

**CITY OF NORTH ST. PAUL PLANNING COMMISSION
REGULAR MEETING AGENDA
THURSDAY, FEBRUARY 6th, 2020
6:15 PM**

North St. Paul City Hall – Council Chambers
2400 Margaret Street

I. CALL TO ORDER

**II. ROLL CALL
COMMISSION**

Elaine Barton, Commission Chair
Patrick Blee, Commissioner
Rick Gelbmann, Commissioner
Trisha Hamm, Commission Vice-Chair
John Monge, Commissioner
Tom Sonnek, Commission City Council Liaison
Michael Stahlmann, Commissioner
Allan Worm, Commissioner

STAFF

Erin Perdu, Planning Consultant
Olivia Boerschinger, Planning Secretary

III. ADOPT AGENDA

IV. APPROVAL OF MINUTES

A. Approval the January 2nd, 2020 regular meeting minutes

V. MEETING OPEN TO THE PUBLIC

Note: This is a courtesy extended to persons wishing to address the Commission concerning issues that are not on the agenda. This discussion will be limited to 15 minutes.

VI. PUBLIC HEARING

A. Rezoning, Major Subdivision (preliminary plat), and Preliminary Planned Unit Development – 2242 7th St. N. and 2231 6th St. N.

VII. OLD BUSINESS

VIII. COMMISSION BUSINESS ACTION ITEMS & RECOMMENDATIONS

IX. REPORTS FROM STAFF

A. 2020 Zoning Ordinance Updates

X. REPORTS FROM COMMISSIONERS

A. Update from City Council Liaison

XI. ADJOURNMENT

The next regularly scheduled Planning Commission Meeting is Thursday, March 5th, 2020 at 6:15 p.m.

**CITY OF NORTH ST. PAUL
PLANNING COMMISSION
REGULAR MEETING MINUTES
THURSDAY, JANUARY 2, 2020
6:15 P.M.**

North St. Paul City Hall – Council Chambers
2400 Margaret Street

I. CALL TO ORDER

Chair Barton called the meeting to order at 6:15 p.m.

II. ROLL CALL

COMMISSION

Elaine Barton, Commission Chair

Michael Stahlmann, Commissioner

ABSENT AND EXCUSED

Tom Sonnek, Commission City Council Liaison

Chris Bathurst, Commissioner

Rick Gelbmann, Commissioner

Trisha Hamm, Commission Vice Chair

Allan Worm, Commissioner

STAFF

Erin Perdu, City Planner

Olivia Boerschinger, Planning Secretary

III. ADOPT AGENDA

Chair Barton requested the following addition to the Agenda:

-Item 8b – Election of Chair and Vice Chair

Motion to adopt Agenda by Commissioner Gelbmann, and seconded by Commissioner Bathurst, with all present voting aye (5-0). Motion carried to adopt the January 2, 2019 Agenda, as amended.

IV. APPROVAL OF MINUTES

Motion to approve Minutes by Commissioner Worm, and seconded by Commissioner Hamm, with all present voting aye (5-0). Motion carried to approve the December 5, 2019 regular meeting minutes as submitted.

V. MEETING OPEN TO THE PUBLIC

There were no comments.

VI. PUBLIC HEARING

a. Final Plat – 2nd Addition of McKnight Townhomes

City Planner Erin Perdu reviewed a request for approval of Final Plat for Phase 2 of the Gateway at McKnight townhome project. Originally approved in 2018, there are 46 remaining townhome sites on approximately 3.5 acres. The proposed plat for this area matches preliminary plat approval which was given for both phases when the project was originally reviewed.

Ms. Perdu stated Gateway Curve will be completed with this phase. She added the dedication of Outlot C remains to be addressed, and approval is required to convey Outlot C to the adjacent property owners. She noted the developer plans to dedicate Outlot C when the file the final plat.

Ms. Perdu stated City Staff recommends Planning Commission recommendation of City Council approval of the final plat with conditions related to the City Engineer's comments and conveyance of Outlot C.

City Council Liaison requested clarification regarding the conveyance of Outlot C. Ms. Perdu stated a small piece of land at the southern end of the site is to be conveyed to the adjacent property owner as determined in the original approval.

Chair Barton opened the public hearing at 6:22 p.m.

Rob Aurelius, 2271 7th Street North, asked why single-level townhomes were not included in this project as they are in high demand. He added the developer has circumvented City Code by having 6 units in a row without windows on 3 sides. He added open space should be required as there is no room for amenities, and that would improve curb appeal. He commended the developer for complying with setback regulations.

Chair Barton closed the public hearing at 6:24 p.m.

Planning Secretary Olivia Boerschinger stated additional comments received by City Staff have been included in the meeting packet and emailed to the Commissioners.

Chair Barton stated one of the purposes of the Planned Unit Development (PUD) is to allow for flexibility in design and architecture. She asked whether City Staff can comment on having 6 units in a row.

Ms. Perdu stated it was discussed during the PUD architectural review, and revisions were made to the façade to ensure visual interest and variations. She added, when the project was approved, the Planning Commission felt that the intent of the PUD ordinance was met.

Ms. Perdu agreed, adding the difference between a PUD and other developments is that flexibility can be granted in exchange for other benefits that would not otherwise be included in the project plans.

City Council Liaison Sonnek asked whether there is a definition for “public benefit” in the City Ordinances. Ms. Perdu stated there is currently no specific criteria to determine public benefit, but City Staff reviews the City’s Comprehensive Plan goals and environmental goals. She added some cities have specific criteria, and she recommends including this issue in the Code review, to make it easier and more transparent.

Chair Barton requested clarification regarding a requirement related to retaining walls that require fencing if they are greater than 4 feet in height.

Ms. Perdu stated that is a general requirement from the Building Code.

The WSB Engineer stated fencing is required for safety reasons when there is a walkway or sidewalk adjacent to a retaining wall.

Motion by Commissioner Worm, and seconded by Commissioner Hamm, with all present voting aye (5-0). Motion carried to recommend City Council approval of Final Plat for 2nd Addition of McKnight Townhomes subject to conditions listed in the staff report.

Chair Barton stated this item will be reviewed by the City Council at their January 7, 2020 meeting.

VII. OLD BUSINESS

-None.

VIII. COMMISSION BUSINESS ACTION ITEMS & RECOMMENDATIONS

- a. Rezoning, Major Subdivision and Planned Unit Development – 2242 7th Street N – Concept Plan Only

Ms. Perdu reviewed the revised concept for a PUD and major subdivision at 2242 7th Street N. She added this is a concept plan review and no action will be taken. The developer is requesting feedback and comments before they develop a full set of plans. She noted there is no detailed staff report on this agenda item.

Ms. Perdu stated the approximately 4.25-acre property is a heavily wooded site on 1 outlot with a private drive, 20 townhomes and 3 single-family homes. She added the plan was reviewed by the City Council in December 2019. Public comments were received with concerns about the loss of trees and preservation of the wooded nature of the site, as well as creative design elements of the project. The revised concept plan is a cul-de-sac design with 18 units, and the

developer has provided information taken from a tree survey that was completed on the southern portion of the property. The applicant is seeking consensus and feedback on the concept plan.

Ms. Perdu stated the applicant is considering the inclusion of space on the site that would be specifically preserved as open space.

The developer addressed the Planning Commission, stating the T-shaped road was replaced with a cul-de-sac to fit in with the neighborhood, which opened up some space to the east where as many trees as possible would be preserved. He added as many trees as possible would also be saved near a ponding area that has been added to the southern area of the property. He noted all units would be owner-occupied single-family twin homes, at a starting price of \$300,000-350,000.

City Council Liaison requested clarification regarding the ponding area. The developer pointed out the area on the map, where the infiltration pond, with an average depth of 2 feet, could be split into two separate ponds on the southern portion of the property. He added the holding pond would empty within 48 hours of a heavy rainfall.

Commissioner Worm asked whether the developer considered the possibility of single-family homes. The developer stated they have had discussions with City Staff who have indicated that more density is desired. He added single family homes would be a possibility with the proposed layout. He noted he is unsure what the lot sizes would be.

Ms. Perdu stated the lot sizes are 7,920 square feet with setbacks in the R-1 district.

City Council Liaison Sonnek stated the property could be rezoned back to R-1 and single-family homes developed, but the density would be higher with more buildings on the property.

Ms. Perdu agreed, adding 3.4-acre development in the R-1 district without a PUD could accommodate approximately 15 single-family homes, using minimum lot calculations and right-of-way consideration.

City Council Liaison stressed the importance of finding a balance between the residential feel of the neighborhood, the natural habitat and wooded area, and inevitable development.

Commissioner Worm stated single-family homes in the R-1 District could also be two-story homes, and more than 15 homes could potentially fit in the development. The developer confirmed this, adding the lot size could also be smaller.

The developer stated single-level townhomes in this type of development are generally purchased by homeowners over the age of 50, looking toward retirement, with no small children. He added it tends to be a very quiet neighborhood.

Chair Barton stated this type of development fits in a high-density neighborhood and appeals to residents who do not want to live in a large development. She added the PUD provides the opportunity to expand the diversity of housing options and locations. She noted she feels that this is a positive aspect of the PUD.

The developer stated these types of developments are usually self-governed, with individual lots, which gives residents the flexibility of a single-family home.

Chair Barton requested clarification on the developer's comments regarding the inclusion of two separate holding ponds.

The developer stated discussions with the surveyor and engineer included the possibility of creating two separate ponds, one in the southeast corner and another in the southern area. He added this is not his area of expertise.

The WSB Engineer stated it appears there would be an opportunity to split up the holding ponds, and the City Engineer would review them for the same requirements as a single pond.

Commissioner Gelbmann asked whether the linear shape of the pond could be changed. The developer stated that shape conforms to the layout of the development on the property.

Commissioner Worm asked whether the developer had considered a 27-foot wide roadway, which would accommodate parking on both sides of the street. The WSB Engineer stated more impervious surfaces would create the need for additional stormwater mitigation.

City Council Liaison Sonnek stated there were questions regarding the potential for water runoff onto neighboring properties. He asked whether that has been reviewed. The WSB Engineer stated the same questions still exist and will be reviewed when engineering plans are received. She added issues to be reviewed include soil borings, types of infiltration, the size of the ponds, and other considerations.

City Council Liaison Sonnek asked whether underground holding tanks could be done in residential areas. He added massive underground holding tanks are proposed at the downtown development to improve stormwater runoff.

