (EXCLUDING PROPOSED R.O.W.'S) = 35.19 ACRES
UNION LAKE ROAD PROPOSED R.O.W. AREA = 1.65 ACRES
HUTCHINS ROAD PROPOSED R.O.W. AREA = 0.30 ACRES
OFF-SITE WEST AREAS = 0.27 ACRES
TOTAL ACTUAL CONTRIBUTING AREAS TO POND = 37.41 ACRES

NOTE: WE WILL STILL DESIGN FOR 37.99 ACRES (THE ORIGINAL PROPERTY ACREAGE) TO BE CONSERVATIVE.

ASSUMED DESIGN AREA 37.99 ACRES
TOTAL CONTRIBUTING AREA = 37.99 ACRES
AVERAGE RUNOFF COEFFICIENT (C) = 0.54
VOLUME (2) 100 YR = (2)(A)(C)(16,500) = (2)(37.99)(0.54)(16,500) = 676,982 CF

VOLUME PROVIDED:

@ 939.10: 274,428 SF
@ 940.0: 312,677 SF
} 293,552 SF_{AV} x 0.90' DEPTH = 264,196 CF

@ 941.30: 327,223 SF
@ 942.0: 339,223 SF
} 319,950 SF_{AV} x 1.3' DEPTH = 415,935 CF

680,131 CF PROVIDED

(NOTE: AT ELEVATION 942.0; WE HAVE 916,096 CF OF STORAGE VOLUME)

RETENTION POND/BASIN

EXISTING WATER ELEVATION = 939.10 (11-11-2017)
DESIGN HIGH WATER ELEVATION = 941.30 (2-100 YEAR STORM)
1' FREEBOARD ELEVATION = 942.30
STORAGE REQUIRED = 676,982 C.F.
STORAGE PROVIDED = 680,131 C.F.

Storm Water Facilities Maintenance Plan

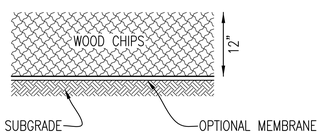
The "Preserve @ Hidden Lake" Homeowners Association shall be responsible for the maintenance of all the storm water facilities. (Note: The developer is responsible until the HOA exists).

These facilities include the following:

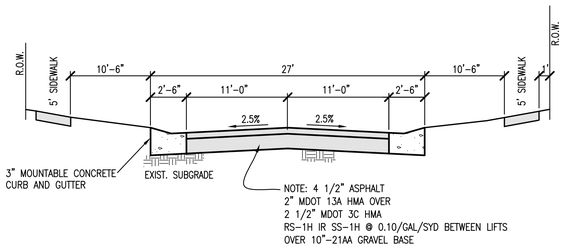
- *Retention Basin Pond*
- *Pretreatment Structure Manholes*
- *Manholes, Rear Yard Catch Basins, End Sections & connecting pipe work*
- *Rear yard swales (within easements)*

The HOA shall hired a qualified contractor to do the following Maintenance Schedule (including report kept on record):

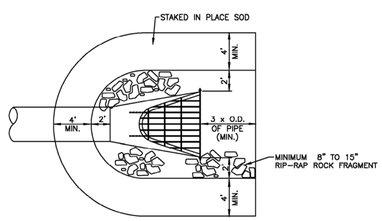
1. *The (6) Pretreatment Structures shall be inspected by a qualified contractor on a semi-annual basis (twice/year) and necessary action taken to clean out the structures in accordance with the manufacturers guidelines.*
2. *The Pond shall be inspected on any annual basis by a qualified contractor and/or civil engineer to insure it is functioning as designed.*
3. *The storm structures & swales shall be inspected on a bi-annual basis (every two years). This is an "above ground" visual inspection to determine if any structures are "failing", (i.e. ground has sank around structure, etc.).*



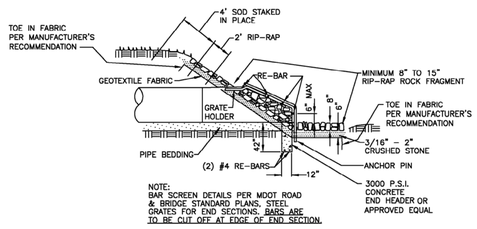
WOOD CHIP PATH



TYPICAL ROAD SECTION

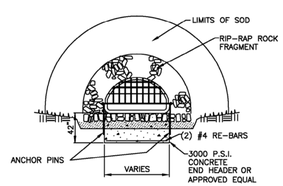


PLAN VIEW



PROFILE VIEW

END SECTION AND BAR SCREEN DETAIL
NO SCALE



END VIEW

STATE OF MICHIGAN
PATRICK McWILLIAMS
ENGINEER
NO. 31658
LICENSED PROFESSIONAL ENGINEER

DATE	ISSUE
11-30-18	PER J & A (11-13-18)
2-24-2021	PER CLIENT REVISED PHASE 2, 3 & 4 (1-22-2021)
3-25-2021	PER DLZ (3-11-2021) & McKENNA (3-11-2021)
5-6-2021	PER DLZ (4-27-2021), & McKENNA (4-26-2021)

PROPRIETOR:
Preserve at Hidden Lake, LLC
8255 CASCADE AVENUE, SUITE 110
COMMERCE TOWNSHIP, MICHIGAN 48382
(248) 842-8613

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KIEFT ENGINEERING, INC.
PROFESSIONAL ENGINEERS AND PROFESSIONAL SURVEYORS
5852 SOUTH MAIN STREET, SUITE 1, CLARKSTON, MICHIGAN 48346
PHONE (248) 625-5251 www.kiefteng.com FAX (248) 625-7110

DATE	11-8-18	CKD. BY	DATE
DRAWN	GF		
DESIGN	JJS/PCM		
SECTION	36	T- 3 -N. R- 8 -E.	

72 HOURS (3 WORKING DAYS) BEFORE YOU DIG CALL MISS DIG 800-482-7171 (TOLL FREE)

Retention Basin Calculations, Details & Notes
"Preserve at Hidden Lake"
WHITE LAKE TOWNSHIP, OAKLAND COUNTY, MICHIGAN

SCALE N/A
SHEET 5 OF 7
KE 2017.182

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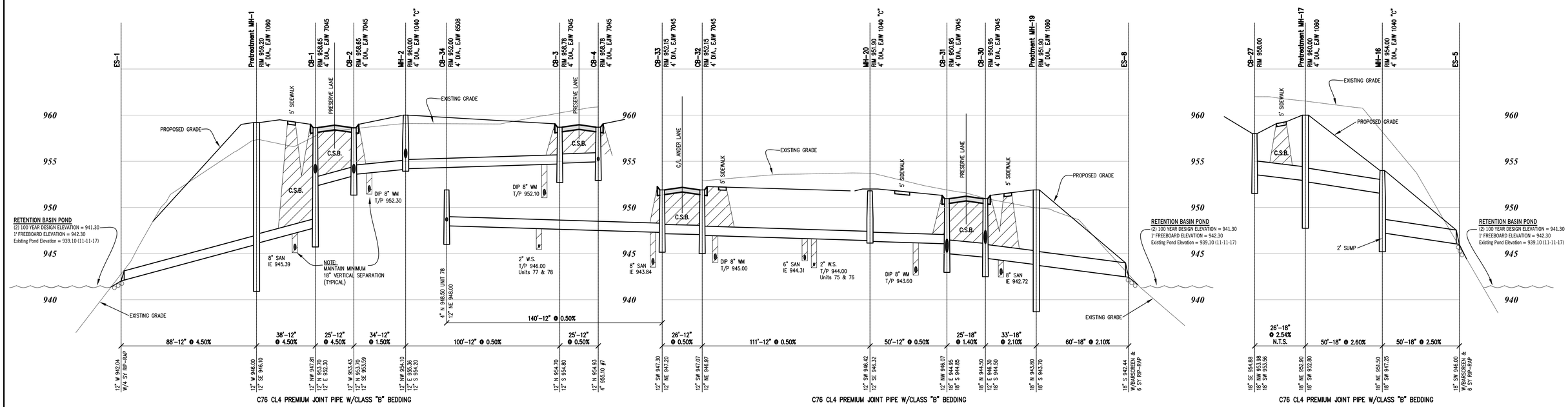

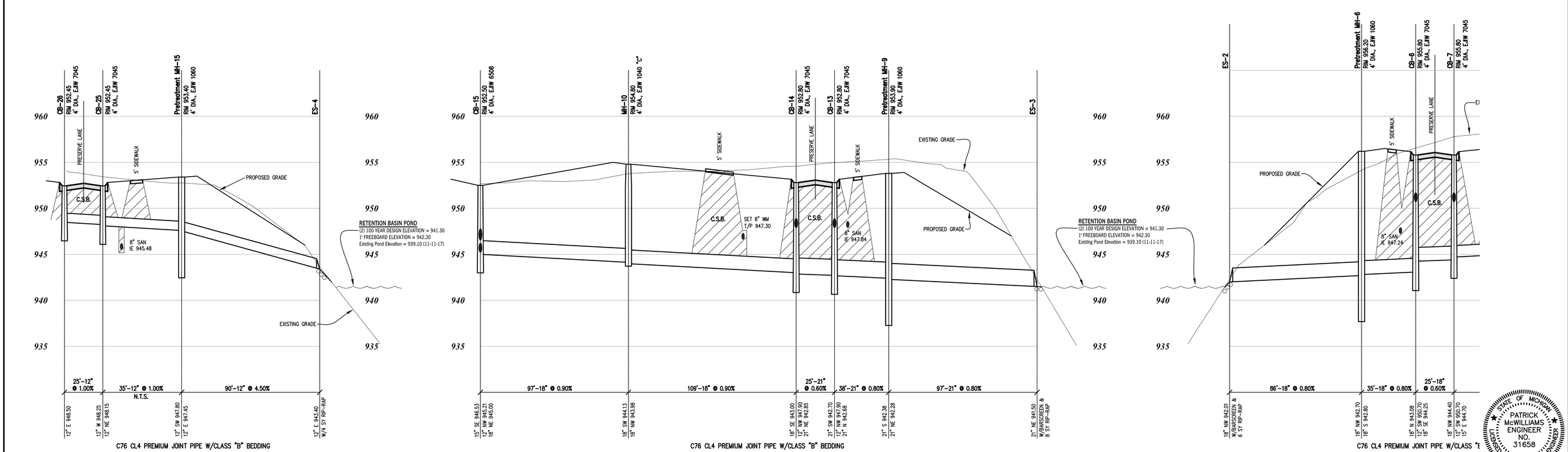

DATE	ISSUE
11-30-18	PER J & A (11-15-18)
1-11-19	PER J & A (12-19-18), McKenna (12-18-18), DPS
2-24-2021	PER CLIENT REVISED PHASE 2, 3 & 4 (1-22-2021)
3-25-2021	PER DLZ (3-11-2021), & McKENNA (3-11-2021)

PROPRIETOR:
Preserve at Hidden Lake, LLC
8255 CASCADE AVENUE, SUITE 110
COMMERCE TOWNSHIP, MICHIGAN 48382
(248) 842-8613

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DATE	11-8-18	CKD. BY	DATE
DRAWN	GF		
DESIGN	JJS		
SECTION	36	T- 3 -N. R- 8 -E.	

72 HOURS (3 WORKING DAYS) BEFORE YOU DIG CALL MISS DIG 800-482-7171 (TOLL FREE)

Storm Sewer Profiles
"Preserve at Hidden Lake"
WHITE LAKE TOWNSHIP, OAKLAND COUNTY, MICHIGAN

SCALE 1" = 30' HORZ.
1" = 5' VERT.
SHEET 6 OF 7
KE 2017.182

STATE OF MICHIGAN
PATRICK McWILLIAMS
ENGINEER NO. 31658
PROFESSIONAL ENGINEER

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Stormceptor®

Stormceptor Sizing Detailed Report

PCSWMM for Stormceptor

Project Information

Date	10/11/2018
Project Name	Preserve at Hidden Lake
Project Number	N/A
Location	White Lake Township

Stormwater Quality Objective

This report outlines how Stormceptor System can achieve a defined water quality objective through the removal of total suspended solids (TSS). Attached to this report is the Stormceptor Sizing Summary.

Stormceptor System Recommendation

The Stormceptor System model STC 450i achieves the water quality objective removing 80% TSS for a User defined particle size distribution.

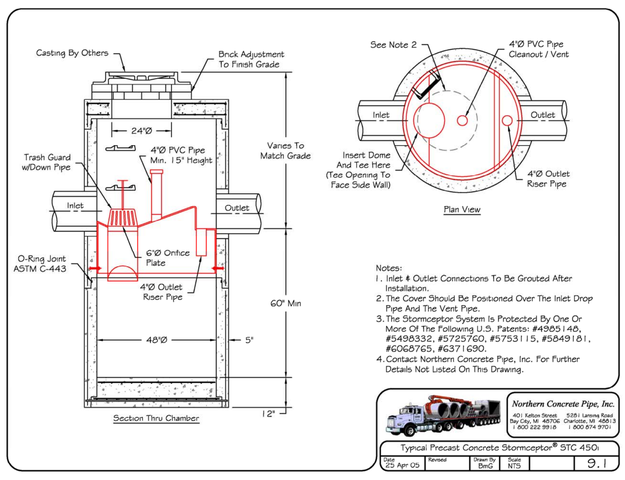
The Stormceptor System

The Stormceptor oil and sediment separator is sized to treat stormwater runoff by removing pollutants through gravity separation and flotation. Stormceptor's patented design generates positive TSS removal for all rainfall events, including large storms. Significant levels of pollutants such as heavy metals, free oils and nutrients are prevented from entering natural water resources and the re-suspension of previously captured sediment (scour) does not occur.

Stormceptor provides a high level of TSS removal for small frequent storm events that represent the majority of annual rainfall volume and pollutant load. Positive treatment continues for large infrequent events, however, such events have little impact on the average annual TSS removal as they represent a small percentage of the total runoff volume and pollutant load.

Stormceptor is the only oil and sediment separator on the market sized to remove TSS for a wide range of particle sizes, including fine sediments (clays and silts), that are often overlooked in the design of other stormwater treatment devices.

Rinker MATERIALS



Pretreatment Structure

MH-1, 6.53 CFS (3.17 Acres, C=0.54)

Stormceptor Rinker MATERIALS

Detailed Stormceptor Sizing Report – Catchment to MH-1

Project Information & Location			
Project Name	Preserve at Hidden Lake	Project Number	KE 2017.182
City	White Lake Tnshp	State/ Province	Michigan
Country	United States of America	Date	10/11/2018
Designer Information		**EOR Information (optional)**	
Name	Daniel Thomson	Name	Patrick McWilliams
Company	Rinker Materials	Company	Kieft Engineering, Inc.
Phone #	414-238-3824	Phone #	248-625-5251
Email	DanielC.Thomson@rinkerpipe.com	Email	

Stormwater Treatment Recommendation

The recommended Stormceptor Model(s) which achieve or exceed the user defined water quality objective for each site within the project are listed in the below Sizing Summary table.

Site Name	Catchment to MH-1
Recommended Stormceptor Model	STC 900
Target TSS Removal (%)	80.0
TSS Removal (%) Provided	80
PSD	D50 = 75 micron
Rainfall Station	DETROIT METRO AP

The recommended Stormceptor model achieves the water quality objectives based on the selected inputs, historical rainfall records and selected particle size distribution.

Stormceptor Sizing Summary	
Stormceptor Model	**% TSS Removal Provided**
STC 450i	72
STC 900	80
STC 1200	81
STC 1800	81
STC 2400	85
STC 3600	86
STC 4800	89
STC 6000	89
STC 7200	91
STC 11000	93
STC 13000	94
STC 16000	95
StormceptorMAX	Custom

Pretreatment Structure

MH-6, 9.06 CFS (4.50 Acres, C = 0.54)

Stormceptor Rinker MATERIALS

Detailed Stormceptor Sizing Report – Catchment to MH-6,

Project Information & Location			
Project Name	Preserve at Hidden Lake	Project Number	KE 2017.182
City	White Lake Tnshp	State/ Province	Michigan
Country	United States of America	Date	10/11/2018
Designer Information		**EOR Information (optional)**	
Name	Daniel Thomson	Name	Patrick McWilliams
Company	Rinker Materials	Company	Kieft Engineering, Inc.
Phone #	414-238-3824	Phone #	248-625-5251
Email	DanielC.Thomson@rinkerpipe.com	Email	

Stormwater Treatment Recommendation

The recommended Stormceptor Model(s) which achieve or exceed the user defined water quality objective for each site within the project are listed in the below Sizing Summary table.

Site Name	Catchment to MH-6
Recommended Stormceptor Model	STC 2400
Target TSS Removal (%)	80.0
TSS Removal (%) Provided	80
PSD	D50 = 75 micron
Rainfall Station	DETROIT METRO AP

The recommended Stormceptor model achieves the water quality objectives based on the selected inputs, historical rainfall records and selected particle size distribution.

Stormceptor Sizing Summary	
Stormceptor Model	**% TSS Removal Provided**
STC 450i	59
STC 900	69
STC 1200	69
STC 1800	70
STC 2400	80
STC 3600	81
STC 4800	82
STC 7200	83
STC 11000	87
STC 13000	87
STC 16000	89
StormceptorMAX	Custom

Pretreatment Structure

MH-9, 13.41 CFS (6.70 Acres, C = 0.54)

Stormceptor Rinker MATERIALS

Detailed Stormceptor Sizing Report – Catchment to MH-9,

Project Information & Location			
Project Name	Preserve at Hidden Lake	Project Number	KE 2017.182
City	White Lake Tnshp	State/ Province	Michigan
Country	United States of America	Date	10/11/2018
Designer Information		**EOR Information (optional)**	
Name	Daniel Thomson	Name	Patrick McWilliams
Company	Rinker Materials	Company	Kieft Engineering, Inc.
Phone #	414-238-3824	Phone #	248-625-5251
Email	DanielC.Thomson@rinkerpipe.com	Email	

Stormwater Treatment Recommendation

The recommended Stormceptor Model(s) which achieve or exceed the user defined water quality objective for each site within the project are listed in the below Sizing Summary table.

Site Name	Catchment to MH-9
Recommended Stormceptor Model	STC 4800
Target TSS Removal (%)	80.0
TSS Removal (%) Provided	80
PSD	D50 = 75 micron
Rainfall Station	DETROIT METRO AP

The recommended Stormceptor model achieves the water quality objectives based on the selected inputs, historical rainfall records and selected particle size distribution.

Stormceptor Sizing Summary	
Stormceptor Model	**% TSS Removal Provided**
STC 450i	59
STC 900	69
STC 1200	69
STC 1800	70
STC 2400	74
STC 3600	75
STC 4800	80
STC 7200	83
STC 11000	87
STC 13000	87
STC 16000	89
StormceptorMAX	Custom

Pretreatment Structure

MH-15, 2.79 CFS (1.34 Acres, C=0.54)

Stormceptor Rinker MATERIALS

Detailed Stormceptor Sizing Report – Catchment to MH-15

Project Information & Location			
Project Name	Preserve at Hidden Lake	Project Number	KE 2017.182
City	White Lake Tnshp	State/ Province	Michigan
Country	United States of America	Date	10/11/2018
Designer Information		**EOR Information (optional)**	
Name	Daniel Thomson	Name	Patrick McWilliams
Company	Rinker Materials	Company	Kieft Engineering, Inc.
Phone #	414-238-3824	Phone #	248-625-5251
Email	DanielC.Thomson@rinkerpipe.com	Email	

Stormwater Treatment Recommendation

The recommended Stormceptor Model(s) which achieve or exceed the user defined water quality objective for each site within the project are listed in the below Sizing Summary table.

Site Name	Catchment to MH-15
Recommended Stormceptor Model	STC 450i
Target TSS Removal (%)	80.0
TSS Removal (%) Provided	84
PSD	D50 = 75 micron
Rainfall Station	DETROIT METRO AP

The recommended Stormceptor model achieves the water quality objectives based on the selected inputs, historical rainfall records and selected particle size distribution.

Stormceptor Sizing Summary	
Stormceptor Model	**% TSS Removal Provided**
STC 450i	84
STC 900	90
STC 1200	90
STC 1800	91
STC 2400	93
STC 3600	94
STC 4800	95
STC 6000	96
STC 7200	97
STC 11000	98
STC 13000	98
STC 16000	98
StormceptorMAX	Custom

Pretreatment Structure

MH-16, 4.57 CFS (2.00 Acres, C=0.54)

Stormceptor Rinker MATERIALS

Detailed Stormceptor Sizing Report – Catchment to MH-16

Project Information & Location			
Project Name	Preserve at Hidden Lake	Project Number	KE 2017.182
City	White Lake Tnshp	State/ Province	Michigan
Country	United States of America	Date	10/11/2018
Designer Information		**EOR Information (optional)**	
Name	Daniel Thomson	Name	Patrick McWilliams
Company	Rinker Materials	Company	Kieft Engineering, Inc.
Phone #	414-238-3824	Phone #	248-625-5251
Email	DanielC.Thomson@rinkerpipe.com	Email	

Stormwater Treatment Recommendation

The recommended Stormceptor Model(s) which achieve or exceed the user defined water quality objective for each site within the project are listed in the below Sizing Summary table.

Site Name	Catchment to MH-16
Recommended Stormceptor Model	STC 900
Target TSS Removal (%)	80.0
TSS Removal (%) Provided	80
PSD	D50 = 75 micron
Rainfall Station	DETROIT METRO AP

The recommended Stormceptor model achieves the water quality objectives based on the selected inputs, historical rainfall records and selected particle size distribution.

Stormceptor Sizing Summary	
Stormceptor Model	**% TSS Removal Provided**
STC 900	87
STC 1200	87
STC 1800	88
STC 2400	91
STC 3600	92
STC 4800	94
STC 6000	94
STC 7200	95
STC 11000	97
STC 13000	97
STC 16000	97
StormceptorMAX	Custom

Pretreatment Structure

MH-19, 15.11 CFS (6.93 Acres, C = 0.54

Stormceptor Rinker MATERIALS

Detailed Stormceptor Sizing Report – Catchment to MH-19

Project Information & Location			
Project Name	Preserve at Hidden Lake	Project Number	KE 2017.182
City	White Lake Tnshp	State/ Province	Michigan
Country	United States of America	Date	10/11/2018
Designer Information		**EOR Information (optional)**	
Name	Daniel Thomson	Name	Patrick McWilliams
Company	Rinker Materials	Company	Kieft Engineering, Inc.
Phone #	414-238-3824	Phone #	248-625-5251
Email	DanielC.Thomson@rinkerpipe.com	Email	

Stormwater Treatment Recommendation

The recommended Stormceptor Model(s) which achieve or exceed the user defined water quality objective for each site within the project are listed in the below Sizing Summary table.

Site Name	Catchment to MH-19
Recommended Stormceptor Model	STC 4800
Target TSS Removal (%)	80.0
TSS Removal (%) Provided	80
PSD	D50 = 75 micron
Rainfall Station	DETROIT METRO AP

The recommended Stormceptor model achieves the water quality objectives based on the selected inputs, historical rainfall records and selected particle size distribution.

Stormceptor Sizing Summary	
Stormceptor Model	**% TSS Removal Provided**
STC 450i	59
STC 900	69
STC 1200	69
STC 1800	70
STC 2400	74
STC 3600	75
STC 4800	80
STC 7200	83
STC 11000	87
STC 13000	87
STC 16000	89
StormceptorMAX	Custom

STATE OF MICHIGAN
PATRICK McWILLIAMS
ENGINEER
NO. 31658
LICENSED PROFESSIONAL ENGINEER

DATE	ISSUE
11-30-18	PER J & A (11-15-18)
2-24-2021	PER CLIENT REVISED PHASE 2, 3 & 4 (1-22-2021)
3-25-2021	PER DLZ (3-11-2021), & McKENNA (3-11-2021)

PROPRIETOR:
Preserve at Hidden Lake, LLC
8255 CASCADE AVENUE, SUITE 110
COMMERCE TOWNSHIP, MICHIGAN 48382
(248) 842-8613

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PHONE (248) 625-5251 www.kiefteng.com FAX (248) 625-7110

DATE	11-8-18	CKD. BY / DATE
DRAWN	GF	
DESIGN	JJS	
SECTION	36	T- 3 -N. R- 8 -E.

72 HOURS (3 WORKING DAYS) BEFORE YOU DIG CALL MISS DIG 800-482-7171 (TOLL FREE)

Storm Sewer Calculations & Details
"Preserve at Hidden Lake"
WHITE LAKE TOWNSHIP, OAKLAND COUNTY, MICHIGAN

SCALE	N/A
SHEET	7 OF 7
	KE 2017.182

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FIRST AMENDMENT TO

PRESERVE AT HIDDEN LAKE

PLANNED DISTRICT DEVELOPMENT AGREEMENT

EXHIBIT 2 – DEVELOPMENT SCHEDULE

Date of Commencement (First Phase)	**Activity**
Complete	Clearing of Land
Complete	Grading of Land
Complete	Underground Work
Complete	Curbs and Paving
Complete	Final Grading and Seeding
Complete	Landscaping

Date of Commencement (Second and Third Phases)	**Activity**
March 15, 2021	Clearing of Land
April 21, 2021	Grading of Land
May 1, 2021	Underground Work
June 1, 2021	Curbs and Paving
June 30, 2021	Final Grading and Seeding
August 1, 2021	Landscaping

Date of Commencement (Phases 4 through 8)	**Activity**
March 15, 2021	Clearing of Land
April 21, 2021	Grading of Land
May 1, 2021	Underground Work
June 1, 2021	Curbs and Paving
June 30, 2021	Final Grading and Seeding
August 1, 2021	Landscaping

Date of Commencement (Phases 9 through 17)	**Activity**
March 15, 2021	Clearing of Land
April 21, 2021	Grading of Land
May 1, 2021	Underground Work
June 1, 2021	Curbs and Paving
June 30, 2021	Final Grading and Seeding
August 1, 2021	Landscaping

WHITE LAKE TOWNSHIP

COMMUNITY DEVELOPMENT DEPARTMENT

DATE: May 28, 2021

TO: Planning Commission

FROM: Sean O'Neil, Planning Director

SUBJECT: Elizabeth Lake Retail – Conceptual Review

As you are aware, there is interest in developing the southwest corner of M-59 and Elizabeth Lake Road. This applicant was before you in March for a PB (Planned Business) minimum acreage waiver. That was recommended for approval by you and approved by the Board. They are now seeking to appear at the June 3rd Planning Commission meeting for a conceptual review. They are seeking feedback on their plan and no action will be taken at this time. You will receive, in your packet, the version of their plan that is currently under review for the second time. Those review comments are not due back to our office until June 9th, so we are going to provide you with their first round of review comments so that you have some information to work with. You will also see a brief letter of request from the developer that touches on a few of the specific topics that they wish to discuss with you at the meeting. This would is an opportunity for you to provide them with any feedback and direction that you may have on all aspects of the plan. They will also be on your June 17th agenda seeking rezoning and preliminary site plan recommendations. A required public hearing will be held at that same time.

