

**PERMIT REPORT**

To: Board of Managers

From: Tom Dietrich, Permitting Program Manager

Date: June 10, 2019

Re: Permit 11-140F Woodland Cove Lake 3rd Addition, Minnetrista

Board Action Requested:

The sixth phase of Woodland Cove (Permit 11-140F) proposes to revise the stormwater management plan approved under Permit #11-140 in a way that will not meet the standard of single-event volume (SEV) control originally approved for all phases of the Woodland Cove development under that permit. SEV control is the measurement that quantifies the amount of water moving downstream under specific rain-events and identifies impacts on downstream waterbodies, specifically bounce and inundation. The plan is revised on basis of: (a) observed poor post-construction performance of stormwater BMPs elsewhere in the development; and (b) further geo-technical testing. The revised stormwater treatment plan does not meet the Permit #11-140 standard, but does meet standards under the present Stormwater Management Rule. Other elements of the proposed work (erosion control, wetland buffers) are unchanged in their conformance to the approved Permit #11-140 framework. The Board is asked to approve the revised stormwater management framework.

Recommendation:

Approval of the MCWD permit amendment request on the following conditions:

1. Submission of an NPDES permit number;
2. Submission of a declaration for stormwater facilities and wetland buffer areas, with the latter incorporating an agreement for buffer establishment, maintenance and buffer monumentation.
3. Financial assurances for:
 - a. Erosion Control, in the amount of: \$5,500.00
 - b. Stormwater Management, in the amount of: \$10,000
 - c. Wetland Protection, in the amount of: \$8,910.00
4. Reimbursement of Engineering and Legal Fees

Background:

Gonyea Homes, Inc. (Applicant) has applied for a Minnehaha Creek Watershed District (MCWD) permit amendment for the construction of a 40-lot subdivision addition within the



Woodland Cove Development. The project is requesting approval to amend the stormwater plan previously approved by the Board in 2011 associated with the overall Woodland Cove Development, under permit #11-140. The proposed means of managing stormwater volume would not achieve the level of management of the plans approved under permit #11-140. For this reason, the application is being brought forward for consideration and action by the Board of Managers.

To provide context, Woodland Cove is a 490-acre development consisting of approximately 1,071 units on the southwest side of Halsted Bay in the City of Minnetrista. Drainage in the development is generally divided by a topographic break on the site that occurs approximately 1,000 feet north of Highway 7. North of this divide, drainage is ultimately directed toward Lake Minnetonka. South of this divide, the majority of the drainage is directed south toward Stone Lake, with some drainage moving west toward Six Mile Creek (Figure 1).

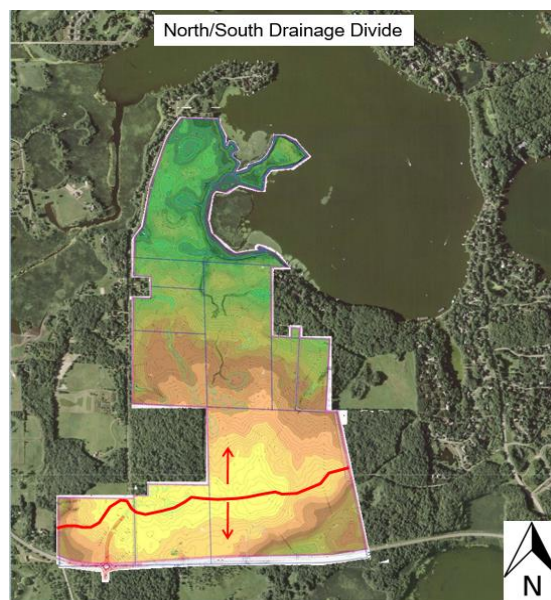


Figure 1: North/South Drainage Divide

The entirety of the Woodland Cove development was permitted under one umbrella application, permit #11-140, approved by the Board of Managers in August of 2011. Though the entire development was approved under one permit application, build-out was anticipated to occur in discrete phases over a period of 10 – 12 years. Each of the discrete phases would then be reviewed for conformity with the overall approval. Since that time, five phases found to be compliant with the overall approval have been issued via staff delegated authority from the Board of Managers. The application for Permit #11-140F is the sixth phase of the Woodland Cove Development.



The designs associated with permit #11-140, specifically the stormwater management design, exceeded the permitting standards at the time of approval. These standards include volume control, rate control, water quality, and protection of downstream waterbodies (which is measured through SEV control to determine bounce and inundation for a given waterbody). Each of these standards is described in more detail in the *Stormwater Management* section

The application for Permit #11-140F, is a discrete phase of Woodland Cove submitted by Gonyea homes that drains north toward Lake Minnetonka (Figure 2). The application proposes to amend the stormwater management plan outlined in Permit #11-140, approved by the Board. In other development phases already completed, a number of infiltration basins have been constructed, and there has been an opportunity to observe their performance, which has been poor. Due to these observations, the applicant has performed additional geo-technical testing to characterize the conditions of the proposed best management practice site. Through that geo-technical testing, environmental conditions have been found that, in the assessment of the applicant's engineer, prevent effective infiltration. The District Engineer concurs in this assessment. The Board-approved stormwater design under permit #11-140 relies upon infiltration for function and performance, therefore, its impediment renders the original stormwater design infeasible, given the geo-technical circumstances. In response, the applicant has explored alternative methods of stormwater management that would provide an equivalent amount of treatment (i.e. practices providing: volume control, rate control, water quality, and prevention of downstream impacts through the measurement of SEV control) as the Board approved design.

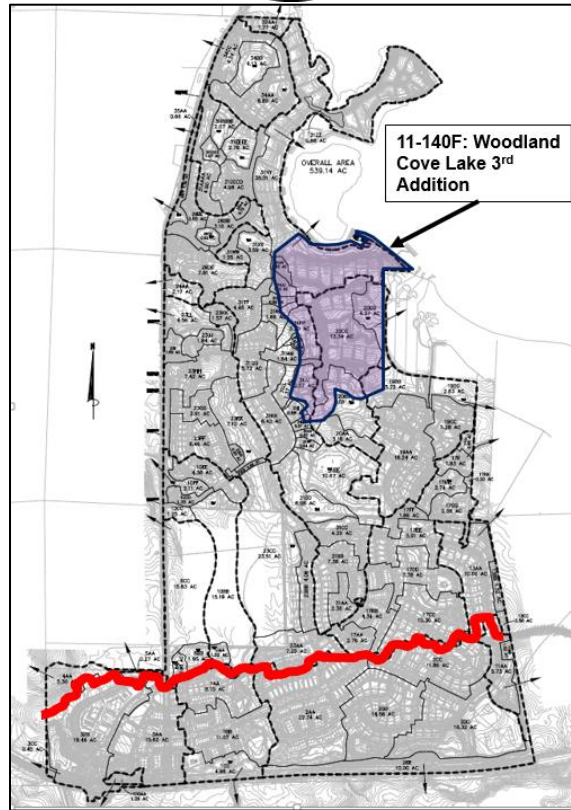


Figure 2: 11-140F Phase Location

In that pursuit, the applicant provided a design for an irrigation/re-use system, which will provide for a substantial amount of abstraction through a combination of decentralized infiltration, evapotranspiration and evaporation. While the alternative design would not achieve an amount of SEV control equivalent to the original approved design, the District Engineer finds that it would provide the greatest feasible level of SEV control. Also, since the time that permit #11-140 was considered, the District stormwater management rule was adjusted. Importantly, the proposed design meets the current stormwater rule standards for volume, rate, water quality, and prevention of downstream impacts (through measurement of SEV control). Therefore, the applicant has requested to revise the original stormwater management design associated with permit #11-140. The technical details of the irrigation/re-use system are outlined in the Stormwater Management section below.

The project will involve removal of existing forested area, installation of streets and associated utility connections, construction of 40 single-family homes, and implementation of wetland buffers, and permanent stormwater management features. The project triggers the District's Erosion Control, Wetland Protection, and Stormwater Management rules, and is also regulated under the Wetland Conservation Act, for which, the City of Minnetrista is the local government



unit responsible for administration. As noted, the project plans reflect a proposed revision of the stormwater management plan approved under Permit #11-140 in light of subsequent performance issues with constructed infiltration basins and additional geo-technical testing. The proposed stormwater management approach will not achieve the level of SEV control as did the approved plans under permit #11-140; however, as noted above, the applicant has demonstrated that the soil and groundwater conditions present in the location of the project are not conducive to infiltration, and therefore prohibit achieving the stormwater design approved in 2011. The applicant has provided a stormwater management plan that meets the District's current Stormwater Management rule.

District Rule Analysis:

Erosion Control Rule

The District's Erosion Control rule provisions were met through the approval of permit #11-140 by the Board of Managers. No amendment is sought for the plan as approved, therefore the information that follows serves as context for the overall proposal.

The District's Erosion Control Rule applies to projects proposing 5,000 square feet of disturbance or 50 cubic yards of fill, excavation, or stockpiling on-site. The Applicant is proposing 25.33 acres of disturbance, therefore the rule is triggered. In accordance with the rule provisions, the Applicant has submitted an erosion control plan which identifies erosion and sediment control best management practices. These include a rock construction entrance, silt fence down gradient of disturbed areas, concrete washout locations utilizing impermeable liners, a sedimentation basin, and inlet protection where necessary. Additionally, a vegetative stabilization plan including the incorporation of six-inches of topsoil into underlying soils prior to final stabilization has also been provided.

Submission of an NPDES permit and a Financial Assurance is listed as a recommended condition of approval. Upon satisfaction of the recommended condition, the project meets the Erosion Control Rule.

Wetland Conservation Act & Wetland Protection

The District's Wetland Protection rule provisions were met through the approval of permit #11-140 by the Board of Managers. No amendment is sought for the plan as approved, therefore the information that follows serves as context for the overall proposal.

The wetland boundary and types were delineated on October 3rd and October 6th, 2008 and approved by WSB & Associates on behalf of the City of Minnetrista on December 19, 2008 (Boundary and Type Notice of Decision (WSB Project No. 1741-17). There are 2.33 acres of existing wetland within the project boundaries with no proposed impacts.

*Wetland Protection*

The buffer provision of the Wetland Protection Rule is applicable whenever any of the Wetland Protection, Stormwater Management or Waterbody Crossings & Structures rules are triggered. Because the Stormwater Management rule is triggered, the buffer provision of the Wetland Protection rule is applicable.

There is one wetland on the northern side of the project which abuts Lake Minnetonka, one wetland on the east side of the site adjacent to the stormwater reuse basin, and a third wetland on the south side of the site. There is no work proposed within the wetlands.

Per section 5(a) of the Wetland Protection rule, buffers must be provided around all disturbed wetlands and on wetland edges downgradient of disturbance. The applicant provided plans demonstrating that buffers will be provided on all applicable wetland areas. Additional analysis on buffer width has been provided under section 6(c) below.

Per section 5(b) of the rule, buffers are required, and have been analyzed under section 6, below.

Per section 5(c) of the rule, buffers must be documented by a declaration or other recordable instrument. An executed maintenance agreement for Wetland Protection is listed as a condition of recommended approval. The maintenance agreement will list the applicable vegetation maintenance requirements and restrictions as outlined in section 7(a) and 7(b).

Section 5(d) of the rule requires a permanent wetland buffer monument to be installed at each lot line where it intersects the buffer, and where needed to indicate the contour of the buffer, with a maximum spacing of 100 feet. This requirement has been analyzed and satisfied under section 7(b) below, as the Applicant will be incorporating conforming monumentation and maintenance terms into the required recorded declaration.

Per section 6(a) of the rule, buffer width requirements are determined by the management class of the wetland. The District's Functional Assessment of Wetlands classifies the northern wetland as a Manage 2, the wetland to the East as a Manage 1, and the wetland to the south as a Manage 1. Reductions in Applied Buffer Width per section 6(b) were approved in 2011 and are not proposed to change.

Per section 6(c) of the rule, buffer averaging is permitted should the full width of the buffer not be able to be provided in all locations. Under the provisions of the Board approval through permit #11-140, this phase of the overall Woodland Cove development proposed 3.89 acres of total buffer area. The current proposal has revised buffer areas to provide .02 additional acre of buffer, totaling 3.91 acres of buffer for the project. Based on staff's review of the information submitted by the Applicant, the adjustment of buffer width conforms to the rule's averaging standard.



Section 6(d) of the rule does not apply as the Applicant has not requested a reduction in Applied Buffer Width.

Section 6(e) of the rule does not apply as this is not a Linear Reconstruction Project.

Section 6(f) of this rule does not apply as this project is not a New Principal Residential Structure.

The applicant has submitted plans and specifications sufficient to show conformance with section 7(a) of the Wetland Protection rule, which prohibits actions such as mowing, fertilizing or placement of yard waste within the buffer area. The recorded declaration sets these protections in place.

Section 7(b) of the rule allows public land, homeowners associations, and right-of-way to comply with buffer monumentation, buffer monitoring, and vegetation management through a written maintenance agreement with the District. The Applicant's contractor, once selected, will complete the initial establishment of the vegetation, including two years of maintenance from date of installation to ensure viability. Following the establishment period, management is proposed to be completed by Minnesota Native Landscapes, in accordance with the Ecological Restoration & Open Space Landscaping & Management Plan, which was approved under permit #11-140. Maintenance of this project will also be covered under the applicant's wetland buffer declaration. Therefore, upon satisfaction of the recommended conditions, the Applicant meets the requirement of section 7(b) of the Wetland Protection rule.

Per section 7(c) of the rule, any buffer areas that will be disturbed by grading or other site activities during construction must be replanted and maintained according to the following standards:

- Soils must be decompacted to a depth of 18 inches and organic matter must be incorporated into soils before revegetation;
- Erosion/sediment control practices consistent with the requirements of the District Erosion Control rule must be employed during buffer establishment;
- Buffers shall be planted with a native seed mix and/or native plantings approved by the District; and
- Buffer maintenance and monitoring shall be performed and meet the standards of the District's Wetland Buffer Monitoring requirements.

Review of the plans, specifications, and additional information the Applicant submitted showed the entirety of buffers around the East and South wetlands will be reseeded and managed to details outlined in the Ecological Restoration & Open Space Landscaping Management Plan. The Applicant has provided information that sufficiently addresses the requirements, including specifications for decompaction of soils, submission of an erosion control plan, and native seed



mix specifications. The Applicant meets the requirement of section 7(c) of the Wetland Protection rule.

In summary, the project meets the requirements of the Wetland Protection Rule as outlined in the 11-140 approval with the inclusion of .02 acre of additional buffer.

Stormwater Management Rule

As noted in the *Background* section, the applicant is proposing to amend the original 2011 Board approved stormwater management plan, as outlined in permit #11-140.

The Stormwater Management Rule is triggered whenever new impervious surface is proposed. The project proposes 25.33 acres of disturbance on the 36 acre project site. Under the approved stormwater management design associated with permit #11-140, the project achieved:

- 23,958 cubic feet of abstraction, exceeding both the volume control and water quality components of the District’s current rule;
- Rate control, as outlined in Table 1; and,
- SEV control (the measurement used to quantify *Impacts on Downstream Waterbodies*, specifically bounce and inundation), as shown in Table 2, which shows a slight increase in the volume of water moving downstream for the 10-yr and 100-yr events. Because Lake Minnetonka is downstream, and has an extremely large capacity, the increases shown were demonstrated to have no impact to bounce or inundation.

Scenario	Rate (cfs)		
	1-yr	10-yr	100-yr
Existing (pre-build) Condition	0.3	7.5	23.9
Permit #11-140 Approval	0.8	6.5	22.4

Table 1: Rate Control Comparison - Existing Conditions to 11-140 Permit Approval

Scenario	Volume (ac-ft)		
	1-yr	10-yr	100-yr
Existing (pre-build) Condition	0.2	1.5	3.8
Permit #11-140 Approval	0.1	2.1	5.0

Table 2: Single-Event Volume Comparison - Existing Conditions to 11-140 Permit Approval

Initially, under permit #11-140, an infiltration basin was proposed in this phase to treat the impervious surface created through the single family homes and associated roads. However, poor post-construction performance of infiltration facilities in other phases of the Woodland Cove development prompted the Applicant to perform additional geo-technical testing to



determine the appropriateness of an infiltration practice. Two separate instances of testing were conducted, the first in late February of 2019, and then a subsequent test in May of 2019. The initial testing in February of 2019 showed infiltration rates of near 0 in/hr and the presence of groundwater. Because these test results diverged significantly from the geo-technical testing submitted with the original permit in 2011, which showed surface infiltration rates of 1.1 in/hr., an additional test (May 2019) was conducted to understand, in additional detail, the discrepancy in results from the testing performed for the original permit #11-140 submittal and the February 2019 test.

The May 30, 2019 geo-technical testing consisted of two test pits, dug several feet below the bottom of the proposed infiltration area. Each test pit encountered low plasticity clay till soils at a depth of approximately two feet below the bottom of the proposed infiltration basin that were not conducive to infiltration. Additionally, at the interface between the topsoil and the clay till, groundwater seams were encountered. Both of the features found (clay soils and the seasonally high groundwater table within three feet of the bottom of an infiltration system) constitute design conditions that prohibit infiltration per the requirements outlined in Section 16 of the MPCA's Construction Stormwater permit (CSW) and the Minnesota Stormwater Manual. These findings were verified by the District Engineer through observation of the geo-technical test performed in the field, and a review of the previous reports generated by the Applicant. Further, the District Engineer concluded that the conditions observed through the testing are most-likely indicative of geo-technical conditions throughout the site of the present proposed phase. This is based upon the level of saturation encountered in the clay till media, which indicates a high groundwater level is typical throughout this location.