The WSB Engineer stated the City may not want to be responsible for the type of maintenance required when underground holding tanks are installed. She added the intent would be to improve the current stormwater run-off situation on the property. She noted that can be accomplished through ponding.

City Council Liaison Sonnek stated the concept plan is an improvement from what was previously presented, and he appreciates the preservation of trees and wooded areas. He added the concept plan information is not complete and further review will be required to weigh potential options.

Commissioner Gelbmann asked the developer whether stormwater ponds on the property would overflow to the southeast. The WSB Engineer stated that would be reviewed when plans and specifications are received from the developer.

Chair Barton stated the concept plan is in line with the City's recently adopted Comprehensive Plan. She added she believes the development plan is headed in the right direction and is worth pursuing, and she likes the cul-de-sac option which has more design interest than a straight road with turn-around. She noted pervious pavers might be considered.

Chair Barton asked whether the 3 single family homes on 6th Street would have access to the open space and ponding area, and whether the homes would be part of the PUD. Ms. Perdu stated the feedback previously received by the developer was for the single-family homes to be removed from the PUD. The developer confirmed this, adding the homes on 6th Street would be zoned R-1 single family and would not be incorporated into the PUD.

The developer stated there is currently no access from the single-family lots on 6th Street to the southerly pond area, but an access easement is proposed between the south 2 lots on 6th Street.

Commissioner Worm asked whether fire trucks will be able to access the development and fit in the cul-de-sac. Commissioner Bathurst confirmed this.

Commissioner Gelbmann stated, as a long-term consideration, a process should be considered for notifying residents about future land use and changes within the City's development plans. He added there was an outreach process that accompanied the recently adopted Comprehensive Plan, and a fair amount of people participated in that process. He stressed the importance of giving residents more notice, and increased opportunity to be involved in changes that are happening.

Ms. Perdu agreed there is a gap between long-term goals in the Comprehensive Plan and specific proposals like the concept plan being considered at tonight's meeting. She added focused neighborhood meetings in areas that are planned to change is a possibility and would give residents an opportunity to discuss what can be considered under the City's zoning Ordinance and development proposals.

VIIIb. Election of Chair and Vice Chair

Motion by Commissioner Gelbmann, and seconded by Commissioner Hamm, with all present voting aye (5-0). Motion carried to nominate Elaine Barton for Planning Commission Chair.

Motion by Chair Barton, and seconded by Commissioner Worm, with all present voting aye (5-0). Motion carried to nominate Trisha Hamm for Planning Commission Vice Chair.

A resident interrupted the proceedings and stated that it was indicated at the beginning of the meeting that public comment related to agenda items would not be taken during the Public Comments portion of the meeting but would be taken during the public hearing. She asked why public comment was not taken during the discussion on Agenda Item 8a.

Chair Barton stated the agenda item was a concept review and not a public hearing, and no action was taken. She added the purpose of the review was to receive information from the developer.

The resident asked why the audience was not made aware that there was no public hearing, so they could speak during Public Comments. She asked when a public hearing will be held.

Chair Barton public hearing notices are posted on the City Calendar and on the City website. Ms. Perdu stated City Staff sends notification of the public hearing to residents within 350 feet of the subject property and also to anyone who wrote their contact information on the sign-in sheet.

IX. REPORTS FROM STAFF

a. 2020 Goals Discussion

Ms. Perdu stated a list of 2020 Planning Commission goals was compiled by Ms. Boerschinger. She added the main item for 2020 will be updating the Zoning Ordinance to ensure consistency with the 2040 Comprehensive Plan. She asked whether the Planning Commission has any other goals to articulate to the City Council and requested consideration of dates for preparing and presenting reports.

Chair Barton stated the City Council had indicated it was not necessary for the Planning Commission to provide a formal report.

City Council Liaison Sonnek agreed, adding the Commission could focus on reviewing the language in commonly used zoning ordinances, including completion of the discussion related to the off-street parking ordinance. Chair Barton agreed, adding parking requirements do not seem to be sufficient, and parking stalls are getting smaller.

Commissioner Worm stated he would like to discuss the minimum lot width ordinance, and reducing the lot width minimum from 60 feet to 40 feet.

Commissioner Gelbmann stressed caution in amending the City's parking requirements, especially in areas like 17th Avenue near Richardson School, where parking is limited due to construction.

City Manager Scott Duddeck stated the School District has been in contact with the City Staff requesting consideration of placement of "no parking" signs on the south side of 17th Avenue between 1st and 2nd Streets to prohibit parking during school hours.

Chair Barton stated she would like to address guidelines for townhomes.

Commissioner Gelbmann stated he would like to address specifications for culverts, to address flooding and drainage. He added that is an issue for the Watershed District, but the City will continue to see large storms and extra capacity is important.

Ms. Perdu stated that is related to engineering specifications and is not part of the City Code.

City Council Liaison Sonnek stated, in summary, the 2020 list of goals could include reconsideration of zoning language amendments for off-street parking; parking stall size requirements; townhome requirements; minimum lot width requirements for single family homes, and drainage requirements.

Ms. Perdu stated City Staff can provide a comprehensive list at the Planning Commission's February meeting. She added the Comprehensive Plan items are time sensitive and must be submitted within 9 months.

Commissioner Gelbmann stressed the importance of stormwater drainage resiliency. Chair Barton stated that is mentioned in the City Code but could be improved, as it relates to erosion and the effects of stormwater. She added she would like a review of tree requirements for developments, including types of trees.

Ms. Perdu agreed, adding there are currently no tree requirements in the City Code. She added requirements related to trees and tree preservation should be discussed.

Mr. Duddeck requested that the Planning Commission address the issue of chickens and bees as soon as possible. He added City Staff can provide a lot of background information for the Commission's review. He noted there has been growing interest from the community related to keeping chickens and bees. The Planning Commission agreed.

Commissioner Barton stated it is an issue of regulation and whether the City has the resources to enforce regulations.

Mr. Duddeck stated he would like to schedule a joint meeting or workshop between the Planning Commission and the Economic Development Authority. City Council Liaison Sonnek stated that would be helpful. The Planning Commission agreed.

Mr. Duddeck stated the City Council's January 7, 2019 meeting will include 2020 appointments, including a new Planning Commissioner.

Mr. Duddeck stated City Staff has discussed the possibility of creating a sub-committee for design and historical review from within the Planning Commission. He added the subcommittee could be called upon for review as needed.

X. REPORTS FROM COMMISSIONERS

a. Update from City Council Liaison

City Council Liaison Sonnek reviewed the City Council's December 2019 meeting, including approval of 2020 History Cruiser Car Show agreement. Mr. Duddeck stated the car show will remain open for all businesses during road construction and will be extended east to Henry Street. He added the car show will probably be moved periodically to accommodate construction.

City Council Liaison Sonnek stated a purchase agreement for the former BP gas station site was approved. He added the existing building will be demolished and the site cleared to eventually facilitate the Highway 36/120 interchange. Mr. Duddeck stated the plat was received by Ramsey County on December 31, 2019.

City Council Liaison Sonnek stated the 2020 Street and Utility Project Feasibility Study was reviewed and accepted. He added stormwater mitigation is a high priority throughout the project area.

City Council Liaison Sonnek stated the City Council voted to renew annual membership with the Ramsey Washington Suburban Cable Commission. He added the City's representative on the Commission has many years of expertise and can help make positive changes.

Mr. Duddeck agreed, adding the Commission's technology capabilities need to be reviewed and updated, as it is not sustainable in its current format.

City Council Member Sonnek stated a resident made a comment earlier in the meeting about the procedure for making public comments at Planning Commission meetings. He added the Commission should consider ways to be clearer that the Public Comments section is reserved for comments related to items that are not on the meeting agenda.

Commissioner Gelbmann agreed, adding it is an issue of fairness, as the Public Comment portion would otherwise become an informal public hearing, which is not equitable for all sides of the issue. City Council Liaison Sonnek agreed, adding it is a formal process.

Commissioner Worm stated the property north of 7th Street may come forward for development, if a precedent is set at the 7th Street project. Chair Barton confirmed this, adding property owners can do whatever they want with their property.

Commissioner Worm stated the Commission receives too much paper. Commissioner Gelbmann agreed, adding guidelines should be considered as some documents do not need to be reviewed by the Commission.

Ms. Perdu stated it is difficult for City Staff sends the entire packet as it is difficult to determine which documents to omit.

Mr. Duddeck stated the Commission could receive documents electronically, which would reduce printing and paper costs.

Ms. Perdu stated the volume of the paper packet can be reviewed by City Staff.

Mr. Duddeck stated the City Council uses SharePoint, a web-based electronic document sharing platform. He added a workshop could be scheduled to provide information for the Commissioners on using SharePoint to reviewing electronic documents.

Mr. Duddeck stated developers are required to submit all documents electronically to minimize the amount of paper that is used for plan reviews by City Staff.

Commissioner Gelbmann stated he visited the new pawn shop recently, which is now open for business.

XI. ADJOURNMENT

There being no further business, motion to adjourn by Commissioner Gelbmann, and seconded by Commissioner Bathurst, with all present voting aye (5-0). Motion carried to adjourn the meeting at 8:00 p.m.

Members, please notify any planned absences to: Olivia Boerschinger
Planning Commission Secretary
651-747-2400
Olivia.boerschinger@northstpaul.org

MEMORANDUM

Date: 1/30/2020
To: Planning Commissioners
From: Erin Perdu, AICP, City Planner
Ryan Krzos, AICP, Planning Consultant
CC: Scott Duddeck, City Manager
Debra Gustafson, Administrative and Community Services Director
Re: Preliminary Plat for property at 2242 7th Street N and 2231 6th Street N; and Rezoning from R-1 to R-2 and Preliminary Planned Unit Development Review for 2242 7th Street N

BACKGROUND

Doug Andrus of Andrus Built LLC, on behalf of the property owner, K&T North St. Paul Investment LLC, is requesting approval of a Rezoning, Preliminary Plat and Preliminary Planned Unit Development to develop the subject property with 18 townhome units and three single family dwellings. The request is divided into three separate requests:

- Rezoning of the portion of the property at 2242 7th Street N. from R-1 to R-2
- Preliminary Planned Unit Development for an 18 townhome development on the 2242 7th Street N. property
- Preliminary plat to create 3 single-family home lots on the property at 2231 6th Street North and 18 townhome lots at 2242 7th Street N.