I look forward to discussing this further with you all on June 3rd when we meet. Please contact me if you have any questions or require additional information.

Thank you.

May 28, 2021

Sean P. O'Neil, AICP
Planning Director
White Lake Township
7525 Highland Road
White Lake, MI 48383
(248) 698-3300 X5
Www.Whitelaketwp.Com

Subject: Elizabeth Lake Retail

Dear Mr. O'Neil,

Please accept this as our request for an informal/conceptual Planning Commission review for the above-reference project at the earliest open date.

We would like to discuss the general lay-out of the project; the landscaping and decorative wall features; the proposed "welcome area" proposed at the corner of Highland Road and Elizabeth Lake Roads; the sidewalk connecting to the library, and; the proposed ring road.

Thank you for your attention.

David

David Yaldo

Rik Kowall, Supervisor
Terry Lilley, Clerk
Mike Roman, Treasurer

Trustees
Scott Ruggles
Michael Powell
Andrea C. Voorheis
Liz Fessler Smith

WHITE LAKE TOWNSHIP
7525 Highland Road • White Lake, Michigan 48383-2900 • (248) 698-3300 • www.whitelaketwp.com

Date: May 20, 2021

To: Nazir Jawich
40500 Ann Arbor #105 LL
Plymouth, MI 48170

From: Sean O'Neil, AICP
Planning Director
Charter Township of White Lake
7525 Highland Road
White Lake, MI 48383

RE: SUBMITTAL OF SITE PLANS
Elizabeth Lake Retail

- 2nd Review of Preliminary Site Plan dated 05-03-21.

Township staff has completed their review of the above-mentioned project. Based on the comments listed below, please revise and resubmit.

N/A	Sean O'Neil, Planning Director
05/19/21	Michael Leuffgen, PE Engineering Consultant
05/19/21	Chris Madigan, Planning Consultant
05/19/21	John Holland, WLT Fire Marshal
05/10/21	Aaron Potter, WLT DPS Director
05/06/21	Jeanine Smith, WLT Assessor

DLZ
ARCHITECTURE • ENGINEERING • PLANNING
SURVEYING • CONSTRUCTION SERVICES

INNOVATIVE IDEAS
EXCEPTIONAL DESIGN
UNMATCHED CLIENT SERVICE

May 19, 2021

Sean O' Neil
Community Development Department
Charter Township of White Lake
7525 Highland Road
White Lake, Michigan 48383

RE: White Lake Plaza- Site Plan Review – 2nd Review

Ref: DLZ No. 2145-7233-05 Design Professional: MA Archmaster

Dear Mr. O' Neil,

Our office has performed a Site Plan review for the above-mentioned revised plan dated May 3, 2021. The plans were reviewed for feasibility based on general conformance with the Township Engineering Design Standards.

General Site Information

This site is located on the south side of M-59 at the southwest corner of Elizabeth Lake Road. Total site acreage is 8.61 acres.

Site Improvement Information:

- Construction of four (4) retail and restaurant space buildings totaling 28,840 square feet.
- Associated paved and curbed parking and maneuvering aisles. Eight ADA accessible parking spaces and associated loading spaces are also proposed.
- Internal traffic circle proposed.
- 8' wide concrete sidewalk is proposed along both M-59 and Elizabeth Lake Road frontages.
- Site to be serviced by watermain and sanitary sewer.
- Storm water runoff is proposed to be pretreated and detained in two (2) proposed detention basins with discharge to the adjacent existing wetlands near the south end of the property.

Note that comments from our April 10, 2021 review are in *italics*. Responses to those comments are in **bold**. New comments are in standard typeface.

The following items should be noted with respect to Planning Commission review:

a) *It appears that based on the proposed design that it will be difficult for vehicles utilizing the drive thru for Building C to make a right hand turn into the proposed on site traffic circle. Of particular concern would be the ability of larger service style trucks (i.e. larger landscaping vehicles) to execute this turn into the traffic circle. Traffic maneuvering and turning radii for this area should be re-examined.* **The plans have been updated with a hatched area with a left turn only sign to help limit traffic from entering the traffic circle once leaving the drive through. This likely helps limit conflicts, however the left turn itself is in conflict with eastbound users in front of building C and users entering the site through the traffic circle. Further discussion with the Planning Commission and Planning Director is warranted.**

b) *The exact limits of the wetlands should be shown. We are unclear as to whether a wetlands delineation has been performed. In addition, all natural water features on the site should be shown on the plan.* **Comment outstanding. Plan does not indicate whether a wetlands delineation has been performed. If it has, a note on plan indicating date of delineation and person(s) who performed delineation will suffice. Plans propose the detention basins and access road are to be constructed within the wetland buffer, we defer to the Township Building Department if this is allowable per the ordinance requirements.**

c) *The two (2) detention basin outlet end sections are proposed to encroach into the wetlands area. The end sections should be pulled back out of the wetlands and placed at the limits of the wetlands buffer.* **Comment outstanding.**

d) *The plans do not adequately represent the required sanitary sewer pump station that will be required for connection to the existing pressure sewer along Elizabeth Lake Road. Oakland County standard details for a duplex sanitary sewer pump station have been attached to this review for reference. The pump station cannot be located in the drive lane as presented. The top of the wet well and valve vault need to be 6 inches above surrounding grade to prevent infiltration. The pump station will consist of above grade appurtenances such as vent piping for wet well and valve vault and control panels, generator, transfer switches, transformer pad that should be located on the plan and protected from traffic. The proposed location does not provide sufficient area for these items as well as provide proposed parking for station maintenance vehicles.* **Pump station has now been moved out of drive lane between the dumpster enclosure and proposed ground sign-2. Further review**

will be necessary at the time of Final Site plan regarding station layout and accessibility for maintenance.

e) *It should be verified by the owner/ applicant that an access easement for the proposed southern and western drives from Elizabeth Lake Road and M-59 all the way to the southwest property line (reference Preliminary Site Plan Sheet SP-2) shall be granted. This will enable access to the property to the southwest for future development.* **Comment outstanding.**

The following items can be addressed at the time of Final Site Plan/ Final Engineering Plan Submittal:

Site Plan Comments-

General

1. *The plan sheets SP-2 and C-3 are a bit difficult to read. Please provide a larger view of plan at time of FSP/FEP submittal.* **Comment remains**.
2. *Plan shall contain notes per White Lake Township Engineering Design Standards Section A. 8. a.-d.* **Comment addressed.**
3. *Benchmarks shall be on NAVD 88 datum. No assumed datum is accepted per Township Ordinance.* **Comment remains.**

Paving/Grading

1. *All proposed barrier free ramps will need to meet ADA standards in terms of slopes and dimensions.* **Comment remains.**

Watermain

1. *We defer to the Fire Department with regard to items related to fire suppression including proposed hydrant locations.* **Comment remains.**
2. *A GV&W and hydrant shall be required at proposed watermain stub at western property line.* **Comment addressed.**
3. *Watermain shall be centered in a 20' wide easement. A 20' wide easement is proposed, however the watermain is not centered.* **Comment remains.**

Sanitary Sewer

1. *Sanitary sewer pump station revisions are required as referenced above.* **Comment addressed to the degree necessary on PSP submittal, further detail will be required for FSP/FEP.**

2. *Sanitary sewer shall be centered in a 20' wide easement. A 20' wide easement is proposed; however, it is not clear as to whether the sanitary sewer centered. In addition, an easement will be required for the Pump Station.* **Comment remains.**

Stormwater Management

1. *Proposed catch basins for the southern and western drives shall be placed within curb and gutter and not in middle of proposed drive.* **Comment addressed.**
2. *Stormwater runoff for Areas C7 and C8 on the Storm Drainage Calculations sheet should be calculated with a higher runoff coefficient 'C' that anticipates future increased impervious flows for these areas. Although it appears that the proposed detention basins will provide ample storage for the future developed flows, the design engineer should verify storage capacity based on ultimate buildout of site. In addition, the sizing of proposed stormwater treatment chambers should be based on ultimate site buildout with a minimum 80% solids removal rate.* **Comment partially addressed. The 'C' factors have now been adjusted for future increased impervious flows for the areas of concern. The remainder of the above comment is outstanding and remains.**
3. Sheet C-5 notes that storm sewer and detention basins shall be the maintenance responsibility of White Lake Township. We note that all storm sewer, detention basins, and associated appurtenances shall be privately maintained by the property owner. A Storm Sewer and Detention Basin Maintenance Agreement with the Township shall be required.
4. A County Drain easement may be required by Oakland County for the Brendal Drain which runs in close proximity to the western property line for this project. Please provide verification from the County with respect to the jurisdiction and easement requirements relative to the Drain.

Recommendation

We are unable to recommend approval of the Preliminary Site Plan due to our concerns/ comments listed within this letter. We recommend those comments be addressed and the plans resubmitted for review. The comments listed under 'Site Plan Comments' can be addressed at the time of Final Site Plan/ Final Engineering Plan submittal.

Please feel free to contact our office should you have any questions.

Sincerely,

DLZ Michigan

Michael Leuffgen, P.E.
Department Manager

Victoria Loemker, P.E.
Senior Engineer

Cc: Justin Quagliata, Community Development, *via email*
Hannah Micallef, Community Development, *via email*
Aaron Potter, DPS Director, White Lake Township, *via email*
John Holland, Fire Marshall, White Lake Township, *via email*

X:\Projects\GFL\2021\2145\723305 Elizabeth Lake Ret\PSP- Review.02\Review.02.docx

MCKENNA

May 19, 2021

Planning Commission
Charter Township of White Lake
7525 Highland Road
White Lake, MI 48383

Subject: White Lake Plaza
Preliminary Site Plan Review #2
Zoned: AG- Agricultural (Proposed Planned Development)

Applicant(s): Nazir Jawich

Location: South side of Highland Road, west of Elizabeth Lake Road

Dear Planning Commissioners:

Nazir Jawich has submitted plans to develop a multi-use development including retail and restaurants on a site consisting of 7.9 net acres for PD zoning. Currently zoned Agriculture, the siteis designated as “Lakes Town Center” on the Township’s Future Land Use Map.

Source: Oakland County Property Gateway

DETROIT
28 West Adams Street
Suite 1000
Detroit, Michigan 48226

O 313.888.9882
F 248.596.0930
MCKA.COM

Communities for real life.

Planned Development approval involves three (3) steps: Preliminary Site Plan Review, Final Site Plan Review, and Development Agreement Review. We have reviewed the application for compliance with theTownship's Zoning Ordinance and Master Plan, as well as sound planning and design principles, and offer the following comments:

Planned Development Review Process

The Planned Development review process involves the following three (3) steps:

1. Preliminary Site Plan Review: This is the step in which the number of units and road layout are established, the amount of open space is determined, and other project details are decided upon. At the preliminary review step the Planning Commission holds a public hearing. The Planning Commission must review the PD proposal and make a recommendation to the Township Board for the preliminary site plan. The Township Board is required to take action, approving or denying the preliminary site plan. The property is rezoned to PD at the end of this step.

2. Final Site Plan Review: Final site plan review is the step at which all of the details are included on thefinal site plan and all of the conditions of preliminary site plan review must be satisfied. The Planning Commission is required to review the final site plan and take action, approving or denying the final site plan. It is at this step where the Planning Commission also reviews the proposed Development Agreement and makes a recommendation to the Township Board.

3. Development Agreement Review: Upon recommendation of the Development Agreement by the Planning Commission, the Township Board takes final action on the Development Agreement.

COMMENTS

1. **Existing Conditions.** The conditions of the site and the surrounding area are summarized below:

Location	Existing Land Use	Master Plan	Existing Zoning
Site	Vacant	Lakes Town Center	Agricultural
North	Single-Family Residential	Lakes Town Center	Suburban Farm/ Single-Family Residential
East	Commercial	Lakes Town Center	General Business
South	Vacant	Lakes Town Center	Agricultural
West	Vacant	Lakes Town Center	Agricultural

2. **Proposed Use.** The applicant is proposing four one story buildings as part of a commercial plaza. One building will be dedicated to use as a restaurant while the other three will be dedicated for use as a mix of retail and restaurant uses. Additionally, the applicant has proposed two drive-thru lanes for the restaurants within the development. Though the underlying AG- Agriculture zoning does not support these uses, the applicant has applied to rezone the area as a Planned Development. Further, the site is designated as the "Lakes Town Center" on the Township's Future Land Use Map. This designation calls for a mix of commercial and residential

options. The retail and restaurant uses align with this future land use designation, and are appropriate for the site.

3. **Building Placement; Architecture and Design.** The site is not of a conforming size for a PD. However the proposed development conforms to the standards of the underlying AG zoning district.

Applicable Requirement	AG District Standards	Proposed
Front Yard Setback	35 feet	146-feet
Side Yard Setback	25 feet	43 feet (west) 46 feet (east)
Rear Yard Setback	50 feet	277 feet
Building Height	35 feet	25 feet
Minimum Lot Area	10 acre	7.9 acres**
Lot Coverage	30%	8.36%

**The minimum lot area to be considered for a Planned Development is 10 acres. A waiver from this minimum size is required.

Further, we note that in the south of the property, the applicant has proposed a drive lane which is at least partially located within the required 25-foot wetland setback. We believe there is ample room to propose a drive lane which does not encroach into this required setback. A revised plan should remove the drive lane from the setback, or a variance should be requested.

Elevations have been submitted for each of the proposed buildings. Generally, they will be comprised of brick, cultured stone, dryvit, and a moderate amount of glazing (windows) along the storefronts. The buildings will also feature fabric awnings and a cornice atop each building. The elevation sheets note that some colors are still to be selected. Finalized colors should be noted and material samples provided for Planning Commission review at the time of Final Site Plan.

4. **Site Circulation and Parking.** Restaurant uses require one parking space per 75 square feet of gross floor area, while the retail uses require one parking space per 200 square feet of gross floor area. Based on the square footage provided for each use, a total of 193 parking spaces are required on site. As submitted, the site plan proposes a total of 193 parking spaces, including eight ADA accessible spaces. Additionally, there are several 17-foot spaces, along Highland Road which are adjacent to perpendicular 19-foot spaces. Because of the proximity and conflicting angles, we believe the potential exists for cars in the endspaces to block entrance or exit from the nearby spaces. We recommend these spaces be lengthened to 19-feet with the overhang remaining, to help reduce this issue. Separately, the two drive-thru operations require atotal of eight (8) stacking spaces each. The applicant has met this standard, as demonstrated on sheet SP-2.

Finally, we note that while the proposed maneuvering lanes comply with the ordinance requirements (typically 24-26 feet,) there is at least one area of concern. There is a pinch point in the southeast corner of the development, where the stacking lane adjacent to Building A and the eastern most trash enclosure come together. We believe this will create a maneuvering lane which is too narrow for cars, delivery trucks, and most importantly fire department vehicles to pass. While we recommend widening the maneuvering lane in this area. The applicant has provided a turning analysis on Sheet SP-4 indicating trucks can make the turn in that corner. Our concern is not related to the lane width alone. We remain worried, based on provided information, that should the gates to the trash enclosure inadvertently remain open or if there are stacked cars in the drive-thru that the lane would no longer be usable for larger vehicles. Ultimately, we defer to the Fire Department as to whether the layout is appropriate.

5. **Pedestrian Circulation.** Per Section 5.21 of the Zoning Ordinance, an eight (8) foot wide public sidewalk is required along both Elizabeth Lake and Highland Roads. The applicant has proposed such a pathway along both of the frontages as required. Additionally, a four (4) foot walkway and seating area are proposed in the northeast corner of the site, where Elizabeth Lake and Highland Roads meet. Finally, sidewalks have been

6. **Landscaping and Screening.** A landscape plan was not provided with the submitted application materials and is required until final site plan review. At that time the landscape plan will be review for compliance with the requirements in Section 5.19 of the Zoning Ordinance.

7. **Lighting.** Section 5.18(G) of the Zoning Ordinance includes the standards for outdoor lighting. Currently, the application materials indicate there will be exterior lighting planned for the site. A lighting plan showing compliance with the standards within section 5.18(G) should be submitted at the time of the final site plan.

8. **Signs.** Section 5.9 of the Zoning Ordinance regulates signs. Sheet SP-2 details a proposed multi-tenant sign adjacent to Highland Road and Elizbeth Lake Road. The 15-foot-tall sign has a total "sign area" of approximately 144 square feet, and otherwise complies with the regulations applied to similar signs in the GB ad PB zoning districts.

9. **Trash Disposal.** Four trash enclosures are proposed in the rear of the buildings. However, no details for proposed screening was provided with this application. At the time of final site plan review, the applicant should submit these details in order to confirm that the screening walls will be between six-feet and eight-feet tall and comprised of a similar masonry material as the buildings.

10. **Planning Commission Comments.** Recently, the Planning Commission considered the applicant's request for a waiver from the minimum size requirements for a Planned Development. During this meeting, the Commission expressed concerns regarding the proposed preliminary layout of the site and its relation to the Lakes Town Center Planning Area in the Township Master Plan. Planned Developments are intended to permit, with Township approval, development in a coordinated and cohesive arrangement which may be more difficult to achieve under more conventional, piecemeal development designed to conform with standard zoning requirements. Development standards, as approved in a development plan, in this district shall result in a project that is superior to one constructed under standard zoning requirements and shall be mutually acceptable to the applicant and the Township.

    Because the development is intended to both produce a product that is superior to that achievable under conventional zoning standards and serve as a cohesive agreement between the Township and applicant, it is vital that the applicant work to incorporate comments from the Planning Commission and Township board into the overall design. Some of these comments, such as the wetland buffer and the pinch point adjacent to the southeast drive-thru, have already been incorporated into this letter. However, the Planning Commission also expressed concerns that the proposed project did not align with the master plan goals for the Lakes Town Center Planning Area south of Highland Road. Specifically, the Planning Commission expressed concerns that the proposed development does not emphasize walkability enough, and a desire to have buildings facing Elizabeth Lake Road. We recommend the applicant incorporate the recommendations from the Lakes Town Center "Forms and Physical Characteristics" subsection.

    <u>As proposed, we find the development is similar to one that would be proposed under more conventional zoning standards. Given that the applicant has requested a waiver from the requirements of a Planned Development district. We believe it is important to work directly with Township Staff and Planning Commission to propose a development that incorporates the above comments, and further the Master Plan recommendations.</u>

Recommendation

As noted in our review letter, there are several issues noted in the review letter, which we believe can be corrected or clarified. Once Planning Commission finds their comments and concerns have been adequately addressed, we believe it would be appropriate to recommend approval of the project.

If you have any questions about this report or require additional information, please do not hesitate to contact us.

Respectfully submitted,

McKENNA

Chris Madigan, AICP
Associate Planner

cc: Mr. Sean O'Neal, AICP
Mr. Justin Quagliata
Ms. Hannah Micallef

Fire Department
Charter Township
of White Lake

Site / Construction Plan Review

To: Sean O'Neil, Planning Department Director

Date: 05/19/21

Project: Elizabeth Lake Retail

File #: Not Shown

Date on Plans: 05/03/21

The Fire Department has the following comments with regards to the 3rd review of revised preliminary site plans for the project known as Elizabeth Lake Retail:

1. Site Access
    a. Sheet SP – 3 shows apparatus placement throughout the site, but no actual movement. The applicant shall submit a turn radius profile (based on a 40' truck) that demonstrates apparatus movement including the access drive around building "A".
    b. The drive-through on building "A" consumes most of the access drive, and has the potential to create a bottle neck within this area. The south side of the buildings presents as the loading and off-loading area, so larger truck traffic would be expected.
2. Hydrants
    a. Relocate the hydrant shown at the southwest corner of building "B" to the southeast side of building "A" at a minimum setback of 50'. This would put the hydrant on the north side of the dumpster enclosure. Impact protection shall be required.
    b. The hydrants located on the north side of Highland road cannot be considered for appropriate converge due to location and safe accessibility. At a minimum, add two (2) hydrants to the north side of the buildings (spacing not to exceed 300').
3. Elevations
    a. The elevations on Sheet A -1-2 are not scaled **(Unable to confirm if this deficiency has been corrected).**

John Holland
Fire Chief
Charter Township of White Lake
(248)698-3993
jholland@whitelaketwp.com

Plans are reviewed using the International Fire Code (IFC), 2015 Edition and Referenced NFPA Standards.

Rik Kowall, Supervisor
Anthony Noble, Clerk
Mike Roman, Treasurer

Trustees
Scott Ruggles
Michael Powell
Andrea C. Voorheis
Liz Fessler Smith

WHITE LAKE TOWNSHIP
DEPARTMENT OF PUBLIC SERVICES

7525 Highland Road, White Lake, Michigan 48383-2900, (248) 698-7700, www.whitelaketwp.com

April 10, 2021

Sean O'Neil
Planning Director, Charter Township of White Lake
7525 Highland Rd.
White Lake, MI 48383

RE: Elizabeth Lake Retail Preliminary Site Plan

Sean,

DPS has reviewed the preliminary site utility plan for the development for conformance to Township Engineering and Design Standards and has the following comments:

Water:

Please add two hydrants on the north side of the proposed structures. Hydrants on the north side of M-59 or Elizabeth Lake Road are not practically accessible to this site for fire department use and should not be used for hydrant coverage on this site. Hydrant spacing is 300 ft maximum in commercial areas.

Please add one hydrant near the section stubbing to the west for additional hydrant coverage and flushing.

I defer to the Township Fire Marshal for additional comment on hydrant coverage and spacing.

Relocate water service valves to the edge of the easement.

Fire suppression supplies not shown on the plan. I defer to the Township Fire Marshal for fire suppression requirements.

20-foot-wide easements are required for water to be centered on the pipe providing 10 feet on both sides. These may be contiguous with other easements providing that the 10-foot separation between sanitary or storm is maintained and providing 10 feet on both sides of both pipes.

White Lake Standard easement documents are attached.

Please review watermain acceptance requirements in the Engineering Design Standards attached.

Minimum water service size for new commercial is 1.5 inch.

No detail has been shown regarding the proposed watermain crossing at M-59. An MDOT plan and profile review will be required.

Sanitary:

Black water is not permitted through grease interceptors. Please show blackwater bypass on future submittals.

Forcemain discharge from sanitary station is not shown on the plan.

Stormwater:

The stormwater maintenance responsibilities outlined on C-5 are incorrect. Stormwater remains privately owned and maintained in White Lake. White Lake is not a municipal stormwater operator. An agreement with the Township is required using the Township standard Storm Water Management Facilities Easement, Maintenance Agreement and Lien. A copy of the standard document is attached.

Estimated Capital Charges and Fees:

Below is an itemized preliminary estimate for each proposed structure based on the current Fee Ordinance and OCWRC Unit Assignment Factors (attached). These are preliminary estimates only and will be updated through the phases of planning and ultimately as-built.

Building A: Restaurant. 3560 SF. Assuming Quick Service with Dining and Restrooms per Sheet A-1-1. Plumbing fixture schedule not provided, assuming 12 fixtures= 5.9 REU's. 1.5-inch water service.

Water:

New Water Service Permit and Inspection	$75.00
Capital Connection Fee for 1.5"	$2,607.15
Meter and Components	$701.64
Meter Installation	$75.00
Total	**$3458.79**

Sanitary:

Commerce Treatment Plant Capital Fee with 1.5" Water	$11,785.00
White Lake Capital Connection Fee ($2100 per REU)	$12,390.00
Plumbing Inspection Permit	$50.00
Oakland County Tap Inspection Permit	$200.00
Total:	**$24,425.00**

Building B: Retail. 8400 SF. 1 REU. 2-inch water service.

Water:

New Water Service Permit and Inspection	$75.00
Capital Connection Fee for 2 inch.	$4,716.08
Meter and Components	$2,375.14
Meter Installation	$75.00
Total	**$7,241.22**

Sanitary:

Commerce Treatment Plant Capital Fee (1 REU)	$4,896.00
White Lake Capital Connection Fee ($2100 per REU)	$2,100.00
Plumbing Inspection Permit	$50.00
Oakland County Tap Inspection Permit	$200.00
Total:	**$7,246.00**

Building C: Retail 6220 SF. Restaurant 2280 SF. Assuming Quick Service with Dining and Restrooms per Sheet A-1-1. Plumbing fixture schedule not provided, assuming 12 fixtures= 5.9 REU's. 1 REU. 2-inch water service.

Water:

New Water Service Permit and Inspection	$75.00
Capital Connection Fee for 2 inch.	$4,716.08
Meter and Components	$2,375.14
Meter Installation	$75.00
Total	**$7,241.22**

Sanitary:

Commerce Treatment Plant Capital Fee (1 REU)	$4,896.00
White Lake Capital Connection Fee ($2100 per REU)	$2,100.00
Plumbing Inspection Permit	$50.00
Oakland County Tap Inspection Permit	$200.00
Total:	**$7,246.00**

Building D: Retail. 8400 SF. 1 REU. 2-inch water service.

Water:

New Water Service Permit and Inspection	$75.00
Capital Connection Fee for 2 inch.	$4,716.08
Meter and Components	$2,375.14
Meter Installation	$75.00
Total	**$7,241.22**

Sanitary:

Commerce Treatment Plant Capital Fee (1 REU)	$4,896.00
White Lake Capital Connection Fee ($2100 per REU)	$2,100.00
Plumbing Inspection Permit	$50.00
Oakland County Tap Inspection Permit	$200.00
Total:	**$7,246.00**

Please feel free to contact me with any question regarding this review. 248-698-7700 Ext.226.