Through the information submitted by the Applicant, staff and the District Engineer have determined that the geo-technical constraints demonstrated preclude infiltration. Therefore, in order to provide stormwater treatment under these geo-technical conditions, the Applicant proposes to utilize a stormwater irrigation and re-use system. The system retains water in a large pond reservoir, and through use of a specialized pump, moves retained stormwater through an irrigation piping network, utilizing the stormwater on available greenspace, as shown in Figure 3. The design of the irrigation system follows best engineering practices as outlined in the Minnesota Stormwater Manual and the District's Stormwater Management rule. This includes submission of materials sufficient to demonstrate that:

- Sufficient pervious greenspace is available for irrigation;
- The stormwater re-use volume available in the reservoir pond both:
 - Below the primary outlet; and,
 - Above the required dead pool of the pond, maintaining at least 4 feet of depth for water quality;
- The ability to pump and irrigate the pervious areas within a 48-hour period of a storm event.



The District Engineer has reviewed and determined that the above criteria have been met for the proposal.

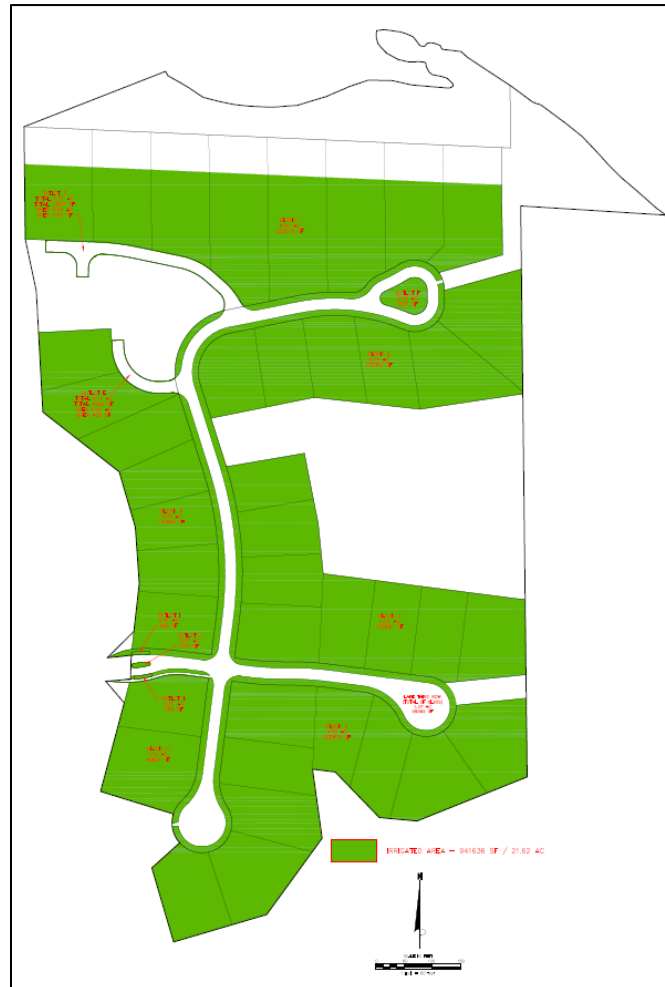


Figure 3: Proposed Irrigable Greenspace

In examining alternative stormwater management practices, the Applicant submitted information including plans, calculations, and a narrative outlining that, with respect to all reasonable alternatives, meeting the performance standards of permit #11-140 is infeasible. Specifically, the applicant cited the single event volumes (SEVs) leaving the site under various storm events, due to poor soils and a regionally high groundwater table (Table 2). The Applicant has, based on the assessment and review of staff and the District Engineer, demonstrated that, due to the geo-technical conditions present, it is infeasible to meet the performance standards afforded by the stormwater designed associated with permit #11-140.

However, the proposed irrigation/re-use system strives to meet the performance standards of the design associated with permit #11-140 to the maximum extent feasible. Because of the shortfall



from the original board decision under permit #11-140, the applicant is requesting an amendment to the stormwater management plan. In support of this request, the applicant has demonstrated that the proposed irrigation/re-use system will meet, and in several instances, exceed, the District’s current Stormwater Management rule. A detailed, technical discussion of how each portion of the District’s current Stormwater Management rule is met can be found below. Staff and the District Engineer, based upon the information submitted, and considering the proposal meets the District’s current Stormwater Management standards, find the request to be reasonable.

Under the present stormwater rule, since the proposed site disturbance is greater than 40%, phosphorus, rate, and volume control must be provided for the entire site’s impervious surface, per section 5(c) of the rule, as shown in Table 1 below. The project proposes 6.07 acres of impervious surface (264,409 square feet).

Site Size	Site Disturbance	Impervious Surface Increase	Requirements	Treatment Scope
≤ 1 acre	N/A	N/A	Incorporate BMPs	N/A
> 1 acre	< 40% site disturbance	< 50% increase in impervious surface	Phosphorus Control, Rate Control, and Volume Control	Additional impervious surface
		≥ 50% increase in impervious surface		Entire site’s impervious surface
	≥ 40% site disturbance	N/A	Phosphorus Control, Rate Control, and Volume Control	Entire site’s impervious surface

Table 3: Stormwater Requirements for Redevelopment Resulting in an Increase in Impervious Surface

The technical findings of how the applicant’s proposal meets the District’s current Stormwater Management rule standards are outlined below.

Volume Control

The volume control requirement is met by abstracting the first inch of rainfall from all impervious surfaces. Based on the plans, stormwater calculations, and narrative the Applicant submitted, the required abstraction volume is 21,635 cubic feet under current District rules. Comparatively, under permit #11-140, the Board approved an abstraction volume of 23,958 cubic feet. The Applicant has provided an abstraction volume of 27,877 cubic feet, to be accomplished through an irrigation/re-use system (Table 4). As noted above, irrigation/re-use



was selected as the primary method of abstraction due to the underlying clay soils (hydrologic soil group D) and the presence of groundwater, which prohibit infiltration under Section 16 of the MPCA’s Construction Stormwater Permit and the guidance of the Minnesota Stormwater Manual.

Based on staff and the District Engineer’s analysis of the submittals provided by the Applicant, the provided abstraction volume is in excess of both the required abstraction through current District rules and through the permit #11-140 approval. Based on this review and analysis, the volume control requirement is met.

Scenario	Abstraction vol. (cf)
Permit #11-140	23,958
Current Rules (1" x Impervious)	21,780
Proposed (irrigation/re-use)	27,877

Table 4: Abstraction Volume Comparison by Scenario

Rate Control

The rate control requirement dictates that no net increase in the peak runoff rates for the 1-, 10-, and 100-year design storms may occur anywhere stormwater discharges across the downgradient site boundary. The Applicant has submitted plans, a stormwater model, stormwater calculations, and a narrative to demonstrate conformance with this criteria. A comparison of rates for the existing (pre-build), permit #11-140, and proposed (irrigation/re-use) conditions has been prepared by the Applicant to highlight anticipated rates, as shown in (Table 5). All discharge from the site ultimately drains to Lake Minnetonka. Based on this analysis, staff and the District Engineer have determined the rate control requirement is met.

Scenario		Rate (cfs)		
		1-yr	10-yr	100-yr
Existing (pre-build) Condition		0.3	7.5	23.9
Permit #11-140 Approval		0.8	6.5	22.4
Proposed (irrigation/re-use)		0.3	4.2	21.7
Difference	(Permit #11-140 - Existing)	0.5	-1.0	-1.5
	(Proposed - Permitted)	-0.5	-2.3	-0.7
	(Proposed - Existing)	0.0	-3.3	-2.3

Table 5: Rate Comparison by Scenario



Phosphorus Control

Per section 3(a) of the Stormwater Management Rule, the phosphorus control requirement is met by meeting the abstraction requirements as outlined in the *Volume Control* section. Because the Applicant has demonstrated conformance with the volume control requirement, the phosphorus control requirement has been met.

High Water Elevation

The high water elevation requirement of the rule requires two vertical feet of separation between the 100 year flood elevation and the low openings to structures. Based on the Applicant’s submittals, and review and analysis by staff and the District Engineer, there are multiple 100 year high water elevations associated with the reservoir pond of the irrigation/re-use system, wetlands, and hydraulically connected drainage structures. In each case, the low opening to the proposed homes has demonstrated two-feet of vertical separation from proximate water features. Therefore the high water elevation requirement is met.

Downstream Waterbodies

The downstream waterbodies section of the rule regulates new point sources and changes to the bounce and period of inundation of water basins. This assessment is based upon an analysis of SEV control for storm events, which models the volume of water sent downstream and makes a determination as to the volume’s impact on the bounce or period of inundation of a waterbody. Based on the Applicant’s submittals, and review and analysis of the stormwater calculations, staff and the District Engineer have determined, in accordance with section 8 of the Stormwater Management Rule, that due to the large volume and capacity of the downstream waterbody (Lake Minnetonka), bounce will not be measurable and the period of inundation will not be affected, even though the proposed irrigation/re-use system will increase the 100-yr volume by 0.9 ac-ft over the design approved under Permit #11-140 (Table 6). Therefore, the project as proposed meets this criterion of the present rule.

Scenario		Volume (ac-ft)		
		1-yr	10-yr	100-yr
Existing (pre-build) Condition		0.2	1.5	3.8
Permit #11-140 Approval		0.1	2.1	5.0
Proposed (irrigation/re-use)		0.5	2.8	5.9
Difference	(Permit #11-140 - Existing)	-0.1	0.6	1.2
	(Proposed - Permitted)	0.4	0.7	0.9
	(Proposed - Existing)	0.3	1.3	2.1

Table 6: Single Storm Event Volume Comparison by Scenario



The Applicant will be providing a financial assurance in accordance with Section 9 of the Stormwater Management Rule, the submittal of which is included as a condition of approval at the beginning of this report.

The Applicant will be providing a recorded declaration and maintenance agreement in conformance with Section 11 of the Stormwater Management Rule, the submittal of which is included as a condition of approval at the beginning of this report.

In summary, staff and the District Engineer have determined the project, subject to the conditions of approval as listed at the beginning of this report, meets all criteria of the Stormwater Management Rule.

Summary:

Gonyea Homes, Inc. has applied for a Minnehaha Creek Watershed District permit amendment for the Erosion Control, Wetland Protection, and Stormwater Management rules for a proposed 40-lot subdivision in the City of Minnetrista. The proposed project seeks an amendment from the original stormwater management plan from the Woodland Cove subdivision approval under permit #11-140 due to geo-technical constraints. Based upon staff and the District Engineer's review, the proposal meets the applicable requirements of current District rules upon satisfaction of the recommended conditions and approval by the Board of Managers. Therefore, staff recommends approval of the permit with the conditions listed.

Attachments:

1. Water Resources Application Form
2. Proposed Drainage Map
3. Site Plans
4. Irrigation Plan
5. Geo-technical Report
6. Wetland Buffer Exhibit

WATER RESOURCE PERMIT APPLICATION FORM

Use this form to notify/apply to the Minnehaha Creek Watershed District (MCWD) of a proposed project or work which may fall within their jurisdiction. Fill out this form completely and submit with your site plan, maps, etc. to the MCWD at:
15320 Minnetonka Blvd. Minnetonka, MN 55345.

Keep a copy for your records.

YOU MUST OBTAIN ALL REQUIRED AUTHORIZATIONS BEFORE BEGINNING WORK.

1. Name of each property owner: WOODLAND COVE, LLC
Mailing Address: 301 Carlson Parkway #100 City: Minnetonka State: MN Zip: 55305
Email Address: checker@carlson-re.com Phone: 952-404-5026 Fax: _____

2. Property Owner Representative Information (not required) (licensed contractor, architect, engineer, etc...)
Business Name: Gonyea Homes, Inc. Representative Name: Rick Packer
Business Address: 1000 Boone Ave N. #400 City: Golden Valley State: MN Zip: 55427
Email Address: rpacker@gonyeahomes.com Phone: 612-868-5862 Fax: _____

3. Project Address: NA. Outlots Y and Z, Woodland Cove City: Minnetrista
State: MN Zip: 55331 Qtr Section(s): SW4/SF Section(s): 27 Township(s): 117 Range(s): 24
Lot: _____ Block: _____ Subdivision: Woodland Cove PID: 3411724120002, 2711724430002

4. Size of project parcel (square feet or acres): 36 Acres
Area of disturbance (square feet): 20 Volume of excavation/fill (cubic yards): 120000 CY
Area of existing impervious surface: 0 Area of proposed impervious surface: _____
Length of shoreline affected (feet): 120 Waterbody (& bay if applicable): Lake Minnetonka Channel

5. Type of permit being applied for (Check all that apply):
 EROSION CONTROL WATERBODY CROSSINGS/STRUCTURES
 FLOODPLAIN ALTERATION STORMWATER MANAGEMENT
 WETLAND PROTECTION APPROPRIATIONS
 DREDGING ILLICIT DISCHARGE
 SHORELINE/STREAMBANK STABILIZATION

6. Project purpose (Check all that apply):
 SINGLE FAMILY HOME MULTI FAMILY RESIDENTIAL (apartments)
 ROAD CONSTRUCTION COMMERCIAL or INSTITUTIONAL
 UTILITIES SUBDIVISIONS (include number of lots)
 DREDGING LANDSCAPING (pools, berms, etc.)
 SHORELINE/STREAMBANK STABILIZATION OTHER (DESCRIBE): _____

7. NPDES/SDS General Stormwater Permit Number (if applicable): Applied for

8. Waterbody receiving runoff from site: Lake Minnetonka

9. Project Timeline: Start Date: May 15, 2019 Completion Date: Dec 15, 2019

Permits have been applied for: City County MN Pollution Control Agency DNR COE
Permits have been received: City County MN Pollution Control Agency DNR COE

By signing below, I hereby request a permit to authorize the activities described herein. I certify that I am familiar with MCWD Rules and that the proposed activity will be conducted in compliance with these Rules. I am familiar with the information contained in this application and, to the best of my knowledge and belief, all information is true, complete and accurate. I understand that proceeding with work before all required authorizations are obtained may be subject to federal, state and/or local administrative, civil and/or criminal penalties.

Camd Beer
Signature of Each Property Owner

3/26/19
Date

Code _____
MAR 27 2019
Page 1 of 1
Approved By: _____



PROPOSED DRAINAGE MAP

SCALE 1"=300'

CAD FILE 22429-50SI-3	5/23/19 PER CITY COMMENTS
PROJECT NO. 22429-50	REVISIONS
1.12	DATE 3/1/19
	DRAWN BY CJK

WOODLAND COVE LAKE THIRD ADDITION
MINNETRISTA, MINNESOTA
SITE INFORMATION
FOR
GONYEA HOMES, INC.
1000 BOONE AVENUE NORTH, GOLDEN VALLEY, MN 55427

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
KURT D. QUAINANCE, P.E.
Date: 3/1/19 Reg. No. 24676

James R. Hill, Inc.
PLANNERS / ENGINEERS / SURVEYORS
2500 W. Cty. Rd. 42, SUITE 120, BURNSVILLE, MN 55337
PHONE: (952)890-6044 FAX: (952)890-6244