At the January 2, 2020 Planning Commission meeting the applicant presented and received feedback on a concept plan for the site. The concept plan reduced the number of proposed townhomes from the original 20 units proposed (that was tabled in November of 2019) to the current request consisting of 18 units. The current proposal includes townhome lots would front

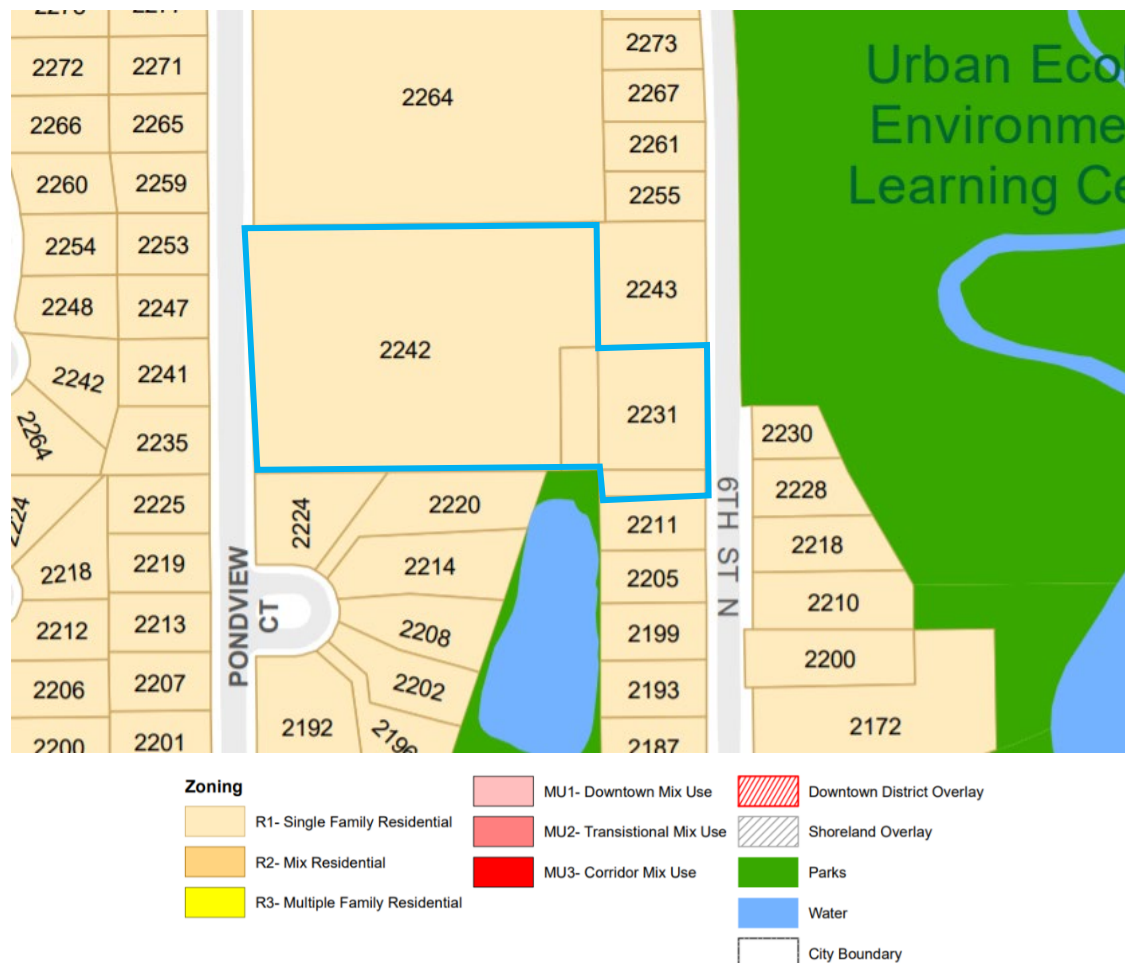


along a cul-de-sac as opposed to the previously proposed “T” shaped turnaround. The three proposed single-family lots along 6th Street North remain.

The site is zoned R-1 Single-Family Residential, of which the applicant requests rezoning a portion to the R-2 Mixed Residential District. The R-2 zoning district allows townhome dwellings as a permitted use. The 4.23-acre subject site is currently comprised of four parcels, two of which contain existing single-family dwellings which would be demolished.

The requested subdivision would divide the four existing parcels into three (3) lots for single family dwellings along 6th Street N, and 18 lots for townhomes with an outlot containing a private cul-de-sac providing access to each of the townhome units. The plat would also dedicate small portions of right-of-way for 7th Street N and 6th Street N to complete the full 60-foot width for these roadways.

Lastly, the Planned Unit Development Overlay approval for the townhome parcel is requested to provide flexibility from the dimensional standards of the Zoning Ordinance allowing redevelopment of the site for medium density residential land uses as envisioned by the Comprehensive Plan.



GENERAL STAFF REVIEW

Consistency with the City Plans

- *154.004 (D)(2) Rezoning Standards (b) The proposed amendment is consistent with the general purposes and intent of the Comprehensive Plan.*
- *154.004 (D)(2) Rezoning Standards (f) If applicable, the proposed amendment is consistent with officially adopted city plans and overlays.*
- *154.008 (C)(4) PUD General Standards (a) Consistency with Comprehensive Plan. The proposed PUD shall be consistent with the Comprehensive Plan.*

The area of the site proposed for townhome units is guided for Medium Density Residential use by the 2040 Comprehensive Plan. The Medium Density Residential land use category envisions uses at densities from 6 to 12 units per acre. The proposed development density within the area to be developed with townhomes is 5.8 units per acre, just under the low end of the comprehensive plan guidance. The Comprehensive Plan encourages diverse housing options particularly the development of “missing middle” styles of housing. The proposed townhome development would be consistent with this aspect of the Plan. The area containing the proposed single-family lots is guided for low density residential land uses. The density of the three proposed lots within this area, which is to remain zoned R-1 is 4.6 units per acre. There are no overlays guiding the subject site.

Health, Safety, and General Welfare

- *154.004 (D)(2) Rezoning Standards (b) The proposed amendment will not adversely affect the health, safety, or general welfare of the city;*

The subject requests would enable the development of medium density residential land uses. Surrounding land uses are low density residential and open space uses. Adverse impacts on health, safety, or the general welfare of the City are not likely from the proposed rezoning or the resulting development.

Compatibility with Surrounding Context

- *154.004(D)(2) Rezoning Standards (c) The proposed amendment is compatible with present and future land uses in the surrounding area and reasonably related to the overall needs of the city;*
- *154.004(D)(2) Rezoning Standards (d) The proposed amendment is compatible with adjacent properties;*
- *154.008(C)(6)(b)(ix) Preliminary PUD Review and evaluation criteria. (D). The arrangement of buildings, structures, and accessory uses does not unreasonably disturb the privacy or property values of the surrounding residential uses.*
- *154.008 (C)(4) PUD General Standards (f) Relationship of PUD site to adjacent areas. The design of a PUD shall take into account the relationship of the site to the surrounding areas. The perimeter of the PUD shall be so designed as to minimize undesirable impact of the PUD on adjacent properties and, conversely, to minimize undesirable impact of adjacent land use and development characteristics on the PUD.*

- *154.010(E)(3) General Architectural requirements (g) Protection of views. Buildings shall be designed and oriented so as not to detract from one another or to unduly restrict views to open spaces, plazas and vistas.*

The immediately surrounding properties contain single-family dwellings on lots primarily in the quarter- to half-acre range, with a roughly three-and-a-half-acre single family lot directly north. The Urban Ecology Environmental Learning center is directly east of the site across 6th Street N. The proposed development would maintain residential use of the site, at a combination of low and medium densities. The proposed townhomes would be oriented towards an internal private roadway which provides access to each of the units. Rear yards meeting the minimum setback requirements would lie between the townhomes and the adjoining properties to the north and south respectively. The residential properties to the south contain residences with their rear facades facing north, opposite the rear of the southerly row of proposed townhomes. The lot to the north of the subject site is also guided for medium density residential land uses by the Comprehensive Plan. Staff finds that the proposed development as revised is a reasonable approach to provide medium density land use within the subject site and is proposed in a manner that is compatible within the existing neighborhood context. The townhomes are arranged toward the center of the subject property, allowing for reasonable buffer areas and minimizing their impact on surrounding neighborhoods.

Proposed Uses

- *154.006(C)(1) Permitted, Conditional, and Interim Uses refers to Table 3 for allowed uses within the residential districts.*
- *154.008(C)(6)(ix) Preliminary PUD Review and evaluation criteria. (H) Proposed unit and accessory use requirements are in compliance with the district provisions in which the development is planned.*
- *154.008 (C)(4) PUD General Standards (c) Permitted uses. All permitted, conditional, and interim uses contained in the underlying zoning district shall be treated as permitted, conditional, and interim uses in the PUD Overlay District.*

The proposed development includes single family dwellings in the area to remain R-1 and townhome dwellings in the area to be rezoned to R-2. These uses are permitted within the corresponding zoning districts. Planned unit developments are also permitted in the R-2 district.