Sincerely,

Aaron Potter
Director, Department of Public Services
Charter Township of White Lake

Assessing Department

Memo

To: Sean O'Neil, Planning

From: Jeanine A Smith

Date: May 6, 2021

Re: Project Name: Elizabeth Lake Retail Parcel Number: 12-21-426-005

Comments: Please note the correct parcel number for this property. I had -006 before.

This plan is part of a much larger parcel than is indicated on the plans. If the intent is to divide this parcel an application must be made at the Assessing Department.

PROJECT:

PROPOSED RESTAURANTS & RETAILS PLAZA

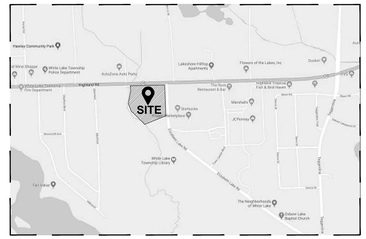
LOCATION:

(21-426-004) HIGHLAND RD. WHITE LAKE, MI 48386

PRELIMINARY SITE PLAN

DRAWING INDEX	
SHEET No.	SHEET TITLE
----	(COVER SHEET)
SP-1	EXISTING SITE PLAN/TOPO SURVEY
SP-2	PROPOSED SITE PLAN
SP-3	SITE PLAN DETAILS
SP-4	FIRE TRUCK CIRCULATION
C-1	MDOT DETAILS
C-2	PROPOSED GRADING PLAN
C-3	PROPOSED UTILITY PLAN
C-4	STORM DRAINAGE CALCULATIONS
C-5	STORM MAINTENANCE PLAN
A-1-1	BUILDING "A" - PROP. FLOOR PLAN
A-1-2	BUILDING "A" - PROP. ELEVATIONS
A-2-1	BUILDING "B" - PROP. FLOOR PLAN
A-2-2	BUILDING "B" - PROP. ELEVATIONS
A-3-1	BUILDING "C" - PROP. FLOOR PLAN
A-3-2	BUILDING "C" - PROP. ELEVATIONS
A-4-1	BUILDING "D" - PROP. FLOOR PLAN
A-4-2	BUILDING "D" - PROP. ELEVATIONS

LEGAL DESCRIPTION: (PARCEL C)
Land situated in the Township of White Lake, County of Oakland, State of Michigan.
Part of the East ½ of the Southeast ¼ of section 21, Town 3 North, Range 8 East, Township of White Lake, Oakland County, MI, described as beginning at a point distance South 89 degrees 25 minutes 19 seconds West 332.92 feet from the East ¼ corner, section 21, Town 3 North, Range 8 East down the centerline of Highland Road, (M-59) to the intersection of Highland Road (100 Feet wide) and Elizabeth Lake Road (66 Feet Wide); thence down the centerline of Elizabeth Lake Road, (66 feet wide) South 00 degrees 25 feet 22 seconds East, 549.70 feet to a point; thence South 69 degrees 50 minutes 10 seconds West 404.63 feet to a point, also known as the centerline of the Creek; also known as Brendel Lake Creek; Thence North 43 degrees 16 minutes 04 seconds West 299.25 feet, Rad. = 1,681.04; Chd. = 298.86 feet; Thence continuing on centerline of the Creek, also known as Brendel Lake Creek; North 54 degrees 53 seconds 29 minutes West, 30 feet to a point, thence N. 19 degrees 57 minutes 07 seconds West 148 Feet; thence North 11 degrees 17 minutes 59 seconds East 241 feet; thence North 00 degrees 32 minutes 16 seconds West 85 feet to the centerline of Highland Road, (M59 100 feet wide); thence South 89 degrees 25 minutes 19 seconds East 609.27 feet back to the point of beginning; except the portion of 50 feet on Highland Road (100 feet wide) and that portion of 33 feet on Elizabeth Lake Road (66 feet wide) for road and public utilities, containing 8.61 acres more or less.



LOCATION MAP
N.T.S.

AERIAL VIEW FROM GOOGLE MAPS
N.T.S.

GOVERNING CODE:
MICHIGAN BUILDING CODE 2015 AND
CHARTER TOWNSHIP OF WHITE LAKE, MI ZONING ORDINANCE

USE GROUP : M (MERCANTILE) & A-2 (ASSEMBLY GROUP)

PROPOSED USE: RETAILS & RESTAURANTS PLAZA

AREA OF THE PROPERTY: 344,865 SQ. FT. = 7.917 ACRES (EXCLUDING R.O.W.)

ZONING AG (AGRICULTURAL)

BUILDING DATA:

PROP. TOTAL BUILDINGS AREA= RESTAURANTS(3,560+2,280)+RETAILS (8,400+8,400+6,200) = 28,840 SQ. FT.

PROP. BUILDINGS HEIGHT = 25 FT. (REQUIRED: 35 FT. MAX)

LOT COVERAGE

REQUIRED = 30% MAX. PROPOSED = 8.36%

SETBACK REQUIREMENTS

REQUIRED:		PROPOSED:	
FRONT:	35.0 FT.	FRONT:	146.0 FT.
SIDE:	25 FT. ONE SIDE (50 FT. TOTAL)	EAST SIDE:	46.0 FT.
		WEST SIDE :	43.0 FT.
REAR :	50.0 FT.	REAR :	277.0 FT.

PARKING SPACES REQUIREMENTS

REQUIRED PARKING SPACES FOR 2 RESTAURANTS:
1 SPACE/75 SQ. FT. OF GROSS FLOOR AREA:
(3,560+2,280)/75= 78 PARKING SPACES

REQUIRED PARKING SPACES FOR 2 RETAILS:
1 SPACE/200 SQ. FT. OF GROSS FLOOR AREA:
(8,400+8,400+6,200)/200= 115 PARKING SPACES

TOTAL PARKING SPACES = 193 PARKING SPACES INCL. 6 H.C. PARKING SPACE

PROVIDED PARKING SPACES:
193 PARKING SPACES INCLUDING 8 H.C. PARKING SPACE

LOADING UNLOADING SPACES
(3) LOADING UNLOADING AREAS ARE PROVIDED

CODES CURRENTLY IN EFFECT

- 2015 MICHIGAN BUILDING CODE, MBC 2015
- 2015 MICHIGAN MECHANICAL CODE MMC 2015
- 2015 MICHIGAN PLUMBING CODE, MPC 2015
- 2017 NATIONAL ELECTRICAL CODE, 2017 CONSTRUCTION CODE – PART 8. ELECTRICAL CODE RULES
- ACCESSIBILITY: MICHIGAN BARRIER FREE DESIGN LAW, P.A. 1966 AS AMENDED AND THE 2009 ICC/ANSI A117.1 STANDARD AS REFERENCED FROM CHAPTER 11 OF THE 2015 MICHIGAN BUILDING CODE.

MA ARCHMASTER
Residential & Commercial Designs
Cell Phone: (313) 505-7744
Email: alahwalmoneer@gmail.com

PROJECT:
PROPOSED RESTAURANTS AND RETAILS PLAZA
ADDRESS:
(21-426-004) HIGHLAND RD. WHITE LAKE, MI 48386
CLIENT'S NAME: NAZIR JAWICH

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REVISIONS:
05/03/2021
05/25/2021

DATE: 03/26/2021

DRAWN BY: MONEER ALAHWAL

SCALE: AS NOTED

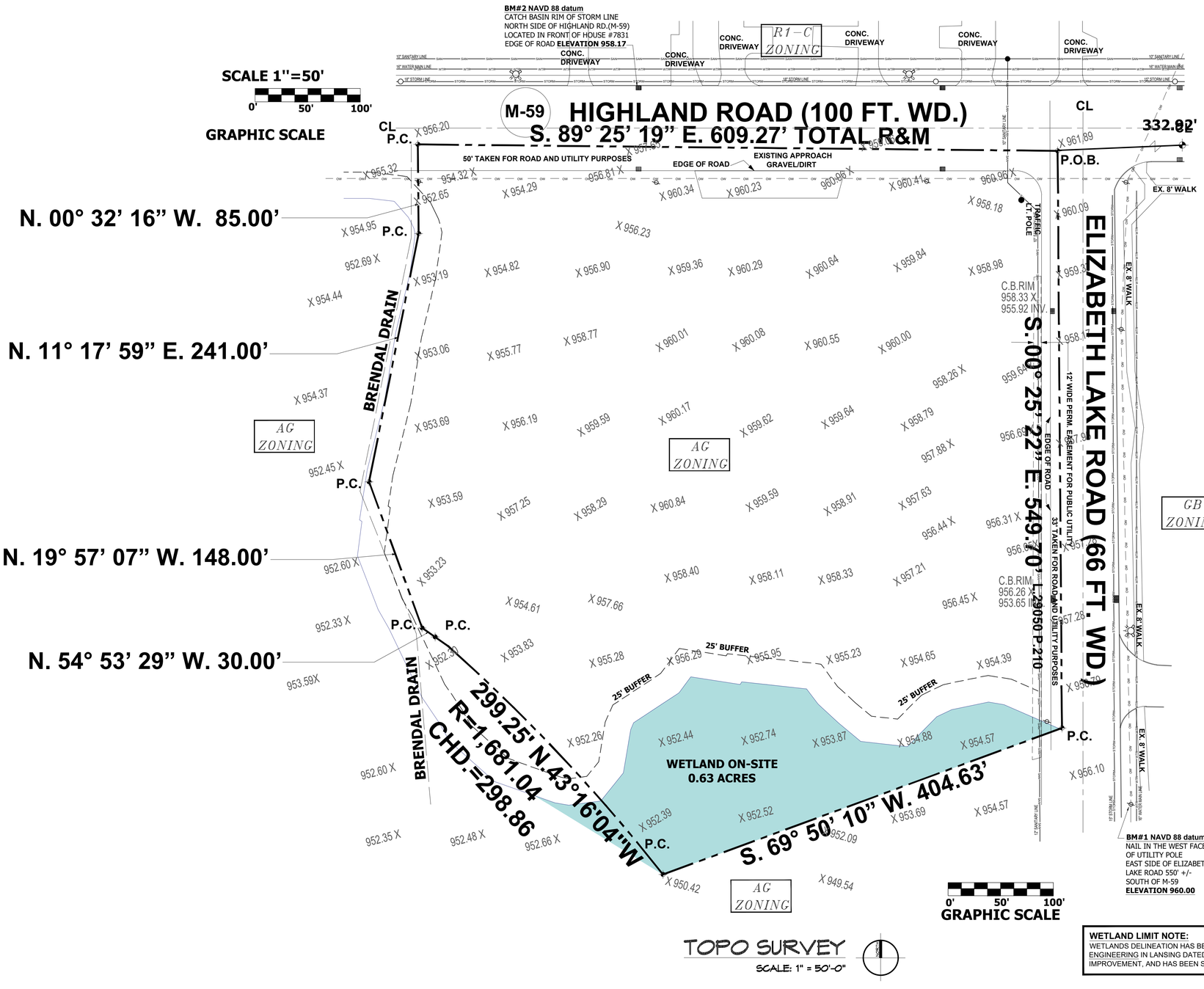
SHEET TITLE: COVER SHEET

SHEET #: ---

APPROVED BY:

STATE OF MICHIGAN
MOHAMED NASRI BAZNA
ENGINEER
No. 32351
LICENSED PROFESSIONAL ENGINEER

LEGAL DESCRIPTION: (PARCEL C)
Land situated in the Township of White Lake, County of Oakland, State of Michigan.
Part of the East ½ of the Southeast ¼ of section 21, Town 3 North, Range 8 East, Township of White Lake, Oakland County, MI, described as beginning at a point distance South 89 degrees 25 minutes 19 seconds West 332.92 feet from the East ¼ corner, section 21, Town 3 North, Range 8 East down the centerline of Highland Road, (M-59) to the intersection of Highland Road (100 Feet wide) and Elizabeth Lake Road (66 Feet Wide); thence down the centerline of Elizabeth Lake Road, (66 feet wide) South 00 degrees 25 feet 22 seconds East, 549.70 feet to a point; thence South 69 degrees 50 minutes 10 seconds West 404.63 feet to a point, also known as the centerline of the Creek; also known as Brendel Lake Creek; Thence North 43 degrees 16 minutes 04 seconds West 299.25 feet, Rad. = 1,681.04; Chd. = 298.86 feet; Thence continuing on centerline of the Creek, also known as Brendel Lake Creek; North 54 degrees 53 seconds 29 minutes West, 30 feet to a point, thence N. 19 degrees 57 minutes 07 seconds West 148 Feet; thence North 11 degrees 17 minutes 59 seconds East 241 feet; thence North 00 degrees 32 minutes 16 seconds West 85 feet to the centerline of Highland Road, (M59 100 feet wide); thence South 89 degrees 25 minutes 19 seconds East 609.27 feet back to the point of beginning; except the portion of 50 feet on Highland Road (100 feet wide) and that portion of 33 feet on Elizabeth Lake Road (66 feet wide) for road and public utilities, containing 8.61 acres more or less.



TOPO SURVEY
SCALE: 1" = 50'-0"

LOCATION MAP
N.T.S.

ZONING AND SETBACK INFORMATION

Zoning and Setback information was obtained From the Municipal official, it is the responsibility Of the client to insure that this information is Correct.

THIS PROPERTY IS ZONED AS:
AG AGRICULTURAL

LOT SIZE
MIN. AREA MIN. LOT WIDTH
5 ACRES 300.0' FEET

LOT COVERAGE
MAX LOT COVERAGE
30%

MINIMUM SETBACKS: **BUILDING HEIGT**
Front Yard:
35 FT.(BUILDING) **MAXIMUM STORIES 2.5**
MAXIMUM HEIGHT 35 FT.

Side Yards:
25 FT.ONE SIDE
50 FEET TOTAL OF TWO SIDES

Rear Yard
50 FT. (BUILDING)

BENCHMARKS
BM#1 NAIL IN THE WEST FACE OF UTILITY POLE
EAST SIDE OF ELIZABETH LAKE ROAD 550' +/-
SOUTH OF M-59 **ELEVATION 960.00**

BM#2 CATCH BASIN RIM OF STORM LINE
NORTH SIDE OF HIGHLAND RD.(M-59)
LOCATED IN FRONT OF HOUSE #7831
EDGE OF ROAD **ELEVATION 958.17**

LEGEND

PROPERTY LINE	
EASEMENT LINE	
EX. GAS LINE	GAS
PROP. GAS LINE	
EX. WATER MAIN	ATR
PROP. WATER MAIN	
EX. SANITARY LINE	SAN
PROP. SANITARY LINE	
EX. STORM LINE	STORM
PROP. STORM LINE	
FENCE	
OVER-HEAD WIRES	OW
SANITARY SEWER MAN HOLE	
STORM SEWER CATCH BASIN	
POWER POLE	P.P.
LIGHT POLE	L.P.
FIRE HYDRANT	
WATER SHOT-OFF	
EXISTING ELEVATION	X 961.89
PROPOSED ELEVATION	960.00
TOP OF CURB	TC
GUTTER	G
TOP OF WALK	TW
PAVEMENT	P
DRAINAGE DIRECTION	

WETLAND LIMIT NOTE:
WETLANDS DELINEATION HAS BEEN PERFORMED AND PROVIDED BY ALAN BOYER OF LSG ENGINEERING IN LANSING DATED ON FEB. 27, 2018. IT WAS DONE FOR THE KROGER DRAIN IMPROVEMENT, AND HAS BEEN SEEN BY THE TOWNSHIP AND EGLE (DEQ).

MA ARCHMASTER
Residential & Commercial Designs
Cell Phone: (313) 505-7744
Email: alahwalmoneer@gmail.com

PROJECT:
PROPOSED RESTAURANTS AND RETAILS PLAZA
ADDRESS:
(21-426-004) HIGHLAND RD. WHITE LAKE, MI 48386
CLIENT'S NAME: NAZIR JAWICH

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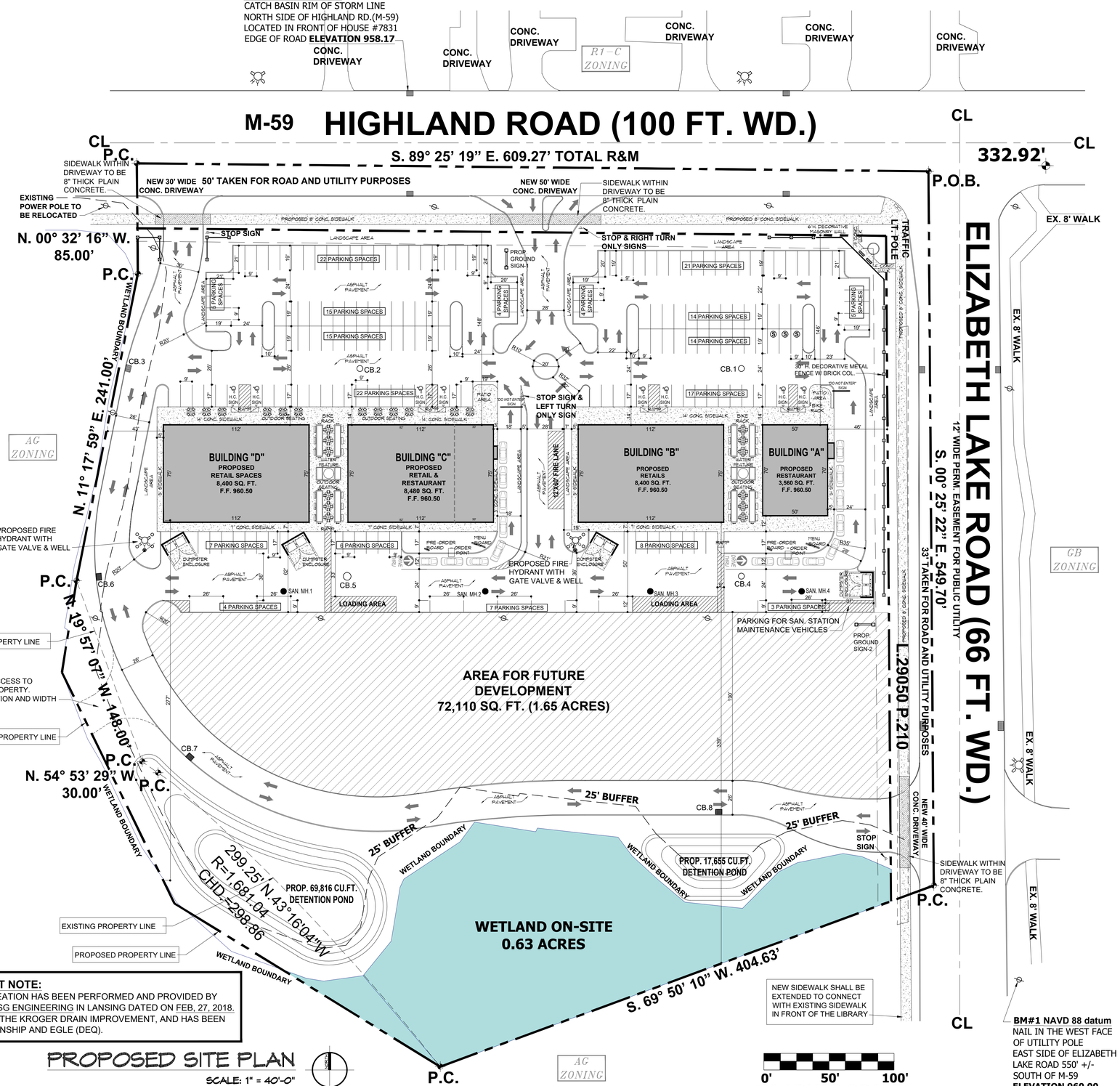
REVISIONS:
05/03/2021
05/25/2021

DATE: 03/26/2021
DRAWN BY: MONEER ALAHWAL
SCALE: AS NOTED
SHEET TITLE:
- TOPO SURVEY

SHEET #: SP-1

APPROVED BY:

STATE OF MICHIGAN
MOHAMED NASRI BAZNA
ENGINEER
No. 32351
LICENSED PROFESSIONAL ENGINEER



PROPOSED SITE PLAN

SCALE: 1" = 40'-0"

WETLAND LIMIT NOTE:
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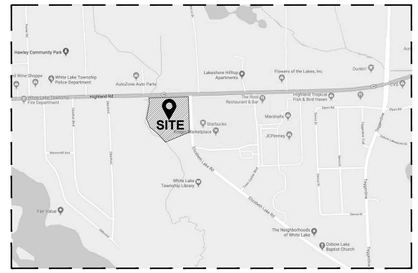

LOCATION MAP

N.T.S.

GOVERNING CODE:

MICHIGAN BUILDING CODE 2015 AND
CHARTER TOWNSHIP OF WHITE LAKE, MI ZONING ORDINANCE

USE GROUP :	M (MERCANTILE) & A-2 (ASSEMBLY GROUP)
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ZONING	AG (AGRICULTURAL)

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- ACCESSIBILITY: MICHIGAN BARRIER FREE DESIGN LAW, P.A. 1966 AS AMENDED AND THE 2009 ICC/ANSI A117.1 STANDARD AS REFERENCED FROM CHAPTER 11 OF THE 2015 MICHIGAN BUILDING CODE.

WHITE LAKE TOWNSHIP ENGINEERING DESIGN STANDARDS

a. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE TOWNSHIP'S CURRENT STANDARDS AND SPECIFICATIONS.
b. THE CONTRACTOR SHALL NOTIFY THE TOWNSHIP ENGINEER AND/OR THE AUTHORITY HAVING JURISDICTION, 48 HOURS PRIOR TO THE BEGINNING OF CONSTRUCTION.
c. CONTRACTOR SHALL CONTACT MISS DIG AT 800-482-7171, 72 HOURS IN ADVANCE OF CONSTRUCTION, FOR EXISTING UNDERGROUND UTILITY LOCATIONS.
d. IN ORDER TO VERIFY COMPLIANCE WITH APPROVED PLANS, FULL-TIME CONSTRUCTION OBSERVATION WILL GENERALLY BE REQUIRED DURING ALL PHASES OF UNDERGROUND SITE CONSTRUCTION INCLUDING INSTALLATION OF SANITARY SEWER, STORM SEWERS, DRAINS, WATERMAINS AND APPURTENANCES AS WELL AS PRIVATE STREET CURBING AND PAVING CONSTRUCTION. INTERMITTENT OBSERVATIONS WILL BE MADE FOR SITE GRADING, PARKING LOT CURBING AND PAVING, RETAINING WALL CONSTRUCTION AND OTHER SURFACE ACTIVITY.

ACCESS ROAD NOTES:

- THE PROPERTY OWNER WILL PROVIDE ACCESS EASEMENT FOR THE PROPOSED ACCESS ROAD FROM ELIZABETH LAKE ROAD AND M-59 ALL THE WAY TO THE SOUTHWEST PROPERTY LINE.
- A VARIANCE MIGHT BE REQUIRED AS A PART OF THE PROPOSED ACCESS ROAD IS TO BE CONSTRUCTED WITHIN THE WETLAND BUFFER.

MA ARCHMASTER
Residential & Commercial Designs

Cell Phone: (313) 505-7744
Email: alahwalmoneer@gmail.com

PROJECT:
PROPOSED RESTAURANTS AND RETAILS PLAZA

ADDRESS:
(21-426-004) HIGHLAND RD. WHITE LAKE, MI 48386

CLIENT'S NAME: NAZIR JAWICH

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REVISIONS:
05/03/2021
05/25/2021

DATE: 03/26/2021

DRAWN BY: MONEER ALAHWAL

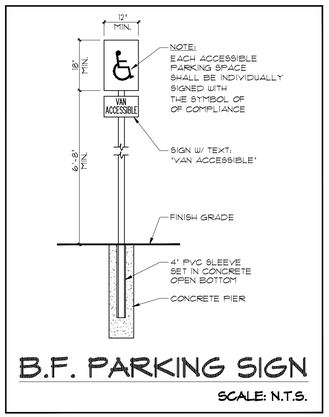
SCALE: AS NOTED

SHEET TITLE:
- PROPOSED SITE PLAN

SHEET #: SP-2

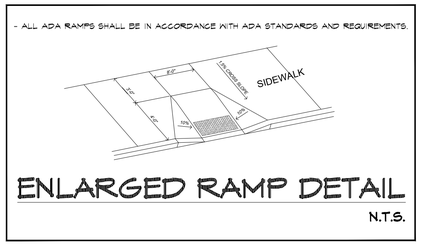
APPROVED BY:

STATE OF MICHIGAN
MOHAMED NASRI BAZNA
ENGINEER
No. 32351
LICENSED PROFESSIONAL ENGINEER



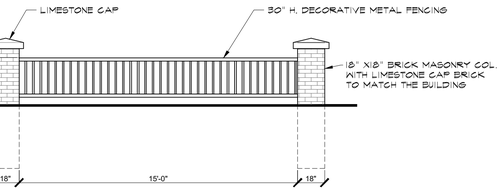
B.F. PARKING SIGN

SCALE: N.T.S.



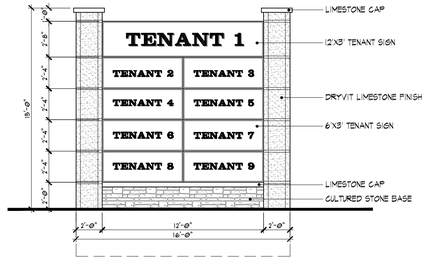
ENLARGED RAMP DETAIL

N.T.S.



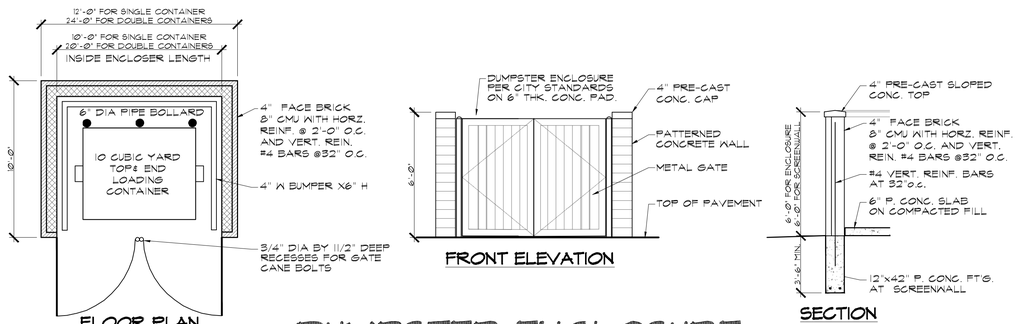
DECORATIVE METAL FENCE W/BRICK COL.