WOODLAND COVE LAKE THIRD ADDITION

MINNETRISTA, MINNESOTA

FINAL GRADING, DRAINAGE, EROSION & SEDIMENT CONTROL, SANITARY SEWER, WATERMAIN, STORM SEWER, & STREET CONSTRUCTION PLANS

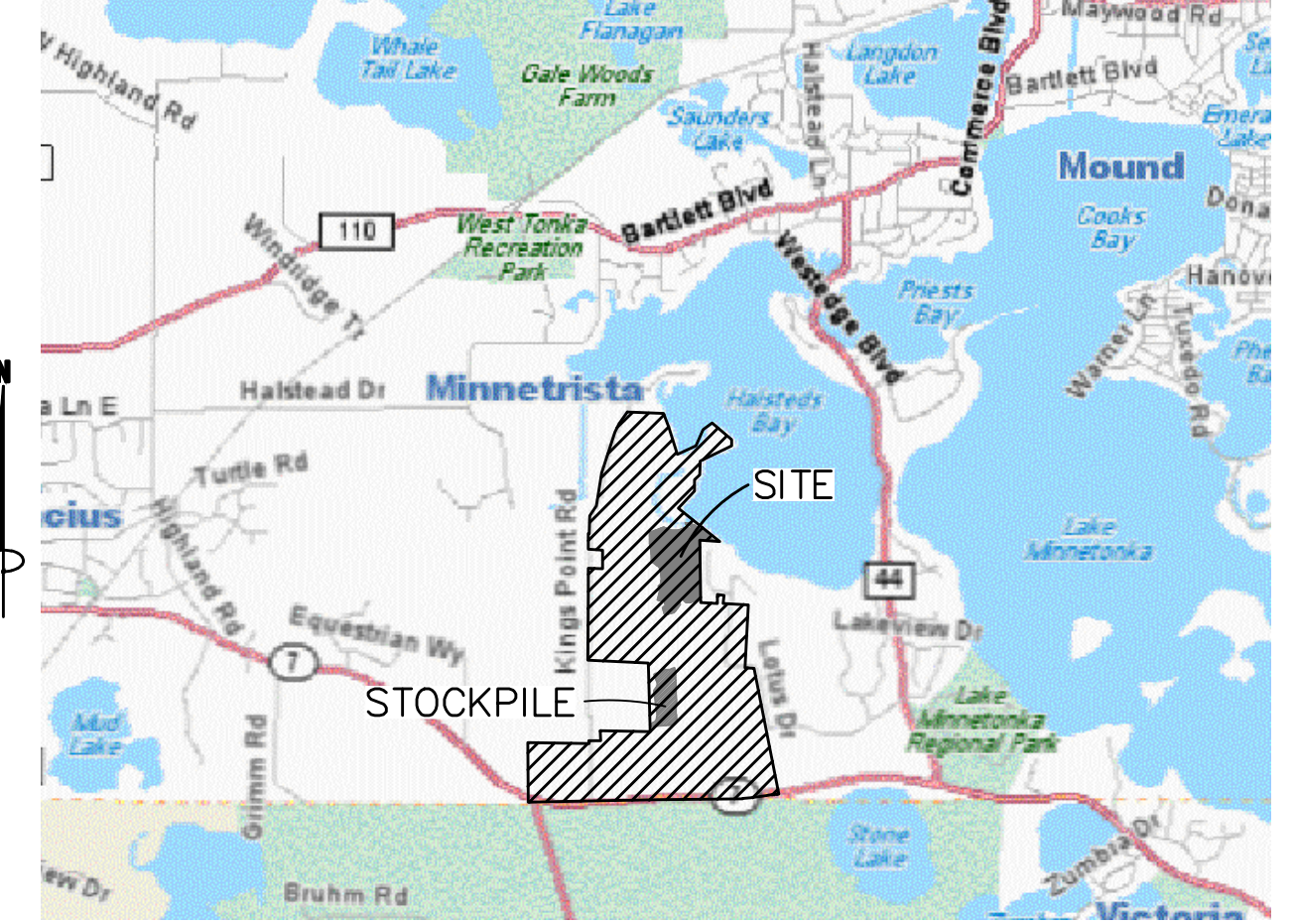
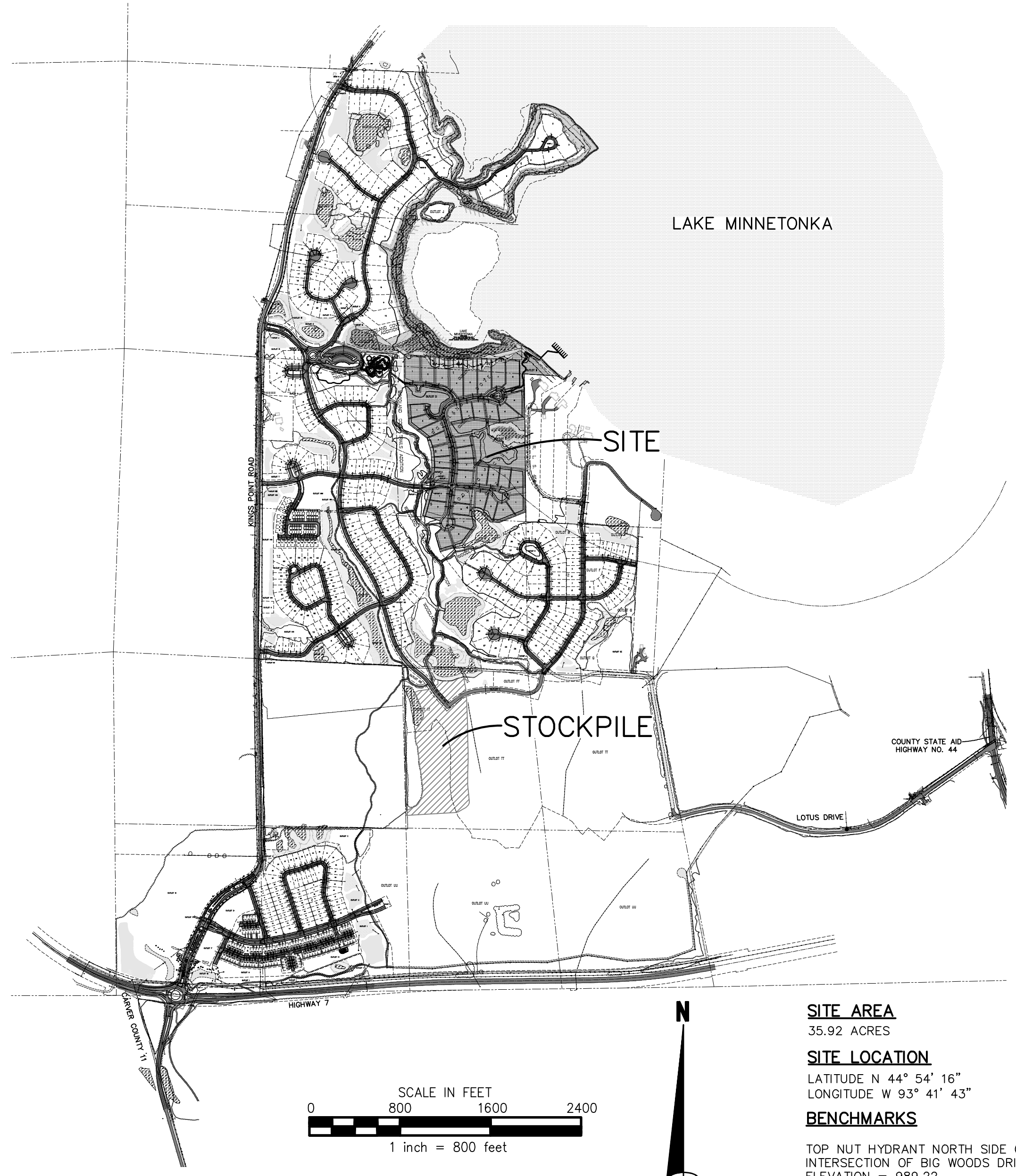
FOR
GONYEA HOMES, INC.
1000 BOONE AVENUE NORTH, GOLDEN VALLEY, MN 55427
PHONE: (763) 432-4500

INDEX

TITLE SHEET	1.00
SITE INFORMATION	1.10-1.12
FINAL EROSION & SEDIMENT CONTROL PLAN	2.10-2.11
FINAL EROSION & SEDIMENT CONTROL PLAN OPEN SPACE SEED MIXTURES	2.20-2.21
EROSION & SEDIMENT CONTROL DETAILS	2.30-2.32
FINAL GRADING & DRAINAGE PLAN	3.00-3.01
SANITARY SEWER & WATERMAIN CONSTRUCTION	4.00
HALSTEAD BAY LANE (PRIVATE) & HALSTEAD BAY ALCOVE	4.01
WOODLAND COURT	4.02
HALSTEAD BAY BEND (PRIVATE) & BIG WOODS DRIVE	4.03
STORM SEWER CONSTRUCTION	5.00-5.02
STREET CONSTRUCTION	6.00
BIG WOODS DRIVE	6.01
HALSTEAD BAY ALCOVE & WOODLAND COURT	6.02
HALSTEAD BAY ALCOVE	6.03
HALSTEAD BAY LANE (PRIVATE), TURN-AROUND (PRIVATE), & HALSTEAD BAY BEND (PRIVATE)	6.03
FINAL TREE PRESERVATION PLAN	7.00-7.01
DETAILS	8.00-8.02

LEGEND

- EXISTING ASPHALT SURFACE
- EXISTING CONCRETE SURFACE
- EXISTING GRAVEL SURFACE
- EXISTING DELINEATED WETLAND (KJOLHAUG ENVIRONMENTAL SERVICES CO.)
- EXISTING LAKE
- EXISTING INFILTRATION BASINS
- EXISTING SEDIMENTATION BASINS
- EXISTING WETLAND BUFFER
- EXISTING LANDSCAPING
- EXISTING CONTOUR
- EXISTING WETLAND DELINEATION
- EXISTING EDGE OF AQUATIC VEGETATION
- EXISTING FENCE
- EXISTING TREE LINE/TREES
- EXISTING WATERMAIN
- EXISTING SANITARY SEWER
- EXISTING STORM SEWER
- EXISTING FIELD DRAINTILE
- EXISTING FORCEMAIN
- EXISTING OVERHEAD POWER LINE/POWER POLES
- EXISTING UNDERGROUND ELECTRIC
- EXISTING ELECTRIC METER
- EXISTING ELECTRIC PEDESTAL
- EXISTING LIGHT POLE
- EXISTING UNDERGROUND TELEPHONE
- EXISTING UNDERGROUND FIBER OPTIC
- EXISTING CONDUIT CROSSING
- EXISTING TELEPHONE PEDESTAL
- EXISTING FIBER OPTIC PEDESTAL
- EXISTING SIREN
- EXISTING UNDERGROUND GAS
- EXISTING GAS VALVE
- EXISTING SEPTIC VENTS
- EXISTING WELL
- EXISTING SIGN
- EXISTING FLAGPOLE
- EXISTING MAIL BOX
- EXISTING SOIL BORING
- EXISTING INFILTRATION TEST PIT
- EXISTING BOARDWALK & DOCKS
- 75' BUILDING SETBACK LINE FROM OHW
- FEMA LINE (ELEV 931)-PER LOMA-27053C0287E (JUNE 7, 2012)
- 929.4' ORDINARY HIGH WATER LINE PER MNDNR
- 931.5' 100 YR. HIGH WATER LEVEL PER CITY OF MINNETRISTA & MCWD
- 35' WETLAND SETBACK LINE
- 37.5' SHORE IMPACT ZONE FROM OHW
- BLUFF LINE
- SHORELAND PROTECTION ZONE
- UNDISTURBED AREA
- PROPOSED CONTOUR
- PROPOSED RETAINING WALL
- PROPOSED BOARDWALK & DOCKS
- PROPOSED CONCRETE CURB & GUTTER
- PROPOSED CONCRETE TIPOUT CURB
- PROPOSED STORM SEWER
- PROPOSED WATERMAIN (8" PVC UNLESS OTHERWISE NOTED)
- PROPOSED SANITARY SEWER (8" PVC)
- PROPOSED IRRIGATION CONDUIT CROSSING (4" PVC SCHEDULE 40)
- PROPOSED CONDUIT CROSSING (4" PVC SCHEDULE 40)
- PROPOSED SANITARY SERVICE (4" PVC SCHEDULE 40)
- PROPOSED WATER SERVICE (1 1/2" TYPE K COPPER)
- PROPOSED DRAINTILE (4" HDPE WITH SOCK)
- PROPOSED SPOT ELEVATION
- PROPOSED GARAGE LOCATION
- PROPOSED WETLAND BUFFER
- PROPOSED SEDIMENTATION BASINS
- PROPOSED 10' POND MAINTENANCE ACCESS
- PROPOSED 5' CONCRETE SIDEWALK
- PROPOSED 8' BITUMINOUS TRAIL/DOCK ACCESS & CART PARKING
- PROPOSED NO PARKING SIGN (NP)
- PROPOSED STOP SIGN (R1-1)/STREET NAME SIGN (SNS)
- PROPOSED WETLAND BUFFER/OPEN SPACE SIGN (SIGN APPROVED BY MCWD(SEE DETAIL SHEET 8.00))
- PROPOSED ROCK CONSTRUCTION ENTRANCE
- PROPOSED SEED & MnDOT CATEGORY 3 EROSION CONTROL BLANKET (NATURAL NETTING)
- PROPOSED SILT FENCE (POST-GRADING CONSTRUCTION)
- PROPOSED HEAVY-DUTY SILT FENCE
- PROPOSED DOUBLE ROW HEAVY-DUTY SILT FENCE (5' MIN. SPACING)
- PROPOSED STREET EXISTING CB PROTECTION-WMCO (PRE-CONSTRUCTION)
- PROPOSED DITCH CHECK (POST-GRADING/UTILITY CONSTRUCTION)
- PROPOSED STREET CB PROTECTION-WMCO (POST-STORM SEWER CONSTRUCTION)
- PROPOSED FES/REAR YARD CB INLET PROTECTION (POST-STORM SEWER CONSTRUCTION)
- PROPOSED CONCRETE WASH AREA



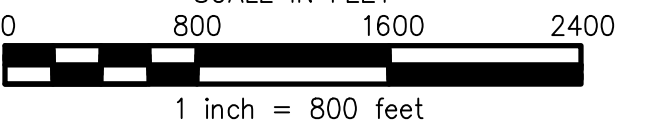
LOCATION MAP
NOT TO SCALE

STRUCTURE NO.	BLD.	INSIDE DIM.	NEENAH CASTING
FES 1			
OUTLET STRUCTURE 2	4.00	48"	SEE DETAIL
FES 3			
STMH 4	17.28	60"	R-1642
CBMH 5	4.00	48"	R-4342
CBMH 6	7.98	48"	R-3067V
CBMH 7	6.00	48"	R-4342
OUTLET STRUCTURE 8	4.00	48"	SEE DETAIL
CBMH 9	4.14	48"	R-3067VB
CB 10	4.00	2X3	R-3067VB
FES 11			
STMH 12	5.37	48"	R-1642
CBMH 13	9.99	48"	R-3067VB
CBMH 14	9.29	48"	R-3067VB
CBMH 15	8.81	48"	R-3067V
CBMH 16	4.12	48"	R-3067V
CBMH 17	4.17	48"	R-3501-TR
CBMH 18	4.13	48"	R-3067V
CB 19	4.00	2X3	R-3067V
STMH 20	4.00	48"	R-1642
CB 21	4.00	2X3	R-3067VB
CB 22	3.00	27"	R-4342
CB 23	4.00	2X3	R-3067V
FES 24			
STMH 25	7.00	48"	R-1642
CBMH 26	4.22	48"	R-3067VB
CBMH 27	4.00	48"	R-3067VB
CBMH 28	4.00	48"	R-3067VB
FES 29			
FES 30			

SITE AREA
35.92 ACRES

SITE LOCATION
LATITUDE N 44° 54' 16"
LONGITUDE W 93° 41' 43"

BENCHMARKS
TOP NUT HYDRANT NORTH SIDE OF BIG WOODS DRIVE ±780' EAST OF INTERSECTION OF BIG WOODS DRIVE AND WOODLAND COVE PARKWAY. ELEVATION = 989.22
TOP NUT HYDRANT NORTH SIDE OF BIG WOODS DRIVE ±420' EAST OF INTERSECTION OF BIG WOODS DRIVE AND WOODLAND COVE PARKWAY. EAST SIDE OF LOT 13, BLOCK 7, WOODLAND COVE. ELEVATION = 991.99



PROJECT CONTACTS

PROJECT ENGINEER: KURT D. QUAINANCE, P.E. - JAMES R. HILL, INC. (952)-890-6044 (O) (612)-508-8890 (M) (763)-432-4500 (O)

OWNER REPRESENTATIVE: RICK PACKER - GONYEA HOMES, INC. (763)-432-4500 (O)

CITY ENGINEER (CONSULTANT): PAUL HORNBY, P.E. - CITY OF MINNETRISTA/WSB & ASSOCIATES, INC. (952)-241-2535 (O) (651)-325-6849 (M) (651)-325-6849 (M)

NPDES OFFICER: NICK NISTLER - MPCA (651)-757-2564 (O)

James R. Hill, Inc.
PLANNERS / ENGINEERS / SURVEYORS
2500 W. Ctr. Rd. 42, Suite 120, Burnsville, MN 55337
PHONE: (952)890-6044 FAX: (952)890-6244

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota. P.E. KURT D. QUAINANCE
Date: 3/1/19 Reg. No. 24876

WOODLAND COVE LAKE THIRD ADDITION
MINNETRISTA, MINNESOTA
TITLE SHEET
FOR
GONYEA HOMES, INC.
1000 BOONE AVENUE NORTH, GOLDEN VALLEY, MN 55427