Proposed Lot/Building Dimensional and Setback Requirements

- *154.006(C)(3) refers to Table 4 for the lot requirements within the residential districts.*
- *154.008 (C)(4) PUD General Standards (l) Building height. Height limitations shall be the same as imposed in the respective zoning districts.*
- *154.008 (C)(4) PUD General Standards (d) Density. Increased density shall be permitted to encourage the preservation of natural topography and geological features. The city may, but shall not be required to, provide concessions in setbacks, density, or lot size to protect waterways or water bodies, steep slopes or other areas which would normally not be developable. The city will consider allowing an increase in the allowable density upon proof by the applicant that some of the following features are being provided as part of the proposed development:*

- i. *Preservation of natural site features, wetlands, lowlands, wooded areas, and the like, protected by the Minnesota Department of Natural Resources, by the city and/or Ramsey County ordinances.*
- ii. *Creation of conservation easements due to steep slopes, wooded areas and/or environmentally sensitive areas, as identified in the Comprehensive Plan.*
- iii. *Creation of park/public areas for active and passive park uses beyond required standards or other public purposes such as schools, public buildings, greenways, and the like which meet the intent of the Park and Recreation goals of the Comprehensive Plan and are consistent with the public dedication requirements for the proposed development.*
- iv. *Installation of public improvements designed to serve areas beyond the project boundary.*
- v. *The city may consider increased density for housing projects which provide affordable housing options, consistent with the Comprehensive Plan.*
- *154.008 (C)(4) PUD General Standards (e) Minimum lot size. The minimum lot size requirements of other sections of this chapter do not apply to a PUD except that the minimum lot size requirements of the underlying zone shall serve as a guideline to determine the maximum dwelling unit density of a total development. The maximum dwelling unit density shall be determined by the area remaining after appropriate space for street right-of-ways and any other public dedications have been determined and subtracted from the total PUD area. If the property involved in the PUD includes land in more than one zoning district, the number of dwelling units or the square footage of commercial, residential or industrial uses in the PUD shall be proportional to the amount that would be allowed separately on the parcels located in each of the underlying zoning districts.*

A summary of the information included in Table 4 is provided below. (items underlined are areas where the lot(s) does not meet zoning standards and therefore require deviations allowable in a PUD):

Requirement	R-1 (Existing Zoning Designation)	Proposed SF Lots along 6th St (To remain R-1)	R-2 (Requested Zoning Designation)	Proposed Townhome Lots (Requested R-2 Zoning)
Minimum Lot Area	<i>7,920 sf per dwelling unit</i>	9,241 – 9,922 sf ² per dwelling unit	<i>5,967 sf per dwelling unit</i>	<u>5,044</u> – 7,765 sf per dwelling unit
Minimum Lot Width	<i>60 ft</i>	65 – 69.91 ft	<i>80 ft</i>	<u>~27 ft – 53.12 ft</u>
Front Yard Setback	<i>25 ft</i>	Building pad locations were not identified on the plans for these lots.	<i>25 ft</i>	>25 ft

Requirement	R-1 (Existing Zoning Designation)	Proposed SF Lots along 6 th St (To remain R-1)	R-2 (Requested Zoning Designation)	Proposed Townhome Lots (Requested R-2 Zoning)
Rear Yard Setback	25 ft		25 ft	>25 ft
Side Yard Setback	6 ft internal, 15 ft corner		6 ft internal, 15 ft corner	6 ft interior – 0 ft where units are attached 15 ft corner
Maximum Height	Two (2) stories or 35 ft. in height		Two (2) stories or 35 ft. in height	The submitted building renderings show One story townhome units.
Limit of Surfacing in Front Yard	40%		40%	Approx. 37% - <u>approx. 72%</u>
Minimum Livable Space	900 sf 1 story, 1,200 sf 2 stories		900 sf 1 story, 1,200 sf 2 stories	1,846 sf building pad (not including garage)
Lot Coverage	40%		50%	28 % - <u>56%</u> (6 of 18 are above 50%)
Density	Low (3 – 5.5 units/ac)	4.6 units per acre	Medium (5.6 – 7.3 units/ac)	5.8 units per acre

The townhouse and single-family portions of the development would generally comply with the range of densities allowed in the R-2 and R-1 Districts respectively. Accordingly, an allowance for increased density is not requested with this project. The proposed townhomes do not comply with required lot width in the R-2 district and most of the proposed townhome lots are substandard in lot area. These reductions are requested in order to achieve the minimum level of density prescribed in the R-2 district and the Comprehensive Plan's future land use guidance for this site. The Planned Unit Development process allows for reduction in dimensional requirements of the Ordinance to meet certain objectives. In this case, the deviations allow for a development that:

- Promotes more efficient land use and density consistent with the Comprehensive Plan.
- Facilitates the economical provision of streets – a private drive is proposed.

- Allows for medium density residential units (townhomes) that are reasonably buffered from surrounding neighborhoods, consistent with the city's housing goals.

The proposed townhome lots would comply with the required 25-foot front yard setback, the required 6-foot interior side setback, and the required 15-foot corner side setbacks.

Several of the proposed townhome lots would exceed the limit on front yard surfacing, and less than half of the lots would exceed the total lot coverage requirements. This is due in large part to the wide driveways that lead to each of the units. Said driveways provide additional off-street parking capacity for guests of residents, as guest parking stalls within the private drive are not provided due to the width of the street and the location of driveways.

Ownership

- *154.008(C)(6)(b)(ix) Preliminary PUD Review and evaluation criteria (A). Adequate property control is provided to protect the individual owner's rights and property values and the public responsibility for maintenance and upkeep.*
- *154.008 (C)(4) PUD General Standards (a) Ownership. An application for PUD approval must be filed by the landowner or jointly by all landowners of the property included in a project. The application and all submissions must be directed to the development of the property as a unified whole. In the case of multiple ownership, the approval of the final plat shall be binding on all owners. In absence of an ownership application, the project developer may submit with the development application the written consent of all property owners within the proposed PUD. The financial commitments incurred through any portion of the development shall be the responsibility of the owner.*

The property owner is listed as the owner or submitted recently executed deed transfers for each of the four subject parcels. The application materials state that a townhome association will be responsible for maintenance of the private roadway and lawn care for the site. Staff recommends that a copy of the executed associated documents be submitted to the City as a condition of approval.

Utilities and Municipal Services

- *154.004(D)(2) Rezoning Standards (e) The proposed amendment can be adequately supported by public urban services including the water supply, transportation system and capacity, police and fire protection, utilities, and sanitary waste disposal and stormwater disposal systems.*
- *154.008(C)(6)(b)(ix) Preliminary PUD Review and evaluation criteria (F). The drainage and utility system plans are submitted to the City Engineer and shall be subject to approval of the City Engineer.*
- *154.008 (C)(4) PUD General Standards (k) Public services. The proposed project shall be served by the city water and sewer system and fire hydrants shall be installed at such locations as required by the City Engineer or the Fire Chief to provide fire protection.*
- *154.008 (C)(4) PUD General Standards (g) Utility requirements. Utilities, including telephone and electrical systems, installed within a PUD shall be placed underground. Utility appurtenances which can be effectively screened may be exempt from this*

requirement if the city finds that such exemption will be consistent with the objective of this section and the character of the proposed PUD.

- *154.010(A) Development Standards (9) Utility installations. All on site utility installations shall be placed underground.*

Revised utility plans were included in the applicant's submittal. Water and sewer mains providing service for the proposed townhomes would extend from existing mains within the 7th Street right-of-way. The City Engineer has reviewed the utility plans and has requested several revisions outlined in the "Engineering Comments" section.

Water, sewer, and storm sewer facilities are shown on the utility plan as located underground. Telephone and electrical systems were not identified on the utility plan. Any utilities not shown on the plan would have to be screened or located underground and would have to be shown on a revised utility plan and submitted for review prior to construction or shown on final PUD plans.

Open Space

- *154.008(C)(6)(b)(ix) Preliminary PUD Review and evaluation criteria. (C) A sufficient amount of usable open space is provided.*
- *154.008 (C)(4) PUD General Standards (n) Open space. Common open space shall be either held in common ownership by all owners in the PUD or dedicated for public use with approval of the City Council. Whenever possible, common open space shall be linked to the open space areas of adjoining developments. Common open space shall be of such size, shape, character, and locations as to be useable for its proposed purpose.*
- *154.010(B)(1)(d) Residential Open Space. Townhouse. Each lot shall contain at least 500 square feet of usable open space for each unit.*

Each of the proposed townhome lots would have a yard area that would qualify as usable open space; each of these areas would exceed the minimum 500 square feet. The plan does not propose any common open space. However, the townhome style of development features yards for each of the individual units which provides needed area for recreational opportunities.

Drainage/Natural Resources

- *154.010(D)(45) Townhouse dwelling Supplemental Standards. (b) Drainage. Drainage shall be provided as required consistent with the city and Watershed District requirements. Any required NURP ponds shall be integrated into the overall plan and proper easement and maintenance agreements shall be provided.*
- *154.010(F) Landscaping Standards (9) Drainage, access & utility easements. No landscape material other than grass, or retaining walls, shall be placed within a drainage, access or utility easement. Rock or riprap may be allowed upon review and approval by the Zoning Administrator provided the proposed material does not interfere with drainage, access or utilities.*

The proposed development includes on-site drainage features including two detention facilities located in areas to the east of the proposed townhome units. The submitted materials include a drainage report which was reviewed by the City Engineer. Several requested revisions or items

of additional information from the applicant related to stormwater are included in the “Engineering Comments” section.

The proposed landscaping plan shows several tree plantings within the proposed drainage and utility easement encompassing the stormwater detention facilities. In accordance with the above noted standard, these plantings will need to be relocated on a revised landscaping plan.

Landscaping

- *154.008 (C)(4) PUD General Standards (j) Landscaping. In any PUD, the developer shall prepare and submit a landscaping plan as a part of the Final Plan, which shall include a detailed planting list with sizes and species indicated to be approved by the City Council. In assessing the landscaping plan, the City Council shall consider the natural features of the particular site, the architectural characteristics of the proposed structures and the overall scheme of the PUD plan.*
- *154.010(F)(3) Tree requirements. (a) Number of trees. Trees must be planted within the property lines and in a location as not to interfere with sight line visibility at maturity. The minimum number of trees of any given site shall be as follows: (i.) Single- and two-family uses. A minimum of one tree per parcel.*
- *154.010(F)(3) Tree requirements. (a) Number of trees. (ii.) Townhouse and multiple family uses. Residential structures containing two or more units shall contain as a minimum: one tree per dwelling unit.*
- *154.010(F)(4) Landscape coverage. All residential district properties are encouraged to have diversified landscaping in addition to the landscaping required in setback areas for free-standing, detached structures. All landscaped areas are encouraged to be developed with live deciduous and coniferous plants, grass, trees, and shrubs which provide a variety of color, texture, height, and forms consistent with the needs of the site and other elements of the plan. The landscaped areas may contain, but not limited to, some decorative stones, wood, patio blocks, sculptures, and other appropriate ornamental features. Overall composition and location of landscaped areas shall complement the scale of the development and its surroundings. In general, larger, well-placed contiguous planting areas shall be preferred to smaller, disconnected areas. The following zoning classifications will have the following percentage of the lot landscaped: (b) R-2 District. All areas, except for buildings, driveways and approved parking areas, shall be landscaped as described above. Landscaping may include retaining the natural landscape where appropriate. At least 50% of the front yard must be landscaped.*
- *154.010(F)(5) Required yards and setbacks.*
 - (a) All developed uses shall consist of, but not limited to, a landscaped yard, including grass, plantings, decorative stones, trees and shrubs, along all streets.*
 - (b) Except for driveways, the yard shall extend along the entire frontage of the lot, and along both streets in the case of a corner lot, such yard shall have a depth of at least ten feet.*
 - (c) Required yards and setback areas, except driveways and areas used for accessory structures, shall be graded to final elevations and sodded or seeded and landscaped with grass, plantings, decorative stones, trees and shrubs.*

A landscaping plan was included in the application submittal. The proposed 18 units of townhomes and three single family dwellings requires 21 trees (one tree per residential unit). The proposed landscaping plan shows 25 trees of three species: River Birch, Hackberry, and Sienna Glen Maple. Eight of the proposed trees are located on either side of the proposed roadway serving the townhomes, and three along the west side of 6th Street N in front of the three single-family home sites. Clusters of proposed River Birch plantings are located around the sides of the two stormwater detention facilities. As previously noted, plantings are not permitted within drainage and utility easements, therefore said plantings must be relocated on a revised landscaping plan.