N.T.S.



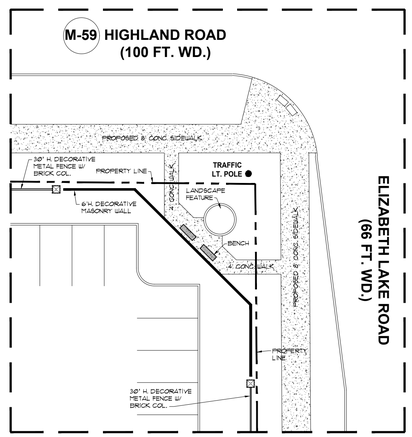
PROPOSED MULTI TENANT MONUMENT SIGNS

SCALE: 3/16" = 1'-0"



DUMPSTER ENCLOSURE

SCALE: N.T.S.



ENLARGED DETAIL - NORTH-EAST CORNER

SCALE: 1" = 20'-0"

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Residential & Commercial Designs

Cell Phone: (313) 505-7744
Email: alahwalmoneer@gmail.com

PROJECT:
PROPOSED RESTAURANTS AND RETAILS PLAZA
ADDRESS:
(21-426-004) HIGHLAND RD. WHITE LAKE, MI 48386
CLIENT'S NAME: NAZIR JAWICH

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REVISIONS:
05/03/2021
05/25/2021

DATE: 03/26/2021

DRAWN BY: MONEER ALAHWAL

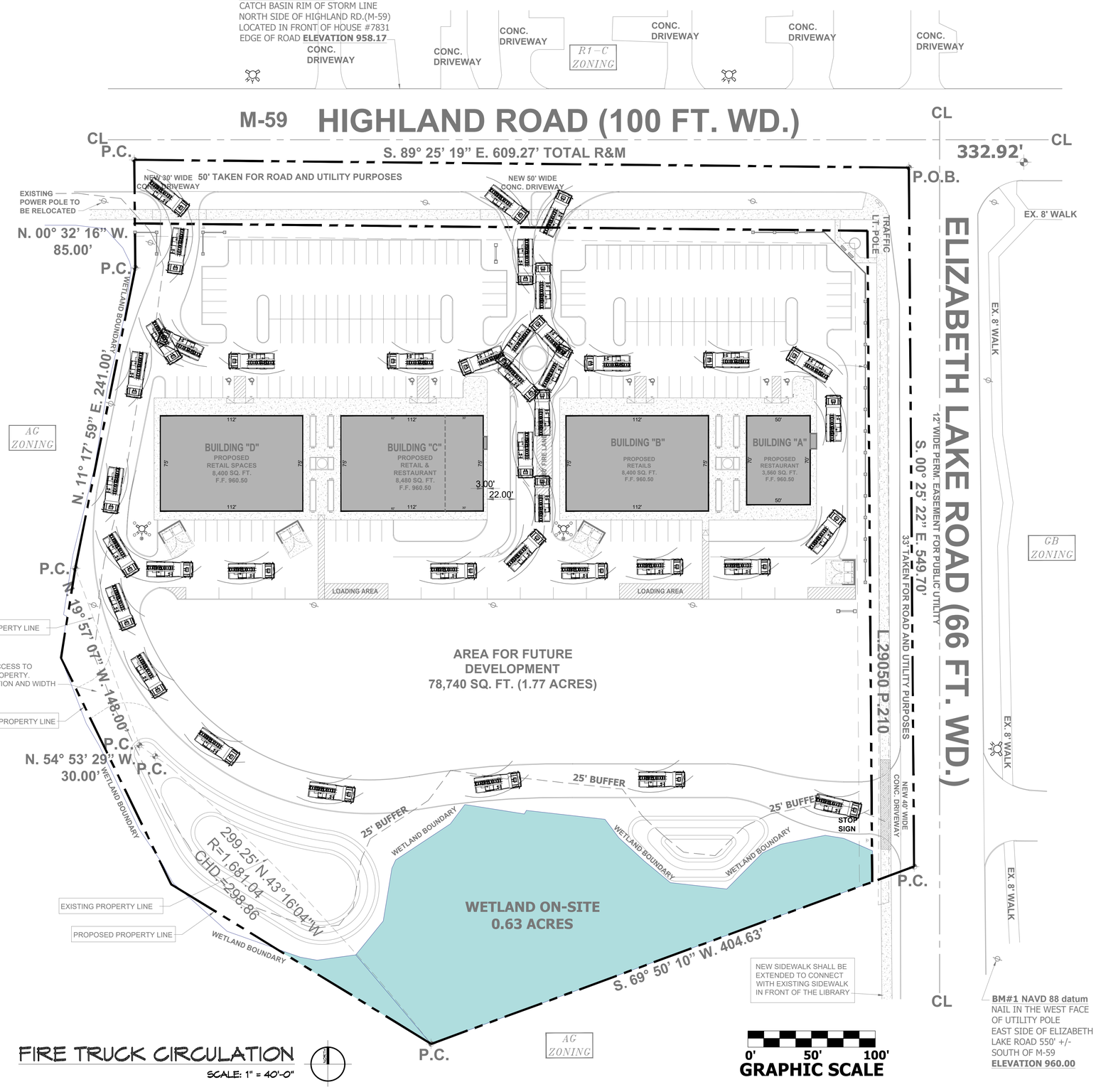
SCALE: AS NOTED

SHEET TITLE:
- SITE PLAN DETAILS

SHEET #: SP-3

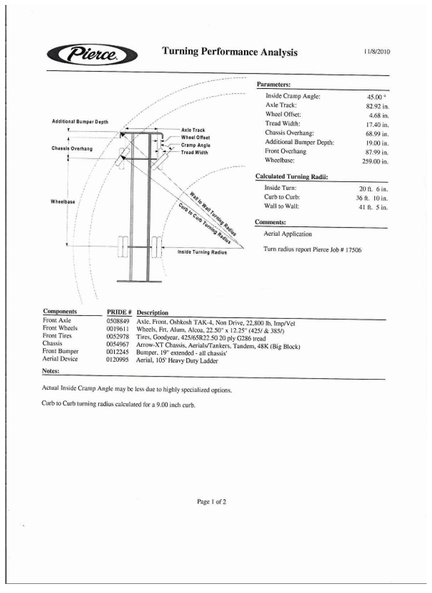
APPROVED BY:

STATE OF MICHIGAN
MOHAMED
NASRI
BAZNA
ENGINEER
No. 32351
LICENSED PROFESSIONAL ENGINEER



FIRE TRUCK CIRCULATION

SCALE: 1" = 40'-0"



Pierce — Turning Performance Analysis — 11/8/2010

Parameters:

Inside Cramp Angle:	45.00 °
Axle Track:	82.92 in.
Wheel Offset:	4.68 in.
Tread Width:	17.40 in.
Chassis Overhang:	68.99 in.
Additional Bumper Depth:	19.00 in.
Front Overhang	87.99 in.
Wheelbase:	259.00 in.

Calculated Turning Radii:

Inside Turn:	20 ft. 6 in.
Curb to Curb:	36 ft. 10 in.
Wall to Wall:	41 ft. 5 in.

Comments:

Aerial Application

Turn radius report Pierce Job # 17506

Components	PRIDE #	Description
Front Axle	0508649	Axle, Front, Oshkosh TAK-4, Non Drive, 22,800 lb, Imp/Vet
Front Wheels	0019611	Wheels, Fit, Alum, Alcoa, 22.50" x 12.25" (425/ & 385/)
Front Tires	0025978	Tires, Goodyear, 425/65R22.5G 20 ply G286 tread
Chassis	0054967	Arrow-XT Chassis, Aerials/Tankers, Tandem, 48K (Big Block)
Front Bumper	0012245	Bumper, 19" extended - all chassis'
Aerial Device	0120995	Aerial, 105' Heavy Duty Ladder

Notes:

Actual Inside Cramp Angle may be less due to highly specialized options.

Curb to Curb turning radius calculated for a 9.00 inch curb.

Page 1 of 2

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Residential & Commercial Designs

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REVISIONS:
- 05/03/2021
- 05/25/2021

DATE: 03/26/2021

DRAWN BY: MONEER ALAHWAL

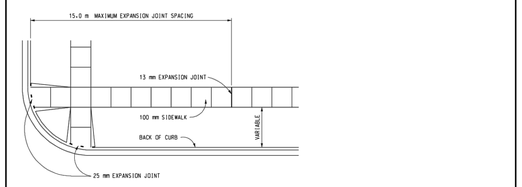
SCALE: AS NOTED

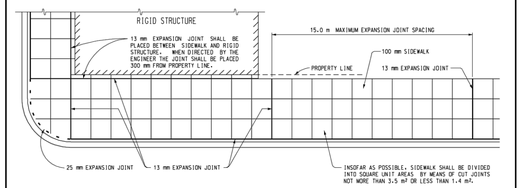
SHEET TITLE: - FIRE TRUCK CIRCULATION

SHEET #: SP-4

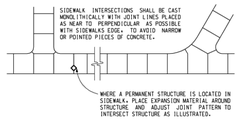
APPROVED BY:

STATE OF MICHIGAN
MOHAMED NASRI BAZNA
ENGINEER
No. 32351
LICENSED PROFESSIONAL ENGINEER

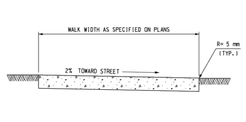




LOCATION OF JOINTS IN CONCRETE SIDEWALK



TYPICAL SIDEWALK JOINT LAYOUTS



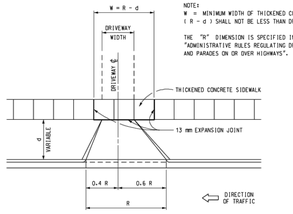
100 mm CONCRETE SIDEWALK

MDOT	ENGINEER OF CONSTRUCTION & TECHNOLOGY	ENGINEER - ROAD DESIGN
PREPARED BY DESIGN DIVISION	ENGINEER OF MAINTENANCE	ENGINEER OF DESIGN
DRAWN BY: R.L.C.		DEPARTMENT DIRECTOR James R. DeSana
CHECKED BY: R.K.C.	ENGINEER OF TRAFFIC AND SAFETY	By: CHIEF ENGINEER/DEPUTY DIRECTOR BUREAU OF HIGHWAY TECHNICAL SERVICES

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY TECHNICAL SERVICES STANDARD PLAN FOR
DRIVEWAY OPENINGS & APPROACHES, AND CONCRETE SIDEWALK

11-9-98	5-29-98	R-29-C	SHEET
T.H.K.A. APPROVAL	PLAN DATE		1 OF 4

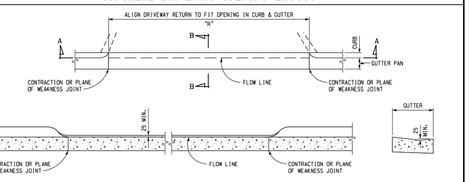
NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL SIGNED COPY APPROVED FOR PUBLICATION. IS KEPT ON FILE AT THE MICHIGAN DEPARTMENT OF TRANSPORTATION.



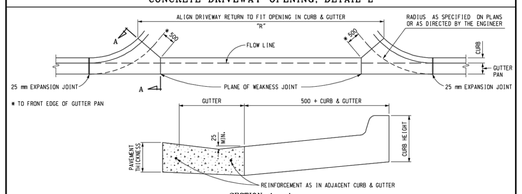
NOTE:
W = MINIMUM WIDTH OF THICKENED CONCRETE SIDEWALK.
(R - d) SHALL NOT BE LESS THAN DRIVEWAY WIDTH.

THE "R" DIMENSION IS SPECIFIED IN THE PUBLICATION "ADMINISTRATIVE RULES REGULATING DRIVEWAYS, BANNERS AND PARADES ON OR OVER HIGHWAYS".

CONCRETE DRIVEWAY OPENING LAYOUT



CONCRETE DRIVEWAY OPENING, DETAIL L

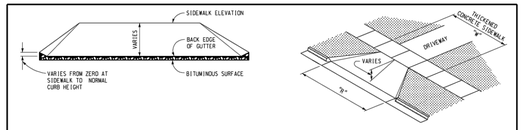


CONCRETE DRIVEWAY OPENING, DETAIL M

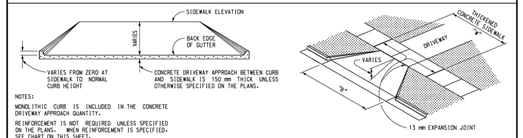
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY TECHNICAL SERVICES STANDARD PLAN FOR
DRIVEWAY OPENINGS & APPROACHES, AND CONCRETE SIDEWALK

11-9-98	5-29-98	R-29-C	SHEET
T.H.K.A. APPROVAL	PLAN DATE		2 OF 4

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL SIGNED COPY APPROVED FOR PUBLICATION. IS KEPT ON FILE AT THE MICHIGAN DEPARTMENT OF TRANSPORTATION.



BITUMINOUS DRIVEWAY APPROACH
(TO BE USED WITH DETAIL L1

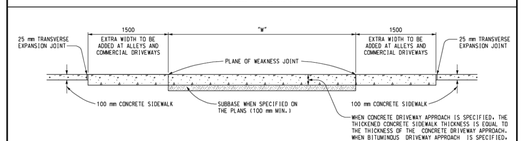


NOTES:
MONOLITHIC CURB IS INCLUDED IN THE CONCRETE DRIVEWAY APPROACH QUANTITY.

REINFORCEMENT IS NOT REQUIRED UNLESS SPECIFIED ON THE PLANS. WHEN REINFORCEMENT IS SPECIFIED, SEE CHART ON THIS SHEET.

WHEN AREA BETWEEN CURB & GUTTER AND SIDEWALK IS MORE THAN 30.0 m² , PLACE A CONTRACTION JOINT IN LINE WITH CENTERLINE OF DRIVEWAY AND PERPENDICULAR TO ROADWAY.

CONCRETE DRIVEWAY APPROACH
(TO BE USED WITH DETAIL L OR M)



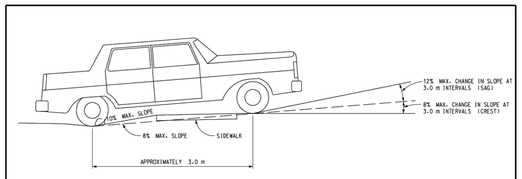
THICKENED CONCRETE SIDEWALK

REINFORCEMENT FOR CONCRETE DRIVEWAYS		
CONCRETE DRIVEWAY THICKNESS (mm)	WIRE SIZE (150 mm X 150 mm MESH)	AVERAGE WEIGHT (kg / m)²
LESS THAN 200	W1.4	103
	W2.9	205
200 OR GREATER	USE WIRE FABRIC REINFORCEMENT SPECIFIED ON STANDARD PLAN R-45-SERIES	

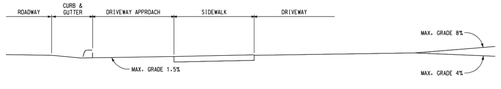
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY TECHNICAL SERVICES STANDARD PLAN FOR
DRIVEWAY OPENINGS & APPROACHES, AND CONCRETE SIDEWALK

11-9-98	5-29-98	R-29-C	SHEET
T.H.K.A. APPROVAL	PLAN DATE		3 OF 4

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL SIGNED COPY APPROVED FOR PUBLICATION. IS KEPT ON FILE AT THE MICHIGAN DEPARTMENT OF TRANSPORTATION.



LOW VOLUME COMMERCIAL OR RESIDENTAL DRIVEWAY SLOPES



COMMERCIAL DRIVEWAY PROFILE FOR MAJOR TRAFFIC GENERATORS

NOTES:

FOR DRIVEWAY DESIGN REFER ALSO TO "ADMINISTRATIVE RULES REGULATING DRIVEWAYS, BANNERS, AND PARADES ON OR OVER HIGHWAYS" AND GEOMETRIC DESIGN G-680-SERIES. COMMERCIAL DRIVEWAYS.

FOR CURB AND GUTTER DETAILS, SEE STANDARD PLAN R-30-SERIES.

SIDEWALK TRANSVERSE SLOPE MAY VARY FROM 0% TO 4% TO MEET THE SIDE CONDITIONS. WHEN TRANSVERSE SLOPE IS LESS THAN 2%, LONGITUDINAL DRAINAGE MUST BE PROVIDED.

WHEN SETTING GRADES FOR COMMERCIAL DRIVES, THE TYPES OF VEHICLES USING THE DRIVE SHOULD BE CONSIDERED.

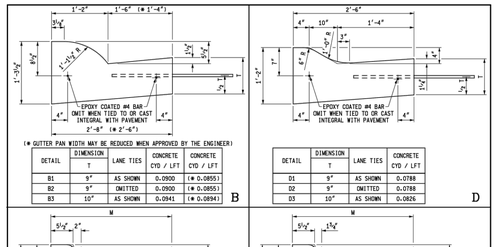
ALL DIMENSIONS ARE IN MILLIMETERS (mm) UNLESS OTHERWISE NOTED.

MDOT	
PREPARED BY DESIGN DIVISION	
DRAWN BY: R.L.C.	
CHECKED BY: R.K.C.	

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY TECHNICAL SERVICES STANDARD PLAN FOR
DRIVEWAY OPENINGS & APPROACHES, AND CONCRETE SIDEWALK

11-9-98	5-29-98	R-29-C	SHEET
T.H.K.A. APPROVAL	PLAN DATE		4 OF 4

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL SIGNED COPY APPROVED FOR PUBLICATION. IS KEPT ON FILE AT THE MICHIGAN DEPARTMENT OF TRANSPORTATION.



(* GUTTER PAN WIDTH MAY BE REDUCED WHEN APPROVED BY THE ENGINEER)

DETAIL	DIMENSION T	LANE TIES	CONCRETE CYD / LFT	CONCRETE CYD / LFT
B1	9"	AS SHOWN	0.0900	(* 0.0855)
B2	9"	OMITTED	0.0900	(* 0.0855)
B3	10"	AS SHOWN	0.0941	(* 0.0894)

DETAIL	DIMENSION T	LANE TIES	CONCRETE CYD / LFT
D1	9"	AS SHOWN	0.0788
D2	9"	OMITTED	0.0788
D3	10"	AS SHOWN	0.0826

DETAIL	DIMENSION M	DIMENSION N	LANE TIES	CONCRETE CYD / LFT
C1	1'-4"	5/8"	AS SHOWN	0.0506
C2	1'-6"	5/8"	OMITTED	0.0506
C3	2'-0"	1 1/4"	AS SHOWN	0.0632
C4	2'-0"	1 1/4"	OMITTED	0.0632
C5	2'-6"	1 1/4"	AS SHOWN	0.0757
C6	2'-6"	1 1/4"	OMITTED	0.0757

DETAIL	DIMENSION M	DIMENSION N	LANE TIES	CONCRETE CYD / LFT
F1	1'-4"	5/8"	AS SHOWN	0.0484
F2	1'-6"	5/8"	OMITTED	0.0484
F3	2'-0"	1 1/4"	AS SHOWN	0.0610
F4	2'-0"	1 1/4"	OMITTED	0.0610
F5	2'-6"	1 1/4"	AS SHOWN	0.0737
F6	2'-6"	1 1/4"	OMITTED	0.0737

* WHEN OTHER THAN 1" (4" MIN. TO 9" MAX.) FACE EXPOSURE IS SPECIFIED ON PLANS, VARY TOTAL CURB HEIGHT AND BATTER ACCORDINGLY

EPOXY COATED #4 BAR OMIT WHEN TIED TO OR CAST INTEGRAL WITH PAVEMENT

LANE TIE

BOTTOM OF PAVEMENT

½ THICKNESS OF PAVEMENT OR BASE

DETAIL	CURB HEIGHT	LANE TIES	CONCRETE CYD / LFT
E1	1'-4"	AS SHOWN	0.0310
E2	1'-4"	OMITTED	0.0310
E4	2'-0"	OMITTED	0.0477

NOTES:

CURB AND GUTTER RADII SHALL BE DIMENSIONED TO THE FRONT EDGE OF THE GUTTER PAN OR EDGE OF PAVEMENT.

CONCRETE CURB AND GUTTER ENDINGS WILL BE PAID FOR IN LINEAR FEET OF THE ADJACENT CURB DETAIL.

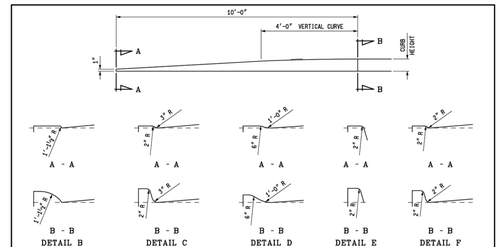
JOINTS SHALL BE PLACED AT RIGHT ANGLES TO THE EDGE OF CONCRETE CURB AND GUTTER.

JOINTS DETAILED ON THE PLANS SHALL SUPERSEDE THOSE SPECIFIED ON THIS STANDARD PLAN.

BOTTOM SLOPE OF CURB AND GUTTER STRUCTURE MAY BE THE SAME SLOPE AS BOTTOM OF PAVEMENT. BACK OF CURB AND VERTICAL EDGE OF GUTTER PAN MAY HAVE A MAXIMUM ½" BATTER TO FACILITATE FORMING.

WHEN CURB AND GUTTER IS CAST INTEGRALLY, SEE CURRENT STANDARD PLAN R-31-SERIES.

ALL JOINTS FOR CURB OR CURB AND GUTTER ARE INCLUDED IN THE PAY ITEM FOR THE CURB OR CURB AND GUTTER.



CONCRETE CURB, CURB AND GUTTER ENDINGS

1" FIBER JOINT FILLER

CONTRACTION JOINT

JOINTS IN CURB OR CURB AND GUTTER NOT TIED TO CONCRETE PAVEMENT: ADJACENT TO CONCRETE BASE COURSE: OR ADJACENT TO HMA PAVEMENT:

A. PLACE 1" FIBER JOINT FILLER AT 400' MAXIMUM INTERVALS.
B. PLACE 1" FIBER JOINT FILLER AT SPRING POINTS OF INTERSECTING STREETS.
C. PLACE ½" ISOLATION JOINT AT CATCH BASINS PER STANDARD PLAN R-37-SERIES.
D. PLACE CONTRACTION JOINTS AT 40' MAXIMUM INTERVALS.

JOINTS IN CURB OR CURB AND GUTTER TIED TO JOINTED PAVEMENT

A. PLACE 1" FIBER JOINT FILLER OPPOSITE ALL TRANSVERSE EXPANSION JOINTS IN PAVEMENT.
B. PLACE ½" ISOLATION JOINT AT CATCH BASINS PER STANDARD PLAN R-37-SERIES.
C. PLACE CONTRACTION JOINTS OPPOSITE ALL TRANSVERSE CONTRACTION JOINTS IN PAVEMENT.
D. A SYMBOL (D) JOINT SHALL BE PLACED BETWEEN CURB OR CURB AND GUTTER AND ADJACENT CONCRETE PAVEMENT AS SPECIFIED ON STANDARD PLAN R-41-SERIES.

MDOT	DEPARTMENT DIRECTOR Kirk T. Steudle
PREPARED BY DESIGN DIVISION	APPROVED BY: DIRECTOR, BUREAU OF FIELD SERVICES
DRAWN BY: R.L.C.	
CHECKED BY: R.K.C.	APPROVED BY: DIRECTOR, BUREAU OF HIGHWAY DEVELOPMENT

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR
CONCRETE CURB AND CONCRETE CURB & GUTTER

F.H.W.A. APPROVAL	2-6-2014 PLAN DATE	R-30-G	SHEET 1 OF 2

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR
CONCRETE CURB AND CONCRETE CURB & GUTTER

F.H.W.A. APPROVAL	2-6-2014 PLAN DATE	R-30-G	SHEET 2 OF 2

AS-LET PLAN REVISIONS							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

MDOT | VERT. (FT) 0 | HORIZ. (FT) 0 | FILE: | DATE: | DESIGN UNIT: | TSC: | CS: | JN: | DRAWING | SHEET

MA ARCHMASTER
Residential & Commercial Designs
Cell Phone: (313) 505-7744
Email: alahwalmoneer@gmail.com

PROJECT: PROPOSED RESTAURANTS AND RETAILS PLAZA
ADDRESS: (21-426-004) HIGHLAND RD. WHITE LAKE, MI 48386
CLIENT'S NAME: NAZIR JAWICH

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REVISIONS:
05/03/2021
05/25/2021

DATE: 03/26/2021

DRAWN BY: MONEER ALAHWAL

SCALE: AS NOTED

SHEET TITLE: - MDOT DETAILS

SHEET #: C-1

APPROVED BY:

BM#2 NAVD 88 datum
CATCH BASIN RIM OF STORM LINE
NORTH SIDE OF HIGHLAND RD.(M-59)
LOCATED IN FRONT OF HOUSE #7831
EDGE OF ROAD **ELEVATION 958.17**

CONC. DRIVEWAY | CONC. DRIVEWAY | CONC. DRIVEWAY | CONC. DRIVEWAY | CONC. DRIVEWAY | CONC. DRIVEWAY

R1-C ZONING

M-59 **HIGHLAND ROAD (100 FT. WD.)**

CL — CL

P.C. — S. 89° 25' 19" E. 609.27' TOTAL R&M — P.O.B. — 332.92'

50' TAKEN FOR ROAD AND UTILITY PURPOSES

NEW 30' WIDE CONC. DRIVEWAY

EXISTING POWER POLE TO BE RELOCATED

N. 00° 32' 16" W. 85.00'

P.C.

N. 11° 17' 59" E. 241.00'

WETLAND BOUNDARY

AG ZONING

N. 19° 57' 07" W. 148.00'

P.C.

N. 54° 53' 29" W. 30.00'

P.C.