DRAWN BY
CJK

DATE
3/1/19

REVISIONS

CAD FILE
22429-50TS

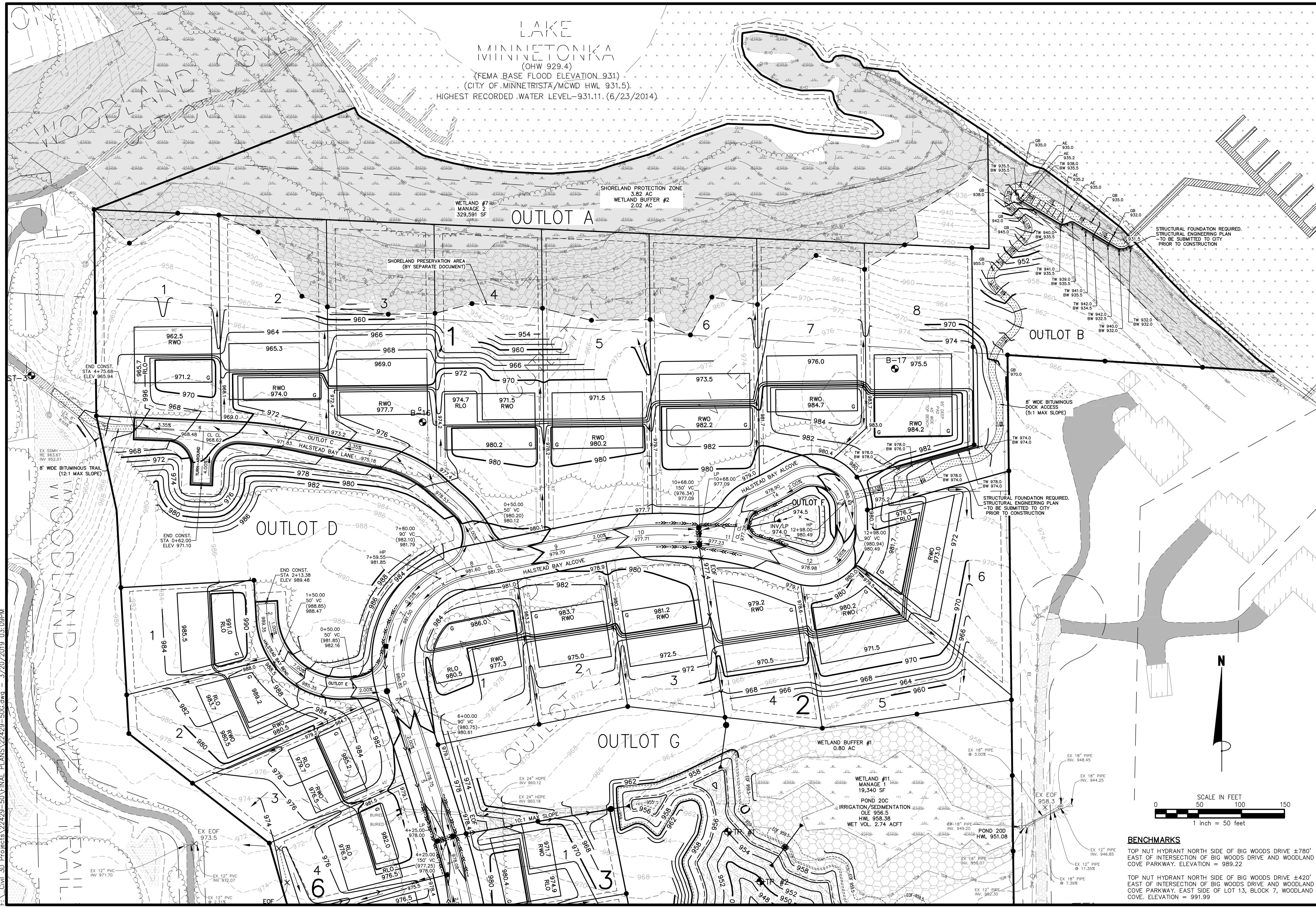
PROJECT NO.
22429-50

1.00

GOPHER STATE ONE CALL
CALL 48 HOURS BEFORE YOU DIG!
TWIN CITY AREA 651-454-0002
MN. TOLL FREE 1-800-252-1166

DEVELOPMENT MINIMUM SETBACKS	FEET
SINGLE-FAMILY LAKESHORE LOTS (BLOCK 1)	
FRONT(RIGHT OF WAY/BACK OF CURB-PRIVATE)	25
REAR	35
SIDE YARD HOUSE/GARAGE	10
SIDE YARD STREET(RIGHT OF WAY)	20
ORDINARY HIGH WATER	75
BLUFF LINE	10
WETLAND	35
SINGLE-FAMILY LOTS (BLOCKS 2-6)	
FRONT(RIGHT OF WAY/BACK OF CURB-PRIVATE)	25
REAR	25
SIDE YARD HOUSE/GARAGE	10
SIDE YARD STREET(RIGHT OF WAY)	20
WETLAND	35

LAKE
MINNETONKA
(OHW 929.4)
(FEMA BASE FLOOD ELEVATION 931)
(CITY OF MINNETRISTA/MCWD HWL 931.5)
HIGHEST RECORDED WATER LEVEL-931.11. (6/23/2014)

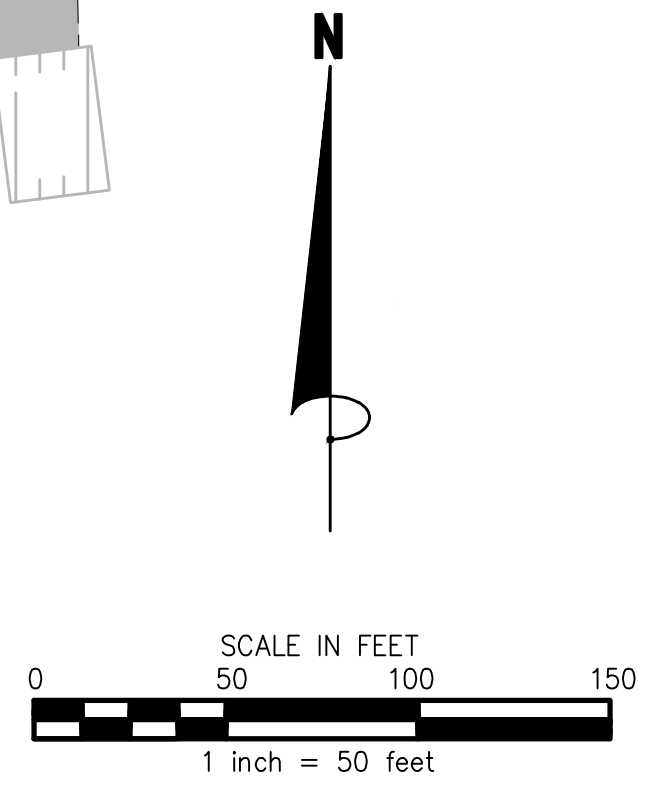


James R. Hill, Inc.
PLANNERS / ENGINEERS / SURVEYORS
2500 W. Ctr. Rd. 42, Suite 120, Burnsville, MN 55337
PHONE: (952)890-6044 FAX: (952)890-6244

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota. DATE: 3/1/19 REG. NO. 24876

WOODLAND COVE LAKE THIRD ADDITION
MINNETRISTA, MINNESOTA
FINAL GRADING & DRAINAGE PLAN
FOR
GONYEA HOMES, INC.
1000 BOONE AVENUE NORTH, GOLDEN VALLEY, MN 55427

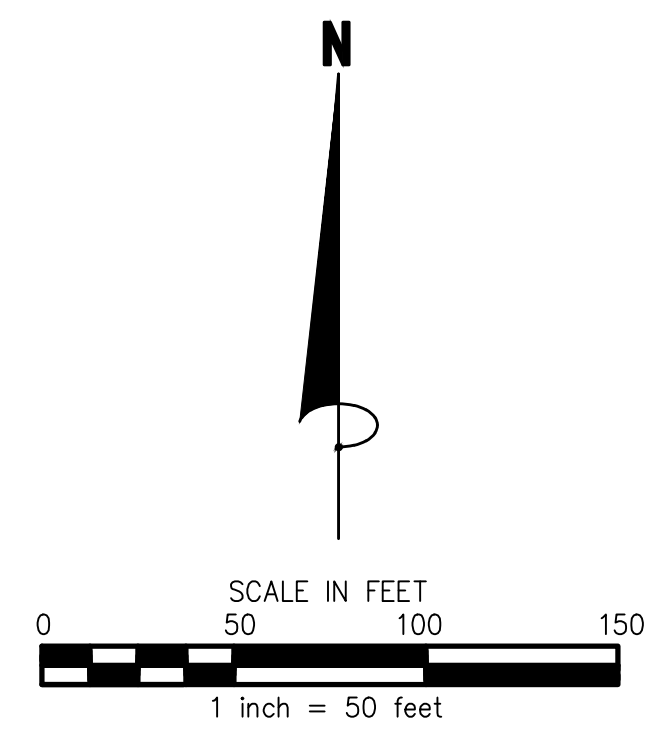
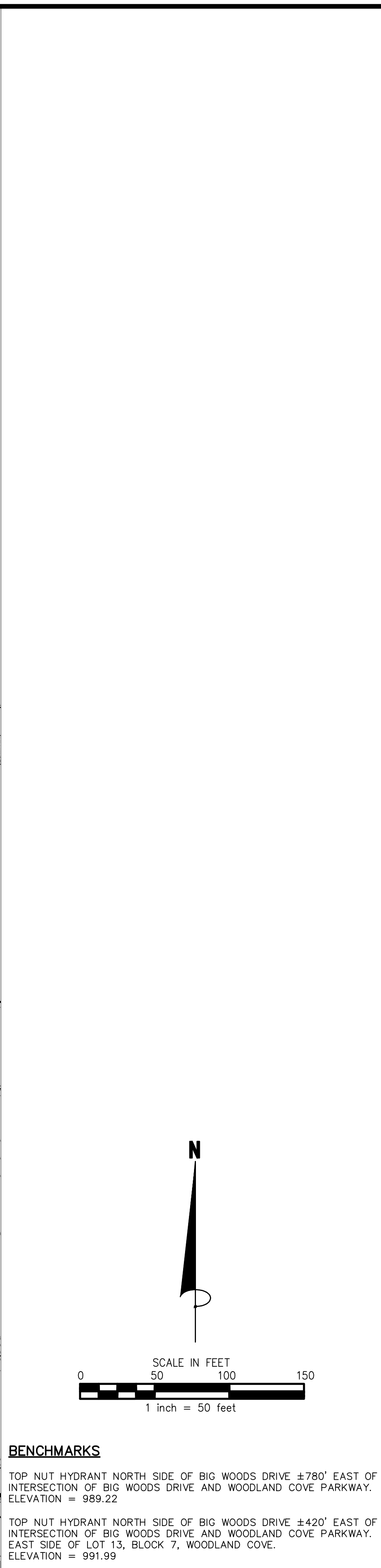
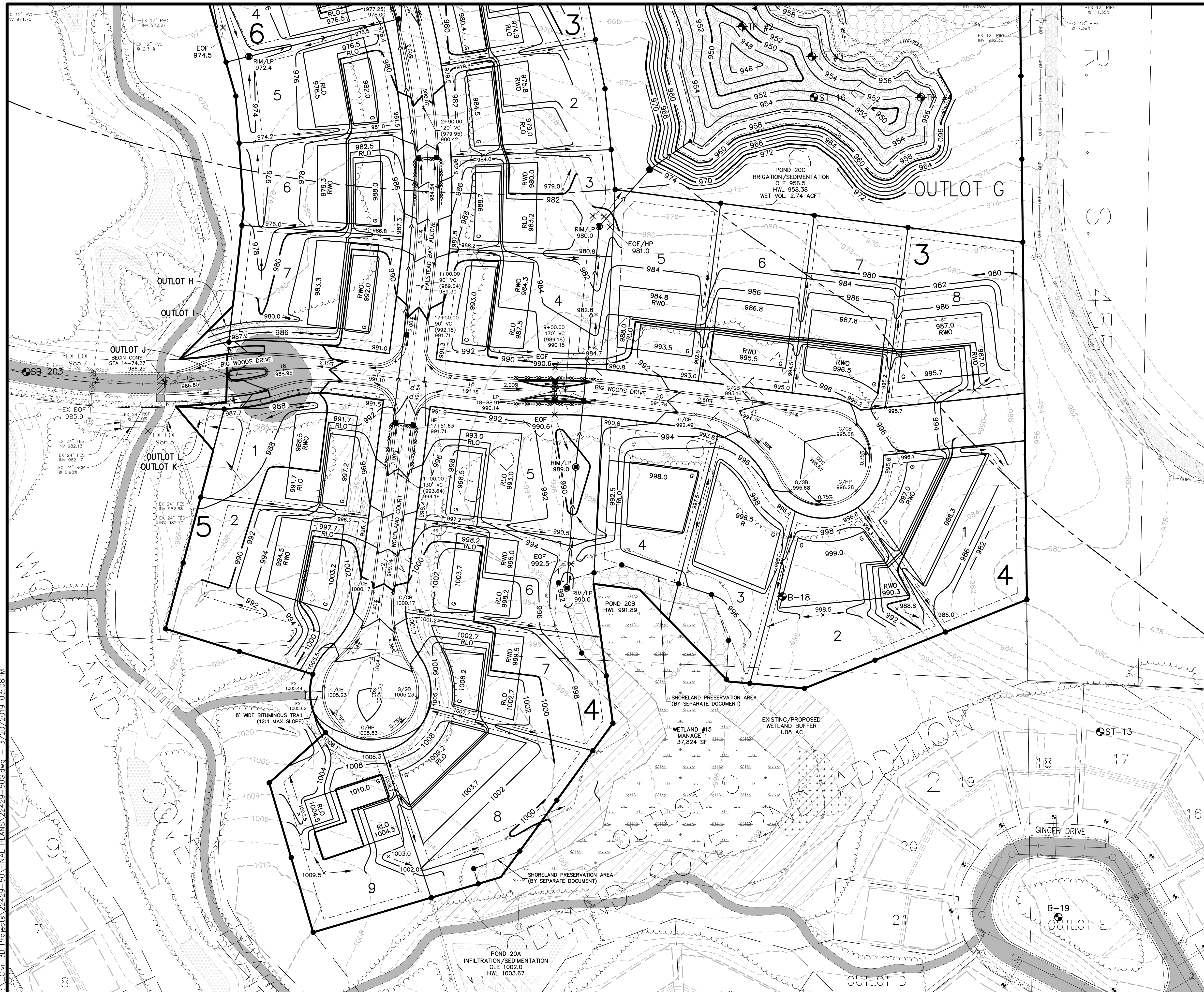
DRAWN BY	CJK
DATE	3/1/19
REVISIONS	
CAD FILE	22429-50G
PROJECT NO.	22429-50
	3.00



BENCHMARKS
TOP NUT HYDRANT NORTH SIDE OF BIG WOODS DRIVE ±780'
EAST OF INTERSECTION OF BIG WOODS DRIVE AND WOODLAND COVE PARKWAY. ELEVATION = 989.22
TOP NUT HYDRANT NORTH SIDE OF BIG WOODS DRIVE ±420'
EAST OF INTERSECTION OF BIG WOODS DRIVE AND WOODLAND COVE PARKWAY, EAST SIDE OF LOT 13, BLOCK 7, WOODLAND COVE. ELEVATION = 991.99

F:\Civil 3D Projects\22429-50\FINAL PLANS\22429-50G.dwg 3/20/2019 03:09PM

F:\Civil 3D Projects\22429-50\FINAL PLANS\22429-50G.dwg 3/20/2019 03:08PM



BENCHMARKS

TOP NUT HYDRANT NORTH SIDE OF BIG WOODS DRIVE ±780' EAST OF INTERSECTION OF BIG WOODS DRIVE AND WOODLAND COVE PARKWAY. ELEVATION = 989.22

TOP NUT HYDRANT NORTH SIDE OF BIG WOODS DRIVE ±420' EAST OF INTERSECTION OF BIG WOODS DRIVE AND WOODLAND COVE PARKWAY. EAST SIDE OF LOT 13, BLOCK 7, WOODLAND COVE. ELEVATION = 991.99

James R. Hill, Inc.
 PLANNERS / ENGINEERS / SURVEYORS
 2500 W. Ctr. Rd. 42, Suite 120, Burnsville, MN 55337
 PHONE: (952)890-6044 FAX: (952)890-6244

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
KURT JOHNSON, P.E.
 Date: 3/1/19 Reg. No. 24876

WOODLAND COVE LAKE THIRD ADDITION
 MINNETRISTA, MINNESOTA
FINAL GRADING & DRAINAGE PLAN
 FOR
GONYEA HOMES, INC.
 1000 BOONE AVENUE NORTH, GOLDEN VALLEY, MN 55427

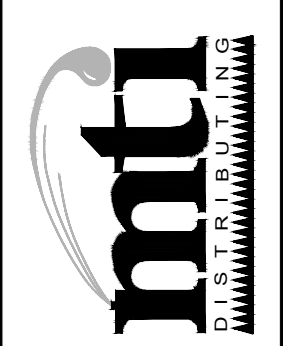
DRAWN BY	CJK
DATE	3/1/19
REVISIONS	
CAD FILE	22429-50G
PROJECT NO.	22429-50
	3.01

NON-POTABLE IRRIGATION PRACTICES

- 1 ALL IRRIGATION WILL TAKE PLACE DURING NIGHT TIME HOURS.
- 2 SIGNAGE WILL BE PLACED IN A VISIBLE LOCATION STATING "NON-POTABLE WATER USED FOR IRRIGATION - DO NOT DRINK THIS WATER"