The areas of the site aside from roadways, driveways, and buildings are shown as residential turf grass. As noted above, several the front yard areas would not comply with the hard-surfacing requirements. A reduction in this requirement could be provided through the PUD process, since this would allow for groupings of wider driveways to accommodate guest parking.

Screening

- *154.010 (A) Development Standards (12) Storage of trash. (a) Residential uses. There shall be no front yard storage of trash or trash containers except in the 24 hour period prior to a scheduled pickup in residential districts.*
- *154.010(D)(45) Townhouse dwelling Supplemental Standards. (c) Projecting air conditioning and heating units. Air conditioning or heating units shall not project through exterior walls or windows unless located behind a balcony and screened from view.*
- *154.010(D)(45) Townhouse dwelling Supplemental Standards. (d) Transformers. If located outside, shall be screened from view.*
- *154.010(D)(27) Townhouse dwelling Supplemental Standards. (e) Utilities. Building utility services and structures such as meters, transformers, refuse containers, including dumpsters, ancillary equipment and the like shall be either located inside the principal building, inside an accessory building, or, where allowed, be outside and entirely screened from off-site views. For new buildings, all utilities shall be underground.*
- *154.010(E)(3) General Architectural requirements. (b) Utilities. Building utility services and structures such as meters, transformers, refuse containers, including dumpsters, ancillary equipment and the like shall be either located inside the principal building, inside an accessory building, or, where outside be entirely screened from off-site views. For new buildings, all utilities shall be underground.*

If meters, transformers, refuse containers are to be placed outside, they must be screened from view and shown on revised plans submitted with the final PUD. If projecting air conditioning and/or heating units are to be used, they must be shown on the building elevations submitted with the final PUD.

Lighting

- *154.010(A) Development Standards (7) Outdoor lighting. All outdoor lighting shall be directed away from adjoining property and from the street unless globe lighting is used. Bare incandescent light bulbs shall not be permitted in view of adjacent property or the*

public right-of-way, except decorative holiday lights having 7.5 watts or less. No exterior lighting shall exceed 0.4 foot candles at the lot line. Yard lights shall not be closer than five feet from the property line, provided the direct source of light is not visible from the public right-of-way or adjacent residential property.

No exterior lighting is shown on the plans. If exterior lighting is proposed, a lighting plan needs to be submitted with the final PUD.

Streets and Sidewalks

- *154.008 (C)(4) PUD General Standards (i) Street width. Requirements outlined in the subdivision ordinance for street widths may be relaxed depending on the number of off-street parking locations and the anticipated density in the planned unit development. The Planning Commission, City Engineer and city's Emergency Services (Fire, Ambulance and Police) shall review each planned unit development to determine street width requirements.*
- *154.010(A) Development Standards (22) Sidewalks and trails. Complete plans shall be provided for proposed sidewalks and trails to serve parking, recreation and service areas within developments and to link to the city's system.*
- *154.010(E)(3) General Architectural requirements (e) Pedestrian ways. Buildings shall be designed with proper provision and orientation for a pedestrian system to serve and link development.*

The proposed private street is shown as being 26 feet in width. A cul-de-sac with a radius of 40 feet would be provided at the eastern termini of the townhome lots.

No proposed sidewalks are included in the plans; however this area of the City does not have sidewalks with which to connect. The Commission may wish to consider requiring the installation of a sidewalk along 7th Street N so that the development is ready to connect to any future sidewalks installed as part of a street reconstruction project or other redevelopment in the area.

Parking

- *154.008 (C)(4) PUD General Standards (h) Parking. Off-street parking and loading space shall be provided in each PUD in the same ratios for types of buildings and uses as required in the underlying zoning district.*
- *154.010(J)(3) General Parking Standards. (a) Minimum size regulations. Each space shall contain a minimum area of not less than 180 square feet, exclusive of access drives, a width of not less than nine feet and a depth of not less than 20 feet. Each space shall be adequately served by access drives as determined by the Zoning Administrator. All loading spaces shall be sufficient to meet the requirements of each use and shall provide adequate space for storage and maneuvering of the vehicles they are designed to serve. Parking ramps and underground parking may be allowed to have some reduction in the dimensions stated above.*

- *154.010(J)(9) Off-street parking standards for residential districts. (c) Setbacks. New driveways and off-street parking shall be set back a minimum of three feet from side property lines.*
- *154.010(J)(9) Off-street parking standards for residential districts. (e) Driveways, authorized parking areas, and authorized garages.*
 - i. Driveways must lead to and abut a vehicle access door having a width of at least eight feet. Driveways must not exceed a 22 foot maximum width at the property line.*
 - iv. Required number of off-street parking spaces. The minimum number of off-street parking spaces are located in Table 8.*

A Summary of the requirements in Table 8 is provided below for single-family and townhome uses.

Use	Requirement	Proposed
Townhouse Dwelling Residential- Family Living	2 per dwelling unit.	18 units with two car garages: 36 stalls
Single Family Dwelling Residential- Family Living	2 per dwelling unit.	3 dwellings with two car garages: 6 stalls

Each of the townhome units would have a driveway leading to an attached 22' by 22' two-car garage. Driveways would be shared between adjoining units; as such they would conflict with the 3-foot side setback. Through the PUD form of approval, this setback requirement may be reduced to allow the shared driveways which are common for townhouse-style developments. In this case, the pairing of driveways creates a greater concentration of green area in the front yard.

Access and Circulation

- *154.008(C)(6)(b)(ix) Preliminary PUD Review and evaluation criteria. (B) The interior circulation plan plus access from and onto public rights-of-way does not create congestion or dangers and is adequate for the safety of the project resident and the general public.*
- *154.010(D)(45) Townhouse dwelling Supplemental Standards. (a) Access. Each townhouse unit shall have direct vehicle access from the garage and driveway to a public road or to an improved private road meeting the requirements of the city.*
- *154.010(D)(45) Townhouse dwelling Supplemental Standards. (f) Public roads. Each townhouse development shall have direct vehicle access to a public road.*
- *154.010(F) Landscaping requirements (8) Traffic visibility. In order to provide a clear view of intersecting streets to motorists, a triangular area of clear vision formed by the two intersecting streets and driveways and a line connecting said centerlines, shall be kept clear of visual obstruction, as specified below.*
 - (a) Within any vision clearance triangle, screening, plantings, walls, fences or other obstructions are not permitted between a height of 30 inches and ten feet above the curb level, with the exception of fences with a maximum of three feet in height and at least two-thirds open to vision.*
 - (c) At the intersection of a private drive or alley with a street, the line shall extend a minimum of ten feet from the intersection of the street and alley or drive property lines.*

According to the Institute of Transportation Engineers' (ITE) Trip Generation Manual townhomes are associated with a daily trip rate of 5.86 trips per unit, which is a lower rate than single-family residences. The 18 proposed units would be expected to generate 105 trips per day. This traffic would originate from the private drive, which feeds into 7th Street N. This volume of traffic is not anticipated to create any congestion or dangers.

Each of the proposed townhome units would have a driveway out to the private road that appears to be 22 feet in width leading to an attached garage. Lastly, the vision triangle at the intersection of the private drive and 7th Street N is clear of landscaping.

Architecture

- *154.008(C)(6)(b)(ix) Preliminary PUD Review and evaluation criteria. (D) The architectural design of the project is visually compatible with the surrounding area. Architectural style or type of buildings shall not solely be a basis for denial or approval of the preliminary PUD plan. However, the overall appearance and compatibility of individual buildings to other site elements of surrounding development will be given primary consideration in the review stages of the Planning Commission and City Council.*
- *154.010(E)(3) General Architectural requirements (f) Pedestrian-oriented design. Building designs are encouraged to make the street enjoyable, visually interesting and comfortable. Individual buildings should be integrated with the streetscape to bring activity in the building in direct contact with the people on the street.*
- *154.010(E)(4) Architectural control. (a) Single-family dwelling. i. Shall be designed to consist of exterior materials compatible with residential development in the area with due regard to architectural quality and the massing of structures.*
- *154.010(E)(4) Architectural control. (b) Two-family dwelling, townhouse dwelling and modular housing:*
 - i. Shall be designed to consist of exterior materials compatible with residential development in the area with due regard to architectural quality and the massing of structures.*
 - ii. Number of units. There shall be no more than five townhouse units attached in any one group or building. For unique designs involving special circumstances, a greater number may be allowed, provided views, windows (in at least three directions for each unit), privacy and line of sight are preserved in the design.*
 - iii. Modulation, length. The building and units shall be modulated to provide interest.*
 - iv. Diversity. Townhouse groupings shall provide diversity in terms of size, type and building orientation and form.*
 - v. Equipment. All building equipment shall be hidden from view. Building vents and chimneys shall consist of similar materials to the building roof and the sides of the building.*

For a preliminary Planned Unit Development, a full architectural submittal is not required by the Ordinance. Additional architectural submittals are required for final PUD review. The applicant did however provide an architectural rendering indicative of the two-unit buildings. The rendering shows a one-story pitched roof structure, with multiple styles of siding, with stone

accents. The character of the proposed townhome structure is traditional in appearance and consistent with residences in the vicinity.

As previously noted, the townhomes are in two-unit groupings, and all appear to be similar in terms of size, building orientation and form, and are not varied in terms of building and unit modulation. The applicant will need to work with staff to address these architectural guidelines while preparing final PUD plans, however, staff finds that for the purposed of preliminary PUD review, the architecture is compatible with surrounding development.