PROPOSED FIRE HYDRANT WITH GATE VALVE & WELL

EXISTING PROPERTY LINE

25' FUTURE ACCESS TO ADJACENT PROPERTY VERIFY LOCATION AND WIDTH

PROPOSED PROPERTY LINE

EXISTING PROPERTY LINE

PROPOSED PROPERTY LINE

299.25' R=1,687.00' CHD=298.86 S 3°16'04" W

PROP. 69,816 CU.FT. DETENTION POND

BUILDING "D" PROPOSED RETAIL SPACES 8,400 SQ. FT. F.F. 960.50

BUILDING "C" PROPOSED RETAIL & RESTAURANT 8,480 SQ. FT. F.F. 960.50

BUILDING "B" PROPOSED RETAILS 8,400 SQ. FT. F.F. 960.50

BUILDING "A" PROPOSED RESTAURANT 3,560 SQ. FT. F.F. 960.50

TRAFFIC ISLAND

LOADING AREA

CB.1 CB.2 CB.3 CB.4 CB.5 CB.6 CB.7 CB.8

AREA FOR FUTURE DEVELOPMENT
78,340 SQ. FT. (1.77 ACRES)

DETENTION PONDS DISCHARGE INLETS SHALL BE RAISED AS PER PROPOSED INVERTS AND SHALL BE OUT OF THE WETLAND BUFFER LINE.

25' BUFFER — WETLAND BOUNDARY

PROP. 17,655 CU.FT. DETENTION POND

WETLAND ON-SITE 0.63 ACRES

INVERT OF DISCHARGE OUTLET SHALL MATCH THE EXISTING GRADING

INVERT OF DISCHARGE OUTLET SHALL MATCH THE EXISTING GRADING

PROPOSED FIRE HYDRANT WITH GATE VALVE & WELL

NEW SIDEWALK SHALL BE EXTENDED TO CONNECT WITH EXISTING SIDEWALK IN FRONT OF THE LIBRARY

S. 69° 50' 10" W. 404.63'

P.C. — P.C.

AG ZONING

CB ZONING

ELIZABETH LAKE ROAD (66 FT. WD.)

12' WIDE PERM. EASEMENT FOR PUBLIC UTILITY

S. 00° 25' 28" E. 549.70'

33' TAKEN FOR ROAD AND UTILITY PURPOSES

NEW 40' WIDE CONC. DRIVEWAY

TRAFFIC LT. POLE

EX. 8' WALK

C.B.RIM 958.33 INV. 955.92

C.B.RIM 956.26 INV. 953.65

MATCH EXISTING

SIGN

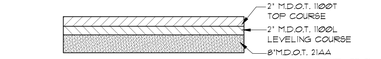
L=290.50' R=1,950.00'

PROPOSED GRADING PLAN

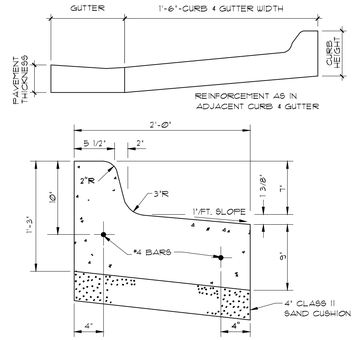
SCALE: 1" = 40'-0"

0' 50' 100'
GRAPHIC SCALE

BM#1 NAVD 88 datum
NAIL IN THE WEST FACE OF UTILITY POLE
EAST SIDE OF ELIZABETH LAKE ROAD 550' +/- SOUTH OF M-59
ELEVATION 960.00

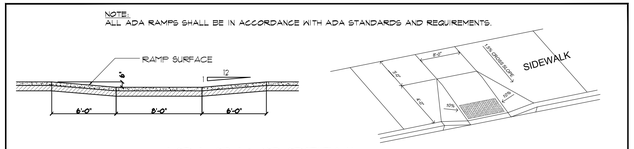


ASPHALT PAVEMENT DETAIL
NOT TO SCALE



CURB AND GUTTER DETAIL
NOT TO SCALE

NOTE:
ALL ADA RAMPS SHALL BE IN ACCORDANCE WITH ADA STANDARDS AND REQUIREMENTS.



ADA RAMP DETAIL
N.T.S.

BENCHMARKS
BM#1 NAIL IN THE WEST FACE OF UTILITY POLE
EAST SIDE OF ELIZABETH LAKE ROAD 550' +/-
SOUTH OF M-59 **ELEVATION 960.00**

BM#2 CATCH BASIN RIM OF STORM LINE
NORTH SIDE OF HIGHLAND RD.(M-59)
LOCATED IN FRONT OF HOUSE #7831
EDGE OF ROAD **ELEVATION 958.17**

LEGEND

PROPERTY LINE	
EASEMENT LINE	
EX. GAS LINE	GAS GAS GAS GAS GAS GAS
PROP. GAS LINE	
EX. WATER MAIN	WTR WTR WTR WTR
PROP. WATER MAIN	
EX. SANITARY LINE	SAN SAN SAN SAN
PROP. SANITARY LINE	
EX. STORM LINE	STORM STORM STORM
PROP. STORM LINE	
FENCE	
OVER-HEAD WIRES	OW OW OW OW
SANITARY SEWER MAN HOLE	●
STORM SEWER CATCH BASIN	○ ▮
POWER POLE	P.P.
LIGHT POLE	L.P.
FIRE HYDRANT	
WATER SHOT-OFF	●
EXISTING ELEVATION	X 961.89
PROPOSED ELEVATION	960.00
TOP OF CURB	TC
GUTTER	G
TOP OF WALK	TW
PAVEMENT	P
DRAINAGE DIRECTION	

MA ARCHMASTER
Residential & Commercial Designs
Cell Phone: (313) 505-7744
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PROJECT:
PROPOSED RESTAURANTS AND RETAILS PLAZA
ADDRESS:
(21-426-004) HIGHLAND RD. WHITE LAKE, MI 48386
CLIENT'S NAME: NAZIR JAWICH

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REVISIONS:
05/03/2021
05/25/2021

DATE: 03/26/2021
DRAWN BY: MONEER ALAHWAL
SCALE: AS NOTED
SHEET TITLE: - PROPOSED GRADING PLAN
SHEET #: C-2
APPROVED BY:

STATE OF MICHIGAN
MOHAMED NASRI BAZNA
ENGINEER
No. 32351
LICENSED PROFESSIONAL ENGINEER

BM#2 NAVD 88 datum
CATCH BASIN RIM OF STORM LINE
NORTH SIDE OF HIGHLAND RD.(M-59)
LOCATED IN FRONT OF HOUSE #7831
EDGE OF ROAD **ELEVATION 958.17**

DEFERRED SUBMITTALS:
- FIRE FIRE SUPPRESSION SUPPLIES PLAN. ***BY OTHER.***

NOTES:
- A STORM SEWER AND DETENTION BASIN MAINTENANCE AGREEMENT WITH THE TOWNSHIP SHALL BE PROVIDED UPON THE FINAL SITE PLAN SUBMISSION.
- A COUNTY DRAIN EASEMENT WILL BE VERIFIED AND/OR PROVIDED WITH OAKLAND COUNTY FOR THE DRAIN WHICH RUNS IN CLOSE PROXIMITY TO THE WESTERN PROPERTY LINE.

M-59 HIGHLAND ROAD (100 FT. WD.)

CONC. DRIVEWAY

R1-C ZONING

10" SANITARY LINE

16" WATER MAIN LINE

CL P.C.

S. 89° 25' 19" E. 609.27' TOTAL R&M

332.92'

CL

P.O.B.

50' TAKEN FOR ROAD AND UTILITY PURPOSES

NEW 50' WIDE CONC. DRIVEWAY

EXISTING POWER POLE TO BE RELOCATED

EX. 8' WALK

TRAFFIC LT. POLE (ATTACHED)

N. 00° 32' 16" W. 855.00'

PROPOSED LOCATION FOR POWER POLE

P.C.

PROPOSED 20' EASEMENT.

CB-2, 4'Ø W/ 2' SUMP RIM 958.80 24" INV. 952.24 E. 24" INV. 952.14 W.

CB-1, 4'Ø W/ 2' SUMP RIM 958.80 24" INV. 952.67 W.

C.B.RIM 958.33 X 955.92 INV.

EX. 8' WALK

CB-3 CB-3, 4'Ø W/ 2' SUMP RIM 959.30 24" INV. 951.91 E. 24" INV. 951.81 S.

158 L.F.,24" DIA R.C.P. C76 CL IV @ 0.15% W/95% SAND BACKFILL

290 L.F.,24" DIA R.C.P. C76 CL IV @ 0.15% W/95% SAND BACKFILL

CB.2

CB.1

PROPOSED LOCATION FOR POWER POLE

AG ZONING

BUILDING "D" PROPOSED RETAIL SPACES 8,400 SQ. FT. F.F. 960.50

BUILDING "C" PROPOSED RETAIL & RESTAURANT 8,480 SQ. FT. F.F. 960.50

BUILDING "B" PROPOSED RETAILS 8,400 SQ. FT. F.F. 960.50

BUILDING "A" PROPOSED RESTAURANT 3,560 SQ. FT. F.F. 960.50

12'X20' FIRE LANE

PROPOSED 30' EASEMENT. 10' FROM EASEMENT LINE TO WATER LINE. 10' BETWEEN WATER LINE AND SEWER LINE 10' FROM SEWER LINE TO EASEMENT LINE. EACH LINE IS CENTERED IN 20' CLEARANCE/EASEMENT.

N. 11° 17' 59" E. 241.00'

157 L.F.,24" DIA R.C.P. C76 CL IV @ 0.15% W/95% SAND BACKFILL

6" S. INV. 953.00 50 L.F.,6" DIA P.V.C. SCH 40 ROOF DRAIN @ 1%

6" S. INV. 952.90 39 L.F.,6" DIA P.V.C. SCH 40 ROOF DRAIN @ 1%

6" S. INV. 953.94 44 L.F.,6" DIA P.V.C. SCH 40 ROOF DRAIN @ 1%

6" S. INV. 952.99 49 L.F.,6" DIA P.V.C. SCH 40 ROOF DRAIN @ 1%

GREASE INTERCEPTOR

30 L.F., 1" K TYPE WATER SERVICE

675 L.F. 12" DUCTILE IRON CL54 W.M.

PROPOSED GAS LINE

EXTEND WATER LINE FOR ADJACENT PROPERTY CONNECTION

CB.6

CB.5

CB.4

10 L.F. 8" DUCTILE IRON CL54 W.M.

FIRE HYDRANT

298 L.F.,24" DIA R.C.P. C76 CL IV @ 0.15% W/95% SAND BACKFILL

GB ZONING

CB-6, 6'Ø W/ 2' SUMP RIM 959.00 24" INV. 951.58 N. 24" INV. 951.58 E. 30" INV. 951.48 S.

CB-5, 4'Ø W/ 2' SUMP RIM 958.40 24" INV. 951.94 E. 24" INV. 951.84 W. 6" INV. 952.50 N. 6" INV. 952.50 NW.

CB-4, 4'Ø W/ 2' SUMP RIM 958.40 24" INV. 952.38 W. 6" INV. 952.50 NE. 6" INV. 952.50 NW.

SAN. MH.1

SAN. MH.2

SAN. MH.3

SAN. MH.4

LOADING AREA

PROPOSED LOCATION FOR POWER POLE

PROPOSED LOCATION FOR POWER POLE

PROPOSED LOCATION FOR POWER POLE

PROPOSED LOCATION FOR POWER POLE

EXISTING PROPERTY LINE

25' FUTURE ACCESS TO ADJACENT PROPERTY. VERIFY LOCATION AND WIDTH

PROPOSED PROPERTY LINE

PROPOSED 20' EASEMENT.

N. 54° 53' 29" W. 30.00'

WETLAND BOUNDARY

PROPOSED 30' EASEMENT. 10' FROM EASEMENT LINE TO WATER LINE. 10' BETWEEN WATER LINE AND SEWER LINE 10' FROM SEWER LINE TO EASEMENT LINE. EACH LINE IS CENTERED IN 20' CLEARANCE/EASEMENT.

AREA FOR FUTURE DEVELOPMENT 78,740 SQ. FT. (1.77 ACRES)

CENTRAL GRAVITY PUMPING STATION FOR SANITARY TO ELIZABETH ROAD

NO BLACK WATER THROUGH GREASE INTERCEPTORS. BLACKWATER BYPASS IS REQUIRED.

C.B.RIM 956.26 X 953.65 INV.

L. 29050 P. 210

CONC. DRIVEWAY

CB-7, 6'Ø W/ 2' SUMP RIM 958.60 30" INV. 951.27 N. 30" INV. 951.17 S.

30" INV. 951.15 STORM WATER TREATMENT CHAMBER (INTERSTORM MODEL 1800) RIM 957.50 ± 30" INV. 951.17 N. 30" INV. 951.07 S.

10 L.F.,30" DIA R.C.P. C76 CL IV @ 0.15% W/95% SAND BACKFILL

35 L.F.,30" DIA R.C.P. C76 CL IV @ 0.15% W/95% SAND BACKFILL

30" INV. 951.05 S.

30" INV. 951.00 N.

DETENTION PONDS DISCHARGE INLETS SHALL BE RAISED AS PER PROPOSED INVERTS AND SHALL BE OUT OF THE WETLAND BUFFER LINE.

PROPOSED 20' EASEMENT.

25' BUFFER

CB-8, 6'Ø W/ 2' SUMP RIM 957.90 30" INV. 951.13 S. CB.8

10 L.F.,30" DIA R.C.P. C76 CL IV @ 0.15% W/95% SAND BACKFILL

30" INV. 951.12

30" INV. 951.02 S.

16 L.F.,30" DIA R.C.P. C76 CL IV @ 0.15% W/95% SAND BACKFILL

30" INV. 951.00 N.

STOP SIGN

NEW 40' WIDE CONC. DRIVEWAY

THE SIZING OF PROPOSED STORMWATER TREATMENT CHAMBERS SHALL BE BASED ON ULTIMATE SITE BUILD-OUT WITH A MINIMUM 80% SOLIDS REMOVAL RATE. STORMWATER TREATMENT CHAMBERS SIZES WILL BE PROVIDED UPON THE FINAL SITE PLAN SUBMISSION.

PROP. 69,816 CU.FT. DETENTION POND

299.25' R=1,687.04' CHD-298.86 S 3°16'04"W

PROP. 17,655 CU.FT DETENTION POND

8" INV. 954.00 S.

21 L.F., 8" DIA PVC SCH.80 @ 2.38% W/95% SAND BACKFILL

8" INV. 952.50 N.

8" INV. 953.00 E.

30 L.F., 8" DIA PVC SCH.80 @ 1.66% W/95% SAND BACKFILL

8" INV. 952.50 W.

WETLAND ON-SITE 0.63 ACRES

EXISTING PROPERTY LINE

PROPOSED PROPERTY LINE

WETLAND BOUNDARY

S. 69° 50' 10" W. 404.63'

NEW SIDEWALK SHALL BE EXTENDED TO CONNECT WITH EXISTING SIDEWALK IN FRONT OF THE LIBRARY

P.C.

CL

BM#1 NAVD 88 datum
NAIL IN THE WEST FACE OF UTILITY POLE EAST SIDE OF ELIZABETH LAKE ROAD 550' +/- SOUTH OF M-59 **ELEVATION 960.00**

ELIZABETH LAKE ROAD (66 FT. WD.)

12" WIDE PERM. EASEMENT FOR PUBLIC UTILITY

S. 00° 25' 22" E. 549.70'

33' TAKEN FOR ROAD AND UTILITY PURPOSES

EX. 8' WALK

EX. 8' WALK

EX. 8' WALK

WHITE LAKE TOWNSHIP ENGINEERING DESIGN STANDARDS

a. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE TOWNSHIP'S CURRENT STANDARDS AND SPECIFICATIONS.
b. THE CONTRACTOR SHALL NOTIFY THE TOWNSHIP ENGINEER AND/OR THE AUTHORITY HAVING JURISDICTION, 48 HOURS PRIOR TO THE BEGINNING OF CONSTRUCTION.
c. CONTRACTOR SHALL CONTACT MISS DIG AT 800-482-7171, 72 HOURS IN ADVANCE OF CONSTRUCTION, FOR EXISTING UNDERGROUND UTILITY LOCATIONS.
d. IN ORDER TO VERIFY COMPLIANCE WITH APPROVED PLANS, FULL-TIME CONSTRUCTION OBSERVATION WILL GENERALLY BE REQUIRED DURING ALL PHASES OF UNDERGROUND SITE CONSTRUCTION INCLUDING INSTALLATION OF SANITARY SEWER, STORM SEWERS, DRAINS, WATERMAINS AND APPURTENANCES AS WELL AS PRIVATE STREET CURBING AND PAVING CONSTRUCTION. INTERMITTENT OBSERVATIONS WILL BE MADE FOR SITE GRADING, PARKING LOT CURBING AND PAVING, RETAINING WALL CONSTRUCTION AND OTHER SURFACE ACTIVITY.

BENCHMARKS
BM#1 NAIL IN THE WEST FACE OF UTILITY POLE EAST SIDE OF ELIZABETH LAKE ROAD 550' +/- SOUTH OF M-59 **ELEVATION 960.00**

BM#2 CATCH BASIN RIM OF STORM LINE NORTH SIDE OF HIGHLAND RD.(M-59) LOCATED IN FRONT OF HOUSE #7831 EDGE OF ROAD **ELEVATION 958.17**

LEGEND

PROPERTY LINE	
EASEMENT LINE	
EX. GAS LINE	GAS GAS GAS GAS GAS GAS
PROP. GAS LINE	
EX. WATER MAIN	WTR WTR WTR WTR
PROP. WATER MAIN	
EX. SANITARY LINE	SAN SAN SAN SAN
PROP. SANITARY LINE	
EX. STORM LINE	STORM STORM STORM
PROP. STORM LINE	
FENCE	
OVER-HEAD WIRES	OW OW OW OW
SANITARY SEWER MAN HOLE	
STORM SEWER CATCH BASIN	
POWER POLE	P.P.
LIGHT POLE	L.P.
FIRE HYDRANT	
WATER SHOT-OFF	
EXISTING ELEVATION	X 961.89
PROPOSED ELEVATION	960.00
TOP OF CURB	TC
GUTTER	G
TOP OF WALK	TW
PAVEMENT	P
DRAINAGE DIRECTION	

PROPOSED UTILITY PLAN

SCALE: 1" = 40'-0"

0' 50' 100'
GRAPHIC SCALE

MA ARCHMASTER
Residential & Commercial Designs
Cell Phone: (313) 505-7744
Email: alahwalmoneer@gmail.com

PROJECT:
PROPOSED RESTAURANTS AND RETAILS PLAZA
ADDRESS: HIGHLAND RD. WHITE LAKE, MI 48386
(21-426-004)
CLIENT'S NAME: NAZIR JAWICH

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REVISIONS:
05/03/2021
05/25/2021

DATE: 03/26/2021

DRAWN BY: MONEER ALAHWAL

SCALE: AS NOTED

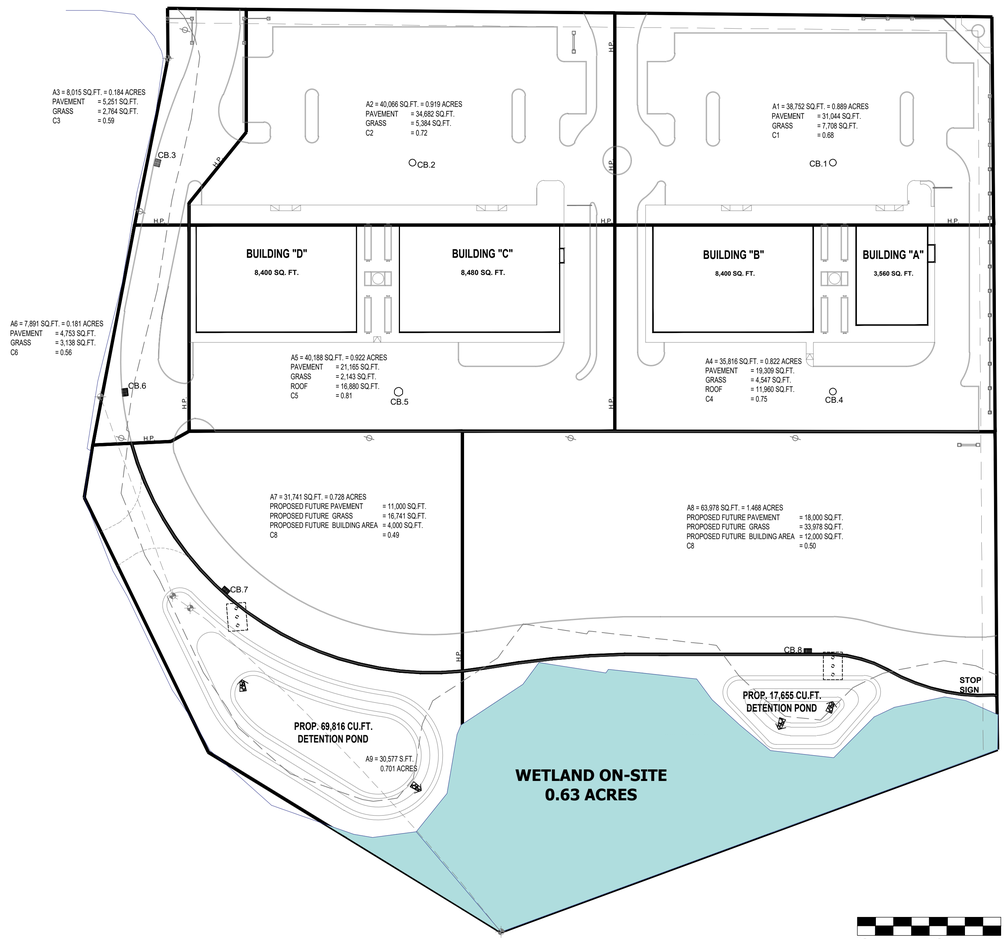
SHEET TITLE:
- PROPOSED UTILITY PLAN

SHEET #: C-3

APPROVED BY:

STATE OF MICHIGAN
MOHAMED NASRI BAZNA
ENGINEER
No. 32351
LICENSED PROFESSIONAL ENGINEER

C FACTORS FOR SURFACES	
GRASS	0.20
PAVEMENT	0.80
ROOF	0.90
OPEN WATER	1.00



STORM DRAINAGE CALCULATIONS

SCALE: 1" = 50'-0"

STORAGE PROVIDED IN DETENTION BASIN #2			
ELEVATION	AREA (SQ.FT.)	VOLUME (CU.FT.)	CUMULATIVE VOLUME (CU.FT.)
951	A1= 5,263	0	0
952	A2= 6,259	5,754	5,754
954	A3= 9,269	15,430	21,184
956	A4= 12,622	21,805	42,989
957	A5= 14,221	26,827	69,816

DEVELOPED AREA = 233,046 SQ.FT.= 5.35 ACRES
C(BUILDING)= 0.90, C(PAVEMENT)= 0.80 ,C(LAWN)= 0.20
A(LAWN)= 1.67 ACRES, A(PAVEMENT)= 4.77 ACRES, A(BUILDING)= 0.75
C(AVE.)= ((1.67X0.20)+(4.77X0.80)+(0.75X0.90))/5.35 = 0.90
Qa= 0.2X5.35 = 1.07 CFS

$Qo = \frac{Qa}{CA} = \frac{1.07}{0.90X5.33} = 0.22$

$T100 = -25 + \sqrt{\frac{10,313}{Qo}} = -25 + \sqrt{\frac{10,313}{0.22}} = 191$ MIN.

$Vs100 = \frac{16,500T}{T+25} - 40QoT = \frac{16,500X191}{191+25} - 40X0.22X191 = 12,909$ CU.FT.

Vs100=12,909 CU. FT./Acre imperviousness

Vt100=VsAC= 12,909X5.33X0.90= 61,926 CU.FT

TOTAL VOLUME REQUIRED = 61,926 CU.FT.

PROVIDED DETENTION STORAGE= 69,816 CU.FT.

NOTE: BIGGER VOLUME PROVIDED w/ FUTURE DEVELOPMENT

OUTLET DESIGN
Qpeak = Qallowable = 1.07 CFS
Pipe Size = 8 in
n = 0.012
Area = 0.35 SQ.Ft.
R = 0.168 FT
Min. Slope = 0.6%
V = 3.2 FT/S.

WATER TREATMENT CHAMBER

QUANTITY OF RUNOFF = 9.30 CFS

USE MECHANICAL TREATMENT UNIT VORTECHS MODEL 9000

STORAGE PROVIDED IN DETENTION BASIN #1			
ELEVATION	AREA (SQ.FT.)	VOLUME (CU.FT.)	CUMULATIVE VOLUME (CU.FT.)
951	A1= 643	0	0
952	A2= 1,027	828	828
954	A3= 2,107	3,070	3,898
956	A4= 3,649	5,686	9,584
957	A5= 4,435	8,071	17,655

DEVELOPED AREA= 111,819 SQ.FT.= 2.55 ACRES
C(BUILDING)= 0.90, C(PAVEMENT)= 0.80 ,C(LAWN)= 0.20
A(LAWN)= 1.87 ACRES, A(PAVEMENT)= 0.41 ACRES, A(BUILDING)= 0.27
C(AVE.)= ((1.87X0.20)+(0.41X0.80)+(0.27X0.90))/2.55 = 0.37
Qa= 0.2X2.55 = 0.51 CFS

$Qo = \frac{Qa}{CA} = \frac{0.51}{0.37X2.55} = 0.54$

$T100 = -25 + \sqrt{\frac{10,313}{Qo}} = -25 + \sqrt{\frac{10,313}{0.54}} = 113$ MIN.

$Vs100 = \frac{16,500T}{T+25} - 40QoT = \frac{16,500X113}{113+25} - 40X0.54X113 = 11,070$ CU.FT.

Vs100=11,070 CU. FT./Acre imperviousness

Vt100=VsAC= 11,070X2.55X0.37= 10,444 CU.FT

TOTAL VOLUME REQUIRED = 10,444 CU.FT.

PROVIDED DETENTION STORAGE= 17,655 CU.FT.

NOTE: BIGGER VOLUME PROVIDED w/ FUTURE DEVELOPMENT

OUTLET DESIGN
Qpeak = Qallowable = 0.29 CFS
Pipe Size = 8 in
n = 0.012
Area = 0.35 SQ.Ft.
R = 0.168 FT
Min. Slope = 0.1%
V = 0.83 FT/S.