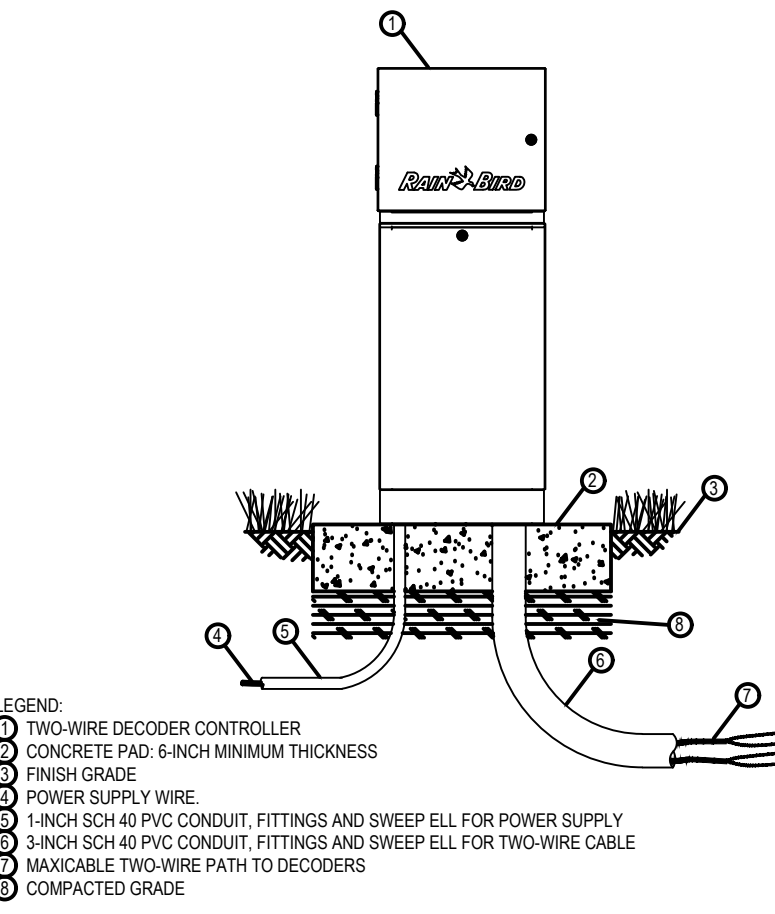
IRRIGATION SCHEDULE

SYMBOL	MANUFACTURER/MODEL/DESCRIPTION	QTY
●	Rain Bird 1804 Series MPR Turf Spray 4.0" Pop-Up Sprinkler with Co-Molded Wiper Seal. 1/2" NPT Female Threaded Inlet.	69
● 08E-WN ● 12E-WN ● 10E-WN ● 15E-WN	Rain Bird 1804 ADJ Turf Spray 4.0" Pop-Up Sprinkler with Co-Molded Wiper Seal. 1/2" NPT Female Threaded Inlet.	27
●	Rain Bird 5004-PC, FC Turf Rotor, 4.0" Pop-Up, Plastic Riser, Adjustable and Full Circle. Standard Angle Nozzle.	41
■	Rain Bird XCZ-100-PRB-LC Wide Flow Drip Control Kit, for Light Commercial Uses. 1" FEEB Valve, with 1" Pressure Regulating 40psi Basket Filter. 0.3gpm to 20gpm.	2
▨	Area to Receive Dripline Rain Bird XFD-06-12 XFD On-Surface Pressure Compensating Landscape Dripline. 0.6 GPH emitters at 12" O.C. Dripline laterals spaced at 12" apart, with emitters offset for triangular pattern. UV Resistant. Specify XF insert fittings.	880.4 Lf.
⊗	Rain Bird PGA (Pond Fill) 2" Electric Remote Control Valve, Globe.	1
⊗	Rain Bird PGA-PRS-D- Globe 1", 1-1/2", 2" Electric Remote Control Valve, Globe. With Pressure Regulator Module.	51
■	Rain Bird 44-LRC 1" Brass Quick-Coupling Valve, with Corrosion-Resistant Stainless Steel Spring, Locking Thermoplastic Rubber Cover, and 2-Piece Body.	10
⊗	1" Blow-Out Point	40
⊗	Nibco T-113 Class 125 bronze gate shut off valve with wheel handle, same size as mainline pipe diameter at valve location. Size Range - 1/4" - 3"	5
⊗	PVC 1" Threaded Ball Valve	40
⊗	Rain Bird PGA Globe 2" Electric Master Valve, Globe.	5
⊗	Fabco 825Y 2" Reduced Pressure Backflow Preventer	1
⊗	Rain Bird ESP-LXD-LXMPED Flow sensing Two-Wire Deceler Commercial Controller. 50 Stations, UV-Resistant, Outdoor-Rated, Powder-Coated Metal Pedestal Case. Available in the US market, International, European, or Australian Markets.	1
⊗	Rain Bird FD-101TURF Field Decoder for Two-Wire system. Install in valve box for valve. Operates one valve/solenoid. Use line surge protection as per manufacturer's directions.	13
⊗	Rain Bird LSP-1TURF Line surge protection decoder directly to the ground rod or ground plate	10
⊗	Rain Bird WR2-RFC Wireless Rain and Freeze Sensor Combo, includes 1 receiver and 1 rain/freeze sensor transmitter.	1
⊗	Non-Potable Signage Place sign in visible area stating "Non-Potable water used for irrigation - DO NOT DRINK THIS WATER"	1
⊗	Water Meter 1-1/2" City Water backup (pond fill)	1
⊗	Pump Station Watertronics Black Max Submersible Pump Station	1
—	Irrigation Lateral Line: 100# Polyethylene Pipe 1-1/4" and smaller shall be Poly Pipe	3,036 Lf.
—	Irrigation Lateral Line: PVC Class 200 SDR 21 1-1/2" and larger shall be PVC	335.4 Lf.
—	Irrigation Mainline: Main PVC Class 200 SDR 21	5,128 Lf.
—	Irrigation Mainline: PVC Class 200 SDR 21	5,218 Lf.
—	Irrigation Mainline: PVC Class 200 SDR 21 2" Pond Fill	346.2 Lf.
—	Pipe Sleeve: PVC Schedule 40 Sleeves shall be 2 pipe sizes larger than the pipe carried within.	129.9 Lf.





RAIN BIRD CORPORATION
6991 EAST SOUTHPOINT RD
TUCSON, AZ 85706
TOLL FREE: 1-800-724-6247
PHONE: (520) 471-6100
FAX: (520) 471-6522
www.rainbird.com



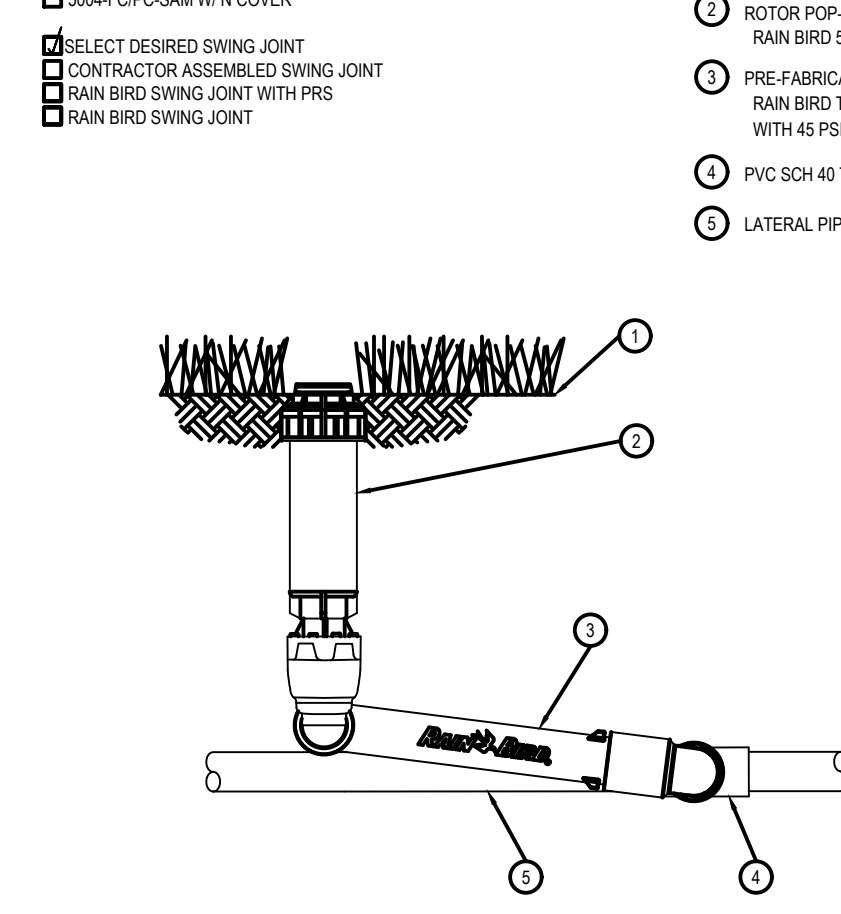
- LEGEND:
 ○ TWO-WIRE DECODER CONTROLLER
 ○ CONCRETE PAD 6-INCH MINIMUM THICKNESS
 ○ FINISH GRADE
 ○ POWER SUPPLY WIRE
 ○ 1/2-INCH SCH 40 PVC CONDUIT, FITTINGS AND SHEEP ELL FOR POWER SUPPLY
 ○ 1/2-INCH SCH 40 PVC CONDUIT, FITTINGS AND SHEEP ELL FOR TWO-WIRE CABLE
 ○ MANHOLE TO TWO-WIRE PATH TO DECODERS
 ○ COMPACTED GRADE

NOTES:
 1. INSTALLATION TO BE COMPLETED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.
 2. ALL DIMENSIONS ARE CONSIDERED TRUE AND EXCEPT MANUFACTURER'S SPECIFICATIONS.
 3. CONTRACTOR'S NOTE: FOR PRODUCT AND COMPANY INFORMATION VISIT www.CADetails.com/info REFERENCE NUMBER 045-513.

CONTROLLERS - CONTROLLERS & TIMERS
 ESP500L - ESP500L/D DECODER CONTROLLER WITH METAL ENCLOSURE & PREDESTAL



RAIN BIRD CORPORATION
6991 EAST SOUTHPOINT RD
TUCSON, AZ 85706
TOLL FREE: 1-800-724-6247
PHONE: (520) 471-6100
FAX: (520) 471-6522
www.rainbird.com



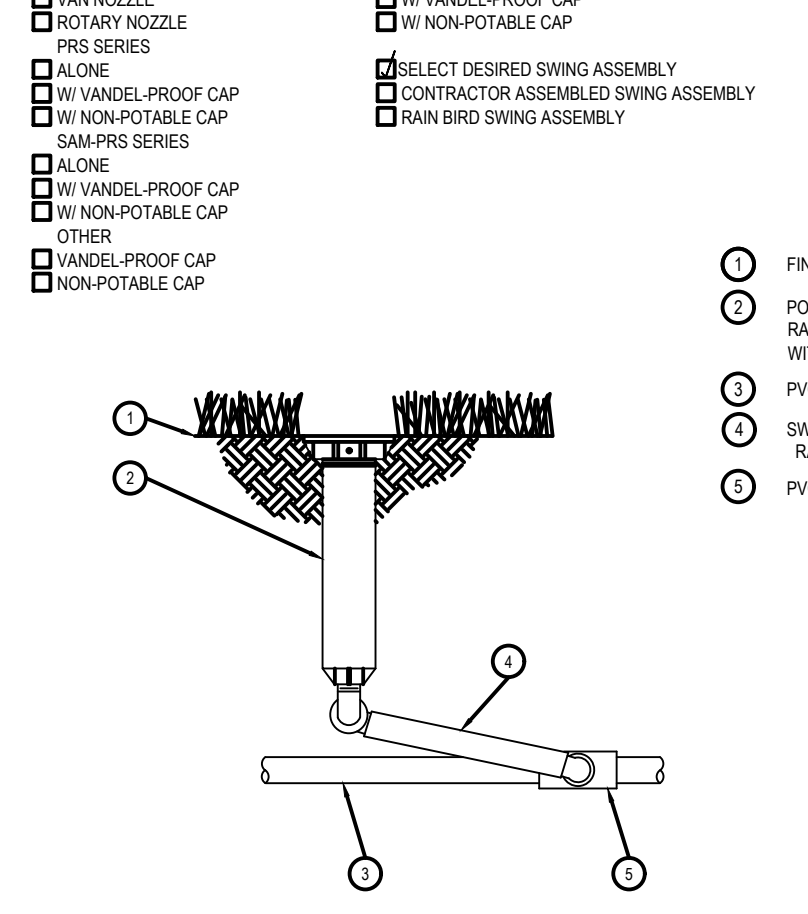
- LEGEND:
 ○ FINISH GRADE
 ○ ROTOR POP-UP SPRINKLER
 ○ PRE-FABRICATED SWING JOINT
 ○ RAIN BIRD 184-075-PRS WITH 45 PSI PRESSURE REGULATOR
 ○ PVC SCH 40 TEE OR ELL
 ○ LATERAL PIPE

NOTES:
 1. INSTALLATION TO BE COMPLETED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.
 2. DO NOT SCALE DRAWINGS.
 3. CONTRACTOR'S NOTE: FOR PRODUCT AND COMPANY INFORMATION VISIT www.CADetails.com/info REFERENCE NUMBER 045-121.

5004 SERIES INTERNAL DRIVE ROTOR



RAIN BIRD CORPORATION
6991 EAST SOUTHPOINT RD
TUCSON, AZ 85706
TOLL FREE: 1-800-724-6247
PHONE: (520) 471-6100
FAX: (520) 471-6522
www.rainbird.com



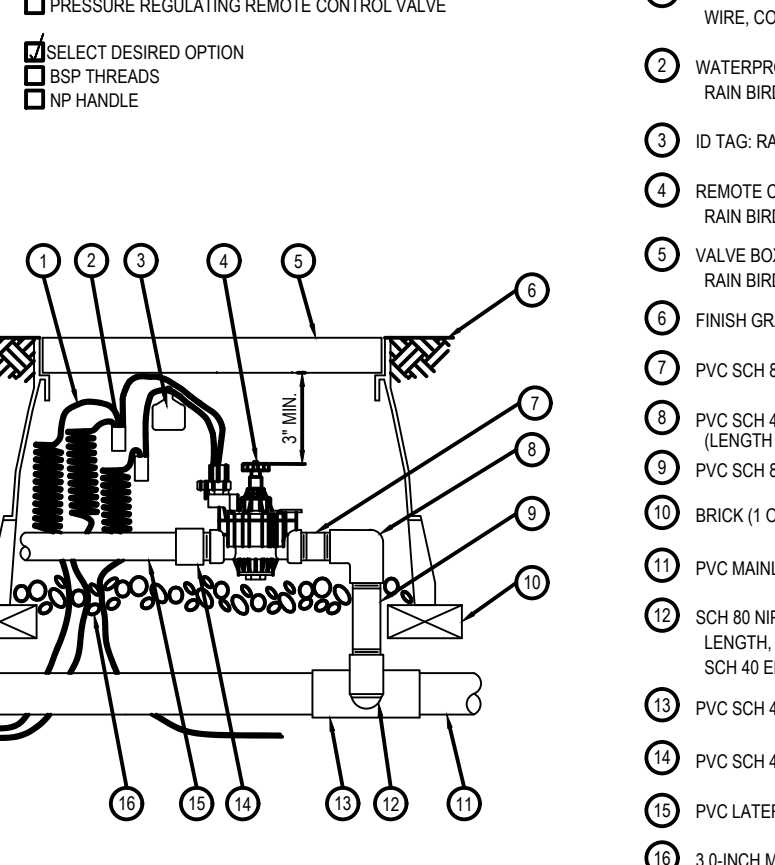
- LEGEND:
 ○ SELECT DESIRED NOZZLE
 ○ PLASTIC SPRAY NOZZLE
 ○ 1804 NOZZLE
 ○ ROTARY NOZZLE
 ○ PRS SERIES
 ○ W/ VANDER PROOF CAP
 ○ W/ NON-POTABLE CAP
 ○ 1804-PRG SERIES
 ○ W/ VANDER PROOF CAP
 ○ W/ NON-POTABLE CAP
 ○ OTHER
 ○ VANDER PROOF CAP
 ○ NON-POTABLE CAP

NOTES:
 1. INSTALLATION TO BE COMPLETED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.
 2. DO NOT SCALE DRAWINGS.
 3. CONTRACTOR'S NOTE: FOR PRODUCT AND COMPANY INFORMATION VISIT www.CADetails.com/info REFERENCE NUMBER 045-084.

1804 WITH SWING PIPE



RAIN BIRD CORPORATION
6991 EAST SOUTHPOINT RD
TUCSON, AZ 85706
TOLL FREE: 1-800-724-6247
PHONE: (520) 471-6100
FAX: (520) 471-6522
www.rainbird.com



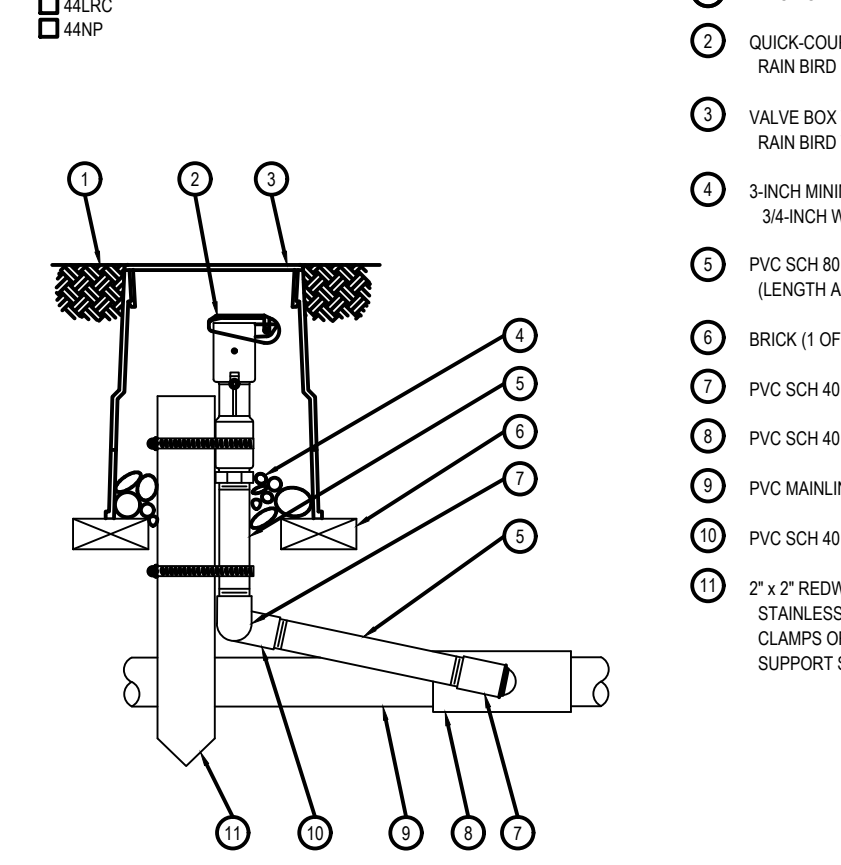
- LEGEND:
 ○ SELECT DESIRED VALVE
 ○ REMOTE CONTROL VALVE
 ○ PRESSURE REGULATING REMOTE CONTROL VALVE
 ○ SELECT DESIRED OPTION
 ○ 1/2" THREADED
 ○ RP HANDLE

NOTES:
 1. INSTALLATION TO BE COMPLETED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.
 2. DO NOT SCALE DRAWINGS.
 3. CONTRACTOR'S NOTE: FOR PRODUCT AND COMPANY INFORMATION VISIT www.CADetails.com/info REFERENCE NUMBER 045-069.