Development Process and Timeframe/Phasing

- *154.008(C)(6)(b)(ix) Preliminary PUD Review and evaluation criteria. (G) The development schedule insures a logical development of the site which will protect the public interest and conserve land.*
- *154.008 (C)(4) PUD General Standards (m) Development agreement. Prior to the issuance of a building permit as part of the PUD, the permit applicant, builder, or developer shall execute and deliver to the City Council a development agreement for the PUD.*

The developer states that the project would move forward as a single phase. A development agreement would need to be completed with the final PUD.

Engineering Comments:

General:

1. A Developer's Agreement with the City will be required to be executed which will define public and private infrastructure ownership and maintenance responsibilities, as well as define required financial securities to be provided by the developer, typically covering 125% of the estimated cost of the public and private improvements proposed within the final approved development plan, and landscaping requirements, as determined by the City Engineer. For consideration by the City Engineer, the applicant shall submit an itemized engineer's estimate representing all work proposed to be completed as part of the development.
2. Public drainage and utility easements shall be dedicated on the final plat to the satisfaction of the City Engineer.
3. Sanitary sewer and watermain extensions shall be owed and maintained by the City and constructed by the applicant at the applicant's cost.
4. All storm water management infrastructure and the private road shall be privately owned and maintained. It is staff's understanding that a Homeowner's Association (HOA) will be created to take on maintenance responsibilities of private infrastructure within the development.
5. Final hydrant locations shall be approved by the Fire Chief. In the currently proposed configuration, the 24' width provided to the private access road will require posting for no on-street parking on one side to maintain emergency access.
6. A haul route plan and a traffic control/detour plan for utility work on 6th and 7th Streets shall be submitted for review and approval prior to permit issuance.
7. The applicant is responsible for and shall provide copies of all applicable permitting for the project prior to grading permit (mass grading) and/or building permit issuance,

including but not limited to RWMWD and Minnesota Pollution Control Agency (MPCA) NPDES stormwater construction, MPCA/Metropolitan Council sanitary sewer extension, and Minnesota Department of Health watermain extension permits, as applicable.

8. Building permits will not be issued until site grades and utility installations are verified to be in conformance with the approved overall development grading and utility plan through submittal and approval by the City Engineer of a certified grading and utility as-built record plan. Individual lot survey as-builts will also be required to be submitted and approved by the Building Official prior to release of Certificate of Occupancy for each lot.
9. City Standard Plates and Specifications shall supersede all submitted details and specifications for work within the right of way and public infrastructure.
10. Additional engineering comments will be provided upon submission of revised plans and stormwater calculations for review by the applicant prior to City Council consideration of approval.

Sheet C01:

1. Expand the drainage and utility easement on Lot 10 to the north in order to provide access to the sanitary manhole 1 located between Lots 10 and 11.

Sheet C10:

1. The note regarding water and sewer service removals shall apply to the four locations along 7th Street North.

Sheet C20:

1. Excessively steep grades between Lots 14 and 15. Consider holding down the grade or the use of retaining walls to direct drainage away from buildings.
2. The swale behind Lots 1 and 2 is less than 2% minimum grade.
3. Lot 1 is shown as FB and appears to be a LO.
4. The retaining wall on lot 4 is in the drainage and utility easement.
5. Contour 954 is shown incorrectly on Lot 4.
6. Drainage swales on Lot 7 and Lots 13 through 18 are outside of the drainage and utility easements.
7. Open trench repairs on the sanitary sewer located between Lots 10 and 11 will not be feasible due to the proposed grade.
8. Direct drainage away from the building on Lot 18.
9. Move the drain tile so that it is located within the drainage and utility easement.
10. Show the eastern property line of Lots 10 and 11.
11. Maximum allowable slope is 3:1.
12. Show the following:
 - a. Rim/inlet elevations
 - b. High points between buildings

Sheet C30:

1. Note 1/C72 is shown in the wrong location.
2. Show sanitary and watermain in plan view (similar to storm on Sheet C40).

Sheet C40:

1. Verify size and material of existing watermain in 7th Street.
2. Address bends in the sanitary sewer services.
3. Call out fitting types on watermain bends.
4. Show the water service to Lot 8.
5. Does the angle between the water main and sanitary sewer main crossing meet MDH standards?
6. Sanitary manhole 2 is shown extending above the proposed ground surface.
7. The drainage and utility easement over the sanitary sewer is 20' wide while the sewer is 14' deep. Typically, the width required is twice the depth. See comment 7 for Sheet C20.
8. Ford A1 castings will be required for curb stops located in driveways.
9. Show rim and inert elevation of existing manhole located in 6th Street.
10. Show the sanitary sewer service location for Block 3, Lot 3.

Sheet C70:

1. Use North St. Paul details where applicable. Include a detail for the pavement section for pavement patching of 6th and 7th Streets in addition to a typical section for the private access road.

Stormwater:

1. Freeboard requirements are not being met for the three proposed structures in Block 3 with respect to Infiltration Basin 1. The City requires two feet of separation between the HWL of adjacent ponding features and the low opening of proposed structures. Additionally, one foot of separation is required between the emergency overflow and the low opening of proposed structures.
2. It appears that freeboard requirement is not being met for the existing home east of Infiltration Basin 2 (2243 6th St N) with respect to the basin's HWL (945.9). The Alta survey indicates the FFE on the front of the existing house is at 948.73, however from Google maps it appears there are egress windows on the north side of the building that would act as the low opening. Based on the Alta survey it is assumed the egress windows are around 945.84.
3. Applicant noted rate control was not being met for the 2-year storm event. Applicant will be held to meeting rate control for all storm events, including the 2-year.
4. Provide rational method storm sewer sizing calculations.
5. The drain tile outlet and the riprap for FES 1 are shown crossing property boundaries. Applicant will be required to confirm that the City will allow the use of City property for this use.
 - a. Additionally, confirm the proposed drain tile outlet does not conflict with the existing sanitary sewer directly north of the existing pond.
6. The OCS grate should be included in the HydroCAD model for Infiltration Basin 1 as the HWL (945.7) is above the OCS grate elevation (945.5).
7. It is recommended 18" of filter topsoil borrow be placed above the underdrain within the filtration basins per the Minnesota Stormwater Manual.
8. It is recommended a second line of underdrain is placed within the filtration basins for redundancy per the Minnesota Stormwater Manual.
9. It is recommended the eastern berm for Infiltration Basin 1 be widened to at least 5 feet.

10. Inlet and outlet to the northern infiltration basin are in close proximity to each other, creating a short-circuiting effect. Consider adjusting these pipes.

RECOMMENDED ACTION

Based on the findings described in this report, staff recommends the following actions:

Approval of the requested rezoning from R-1 Single Family Residential District to R-2 Mixed Residential District.

Conditional Approval of the proposed Preliminary Plat subject to the following conditions of approval:

- a. Payment of park dedication fees.
- b. Additional easement area provided on Lot 10 to the north in order to provide access to the sanitary manhole 1 located between Lots 10 and 11.
- c. Public drainage and utility easements dedicated on the final plat to the satisfaction of the City Engineer.
- d. Positive Action by the City Council on the Rezoning of the property from R-1 to R-2 and the Planned Unit Development.

Conditional Approval of the proposed Preliminary Residential Planned Unit Development (PUD) subject to the following conditions of approval:

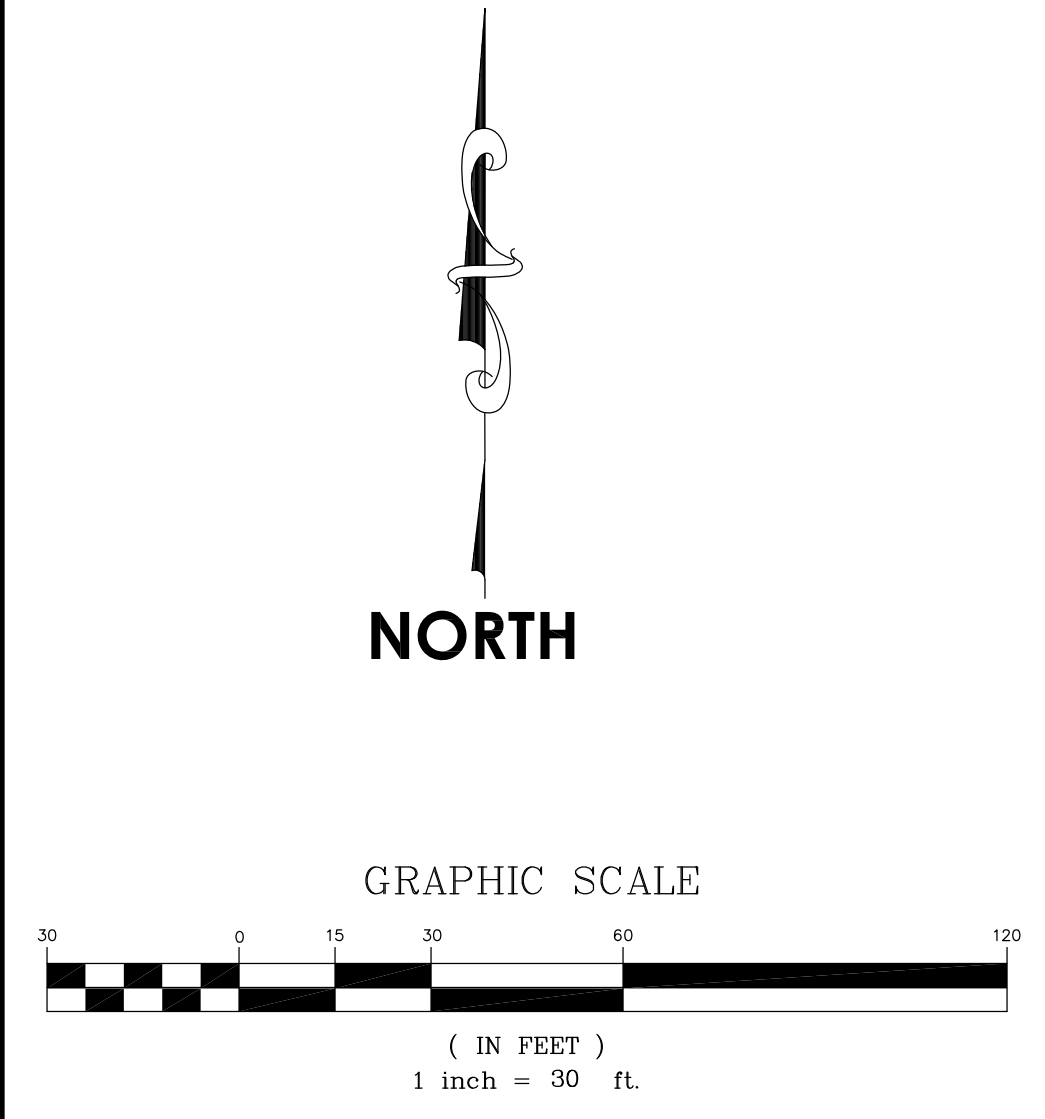
- a. A Developer's Agreement must be developed with the City Attorney and submitted with the final PUD
- b. The applicant shall submit an itemized engineer's estimate representing all work proposed to be completed as part of the development.
- c. A copy of the executed townhome association documents shall be submitted to the City.
- d. Revisions to the preliminary plat, utility, drainage, and stormwater plans per the City Engineer's comments
- e. Sanitary sewer and watermain extensions shall be owed and maintained by the City and constructed by the applicant at the applicant's cost.
- f. All storm water management infrastructure and the private road shall be privately owned and maintained.
- g. Final hydrant locations shall be approved by the Fire Chief. In the currently proposed configuration, the 24' width provided to the private access road will require posting for no on-street parking on one side to maintain emergency access.
- h. A haul route plan and a traffic control/detour plan for utility work on 6th and 7th Streets shall be submitted for review and approval prior to permit issuance.
- i. The applicant is responsible for and shall provide copies of all applicable permitting for the project prior to grading permit (mass grading) and/or building permit issuance, including but not limited to RWMWD and Minnesota Pollution Control Agency (MPCA) NPDES stormwater construction, MPCA/Metropolitan Council sanitary sewer extension, and Minnesota Department of Health watermain extension permits, as applicable.
- j. Building permits will not be issued until site grades and utility installations are verified to be in conformance with the approved overall development grading and utility plan