WATER TREATMENT CHAMBER

QUANTITY OF RUNOFF = 6.10 CFS

USE MECHANICAL TREATMENT UNIT VORTECHS MODEL 7000

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PROJECT:
PROPOSED RESTAURANTS AND RETAILS PLAZA
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CLIENT'S NAME: NAZIR JAWICH

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REVISIONS:
05/03/2021
05/25/2021

DATE: 03/26/2021

DRAWN BY: MONEER ALAHWAL

SCALE: AS NOTED

SHEET TITLE:
- STORM DRAINAGE CALCULATIONS

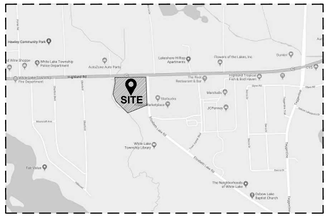
SHEET #: C-4

APPROVED BY:

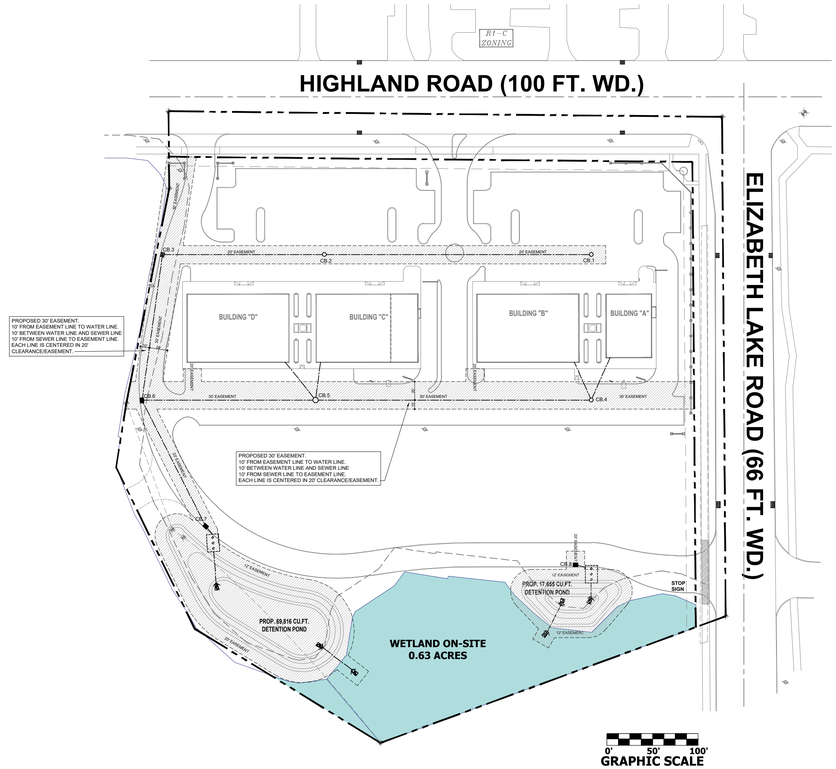
STATE OF MICHIGAN
MOHAMED NASRI BAZNA
ENGINEER
No. 32351
LICENSED PROFESSIONAL ENGINEER

PHYSICAL LIMITS OF STORM WATER MANAGEMENT SYSTEM

LEGAL DESCRIPTION: (PARCEL C)
Land situated in the Township of White Lake, County of Oakland, State of Michigan.
Part of the East ½ of the Southeast ¼ of section 21, Town 3 North, Range 8 East, Township of White Lake, Oakland County, MI, described as beginning at a point distance South 89 degrees 25 minutes 19 seconds West 332.92 feet from the East ¼ corner, section 21, Town 3 North, Range 8 East down the centerline of Highland Road, (M-59) to the intersection of Highland Road (100 Feet wide) and Elizabeth Lake Road (66 Feet Wide); thence down the centerline of Elizabeth Lake Road, (66 feet wide) South 00 degrees 25 feet 22 seconds East, 549.70 feet to a point; thence South 69 degrees 50 minutes 10 seconds West 404.63 feet to a point, also known as the centerline of the Creek; also known as Brendel Lake Creek; Thence North 43 degrees 16 minutes 04 seconds West 299.25 feet, Rad. = 1,681.04; Chd. = 298.86 feet; Thence continuing on centerline of the Creek, also known as Brendel Lake Creek; North 54 degrees 53 seconds 29 minutes West, 30 feet to a point, thence N. 19 degrees 57 minutes 07 seconds West 148 Feet; thence North 11 degrees 17 minutes 59 seconds East 241 feet; thence North 00 degrees 32 minutes 16 seconds West 85 feet to the centerline of Highland Road, (M59 100 feet wide); thence South 89 degrees 25 minutes 19 seconds East 609.27 feet back to the point of beginning; except the portion of 50 feet on Highland Road (100 feet wide) and that portion of 33 feet on Elizabeth Lake Road (66 feet wide) for road and public utilities, containing 8.61 acres more or less.



LOCATION MAP
N.T.S.



LEGEND:

- WHITE LAKE CHARTER TOWNSHIP MAINTENANCE RESPONSIBILITY
- STORM SEWER LINE
- WATER MAIN LINE

STORM WATER MANAGEMENT SYSTEM LONG-TERM MAINTENANCE PLAN

PROPERTY INFORMATION: RESTAURANTS & RETAILS PLAZA
(PARCEL C) Highland Rd, White Lake, MI 48386

PROPERTY OWNER:

PERMIT NO. / REVIEW NO:

A. PHISICAL LIMITS OF THE STORM WATER MANAGEMENT SYSTEM

The storm water management system (SWMS) subject to this long-term maintenance plan (plan) is depicted on Exhibit A to the permit and include without limitation the storm sewers, swales, manholes, catch basins, storm water inlets, manufactured treatment system, detention system, outlet structure and closed conduits that convey flow from the detention system into a storm manhole within the CHARTER TOWNSHIP OF WHITE LAKE right-of-way.

For purpose of this plan, this storm water management system and all of its components as shown on Exhibit A is referred to as RETAIL/RESTAURANT BUILDINGS.

B. TIME FRAME FOR LONG-TERM MAINTENANCE RESPONSIBILITY

PROPERTY OWNER is responsible for maintaining the RETAIL/RESTAURANT BUILDINGS including complying with applicable requirements of the local of the OAKLAND COUNTY soil erosion and sedimentation control program, until OAKLAND COUNTY releases the construction permit. Long-term maintenance responsibility for the RETAIL/RESTAURANT BUILDINGS Development commence when defined by the maintenance permit issued by the County. Long-term maintenance continues in perpetuity.

C. MANNER OF ENSURING MAINTENACE RESPONSIBILITY

PROPERTY OWNER has the responsibility for long-term maintenance of RETAIL/RESTAURANT BUILDINGS Development. PROPERTY OWNER to perform any necessary maintenance, repairs, restoration and any necessary construction of the storm water maintenance system (The " Maintenance Agreement") with WHITE LAKE CHARTER TOWNSHIP.

To ensure that the RETAIL/RESTAURANT BUILDINGS is maintained in perpetuity, the map of the physical limit of the storm water management system (Exhibit A), this plan (Exhibit B), the resolution attached as Exhibit C, and the maintenance agreement between the WHITE LAKE CHARTER and the PROPERTY OWNER will be recorded with the OAKLAND COUNTY register of deeds. Upon recording, a copy of the recorded document will be provided to the County.

D. LONG TERM MAINTENANCE PLAN AND SCHEDULE

Table 1 identities the maintenance activities to be performed, orgonized by category (monitoring/inspectio, preventative maintenance, and remedial actions). Table 1 also identifies site-specific work needed to ensure that the storm water management system function properly.

TABLE 1

STORM WATER MANAGEMENT SYSTEM LONG-TERM MAINTENANCE SCHEDULE

SYSTEM COMPONENTS	MANUFACTURED TREATMENT SYSTEM*	UNDERGROUND DETENTION SYSTEM*	STORM STRUCTURES (CATCH BASINS & MANHOLES)	STORM SEWER (COLLECTION SYSTEMS)	OUTLET CONTROL STRUCTURE	PAVEMENT AREAS	FREQUENCY
MAINTENANCE ACTIVITIES							
INSPECT FOR SEDIMENT ACCUMULATION	X	X	X		X		ANNUALLY
INSPECT FOR FLOATABLES, DEAD VEGETATION AND DEBRIS	X	X	X	X	X		ANNUALLY & AFTER MAJOR EVENTS
INSPECT ALL COMPONENTS DURING WET WEATHER AND COMPARE TO AS-BUILT PLANS.	X	X	X	X	X	X	ANNUALLY
PREVENTATIVE MAINTENANCE							
REMOVE ACCUMULATED SEDIMENT BY VACUUM TRUCK	X	X	X		X		AS NEEDED *
REMOVE FLOATABLE, DEAD VEGETATION AND DEBRIS	X	X	X		X		AS NEEDED
SWEEPING OF PAVEMENT SURFACES (STREETS AND PARKING AREAS)						X	AS NEEDED
REMEDIAL ACTIONS							
STRUCTURAL REPAIRS OR REPLACEMENT IN KIND	X	X	X	X	X	X	AS NEEDED
MAKE ADJUSTMENTS, REPAIRS TO ENSURE PROPER FUCTIONING	X	X	X	X	X	X	AS NEEDED
OIL AND GASOLINE SPILLS						X	CLEAN OUT IMMEDIATELY

NOTES:
* INSPECT AND MAINTAIN THE THE MANUFACTURED TREATMENT STRUCTURE AND DETENTION SYSTEMS PER MANUFACTURER'S RECOMMENDATIONS, AT A MINIMUM WHEN SEDIMENT ACCUMULATES TO A DEPTH OF 6-12 INCHES OR IF SEDIMENT RESUSPENSION IS OBSERVED

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(21-426-004) HIGHLAND RD. WHITE LAKE, MI 48386
CLIENT'S NAME: NAZIR JAWICH

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REVISIONS:
05/03/2021
05/25/2021

DATE: 03/26/2021

DRAWN BY: MONEER ALAHWAL

SCALE: AS NOTED

SHEET TITLE:
- STORM MAINTENANCE PLAN

SHEET #: C-5

APPROVED BY:

STATE OF MICHIGAN
MOHAMED NASRI BAZNA
ENGINEER
No. 32351
LICENSED PROFESSIONAL ENGINEER

GENERAL NOTES:

1. ALL WORK SHALL BE DONE IN ACCORDANCE WITH ALL APPLICABLE LOCAL AND STATE CODES AND ORDINANCES, INCLUDING 2015 MICHIGAN BUILDING CODE, NFPA, NEC & MICHIGAN BARRIER FREE DESIGN.
2. CONTRACTOR SHALL VISIT THE SITE TO FAMILIARIZE HIMSELF WITH THE CONDITIONS UNDER WHICH THE WORK IS TO BE PERFORMED. SUBMITTAL OF A BID SIGNIFIES THE ACCEPTANCE OF SUCH CONDITIONS.
3. CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND EXISTING CONDITIONS IN THE FIELD PRIOR TO CONSTRUCTION.
4. CONTRACTOR SHALL BE RESPONSIBLE FOR TEMPORARY BRACING AND SHORING OF STRUCTURES DURING DEMOLITION AND CONSTRUCTION, AS REQUIRED.
5. CONTRACTOR SHALL REMOVE OR CAP ALL EXISTING ELECTRICAL LINES THAT WILL NOT BE USED.
6. CONTRACTOR SHALL BE RESPONSIBLE FOR PROPER DISPOSAL OF DEBRIS FROM THE JOB SITE AND SHALL KEEP THE JOB SITE IN A CLEAN AND ORDERLY MANNER AT ALL TIMES.
7. CONTRACTOR SHALL VERIFY ANY ADDITIONAL OWNER REQUIREMENTS NOT NOTED ON DRAWINGS PRIOR TO CONSTRUCTION.
8. CONTRACTOR SHALL INCLUDE THE COST OF ALL REQUIRED PERMITS IN HIS BID AND SHALL SECURE SAME.
9. ALL DIMENSIONS ARE TO ROUGH FRAMING UNLESS NOTED OTHERWISE (U.N.O.).
10. ALL INTERIOR PARTITIONS ARE 3 5/8" STEEL STUDS @ 16" o.c., U.N.O.
11. DO NOT SCALE DRAWINGS, USE FIGURED DIMENSIONS ONLY.
12. INSTALL SOLID WOOD BLOCKING AS REQUIRED FOR MOUNTING OF GRAB BARS, MIRRORS, SHELVES, COUNTERS, ETC.

MICHIGAN BUILDING CODE 2015

BUILDING DATA:

USE GROUP:	RESTAURANT A-2 (ASSEMBLY)
CONSTRUCTION CLASSIFICATION:	IIB
BUILDING HEIGHT:	25 FEET
SPRINKLER SYSTEM:	SPRINKLER SYSTEM SHALL BE PROVIDED BY OTHERS. VERIFY REQUIREMENT
GROSS AREA:	3,560 SQ. FT.

OCCUPANCY CALCULATIONS:

WAITING AREA & DINING AREAS: (10 NET/PERSON) = 1,590 SQ. FT./15	= 106 OCCUPANTS
KITCHEN AREAS: (200 GROSS/PERSON) = 1545 SQ. FT./200	= 8 OCCUPANTS
OTHER AREAS: (340 GROSS/PERSON) = 425 SQ. FT./300	= 2 OCCUPANTS
TOTAL OCCUPANT LOAD	= 116 OCCUPANTS

EGRESS WIDTH PER OCCUPANT: 0.2 INCH PER OCCUPANT OR 36" MINIMUM OF 2 EXITS REQUIRED.

NUMBER OF EXIT DOOR PROVIDED: 2 EGRESS EXITS

MAX. TRAVEL DISTANCE: 100' (WITH SPRINKLER SYSTEM)

MAX TRAVEL DISTANCE PROVIDED LESS THAN 72' FEET

CODES CURRENTLY IN EFFECT

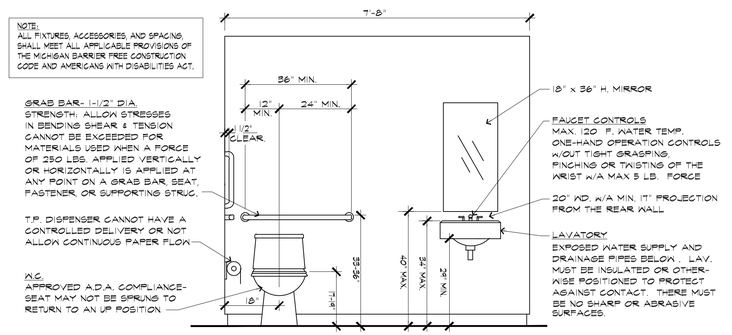
- 2015 MICHIGAN BUILDING CODE, MBC 2015
- 2015 MICHIGAN MECHANICAL CODE MMC 2015
- 2015 MICHIGAN PLUMBING CODE, MPC 2015
- 2017 NATIONAL ELECTRICAL CODE, 2017 CONSTRUCTION CODE – PART 8, ELECTRICAL CODE RULES
- ACCESSIBILITY: MICHIGAN BARRIER FREE DESIGN LAW, P.A. 1966 AS AMENDED AND THE 2009 ICC/ANSI A117.1 STANDARD

DOOR SCHEDULE

DOOR NO.	DIMENSIONS	DESCRIPTION	FRAME
D1	3'-0" X 7'-0" X 1 3/4"	SOLID CORE WOOD-STAINED OAK VENEER DOOR W/ SELF CLOSING DEVICE, PRIVACY LOCK & KICK PLATE, MARBLE THRESH	METAL FRAME
D2	3'-0" X 7'-0" X 1 3/4"	SOLID CORE WOOD-STAINED OAK VENEER DOOR W/ KEY LOCK AND SELF CLOSING DEVICE	METAL FRAME
D3	3'-0" X 7'-0" X 1 3/4"	1" TEMPERED INSULATED GLASS DOOR W/ KEY LOCK AND SELF CLOSING DEVICE	METAL FRAME
D4	3'-0" X 7'-0" X 1 3/4"	HOLLOW METAL DOOR W/ SELF CLOSING DEVICE, PANIC BAR & DEAD BOLT LOCK	METAL FRAME

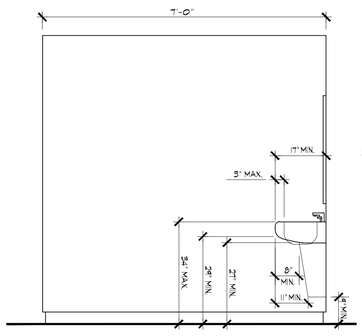
NOTES:
- ALL HARDWARE SETS TO BE SELECTED BY OWNER.
- ALL LOCKS SHALL BE READILY OPENED FROM INSIDE W/O THE USE OF A KEY.
- ALL MEANS OF EGRESS DOORS ARE READILY OPENABLE FROM INSIDE, AND MADE WITHOUT THE USE OF A KEY, SPECIAL KNOWLEDGE, OR SPECIAL EFFORT.

NOTE:
ALL FIXTURES, ACCESSORIES, AND SPACING, SHALL MEET ALL APPLICABLE PROVISIONS OF THE MICHIGAN BARRIER FREE CONSTRUCTION CODE AND AMERICANS WITH DISABILITIES ACT.



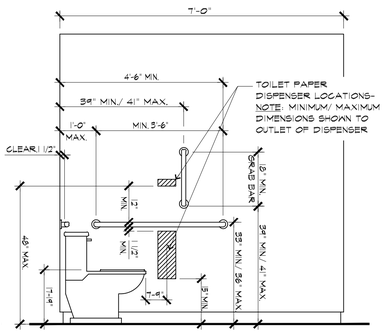
P.H. TOILET & SINK ELEV.

N.T.S.



P.H. SINK SIDE ELEV.

N.T.S.



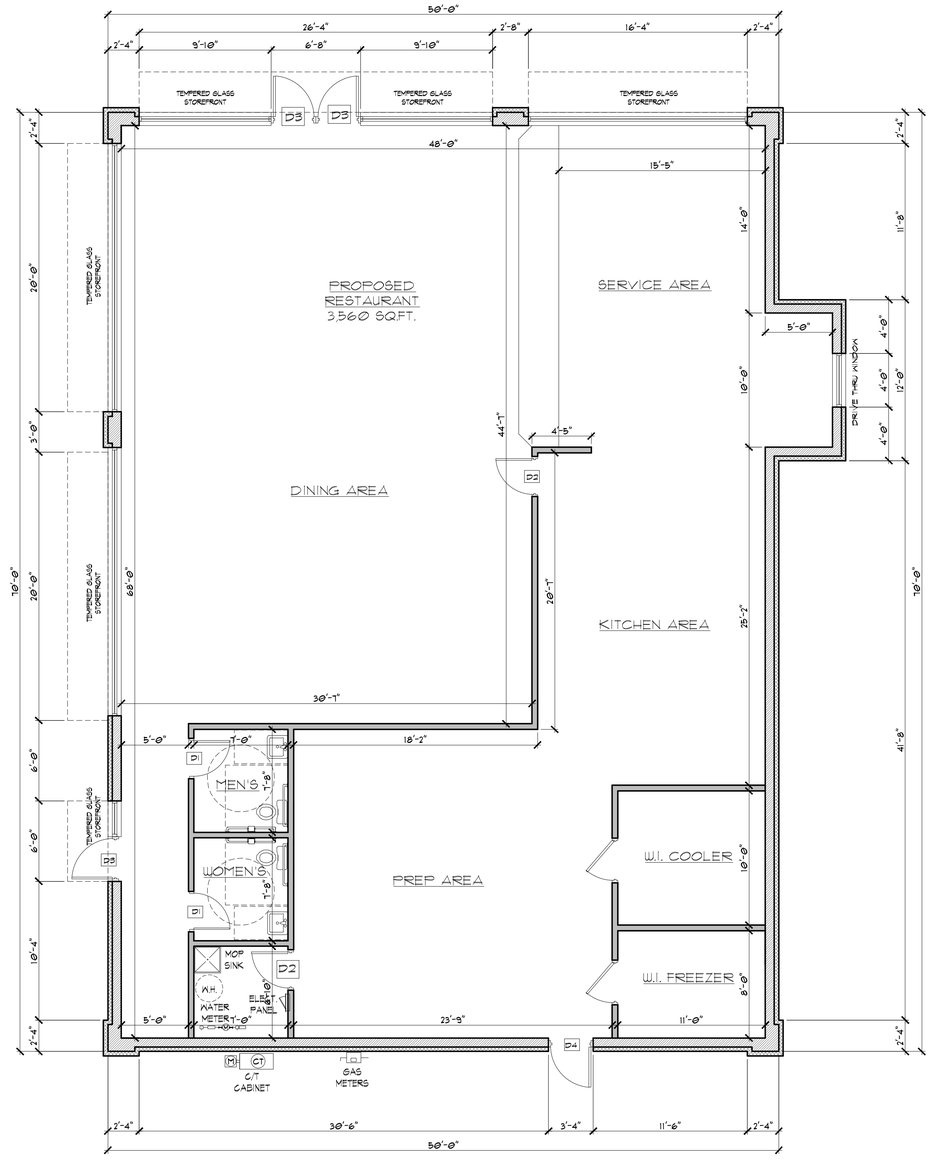
P.H. TOILET SIDE ELEV.

N.T.S.

WALL LEGEND

EXTERIOR WALL
SEE BUILDING'S ELEVATIONS FOR EXTERIOR FINISH
- 8" C.M.U. W/ HORIZONTAL JOINT REINFORCEMENT @ 16" O.C. DOWEL, AND W/ #6 REBAR INTO FOOTING AND THROUGHOUT WALL HEIGHT

INTERIOR PARTITIONS:
5/8" DRYWALL ON 3 5/8"-20 GA. METAL STUDS @ 16" O.C.



BUILDING "A" - PROP. FLOOR PLAN

SCALE: 3/16" = 1'-0"

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Email: alahwalmoneer@gmail.com

PROJECT:
PROPOSED RESTAURANTS AND RETAILS PLAZA

ADDRESS:
(21-426-004) HIGHLAND RD. WHITE LAKE, MI 48386

CLIENT'S NAME: NAZIR JAWICH

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REVISIONS:
- 05/03/2021
- 05/25/2021

DATE: 03/26/2021

DRAWN BY: MONEER ALAHWAL

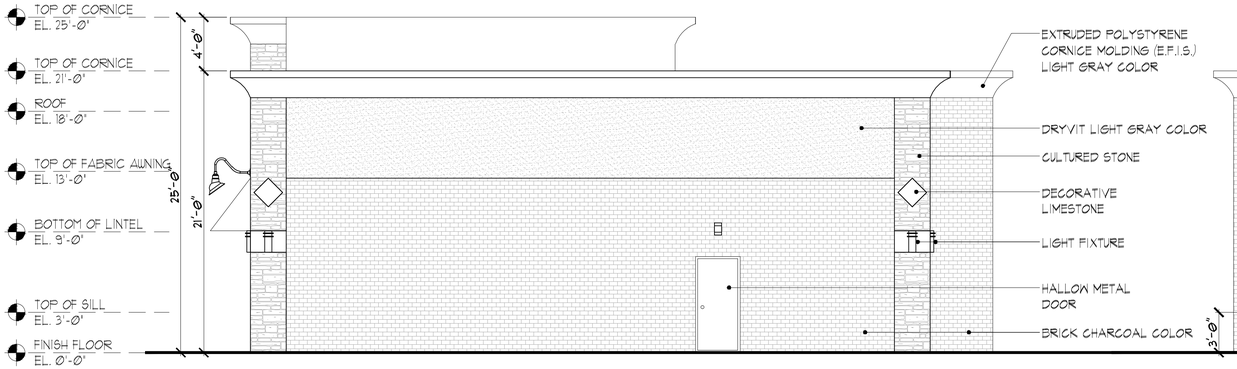
SCALE: AS NOTED

SHEET TITLE:
- BUILDING "A": PROP. FLOOR PLAN

SHEET #: A-1-1

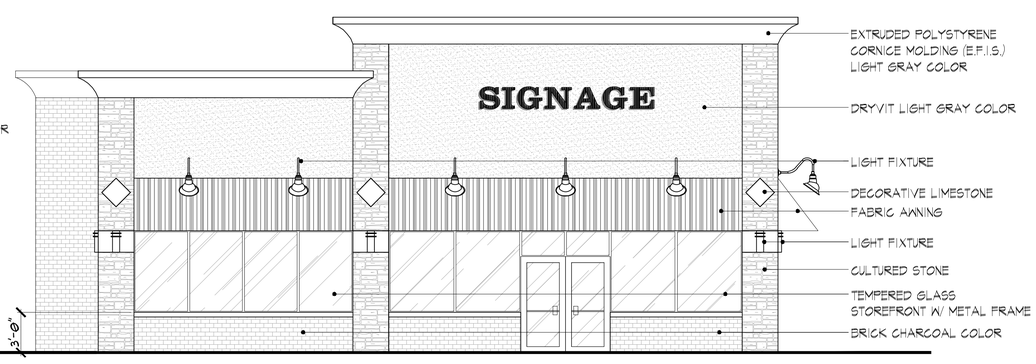
APPROVED BY:

STATE OF MICHIGAN
MOHAMED NASRI BAZNA
ENGINEER
No. 32351
LICENSED PROFESSIONAL ENGINEER



BUILDING "A" - PROP. REAR ELEVATION

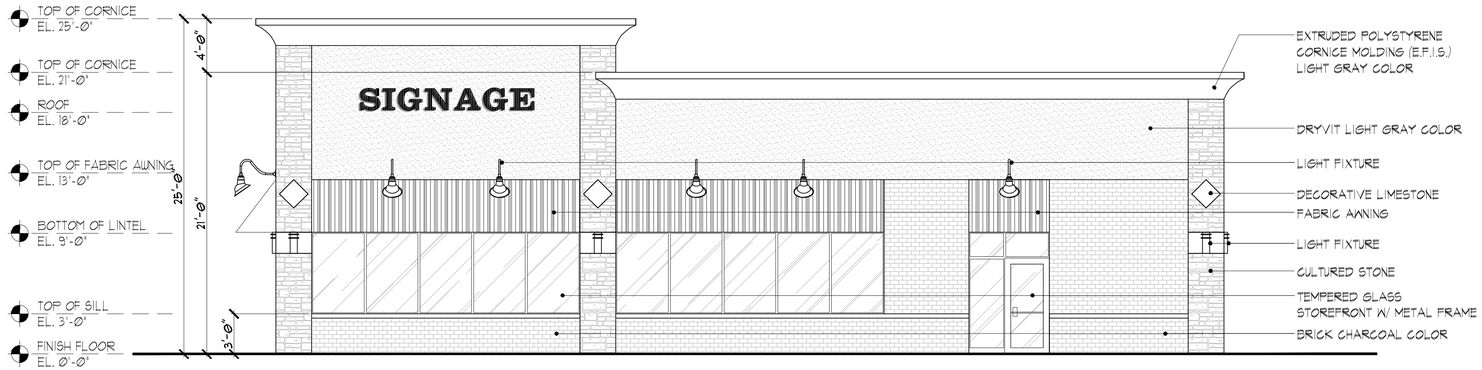
SCALE: 3/16" = 1'-0"



BUILDING "A" - PROP. FRONT ELEVATION

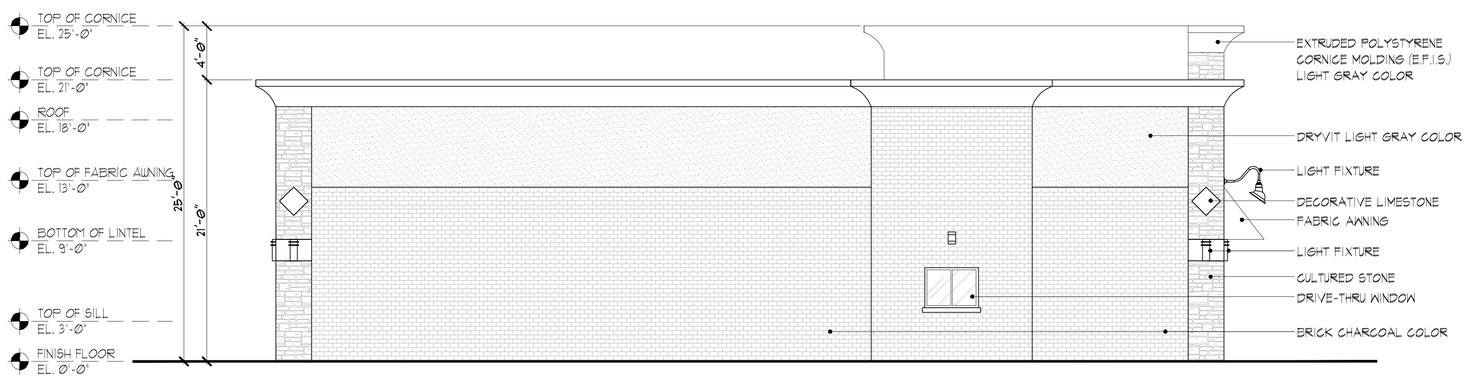
SCALE: 3/16" = 1'-0"

NOTE:
ALL FINALIZED COLORS WILL BE NOTED, AND MATERIAL SAMPLES WILL BE PROVIDED FOR PLANNING COMMISSION REVIEW AT THE TIME OF FINAL SITE PLAN.