PGA SERIES



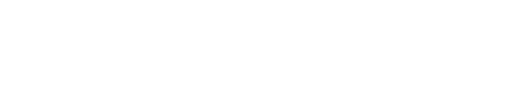
RAIN BIRD CORPORATION
6991 EAST SOUTHPOINT RD
TUCSON, AZ 85706
TOLL FREE: 1-800-724-6247
PHONE: (520) 471-6100
FAX: (520) 471-6522
www.rainbird.com



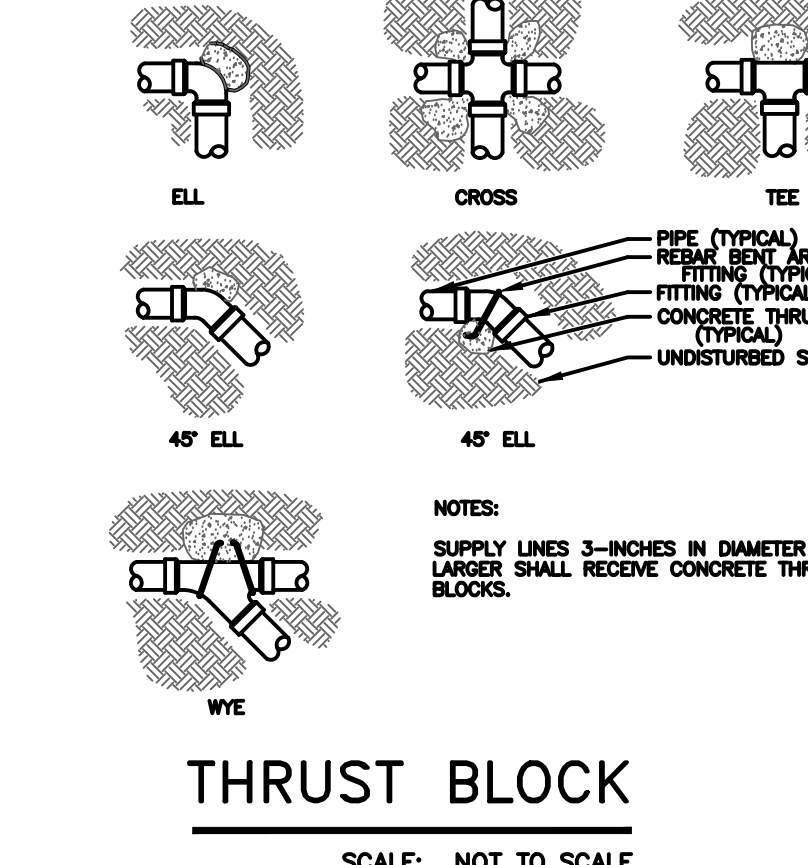
- LEGEND:
 ○ SELECT DESIRED VALVE
 ○ 44RC
 ○ 44RC
 ○ 44RC

NOTES:
 1. INSTALLATION TO BE COMPLETED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.
 2. DO NOT SCALE DRAWINGS.
 3. FURNISH FITTINGS AND PIPING NOMINALLY SIZED IDENTICAL TO NOMINAL QUICK COUPLING VALVE INLET SIZE.
 4. CONTRACTOR'S NOTE: FOR PRODUCT AND COMPANY INFORMATION VISIT www.CADetails.com/info REFERENCE NUMBER 045-127.

44RC SERIES QUICK-COUPLING VALVE



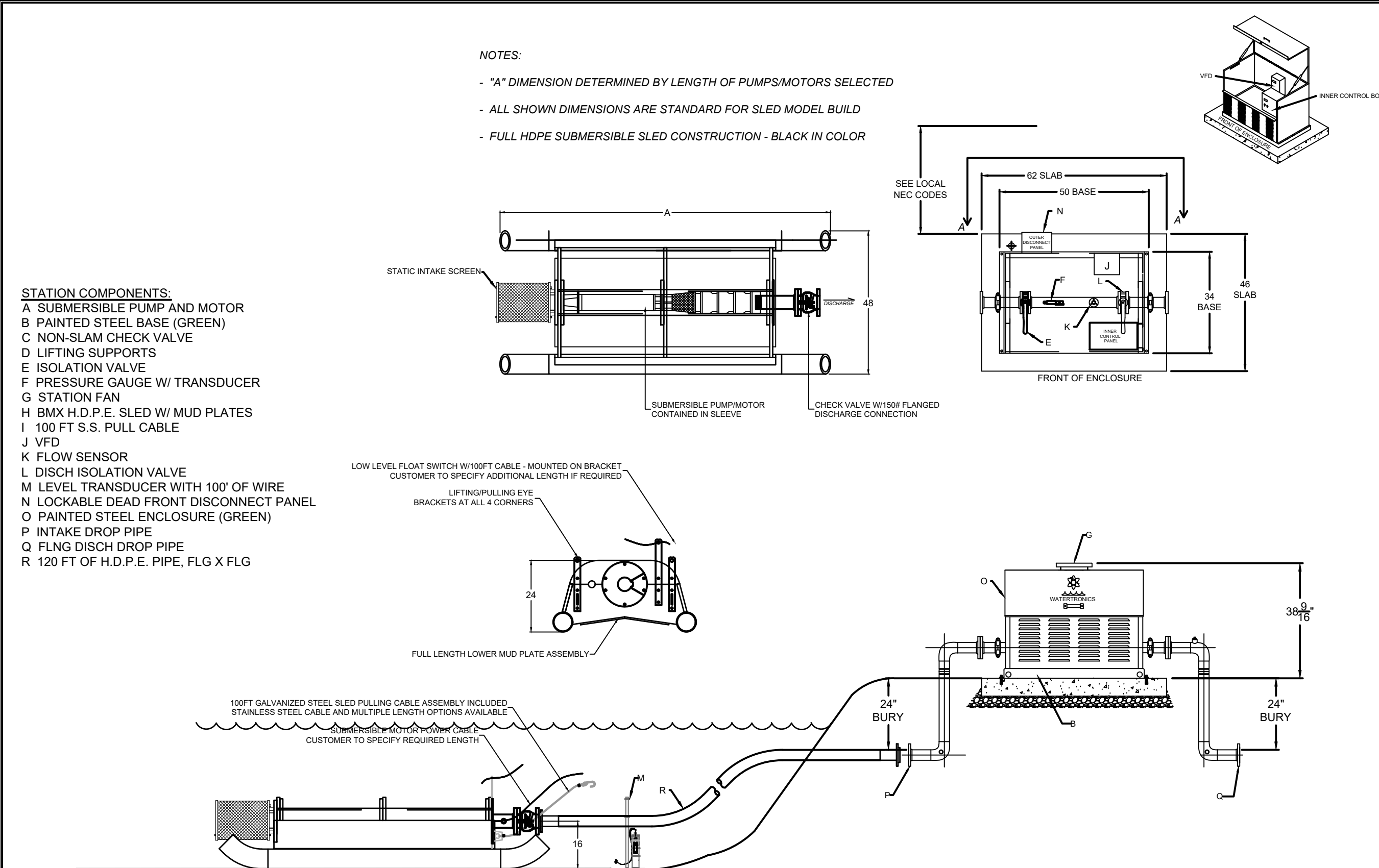
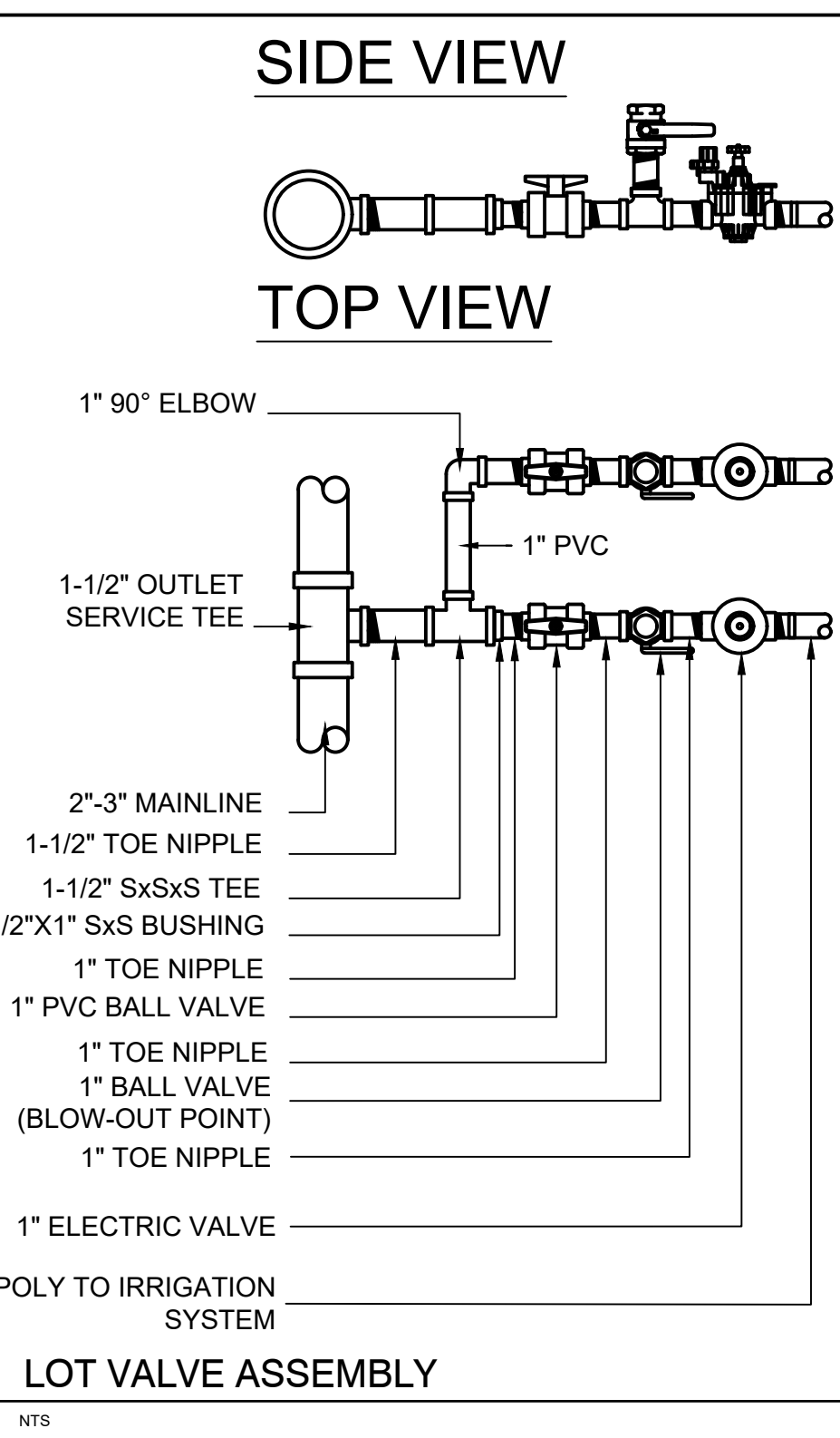
RAIN BIRD CORPORATION
6991 EAST SOUTHPOINT RD
TUCSON, AZ 85706
TOLL FREE: 1-800-724-6247
PHONE: (520) 471-6100
FAX: (520) 471-6522
www.rainbird.com



- LEGEND:
 ○ FINISH GRADE/TOP OF MULCH
 ○ QUICK COUPLING VALVE
 ○ RAIN BIRD MODEL 44RC
 ○ VALVE BOX WITH COVER
 ○ RAIN BIRD VS-8PRD
 ○ 3/4-INCH MINIMUM DEPTH OF 3/4-INCH WASHED GRAVEL
 ○ PVC SCH 40 NIPPLE (LENGTH AS REQUIRED)
 ○ BRICK (1 OF 4)
 ○ PVC SCH 40 STREET ELL
 ○ PVC SCH 40 TEE OR ELL
 ○ PVC MAINLINE PIPE
 ○ PVC SCH 40 ELL
 ○ 2" x 2" REDWOOD STAKE WITH STAINLESS STEEL GEAR CLAMPS OR EQUIVALENT SUPPORT SYSTEM

NOTES:
 1. SUPPLY LINES 3-INCHES IN DIAMETER AND LARGER SHALL RECEIVE CONCRETE THRUST BLOCKS.

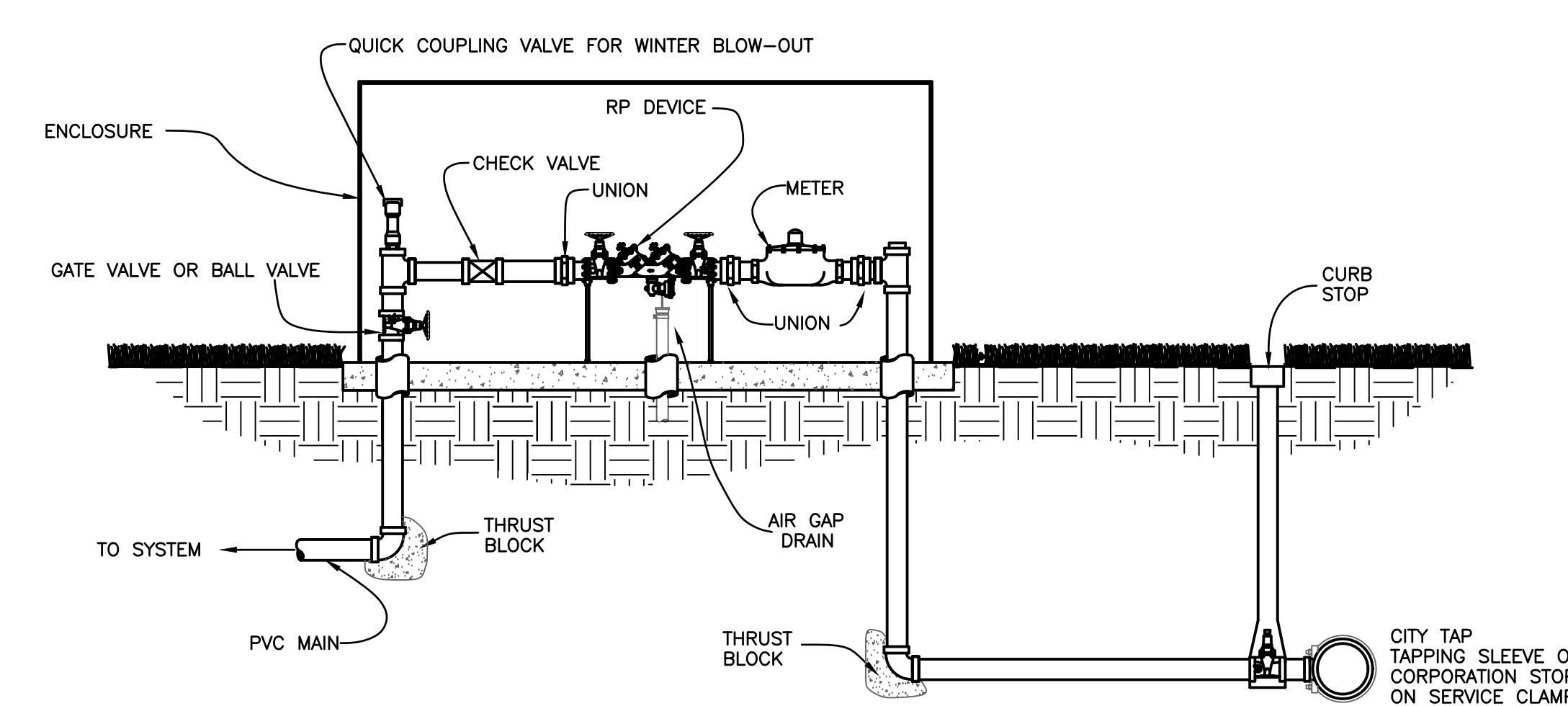
THRUST BLOCK
 SCALE: NOT TO SCALE



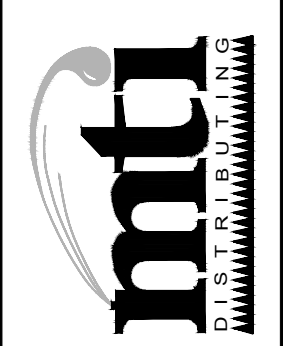
CUSTOMER APPROVAL SIGNATURE	7	SCALE: NONE	DRWN BY:	TITLE:
	6		THIS DRAWING AND DESIGN, IS THE PROPERTY OF WATERTRONICS AND IS NOT TO BE REPRODUCED IN WHOLE OR PART, NOR EMPLOYED FOR ANY PURPOSE OTHER THAN SPECIFICALLY PERMITTED IN WRITING BY WATERTRONICS. THIS DRAWING LOANED AND SUBJECT TO RETURN ON DEMAND	TYPICAL BLACKMAX IRRIGATION PUMP SYSTEM
<input type="checkbox"/> APPROVED AS SUBMITTED	5			WATERTRONICS ELECTRONICALLY CONTROLLED PUMPING SYSTEMS HARTLAND, WISCONSIN
<input type="checkbox"/> MAKE INDICATED CHANGES AND RESUBMIT	4			DATE: SHEET 1 OF 1 SHEETS
	3			
	2			
	1			

VALVE SCHEDULE (Outlot Areas)

NUMBER	MODEL	SIZE	TYPE	GPM
1	Rain Bird PGA-PRS-D- Globe	1"	Turf Rotor	9.26
2	Rain Bird PGA-PRS-D- Globe	1"	Turf Spray	7.85
3	Rain Bird PGA-PRS-D- Globe	1"	Turf Spray	13.18
4	Rain Bird XCZ-100-PRB-LC	1"	Area for Dripline	2.72
5	Rain Bird XCZ-100-PRB-LC	1"	Area for Dripline	6.09
6	Rain Bird PGA-PRS-D- Globe	1"	Turf Spray	21.28
7	Rain Bird PGA-PRS-D- Globe	1-1/2"	Turf Spray	37.85
8	Rain Bird PGA-PRS-D- Globe	1-1/2"	Turf Rotor	30.89
9	Rain Bird PGA-PRS-D- Globe	1"	Turf Rotor	26.26
10	Rain Bird PGA-PRS-D- Globe	1"	Turf Rotor	27.81
11	Rain Bird PGA-PRS-D- Globe	1"	Turf Spray	6.99
12	Rain Bird PGA-PRS-D- Globe	1"	Turf Rotor	26.26
13	Rain Bird PGA-PRS-D- Globe	1"	Turf Spray	18.54



TYPICAL CITY WATER CONNECTION
 SCALE: NOT TO SCALE



March 1, 2019

Project B1901739

Mr. Rick Packer
Gonyea Homes
1000 Boone Avenue North, Suite 400
Golden Valley, MN 55427

Re: Results of Double-Ring Infiltrometer Testing
Woodland Cove Pond Investigation
Big Woods Drive
Minnetrista, Minnesota

Dear Mr. Packer:

We are pleased to present the results of the requested double-ring infiltrometer (DRI) testing completed at the above referenced site in Minnetrista, Minnesota. We completed four tests in general accordance with ASTM International (ASTM) D 3385; *Standard Test Method for Infiltration Rate of Soils in Field Using a Double-Ring Infiltrometer*. The DRI testing was performed in the field by Braun Intertec personnel on February 22, 2019 at the approximate locations identified on the attached sketch. Excavations to reach test elevations were performed by an excavating subcontractor. The excavations were loosely backfilled with excavated spoils on February 25, 2019. Tests were performed to determine the relative infiltration rate of the in-situ soils.