through submittal and approval by the City Engineer of a certified grading and utility as-built record plan.

- k. Individual lot survey as-builts are required to be submitted and approved by the Building Official prior to release of Certificate of Occupancy for each lot.
- l. City Standard Plates and Specifications shall supersede all submitted details and specifications for work within the right of way and public infrastructure.
- m. Additional engineering comments will be provided upon submission of revised plans and stormwater calculations for review by the applicant prior to City Council consideration of approval.
- n. If exterior lighting is proposed, a lighting plan demonstrating compliance with the applicable standards must be submitted with the final PUD.
- o. Relocation of the plantings within the utility and drainage easement.
- p. If meters, transformers, refuse containers are to be located outside, they must be screened from view and shown on revised plans submitted with the final PUD.
- q. If projecting air conditioning and/or heating units are to be used, they must be shown on the building elevations submitted with the final PUD.
- r. Any utilities not shown on the plan would have to be screened or located underground and would have to be shown on a revised utility plan with the final PUD.
- s. Architectural details added to the final PUD to demonstrate conformance with architectural standards.

BOUNDARY & TOPOGRAPHIC SURVEY

~for~ ANDRUS BUILT



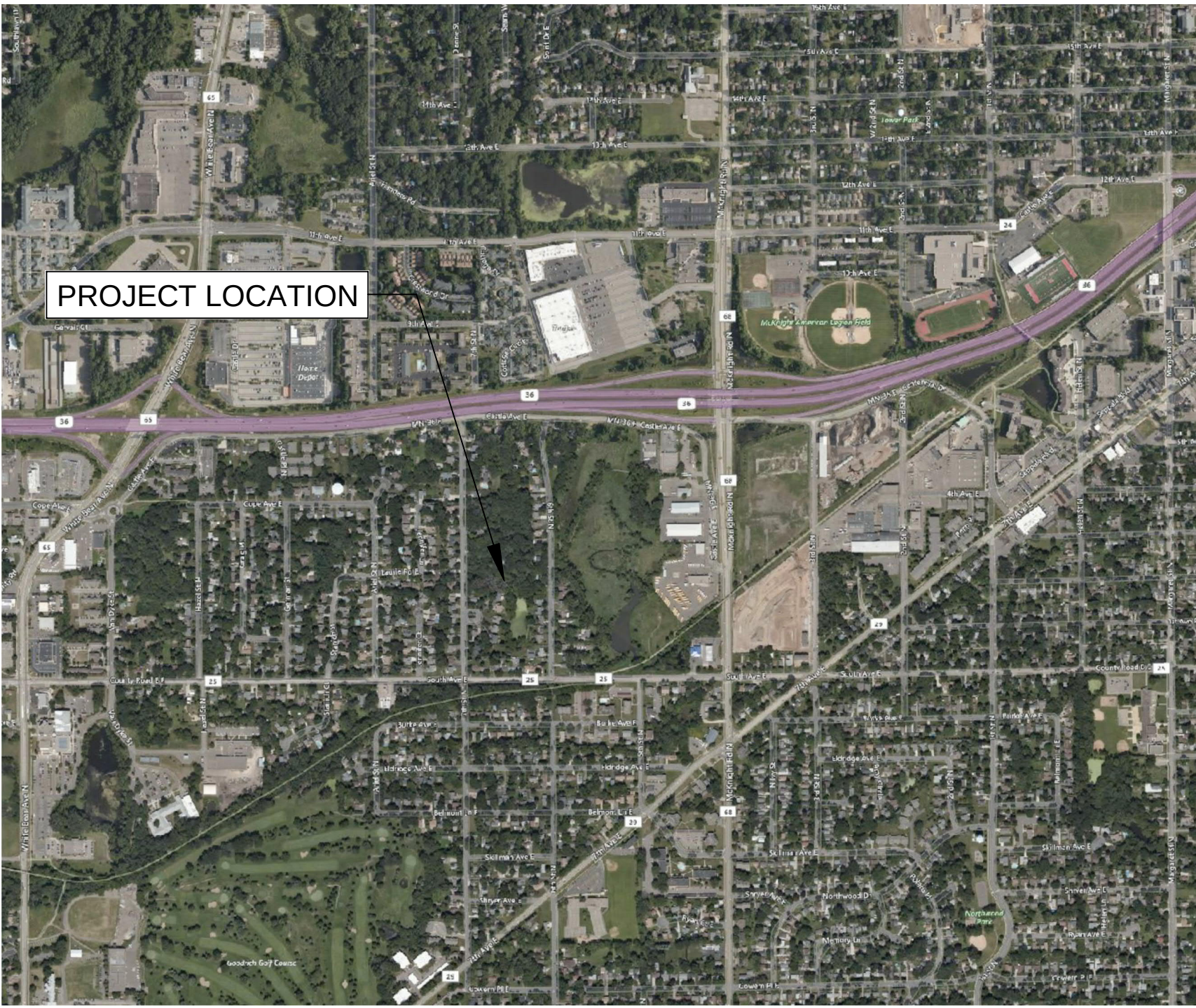
- LEGEND**
- DENOTES IRON MONUMENT FOUND
 - DENOTES IRON MONUMENT SET
 - DENOTES UTILITY POLE
 - DENOTES UTILITY BOX
 - ⊙ DENOTES MISCELLANEOUS MANHOLE
 - ⊙ DENOTES SANITARY SEWER MANHOLE
 - ⊙ DENOTES STORM SEWER MANHOLE
 - ⊙ DENOTES CATCH BASIN
 - ⊙ DENOTES GATE VALVE
 - ⊙ DENOTES FIRE HYDRANT
 - DENOTES EXISTING CONTOUR
 - DENOTES OVERHEAD WIRE
 - DENOTES UNDERGROUND ELECTRIC
 - DENOTES WATERMAIN
 - DENOTES SANITARY SEWER
 - DENOTES STORM SEWER
 - DENOTES EXISTING FENCE
 - x1011.2 DENOTES EXISTING ELEVATION.

BENCHMARK
TOP NUT FIRE HYDRANT AT NW QUADRANT OF INTERSECTIONS OF COUNTY ROAD B EAST & 6TH STREET NORTH. ELEVATION = 947.27 (PER CITY ENGINEER RECORDS, DATUM UNKNOWN).

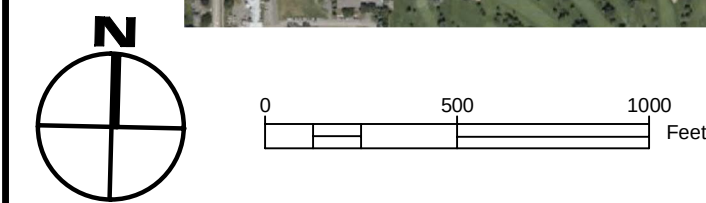
LEGAL DESCRIPTION
Parcel A:
Outlot B, SAUERS POND, Ramsey County, Minnesota. (PID 112922430109)
Parcel B:
The East 50 feet of the West one-half of the East one-half of the South one-half of Lot 24, Castle Wood, Ramsey County, Minnesota. (PID 112922430008)
Parcel C:
The south one-half of the East one-quarter of Lot 24, Castle Wood, Ramsey County, Minnesota. (PID 112922430023)
Parcel D:
All of Lot 24 in Castle Wood, EXCEPT the East one-quarter thereof, and also except the East 50 feet of the West Half of the East Half of the South Half thereof.

I hereby certify that this survey, plan or report was prepared by me or under my direct supervision and that I am a duly Registered Land Surveyor under the laws of the State of Minnesota.