BUILDING "A" - PROP. RIGHT ELEVATION

SCALE: 3/16" = 1'-0"



BUILDING "A" - PROP. LEFT ELEVATION

SCALE: 3/16" = 1'-0"

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PROPOSED RESTAURANTS AND RETAILS PLAZA

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CLIENT'S NAME: NAZIR JAWICH

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REVISIONS:
05/03/2021
05/25/2021

DATE: 03/26/2021

DRAWN BY: MONEER ALAHWAL

SCALE: AS NOTED

SHEET TITLE:
- BUILDING 'A': PROP. ELEVATIONS

SHEET #: A-1-2

APPROVED BY:

STATE OF MICHIGAN
MOHAMED NASRI BAZNA
ENGINEER
No. 32351
LICENSED PROFESSIONAL ENGINEER

DOOR SCHEDULE

DOOR NO.	DIMENSIONS	DESCRIPTION	FRAME
D1	3'-0" X 7'-0" X 1 3/4"	SOLID CORE WOOD-STAINED OAK VENEER DOOR W/ SELF CLOSING DEVICE, PRIVACY LOCK & KICK PLATE. MARBLE THRESH	METAL FRAME
D2	3'-0" X 7'-0" X 1 3/4"	SOLID CORE WOOD-STAINED OAK VENEER DOOR W/ KEY LOCK AND SELF CLOSING DEVICE	METAL FRAME
D3	3'-0" X 7'-0" X 1 3/4"	1" TEMPERED INSULATED GLASS DOOR W/ KEY LOCK AND SELF CLOSING DEVICE	METAL FRAME
D4	3'-0" X 7'-0" X 1 3/4"	HOLLOW METAL DOOR W/ SELF CLOSING DEVICE, PANIC BAR & DEAD BOLT LOCK	METAL FRAME

NOTES:
- ALL HARDWARE SETS TO BE SELECTED BY OWNER.
- ALL LOCKS SHALL BE READILY OPENED FROM INSIDE W/O THE USE OF A KEY.
- ALL MEANS OF EGRESS DOORS ARE READILY OPENABLE FROM INSIDE, AND MADE WITHOUT THE USE OF A KEY, SPECIAL KNOWLEDGE, OR SPECIAL EFFORT.

WALL LEGEND

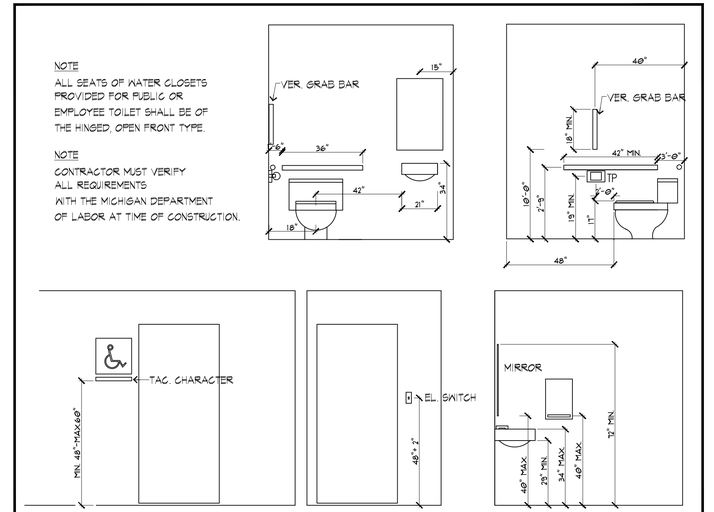
EXTERIOR WALL:
SEE BUILDING'S ELEVATIONS FOR EXTERIOR FINISH
- 8" C.M.U. W/ HORIZONTAL JOINT REINFORCEMENT @ 16" O.C DOWEL AND W/ #6 REBAR INTO FOOTING AND THROUSHOUT WALL HEIGHT

INTERIOR PARTITIONS:
5/8" DRYWALL ON $3\frac{5}{8}$"-20 GA. METAL STUDS @ 16" O.C.

2-HOUR FIRE RATED WALL:
(2) LAYERS 5/8" TYPE 'X" GYPSUM BOARD EACH SIDE OF 3 5/8" METAL STUDS AT 16" O.C.

NOTE
ALL SEATS OF WATER CLOSETS PROVIDED FOR PUBLIC OR EMPLOYEE TOILET SHALL BE OF THE HINGED, OPEN FRONT TYPE.

NOTE
CONTRACTOR MUST VERIFY ALL REQUIREMENTS WITH THE MICHIGAN DEPARTMENT OF LABOR AT TIME OF CONSTRUCTION.



BARRIER FREE TOILET DETAILS
N.T.S.

MICHIGAN BUILDING CODE 2015

BUILDING DATA:

USE GROUP:	RETAIL SPACES M (MERCANTILE)
CONSTRUCTION CLASSIFICATION:	IIB
BUILDING HEIGHT:	25 FEET.
SPRINKLER SYSTEM:	SPRINKLER SYSTEM SHALL BE PROVIDED BY OTHERS, VERIFY REQUIREMENT
GROSS AREA:	8,400 SQ. FT.

OCCUPANCY CALCULATIONS:

FOR EACH RETAIL = 1680 SQ. FT./60 = 28 OCCUPANTS

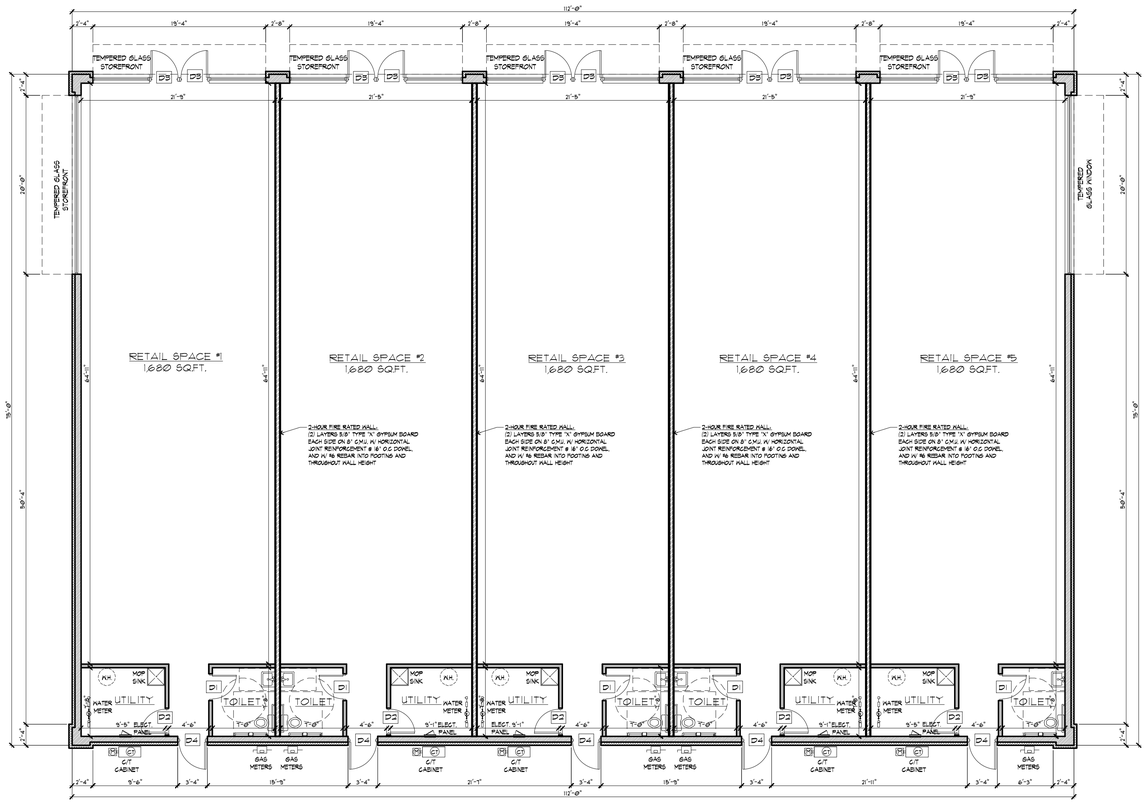
TOTAL OCCUPANT LOAD = 28X5 = 140 OCCUPANTS

NUMBER OF EXIT DOOR REQUIRED FOR EACH RETAIL: 1 EGRESS EXIT REQUIRED FOR EACH TENANT
NUMBER OF EXIT DOOR PROVIDED FOR EACH RETAIL: 2 EGRESS EXITS FOR EACH TENANT

MAX. TRAVEL DISTANCE FOR EACH RETAIL: 75' (WITH SPRINKLER SYSTEM)
MAX TRAVEL DISTANCE PROVIDED FOR EACH RETAIL: LESS THAN 52 FEET

CODES CURRENTLY IN EFFECT
- 2015 MICHIGAN BUILDING CODE, MBC 2015
- 2015 MICHIGAN MECHANICAL CODE MMC 2015
- 2015 MICHIGAN PLUMBING CODE, MPC 2015
- 2017 NATIONAL ELECTRICAL CODE, 2017 CONSTRUCTION CODE – PART 8, ELECTRICAL CODE RULES
- ACCESSIBILITY: MICHIGAN BARRIER FREE DESIGN LAW, P.A. 1966 AS AMENDED AND THE 2009 ICC/ANSI A117.1 STANDARD

GENERAL NOTES:
1. ALL WORK SHALL BE DONE IN ACCORDANCE WITH ALL APPLICABLE LOCAL AND STATE CODES AND ORDINANCES, INCLUDING 2015 MICHIGAN BUILDING CODE, NFPA, NEC & MICHIGAN BARRIER FREE DESIGN.
2. CONTRACTOR SHALL VISIT THE SITE TO FAMILIARIZE HIMSELF WITH THE CONDITIONS UNDER WHICH THE WORK IS TO BE PERFORMED. SUBMITTAL OF A BID SIGNIFIES THE ACCEPTANCE OF SUCH CONDITIONS.
3. CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND EXISTING CONDITIONS IN THE FIELD PRIOR TO CONSTRUCTION.
4. CONTRACTOR SHALL BE RESPONSIBLE FOR TEMPORARY BRACING AND SHORING OF STRUCTURES DURING DEMOLITION AND CONSTRUCTION, AS REQUIRED.
5. CONTRACTOR SHALL REMOVE OR CAP ALL EXISTING ELECTRICAL LINES THAT WILL NOT BE USED.
6. CONTRACTOR SHALL BE RESPONSIBLE FOR PROPER DISPOSAL OF DEBRIS FROM THE JOB SITE AND SHALL KEEP THE JOB SITE IN A CLEAN AND ORDERLY MANNER AT ALL TIMES.
7. CONTRACTOR SHALL VERIFY ANY ADDITIONAL OWNER REQUIREMENTS NOT NOTED ON DRAWINGS PRIOR TO CONSTRUCTION.
8. CONTRACTOR SHALL INCLUDE THE COST OF ALL REQUIRED PERMITS IN HIS BID AND SHALL SECURE SAME.
9. ALL DIMENSIONS ARE TO ROUGH FRAMING UNLESS NOTED OTHERWISE (U.N.O.).
10. ALL INTERIOR PARTITIONS ARE 3 5/8" STEEL STUDS @ 16" o.c., U.N.O.
11. DO NOT SCALE DRAWINGS, USE FIGURED DIMENSIONS ONLY.
12. INSTALL SOLID WOOD BLOCKING AS REQUIRED FOR MOUNTING OF GRAB BARS, MIRRORS, SHELVES, COUNTERS, ETC.



BUILDING "B" - PROP. FLOOR PLAN
SCALE: 1/8" = 1'-0"

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Residential & Commercial Designs

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PROJECT:
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CLIENT'S NAME: NAZIR JAWICH

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REVISIONS:
05/03/2021
05/25/2021

DATE: 03/26/2021

DRAWN BY: MONEER ALAHWAL

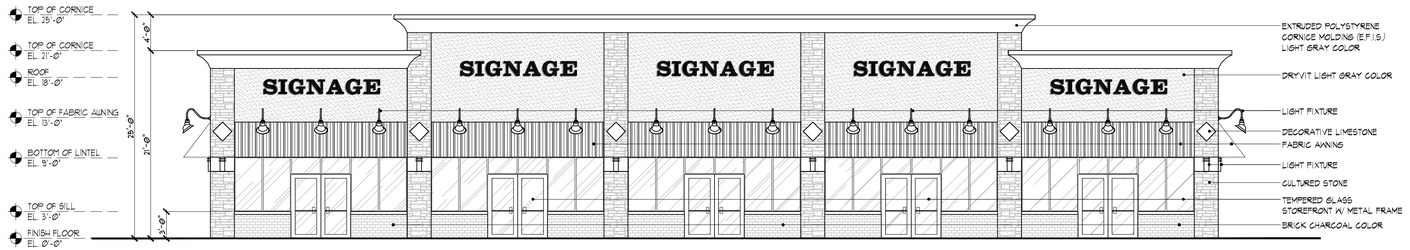
SCALE: AS NOTED

SHEET TITLE:
- BUILDING 'B': PROP. FLOOR PLAN

SHEET #: A-2-1

APPROVED BY:

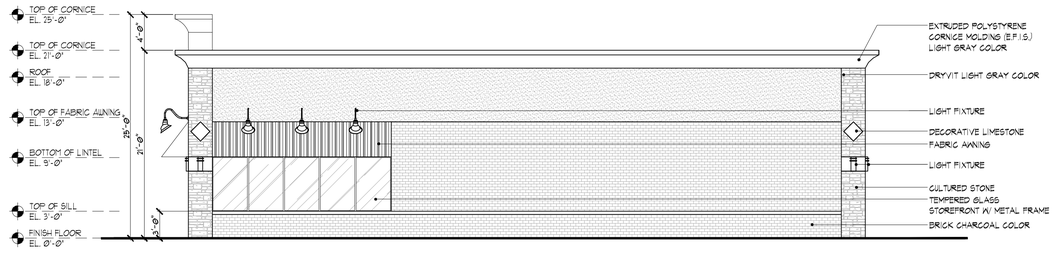
STATE OF MICHIGAN
MOHAMED NASRI BAZNA
ENGINEER
No. 32351
LICENSED PROFESSIONAL ENGINEER



BUILDING "B" - PROP. FRONT ELEVATION

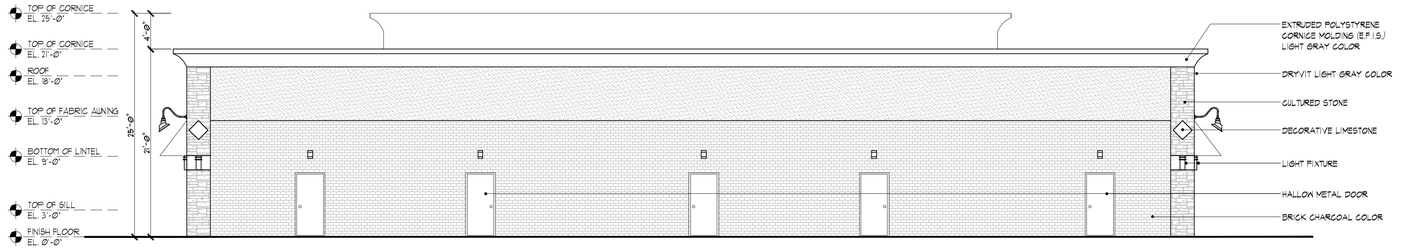
SCALE: 1/8" = 1'-0"

NOTE:
ALL FINALIZED COLORS WILL BE NOTED, AND MATERIAL SAMPLES WILL BE PROVIDED FOR PLANNING COMMISSION REVIEW AT THE TIME OF FINAL SITE PLAN.



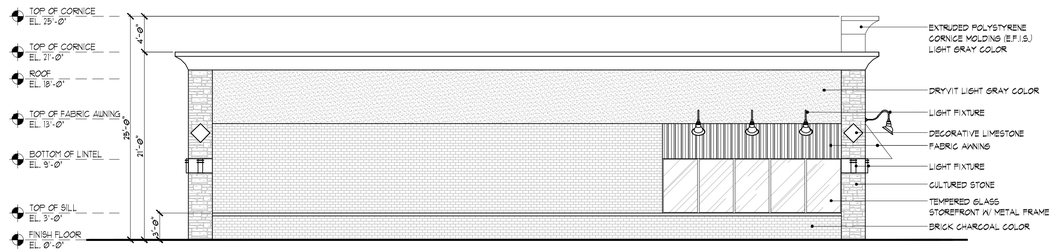
BUILDING "B" - PROP. RIGHT ELEVATION

SCALE: 1/8" = 1'-0"



BUILDING "B" - PROP. REAR ELEVATION

SCALE: 1/8" = 1'-0"



BUILDING "B" - PROP. LEFT ELEVATION

SCALE: 1/8" = 1'-0"

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PROJECT:
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CLIENT'S NAME: NAZIR JAWICH

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REVISIONS:
05/03/2021
05/25/2021

DATE: 03/26/2021

DRAWN BY: MONEER ALAHWAL

SCALE: AS NOTED

SHEET TITLE:
- BUILDING 'B': PROP. ELEVATIONS

SHEET #: A-2-2

APPROVED BY:

STATE OF MICHIGAN
MOHAMED NASRI BAZNA
ENGINEER
No. 32351
LICENSED PROFESSIONAL ENGINEER

DOOR SCHEDULE			
DOOR NO.	DIMENSIONS	DESCRIPTION	FRAME
D1	3'-0" X 7'-0" X 1 3/4"	SOLID CORE WOOD-STAINED OAK VENEER DOOR W/ SELF CLOSING DEVICE, PRIVACY LOCK & KICK PLATE. MARBLE THRESH	METAL FRAME
D2	3'-0" X 7'-0" X 1 3/4"	SOLID CORE WOOD-STAINED OAK VENEER DOOR W/ KEY LOCK AND SELF CLOSING DEVICE	METAL FRAME
D3	3'-0" X 7'-0" X 1 3/4"	1" TEMPERED INSULATED GLASS DOOR W/ KEY LOCK AND SELF CLOSING DEVICE	METAL FRAME
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NOTES:
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- ALL LOCKS SHALL BE READILY OPENED FROM INSIDE W/O THE USE OF A KEY.
- ALL MEANS OF EGRESS DOORS ARE READILY OPENABLE FROM INSIDE, AND MADE WITHOUT THE USE OF A KEY, SPECIAL KNOWLEDGE, OR SPECIAL EFFORT.

WALL LEGEND

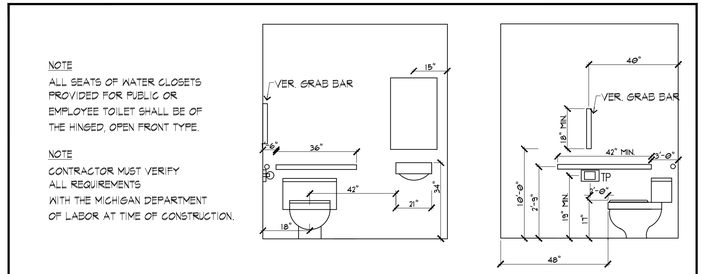
EXTERIOR WALL:
SEE BUILDING'S ELEVATIONS FOR EXTERIOR FINISH
- 8" CMU, W/ HORIZONTAL JOINT REINFORCEMENT @ 16" O.C DOWEL, AND W/ #6 REBAR INTO FOOTING AND THROUGHOUT WALL HEIGHT

INTERIOR PARTITIONS:
5/8" DRYWALL ON $3\frac{5}{8}$"-20 GA. METAL STUDS @ 16" O.C.

2-HOUR FIRE RATED WALL:
(2) LAYERS 5/8" TYPE 'X' GYPSUM BOARD EACH SIDE OF 3 5/8" METAL STUDS AT 16" O.C.

NOTE
ALL SEATS OF WATER CLOSETS PROVIDED FOR PUBLIC OR EMPLOYEE TOILET SHALL BE OF THE HINGED, OPEN FRONT TYPE.

NOTE
CONTRACTOR MUST VERIFY ALL REQUIREMENTS WITH THE MICHIGAN DEPARTMENT OF LABOR AT TIME OF CONSTRUCTION.



BARRIER FREE TOILET DETAILS

N.T.S.

MICHIGAN BUILDING CODE 2015

BUILDING DATA:

USE GROUP:	RETAIL SPACES & RESTAURANT. M (MERCANTILE) & A-2 (ASSEMBLY)
CONSTRUCTION CLASSIFICATION:	IIB
BUILDING HEIGHT:	25 FEET.
SPRINKLER SYSTEM:	SPRINKLER SYSTEM SHALL BE PROVIDED BY OTHERS. VERIFY REQUIREMENT
GROSS AREA:	2,280 SQ. FT. (RESTAURANT)+ 6,200 SQ. FT. (RETAILS)= 8,480 SQ. FT.