The results of the DRI testing performed, including graphical representation, are attached to this report letter. Perched groundwater was observed seeping through the sidewalls of the excavation during the testing of DRI-3 and DRI-4. By the end of the test, ponding water was observed around the double-ring equipment. Due to the standing water observed during the first two tests, we decided to run the tests for DRI-1 and DRI-2 closer to the pond invert elevation with hopes that the water seeping through the sidewalls would be less. Initially there was no water seeping through the sidewalls but water did eventually start seeping through the sidewalls and these tests were also surrounded by standing water at the end of the test. Typically, this is the time of year when groundwater levels are the lowest due to frozen surface conditions. Based on the water flow observed and the recorded moisture contents (above probable optimum moisture content) it appears this is a wet area resulting in slow infiltration as shown by our infiltration test results.

Please note, soil infiltration rates will vary with soil moisture content, the introduction of fine-grained soils, topsoil, filter media, seasonal changes, compaction of the subgrade, or with changes in localized groundwater levels. This test does not constitute a review of the potential impacts, if any, from infiltration of large amounts of stormwater. We also note that topsoil, organics, filter media or compaction of the subgrade can limit the effectiveness of soil infiltration capability.

Soil samples were collected from the sidewalls of the excavations, near the bottom of the excavations. These samples were collected for laboratory testing including mechanical analyses, through a #200 sieve only, (ASTM C117) and moisture content tests (ASTM D2216).

In performing its services, Braun Intertec used that degree of care and skill ordinarily exercised under similar circumstances by reputable members of its profession currently practicing in the same locality. No warranty, express or implied, is made.

We appreciate the opportunity to provide this testing service. If you have any questions or we can be of further assistance, please feel free to contact Erik Johnson at 952.995.2426 (ejohnson@braunintertec.com) at your convenience.

Sincerely,

BRAUN INTERTEC CORPORATION



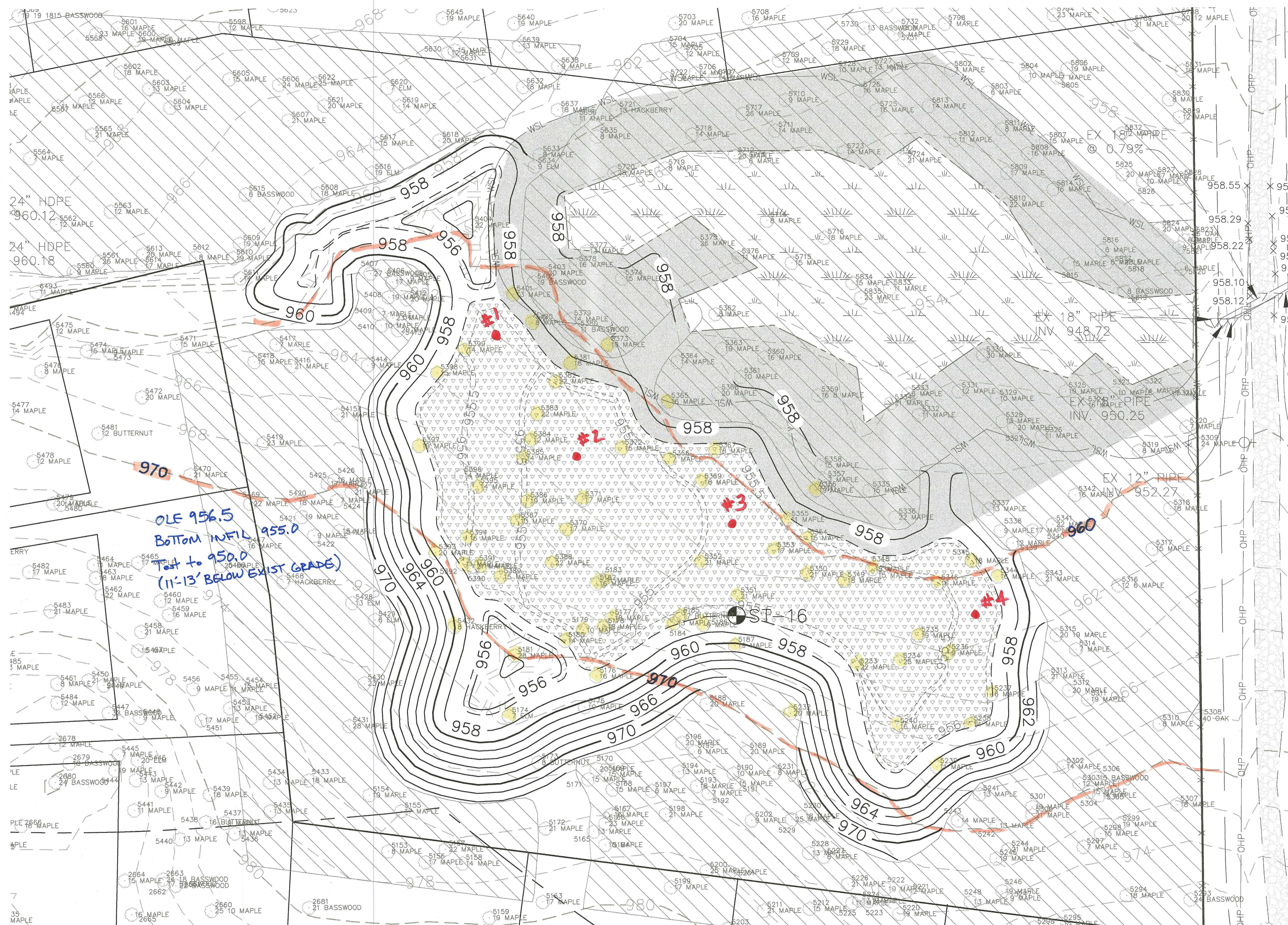
Erik C. Johnson, PE
Associate Principal – Senior Engineer



Bradley J. McCarter, PE
Principal – Senior Engineer

Attachments:

DRI Test Location Sketch
DRI Test Results (4 pages)



EX 18" PIPE
INV. 948.27

EX 18" PIPE
INV. 944.08

EX 18" PIPE
INV. 948.72

EX 12" PIPE
INV. 950.25

EX 12" PIPE
INV. 952.27

EX 12" PIPE
@ 11.60%

EX 18" PIPE
@ 9.64%

DRI Test Location Sketch

B1901739

Minnetrista, MN

February 22, 2019

Results of Double Ring Infiltrometer Testing (ASTM D 3385)- Mariotte Tube Method



Test Number:	DRI-1
Project Description:	Woodland Cove Pond
Project Number:	B1901739
Date:	February 22, 2019
Liquid used:	Potable water
Inner Ring Area:	113 square inches
Outer Ring Area:	452 square inches
Water depth Inner Ring (cm):	12.5
Water depth annular Ring (cm):	12.5
Weather:	Partly Sunny/23

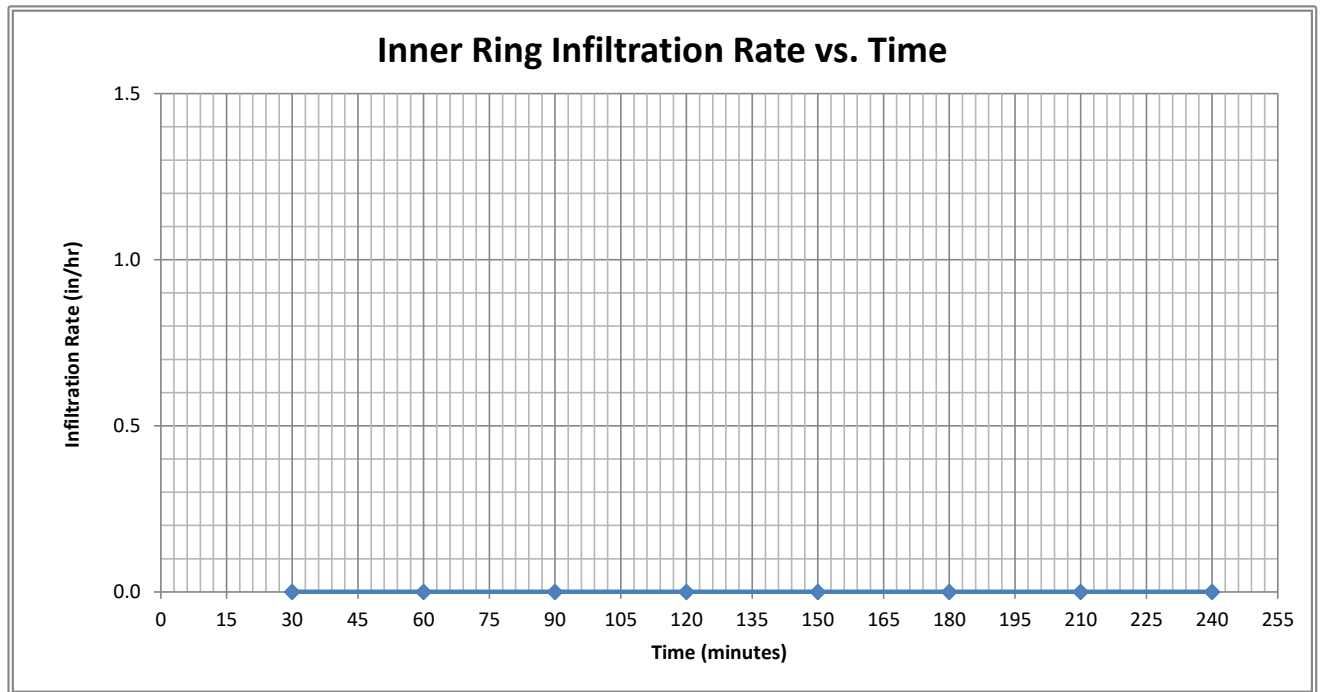
Test Location:	At stake
Test Elevation:	955
Ground Temperature °F:	44
Water Temperature °F:	34
Test performed by:	Matt Kluthe
Moisture Content of soil at test depth before test:	26%
Percent Fines passing a 200 sieve on soil at test depth:	59%

Time	Infiltration Rate (in/hr)
30	0.0
60	0.0
90	0.0
120	0.0
150	0.0
180	0.0
210	0.0
240	0.0

Depth below bottom of test	Soil Profile
0 to 3 feet	Sandy Lean Clay (CL), light brown to brown, moist to wet.
Groundwater depth	Seeping in through the excavation sidewalls during the test and ponding water was noted by the end of the test

Average Infiltration Rate of Inner Ring Over Entire Test (in/hr)	0.0
---	------------

Steady State Infiltration Rate of Inner Ring Over Last 4 intervals (in/hr)	0.0
---	------------



Test performed by Braun Intertec personnel in general accordance with test method ASTM D 3385.

Results of Double Ring Infiltrometer Testing (ASTM D 3385)- Mariotte Tube Method



Test Number:	DRI-2
Project Description:	Woodland Cove Pond
Project Number:	B1901739
Date:	February 22, 2019
Liquid used:	Potable water
Inner Ring Area:	113 square inches
Outer Ring Area:	452 square inches
Water depth Inner Ring (cm):	12.5
Water depth annular Ring (cm):	12.5
Weather:	Partly Sunny/23

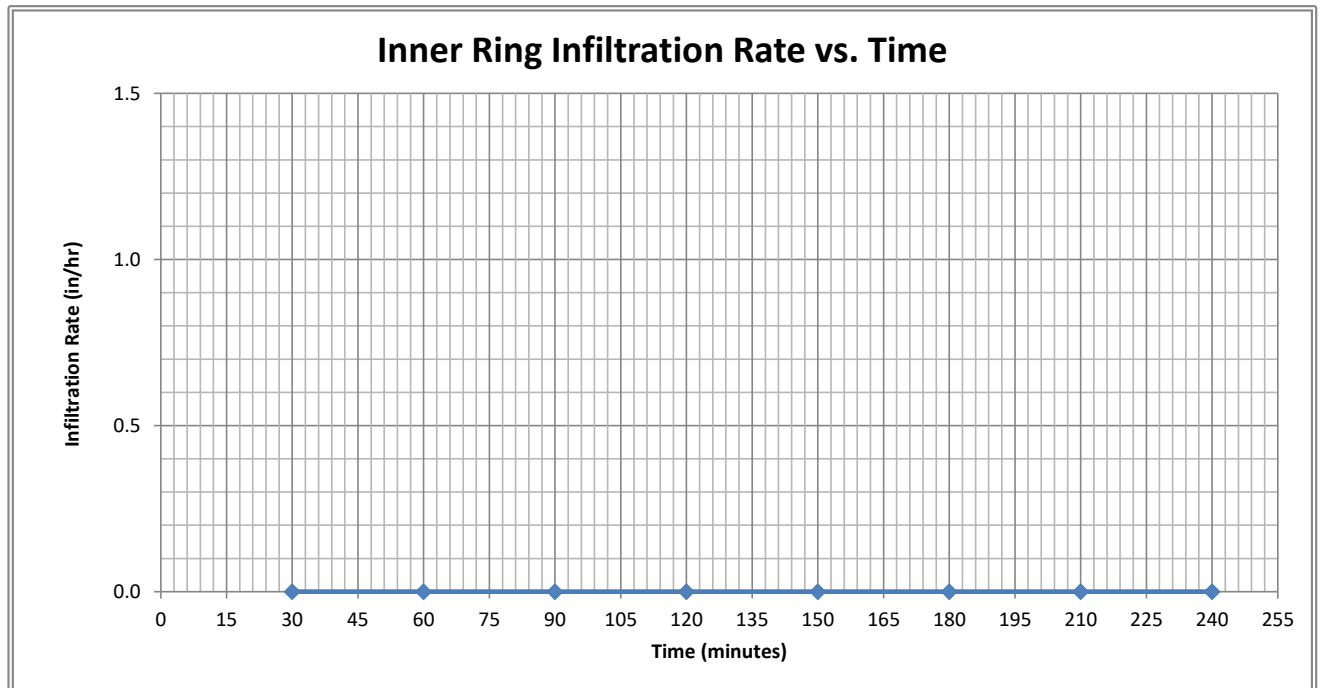
Test Location:	At stake
Test Elevation:	955
Ground Temperature °F:	45
Water Temperature °F:	34
Test performed by:	Matt Kluthe
Moisture Content of soil at test depth before test:	29%
Percent Fines passing a 200 sieve on soil at test depth:	76%

Time	Infiltration Rate (in/hr)
30	0.0
60	0.0
90	0.0
120	0.0
150	0.0
180	0.0
210	0.0
240	0.0

Depth below bottom of test	Soil Profile
0 to 3 feet	Sandy Lean Clay (CL), light brown to brown, moist to wet.
Groundwater depth	Seeping in through the sidewalls during the test and ponding water was noted by the end of the test

Average Infiltration Rate of Inner Ring Over Entire Test (in/hr)	0.0
---	------------

Steady State Infiltration Rate of Inner Ring Over Last 4 intervals (in/hr)	0.0
---	------------



Test performed by Braun Intertec personnel in general accordance with test method ASTM D 3385.