OCCUPANCY CALCULATIONS:

FOR RESTAURANT SPACE:

WAITING AREA & DINING AREAS: (10 NET/PERSON) = 1,016 SQ. FT./15	= 68 OCCUPANTS
KITCHEN AREAS: (200 GROSS/PERSON) = 1,010 SQ. FT./200	= 5 OCCUPANTS
OTHER AREAS: (340 GROSS/PERSON) = 254 SQ. FT./300	= 1 OCCUPANTS
TOTAL OCCUPANT LOAD	= 74 OCCUPANTS

EGRESS WIDTH PER OCCUPANT:	0.2 INCH PER OCCUPANT OR 36" MINIMUM OF 2 EXITS REQUIRED.
NUMBER OF EXIT DOOR PROVIDED:	2 EGRESS EXITS
MAX. TRAVEL DISTANCE:	100' (WITH SPRINKLER SYSTEM)
MAX TRAVEL DISTANCE PROVIDED	LESS THAN 72 FEET

FOR RETAILS SPACES:

- FOR TENANT #1 = 2,080 SQ. FT./60 = 35 OCCUPANTS
- FOR TENANT #2 = 2,060 SQ. FT./60 = 35 OCCUPANTS
- FOR TENANT #3 = 2,060 SQ. FT./60 = 35 OCCUPANTS

TOTAL OCCUPANT LOAD = 105 OCCUPANTS

NUMBER OF EXIT DOOR REQUIRED FOR EACH RETAIL:	1 EGRESS EXIT REQUIRED FOR EACH TENANT
NUMBER OF EXIT DOOR PROVIDED FOR EACH RETAIL:	2 EGRESS EXITS FOR EACH TENANT
MAX. TRAVEL DISTANCE FOR EACH RETAIL:	75' (WITH SPRINKLER SYSTEM)
MAX TRAVEL DISTANCE PROVIDED FOR EACH RETAIL:	LESS THAN 47 FEET

CODES CURRENTLY IN EFFECT
- 2015 MICHIGAN BUILDING CODE, MBC 2015
- 2015 MICHIGAN MECHANICAL CODE MMC 2015
- 2015 MICHIGAN PLUMBING CODE, MPC 2015
- 2017 NATIONAL ELECTRICAL CODE, 2017 CONSTRUCTION CODE – PART 8, ELECTRICAL CODE RULES
- ACCESSIBILITY: MICHIGAN BARRIER FREE DESIGN LAW, P.A. 1966 AS AMENDED AND THE 2009 ICC/ANSI A117.1 STANDARD

GENERAL NOTES:

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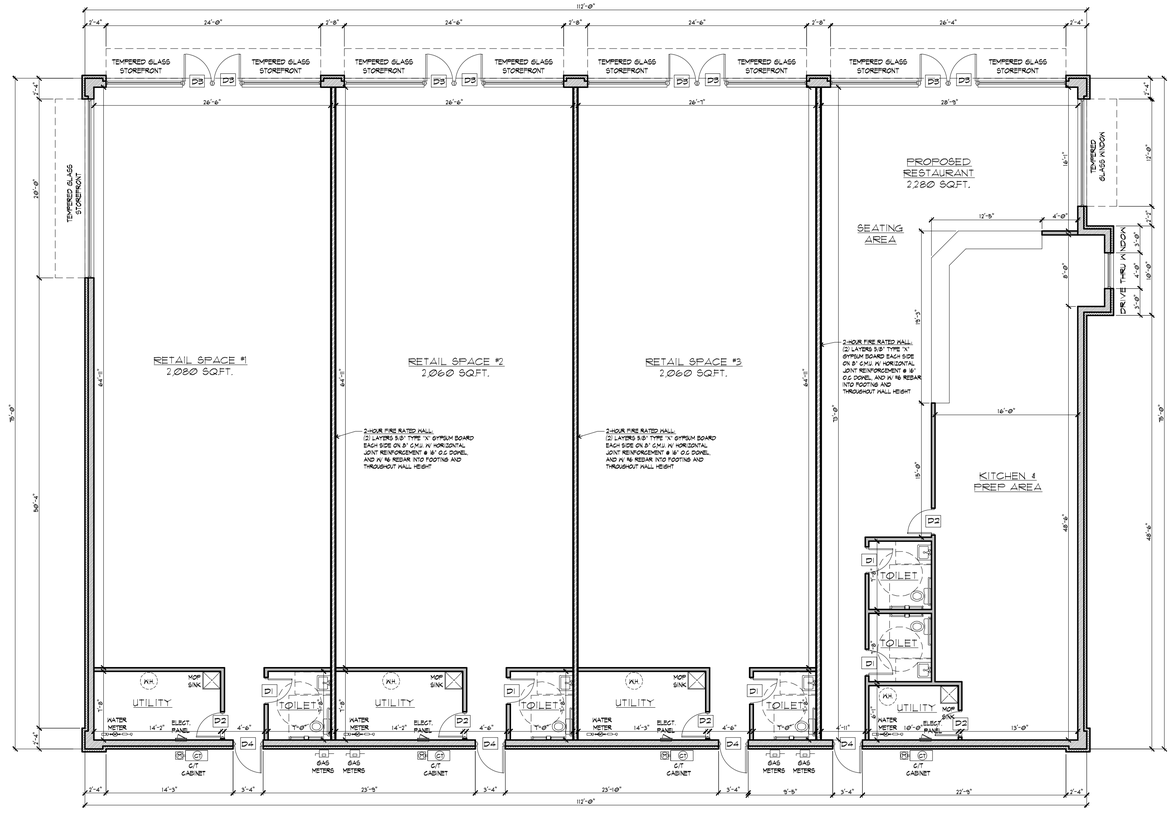
10. ALL INTERIOR PARTITIONS ARE 3 5/8" STEEL STUDS @ 16" o.c., U.N.O.
11. DO NOT SCALE DRAWINGS, USE FIGURED DIMENSIONS ONLY.
12. INSTALL SOLID WOOD BLOCKING AS REQUIRED FOR MOUNTING OF GRAB BARS, MIRRORS, SHELVES, COUNTERS, ETC.



BUILDING "C" - PROP. FLOOR PLAN

SCALE: 1/8" = 1'-0"

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REVISIONS:
05/03/2021
05/25/2021

DATE: 03/26/2021

DRAWN BY: MONEER ALAHWAL

SCALE: AS NOTED

SHEET TITLE:
- BUILDING 'C': PROP. FLOOR PLAN

SHEET #: A-3-1

APPROVED BY:

STATE OF MICHIGAN
MOHAMED NASRI BAZNA
ENGINEER
No. 32351
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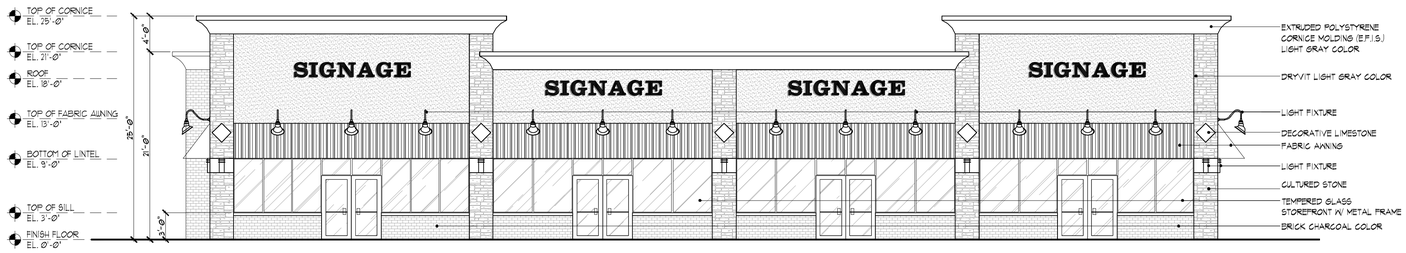

BUILDING "C" - PROP. FRONT ELEVATION

SCALE: 1/8" = 1'-0"

NOTE:
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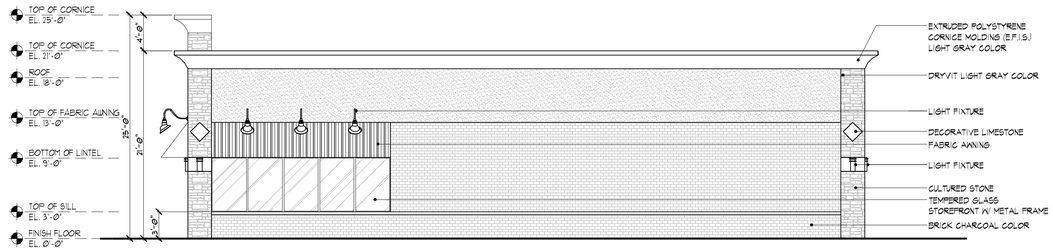
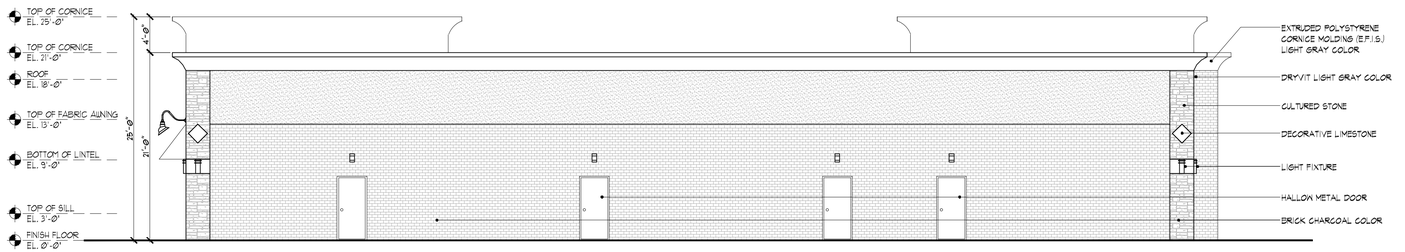


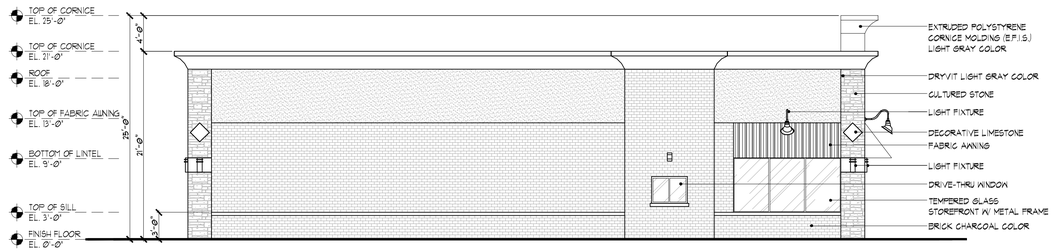
BUILDING "C" - PROP. RIGHT ELEVATION

SCALE: 1/8" = 1'-0"



BUILDING "C" - PROP. REAR ELEVATION

SCALE: 1/8" = 1'-0"



BUILDING "C" - PROP. LEFT ELEVATION

SCALE: 1/8" = 1'-0"

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05/25/2021

DATE: 03/26/2021

DRAWN BY: MONEER ALAHWAL

SCALE: AS NOTED

SHEET TITLE:
- BUILDING 'C' PROP. ELEVATIONS

SHEET #: A-3-2

APPROVED BY:

STATE OF MICHIGAN
MOHAMED NASRI BAZNA
ENGINEER
No. 32351
LICENSED PROFESSIONAL ENGINEER

DOOR SCHEDULE

DOOR NO.	DIMENSIONS	DESCRIPTION	FRAME
D1	3'-0" X 7'-0" X 1 3/4"	SOLID CORE WOOD-STAINED OAK VENEER DOOR W/ SELF CLOSING DEVICE, PRIVACY LOCK & KICK PLATE. MARBLE THRESH	METAL FRAME
D2	3'-0" X 7'-0" X 1 3/4"	SOLID CORE WOOD-STAINED OAK VENEER DOOR W/ KEY LOCK AND SELF CLOSING DEVICE	METAL FRAME
D3	3'-0" X 7'-0" X 1 3/4"	1" TEMPERED INSULATED GLASS DOOR W/ KEY LOCK AND SELF CLOSING DEVICE	METAL FRAME
D4	3'-0" X 7'-0" X 1 3/4"	HOLLOW METAL DOOR W/ SELF CLOSING DEVICE, PANIC BAR & DEAD BOLT LOCK	METAL FRAME

NOTES:
- ALL HARDWARE SETS TO BE SELECTED BY OWNER.
- ALL LOCKS SHALL BE READILY OPENED FROM INSIDE W/O THE USE OF A KEY.
- ALL MEANS OF EGRESS DOORS ARE READILY OPENABLE FROM INSIDE, AND MADE WITHOUT THE USE OF A KEY, SPECIAL KNOWLEDGE, OR SPECIAL EFFORT.

WALL LEGEND

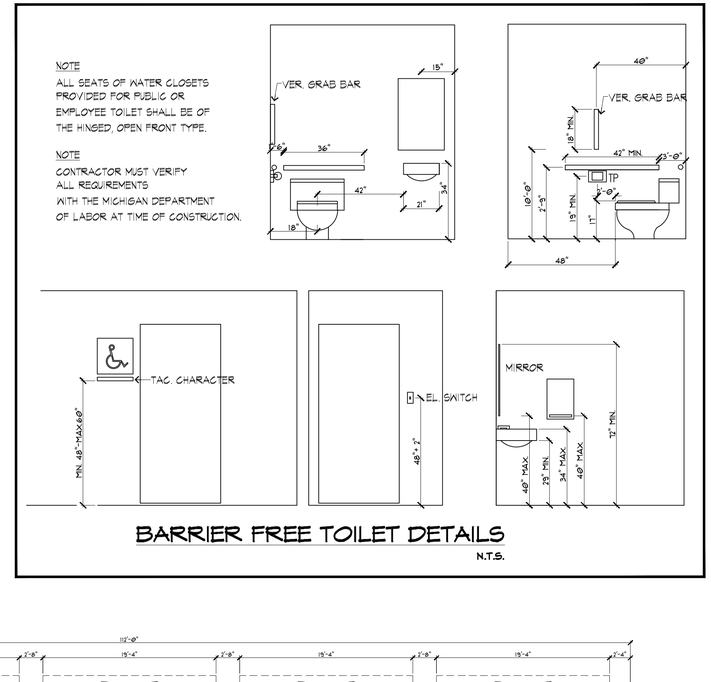
EXTERIOR WALL:
SEE BUILDING'S ELEVATIONS FOR EXTERIOR FINISH
- 8" C.M.U. W/ HORIZONTAL JOINT REINFORCEMENT @ 16" O.C. DOWEL, AND W/ #6 REBAR INTO FOOTING AND THROUGHOUT WALL HEIGHT

INTERIOR PARTITIONS:
5/8" DRYWALL ON $3\frac{5}{8}$"-20 GA. METAL STUDS @ 16" O.C.

2-HOUR FIRE RATED WALL:
(2) LAYERS 5/8" TYPE 'X' GYPSUM BOARD EACH SIDE OF 3 5/8" METAL STUDS AT 16" O.C.

NOTE
ALL SEATS OF WATER CLOSETS PROVIDED FOR PUBLIC OR EMPLOYEE TOILET SHALL BE OF THE HINGED, OPEN FRONT TYPE.

NOTE
CONTRACTOR MUST VERIFY ALL REQUIREMENTS WITH THE MICHIGAN DEPARTMENT OF LABOR AT TIME OF CONSTRUCTION.



BARRIER FREE TOILET DETAILS

N.T.S.

MICHIGAN BUILDING CODE 2015

BUILDING DATA:

USE GROUP:	RETAIL SPACES	
	M (MERCANTILE)	
CONSTRUCTION CLASSIFICATION:	IIB	
BUILDING HEIGHT:	25 FEET.	
SPRINKLER SYSTEM:	SPRINKLER SYSTEM SHALL BE PROVIDED BY OTHERS, VERIFY REQUIREMENT	
GROSS AREA:	8,400 SQ. FT.	

OCCUPANCY CALCULATIONS:

FOR EACH RETAIL = 1680 SQ. FT./60 = 28 OCCUPANTS

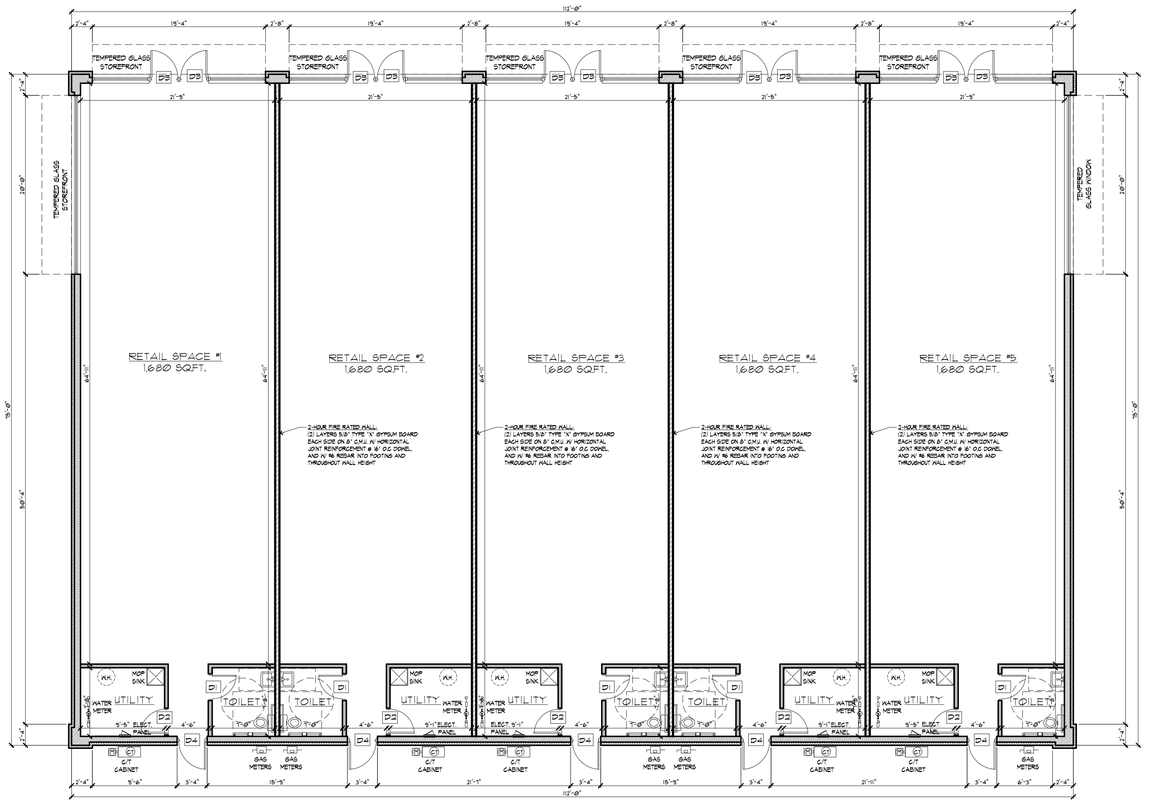
TOTAL OCCUPANT LOAD = 28X5 = 140 OCCUPANTS

NUMBER OF EXIT DOOR REQUIRED FOR EACH RETAIL: 1 EGRESS EXIT REQUIRED FOR EACH TENANT
NUMBER OF EXIT DOOR PROVIDED FOR EACH RETAIL: 2 EGRESS EXITS FOR EACH TENANT

MAX. TRAVEL DISTANCE FOR EACH RETAIL: 75' (WITH SPRINKLER SYSTEM)
MAX TRAVEL DISTANCE PROVIDED FOR EACH RETAIL: LESS THAN 52 FEET

CODES CURRENTLY IN EFFECT
- 2015 MICHIGAN BUILDING CODE, MBC 2015
- 2015 MICHIGAN MECHANICAL CODE MMC 2015
- 2015 MICHIGAN PLUMBING CODE, MPC 2015
- 2017 NATIONAL ELECTRICAL CODE, 2017 CONSTRUCTION CODE – PART 8. ELECTRICAL CODE RULES
- ACCESSIBILITY: MICHIGAN BARRIER FREE DESIGN LAW, P.A. 1966 AS AMENDED AND THE 2009 ICC/ANSI A117.1 STANDARD

GENERAL NOTES:
1. ALL WORK SHALL BE DONE IN ACCORDANCE WITH ALL APPLICABLE LOCAL AND STATE CODES AND ORDINANCES, INCLUDING 2015 MICHIGAN BUILDING CODE, NFPA, NEC & MICHIGAN BARRIER FREE DESIGN.
2. CONTRACTOR SHALL VISIT THE SITE TO FAMILIARIZE HIMSELF WITH THE CONDITIONS UNDER WHICH THE WORK IS TO BE PERFORMED. SUBMITTAL OF A BID SIGNIFIES THE ACCEPTANCE OF SUCH CONDITIONS.
3. CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND EXISTING CONDITIONS IN THE FIELD PRIOR TO CONSTRUCTION.
4. CONTRACTOR SHALL BE RESPONSIBLE FOR TEMPORARY BRACING AND SHORING OF STRUCTURES DURING DEMOLITION AND CONSTRUCTION, AS REQUIRED.
5. CONTRACTOR SHALL REMOVE OR CAP ALL EXISTING ELECTRICAL LINES THAT WILL NOT BE USED.
6. CONTRACTOR SHALL BE RESPONSIBLE FOR PROPER DISPOSAL OF DEBRIS FROM THE JOB SITE AND SHALL KEEP THE JOB SITE IN A CLEAN AND ORDERLY MANNER AT ALL TIMES.
7. CONTRACTOR SHALL VERIFY ANY ADDITIONAL OWNER REQUIREMENTS NOT NOTED ON DRAWINGS PRIOR TO CONSTRUCTION.
8. CONTRACTOR SHALL INCLUDE THE COST OF ALL REQUIRED PERMITS IN HIS BID AND SHALL SECURE SAME.
9. ALL DIMENSIONS ARE TO ROUGH FRAMING UNLESS NOTED OTHERWISE (U.N.O.).
10. ALL INTERIOR PARTITIONS ARE 3 5/8" STEEL STUDS @ 16" o.c., U.N.O.
11. DO NOT SCALE DRAWINGS, USE FIGURED DIMENSIONS ONLY.
12. INSTALL SOLID WOOD BLOCKING AS REQUIRED FOR MOUNTING OF GRAB BARS, MIRRORS, SHELVES, COUNTERS, ETC.



BUILDING "D" - PROP. FLOOR PLAN

SCALE: 1/8" = 1'-0"

MA ARCHMASTER
Residential & Commercial Designs

Cell Phone: (313) 505-7744
Email: alahwalmoneer@gmail.com

PROJECT:
PROPOSED RESTAURANTS AND RETAILS PLAZA
ADDRESS:
(21-426-004) HIGHLAND RD. WHITE LAKE, MI 48386
CLIENT'S NAME: NAZIR JAWICH

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REVISIONS:
05/03/2021
05/25/2021

DATE: 03/26/2021

DRAWN BY: MONEER ALAHWAL

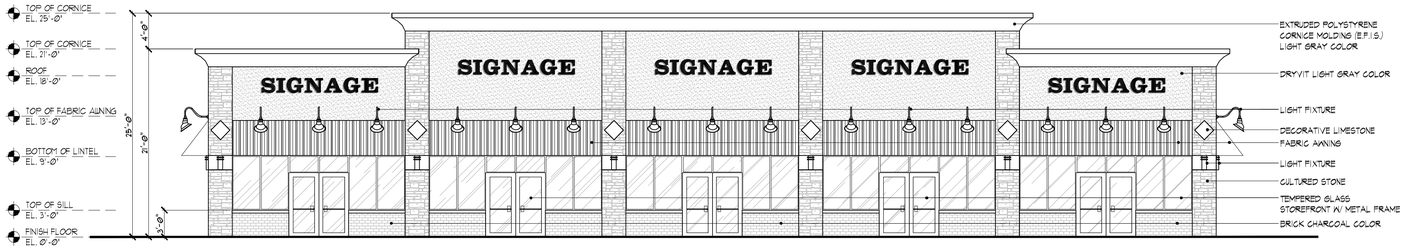
SCALE: AS NOTED

SHEET TITLE:
- BUILDING 'D': PROP. FLOOR PLAN

SHEET #: A-4-1

APPROVED BY:

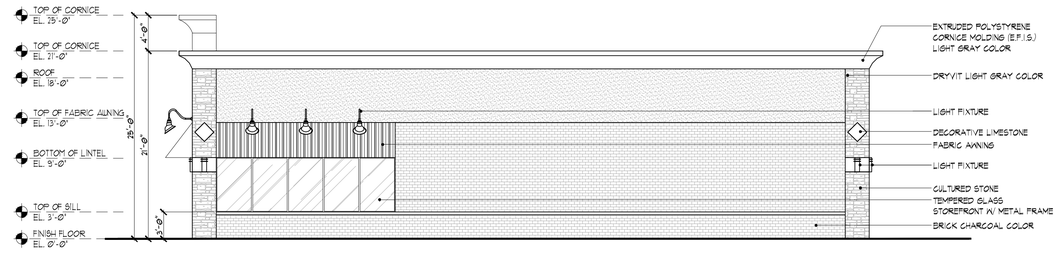
STATE OF MICHIGAN
MOHAMED NASRI BAZNA
ENGINEER
No. 32351
LICENSED PROFESSIONAL ENGINEER



BUILDING "D" - PROP. FRONT ELEVATION

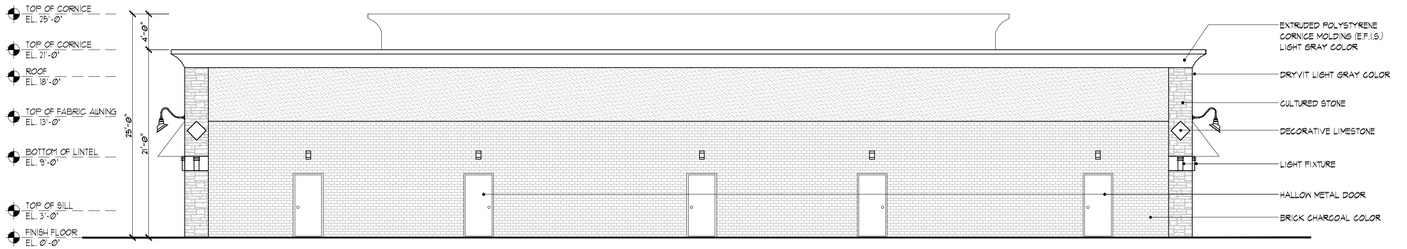
SCALE: 1/8" = 1'-0"

NOTE:
ALL FINALIZED COLORS WILL BE NOTED, AND MATERIAL SAMPLES WILL BE PROVIDED FOR PLANNING COMMISSION REVIEW AT THE TIME OF FINAL SITE PLAN.



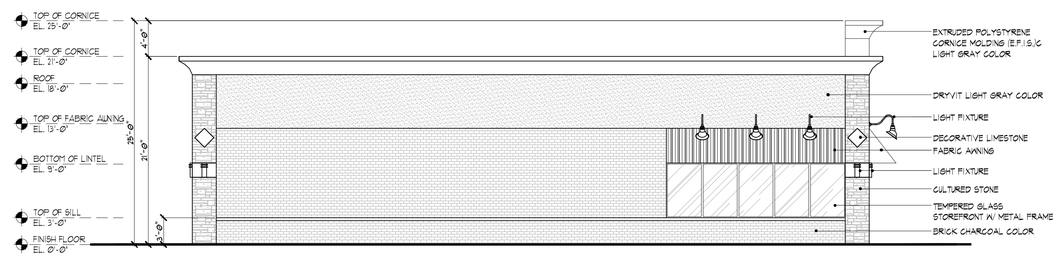
BUILDING "D" - PROP. RIGHT ELEVATION

SCALE: 1/8" = 1'-0"



BUILDING "D" - PROP. REAR ELEVATION

SCALE: 1/8" = 1'-0"



BUILDING "D" - PROP. LEFT ELEVATION

SCALE: 1/8" = 1'-0"

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REVISIONS:
05/03/2021
05/25/2021

DATE: 03/26/2021

DRAWN BY: MONEER ALAHWAL

SCALE: AS NOTED

SHEET TITLE:
- BUILDING 'D': PROP. ELEVATIONS

SHEET #: A-4-2

APPROVED BY:

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