Results of Double Ring Infiltrometer Testing (ASTM D 3385)- Mariotte Tube Method



Test Number:	DRI-3
Project Description:	Woodland Cove Pond
Project Number:	B1901739
Date:	February 22, 2019
Liquid used:	Potable water
Inner Ring Area:	113 square inches
Outer Ring Area:	452 square inches
Water depth Inner Ring (cm):	12.5
Water depth annular Ring (cm):	12.5
Weather:	Overcast/15

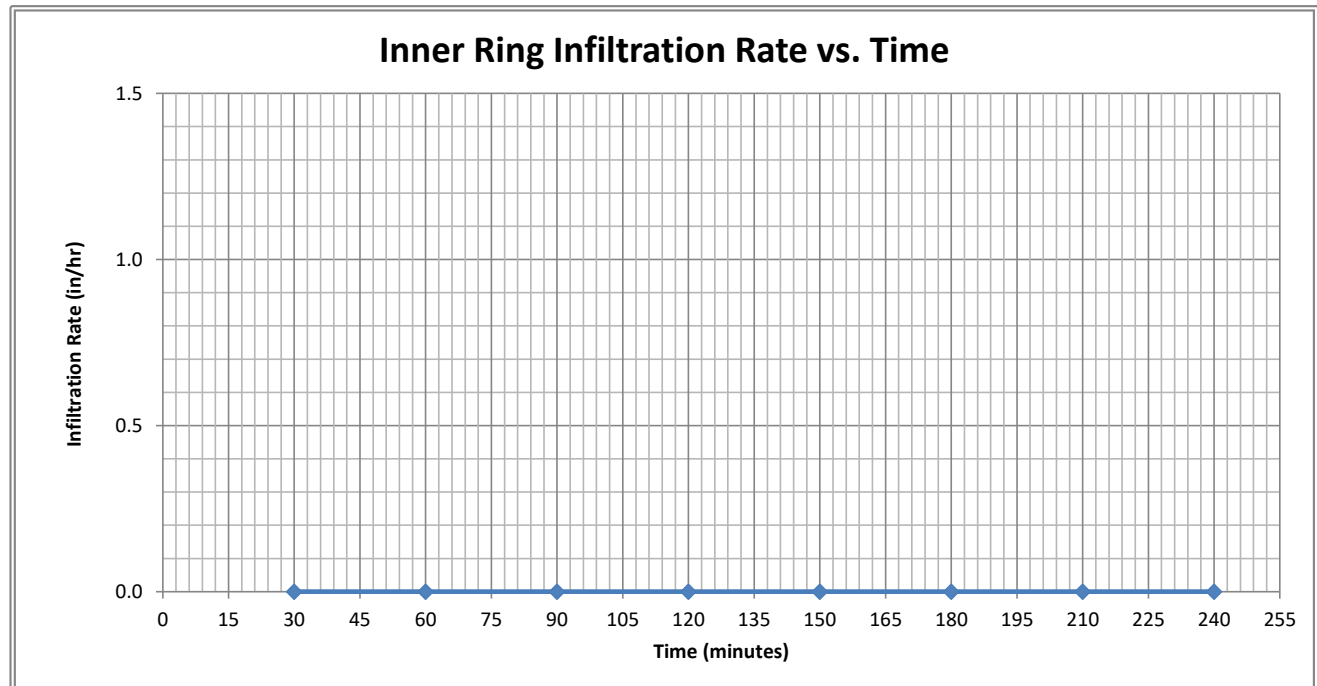
Test Location:	At stake
Test Elevation:	951
Ground Temperature °F:	44
Water Temperature °F:	35
Test performed by:	Matt Kluthe
Moisture Content of soil at test depth before test:	30%
Percent Fines passing a 200 sieve on soil at test depth:	78%

Time	Infiltration Rate (in/hr)
30	0.0
60	0.0
90	0.0
120	0.0
150	0.0
180	0.0
210	0.0
240	0.0

Depth below bottom of test	Soil Profile
0 to 3 feet	Sandy Lean Clay (CL), light brown to brown, moist to wet.
Groundwater depth	Seeping in through the sidewalls during the test and ponding water was noted by the end of the test

Average Infiltration Rate of Inner Ring Over Entire Test (in/hr)	0.0
---	------------

Steady State Infiltration Rate of Inner Ring Over Last 4 intervals (in/hr)	0.0
---	------------



Results of Double Ring Infiltrometer Testing (ASTM D 3385)- Mariotte Tube Method



Test Number:	DRI-4
Project Description:	Woodland Cove Pond
Project Number:	B1901739
Date:	February 22, 2019
Liquid used:	Potable water
Inner Ring Area:	113 square inches
Outer Ring Area:	452 square inches
Water depth Inner Ring (cm):	12.5
Water depth annular Ring (cm):	12.5
Weather:	Overcast/15

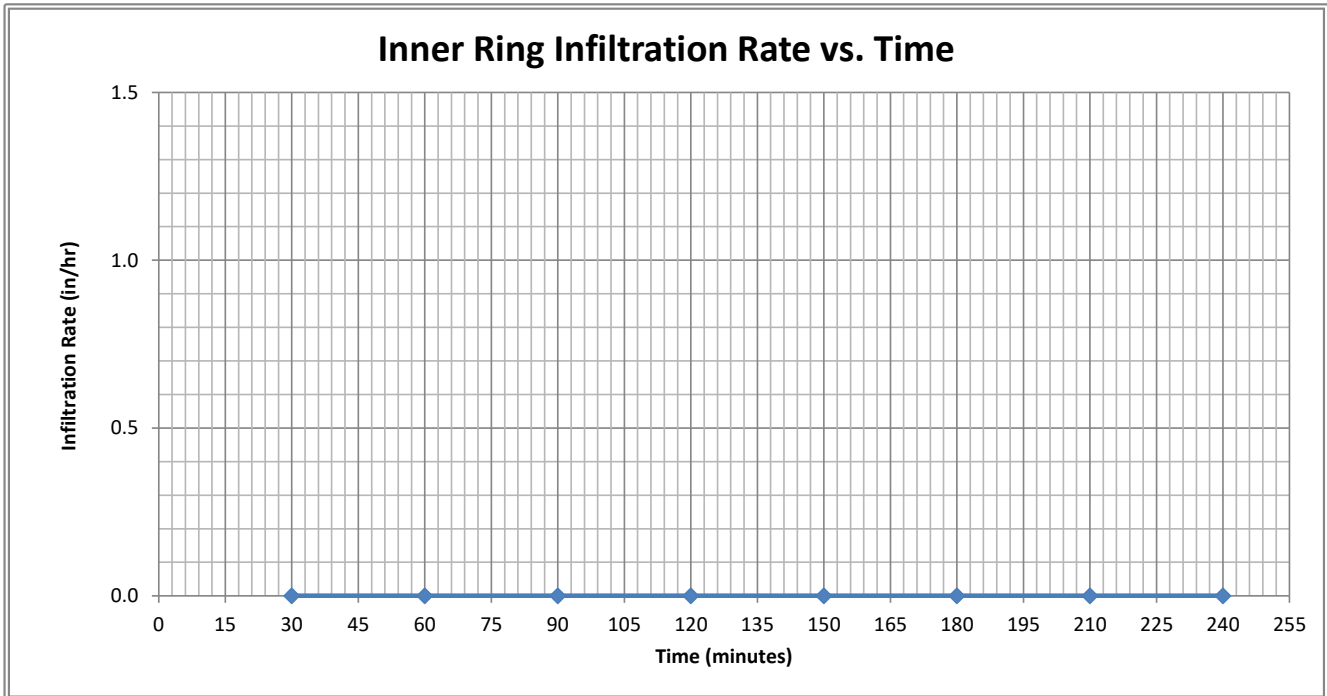
Test Location:	At stake
Test Elevation:	951
Ground Temperature °F:	43
Water Temperature °F:	35
Test performed by:	Matt Kluthe
Moisture Content of soil at test depth before test:	24%
Percent Fines passing a 200 sieve on soil at test depth:	60%

Time	Infiltration Rate (in/hr)
30	0.0
60	0.0
90	0.0
120	0.0
150	0.0
180	0.0
210	0.0
240	0.0

Depth below bottom of test	Soil Profile
0 to 3 feet	Sandy Lean Clay (CL), light brown to brown, moist to wet.
Groundwater depth	Seeping in through the sidewalls during the test and ponding water was noted by the end of the test

Average Infiltration Rate of Inner Ring Over Entire Test (in/hr)	0.0
---	------------

Steady State Infiltration Rate of Inner Ring Over Last 4 intervals (in/hr)	0.0
---	------------

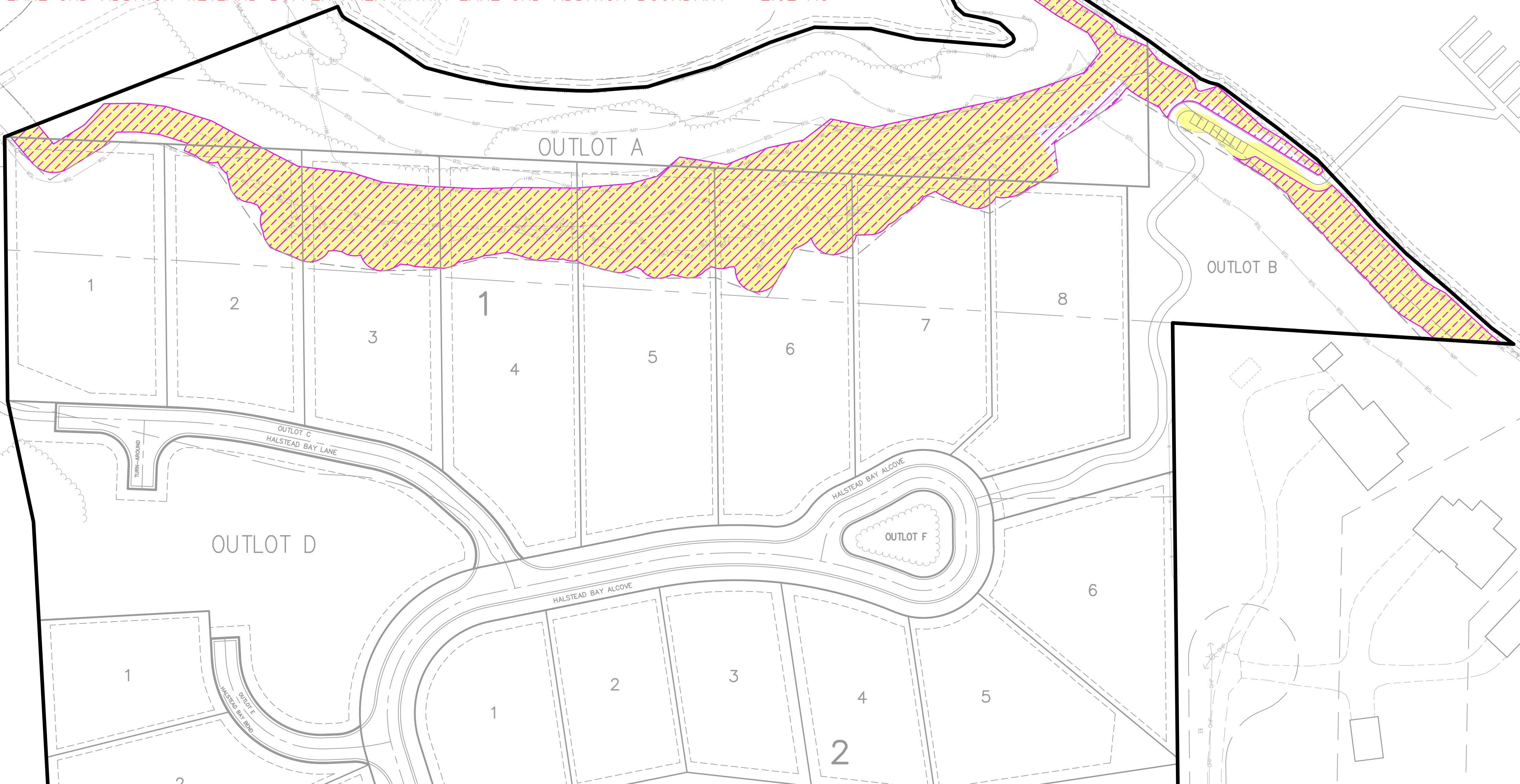


Test performed by Braun Intertec personnel in general accordance with test method ASTM D 3385.

WETLAND #7

PRELIMINARY PLAT WETLAND BUFFER AREA WITHIN LAKE 3RD ADDITION BOUNDARY – 2.01 AC

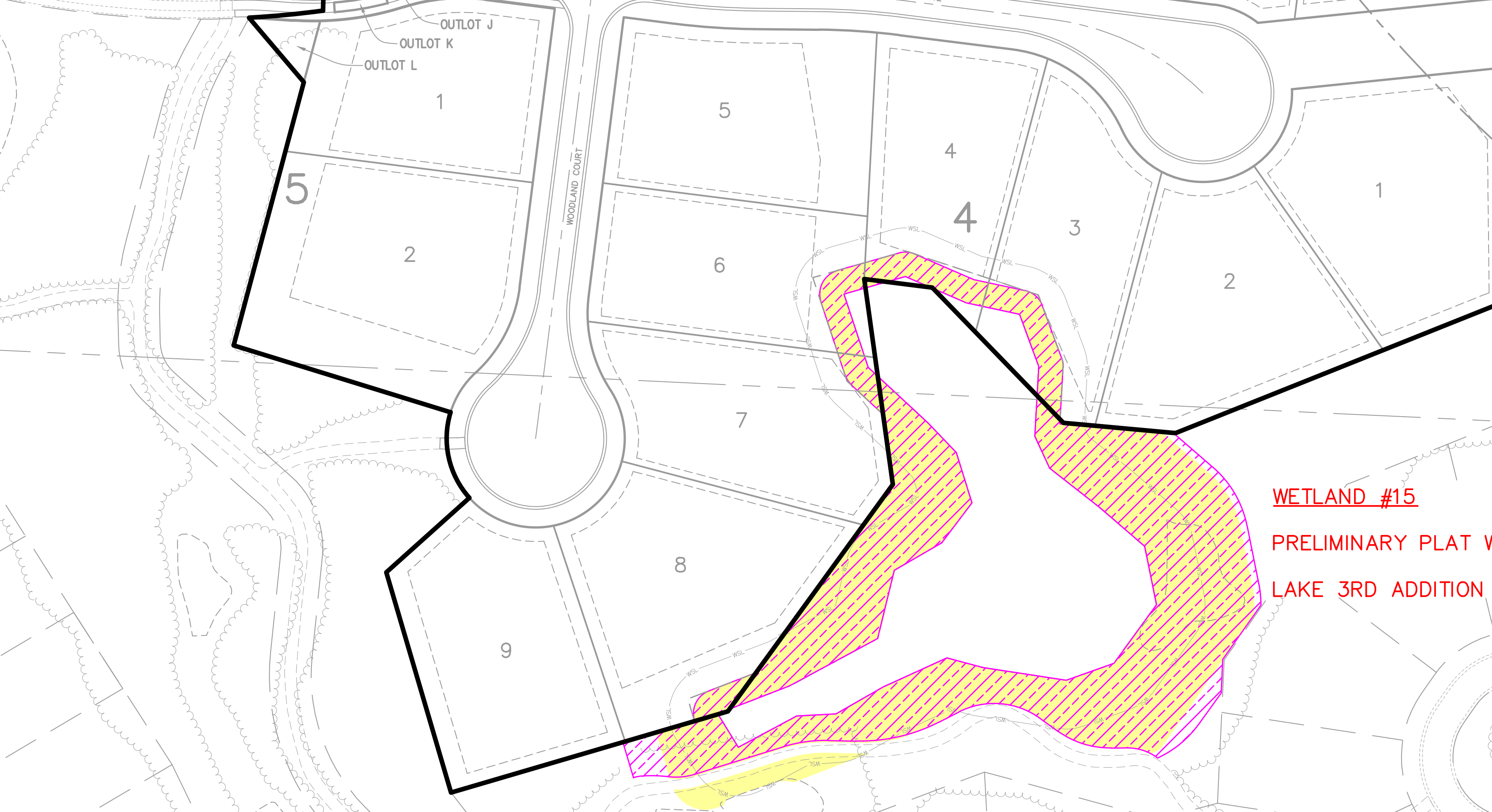
LAKE 3RD ADDITION WETLAND BUFFER AREA WITHIN LAKE 3RD ADDITION BOUNDARY – 2.02 AC



WETLAND #11

PRELIMINARY PLAT WETLAND BUFFER AREA – 0.80 AC

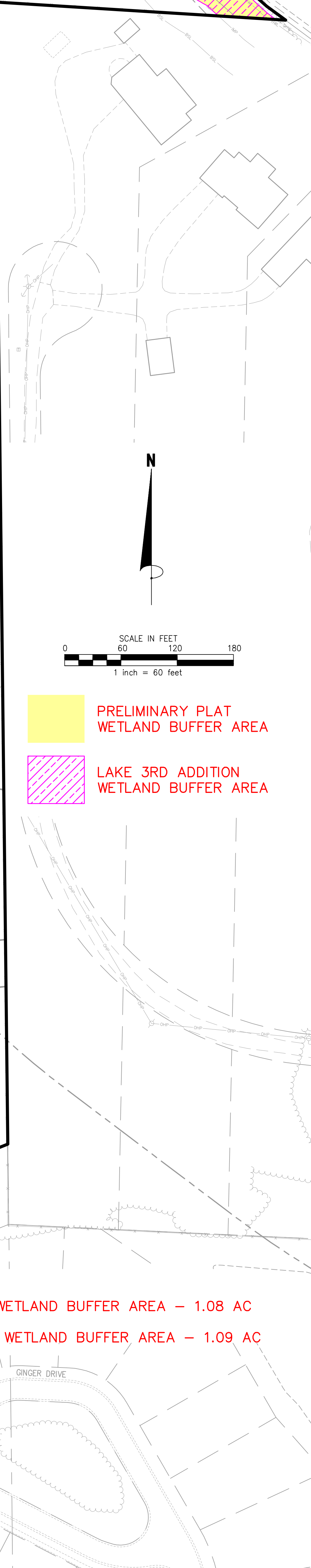
LAKE 3RD ADDITION WETLAND BUFFER AREA – 0.80 AC





WETLAND #15

PRELIMINARY PLAT WETLAND BUFFER AREA – 1.08 AC

LAKE 3RD ADDITION WETLAND BUFFER AREA – 1.09 AC



-  PRELIMINARY PLAT WETLAND BUFFER AREA
-  LAKE 3RD ADDITION WETLAND BUFFER AREA