Eric R. Vickaryous
ERIC R. VICKARYOUS
Date: NOV. 4TH, 2019 Reg. No. 44125



PRELIMINARY PLANS FOR THE
7TH STREET TOWNHOMES
NORTH ST. PAUL, MN
JANUARY, 2020



VICINITY MAP		PROJECT TITLE																					
CONTACTS		INDEX	CERTIFICATION																				
<u>OWNER:</u> Andrus Built, LLC 2440 Charles Street N, Ste 210 North St. Paul, MN 55109 Attn: Doug Andrus Ph: 651.777.0111 doug@andrusbuilt.com <u>CITY:</u> City of North St. Paul 2400 Margaret Street North St. Paul, MN 55109 Ph: 651.747.2595 (P&Z) Morgan Dawley, City Engineer (WSB) Ph: 763.287.7173 mdawley@wsbeng.com <u>SURVEY:</u> Acre Land Surveying, Inc. 9140 Baltimore St NE Ste 100 Blaine, MN 55449 Attn: Eric Vickaryous Ph: (763) 458-2997 acrelandsurvey@gmail.com <u>CIVIL:</u> Civil Methods, Inc. 1551 Livingston Avenue, Ste. 104 West St. Paul, MN 55118 Attn: Dave Poggi, PE Ph: 763.210.5713 dave.poggi@civilmethods.com		<u>SHEET INDEX</u><table><tr><td>T01</td><td>TITLE SHEET</td></tr><tr><td>C01</td><td>PRELIMINARY PLAT</td></tr><tr><td>C10</td><td>EXISTING CONDITION & REMOVALS</td></tr><tr><td>C20</td><td>SITE GRADING</td></tr><tr><td>C30</td><td>STREET & STORM SEWER</td></tr><tr><td>C40</td><td>SANITARY & WATER MAIN</td></tr><tr><td>C50</td><td>EROSION & SEDIMENT CONTROL</td></tr><tr><td>C51</td><td>SWPPP</td></tr><tr><td>C70 - C73</td><td>DETAILS</td></tr><tr><td>L01</td><td>LANDSCAPING</td></tr></table> <u>PLAN REFERENCES:</u> - MINNESOTA DEPT. OF TRANSPORTATION - STANDARD SPECIFICATIONS FOR CONSTRUCTION, 2018 (XXXX) OR Mn/DOT XXXX. - CITY ENGINEERS ASSOCIATION OF MINNESOTA STANDARD SPECIFICATIONS 2013 EDITION. - UNREINFORCED CONCRETE PER ACI 330R-08 AND ACI 330.1-03	T01	TITLE SHEET	C01	PRELIMINARY PLAT	C10	EXISTING CONDITION & REMOVALS	C20	SITE GRADING	C30	STREET & STORM SEWER	C40	SANITARY & WATER MAIN	C50	EROSION & SEDIMENT CONTROL	C51	SWPPP	C70 - C73	DETAILS	L01	LANDSCAPING	THE EXISTING UTILITY INFORMATION SHOWN IN THIS PLAN HAS BEEN SURVEYED BY OTHERS; THE CONTRACTOR SHALL FIELD VERIFY EXACT LOCATIONS PRIOR TO COMMENCING CONSTRUCTION AS REQUIRED BY STATE LAW. NOTIFY 811 OR <u>GOPHER STATE ONE CALL</u> (1.800.252.1166). THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL D. THIS UTILITY QUALITY LEVEL WAS DETERMINED ACCORDING TO THE GUIDELINES OF CI/ASCE 38-02, ENTITLED "STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA." 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.  DAVID M POGGI LICENSE: 44573 DATE: 01-17-2020
T01	TITLE SHEET																						
C01	PRELIMINARY PLAT																						
C10	EXISTING CONDITION & REMOVALS																						
C20	SITE GRADING																						
C30	STREET & STORM SEWER																						
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C70 - C73	DETAILS																						
L01	LANDSCAPING																						

CIVIL METHODS, INC.
1551 Livingston Avenue, Suite 104
West St. Paul, MN 55118
o: 763.210.5713 | www.civilmethods.com



DESIGNED: DMP
DRAWN: DMP
CHECKED: KEB

DATE / REVISION:
01-17-2020 Preliminary Plat Review Set. NOT FOR CONSTRUCTION

OWNER:

ANDRUS BUILT, LLC
2440 CHARLES STREET N, #210
NORTH ST. PAUL, MN 55109

TITLE:

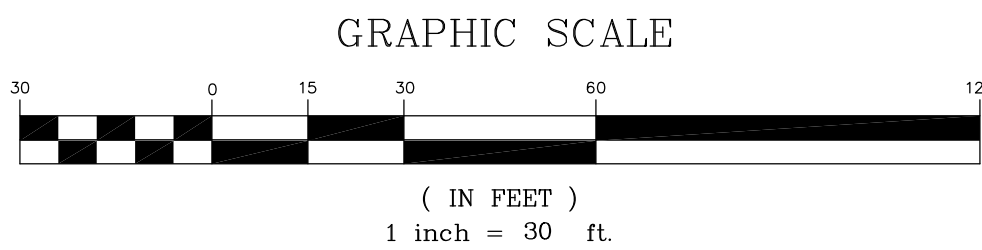
TITLE
7TH STREET TOWNHOMES
2242 7TH STREET, NORTH ST. PAUL, MN

SHEET NO:

T01

PRELIMINARY PLAT OF 7TH STREET TOWNHOMES

for ANDRUS BUILT
EX. HOUSE



NORTH

OUTLOT A

KELLY HEIGHTS

DEVELOPMENT DATA

LAND USE:
SINGLE FAMILY HOMES (R1 ZONING): 0.65± ACRES 3 LOTS (19-21)
PROPOSED DEDICATED (6TH AVE.): 0.05± ACRES
PROPOSED DEDICATED (7TH AVE.): 0.10± ACRES
TOWNHOMES (R2 ZONING-W/ PUD Overlay): 3.43± ACRES 18 LOTS (1-18)

TOTAL: 4.23± ACRES 21 UNITS

P.I.D. #112922430109
P.I.D. #112922430008
P.I.D. #112922430023
P.I.D. #112922430022

- PROPOSED BUILDING SETBACKS: (Proposed R-2 Zoning, Lots 1-18)
FRONT = 20 FEET (back curb to foundation)
REAR = 25 FEET
SIDE = 6 FEET
CORNER SIDE = 15 FEET

- PROPOSED BUILDING SETBACKS: (Proposed R-2 Zoning, Lots 1-18)
FRONT = 25 FEET
REAR = 25 FEET
SIDE = 6 FEET
CORNER SIDE = 15 FEET

EXISTING ZONING: R-1 (SINGLE FAMILY RESIDENTIAL)
TOWNHOMES PROPOSED TO BE REZONED TO R-2 W/ PUD OVERLAY

TREE LEGEND



NOTES

- This survey was prepared without the benefit of titlework. Easement, appurtenances and encumbrances may exist in addition to those shown hereon. This survey is subject to revision upon receipt of a title insurance commitment or attorneys title opinion.
- Only a portion of the trees onsite have been field located.

LEGAL DESCRIPTION

Parcel A:
Outlot B, SAUERS POND, Ramsey County, Minnesota. (PID 112922430109)
Parcel B:
The East 50 feet of the West one-half of the East one-half of the South one-half of Lot 24, Castle Wood, Ramsey County, Minnesota. (PID 112922430008)
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All of Lot 24 in Castle Wood, EXCEPT the East one-quarter thereof, and also except the East 50 feet of the West Half of the East Half of the South Half thereof.

I hereby certify that this survey, plan or report was prepared by me or under my direct supervision and that I am a duly Registered Land Surveyor under the laws of the State of Minnesota.

Eric R. Vickaryous
ERIC R. VICKARYOUS

Date: January 17th, 2020 Reg. No. 44125

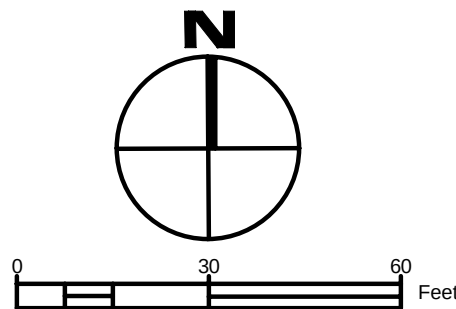
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JOB #19242

SHEET C01

ACRE LAND SURVEYING
Serving Twin Cities Metro
area and beyond
763-458-2997 acrelandsurvey@gmail.com

BENCHMARK
Hydrant at NW corner of property (7th Street)
TNH = 962.32



LEGEND:

PROPERTY LINE	---
EASEMENT	- - - -
CONTOUR	---○---
STORMWATER BMP	[Symbol]
SPOT ELEVATION, FINAL GRADE	[Symbol]
DRAINAGE DIRECTION W/ SLOPE	---X---
PERFORATED UNDERDRAIN	---○---
TREE PROTECTION FENCE	[Symbol]
RETAINING WALL	[Symbol]
DETAIL NO. / SHEET NO.	[Symbol]

GENERAL NOTES:

- The subsurface utility location information in this plan is utility quality level D. This utility quality level was determined according to the guidelines of C/ASCE 38-02, titled "Standard Guidelines for the Collection and Depiction of Existing Subsurface Utility Data." Engineer does not guarantee the accuracy of utility locations or that all existing utilities are shown.
- See Preliminary Plat for proposed parcel nomenclature and easements.
- Contractor is responsible for locating utilities prior to digging.
- Construction shall comply with all applicable governing codes.
- Contractor is solely responsible for jobsite conditions, including safety of all persons and property throughout the duration of the project (not limited to working hours).
- Damaged items or property not identified for removal shall be repaired or replaced at Contractor's expense; no extra compensation will be allowed for repair or replacement not indicated on plans or agreed upon with prior written authorization from the Owner.
- Contours shown to finished grade.
- Point elevations shown at flow line, unless otherwise noted.

INFILTRATION BASIN NOTES:

- Notify Nicole Soderholm (651.792.7976) at Ramsey Washington Metro Watershed District 48 hours prior to beginning construction of infiltration basin.
- Excavate infiltration basin to subgrade with light-weight equipment or from outside the basin footprint to minimize compaction.
- The native topsoil in the basin bottom shall be subcut a minimum of 12" and replaced with a loamy sand-topsoil mix with minimal clay content. 50-60% coarse sand is ideal. Onsite borrow may be suitable, but care must be taken to ensure minimal compaction (infiltration shall be verified after construction to ensure adequate drawdown; if basin does not draw down within 48 hrs it will be reworded at Contractor's expense).
- After final grading and prior to seeding, the basin bottom shall be decompacted by tilling or ripping 12-18" deep (min.).
- Prevent sheet flow from disturbed unvegetated areas from entering the graded basin directly; install sediment control log around top of basin (to remain in place until upslope area is completely vegetated and homes constructed).
- Plant native prairie grass seed and blanket / hydromulch bottom and sideslopes (to overflow) of infiltration basin.



Know what's below.
Call before you dig.

CIVIL METHODS, INC.
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West St. Paul, MN 55118
o: 763.210.5713 | www.civilmethods.com

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.

DAVID M POGGI
DATE: 01-17-2020
LIC. NO.: 44573

DESIGNED: DMP
DRAWN: DMP
CHECKED: KEB

DATE / REVISION:
01-17-2020 Preliminary Plat Review Set. NOT FOR CONSTRUCTION

OWNER:

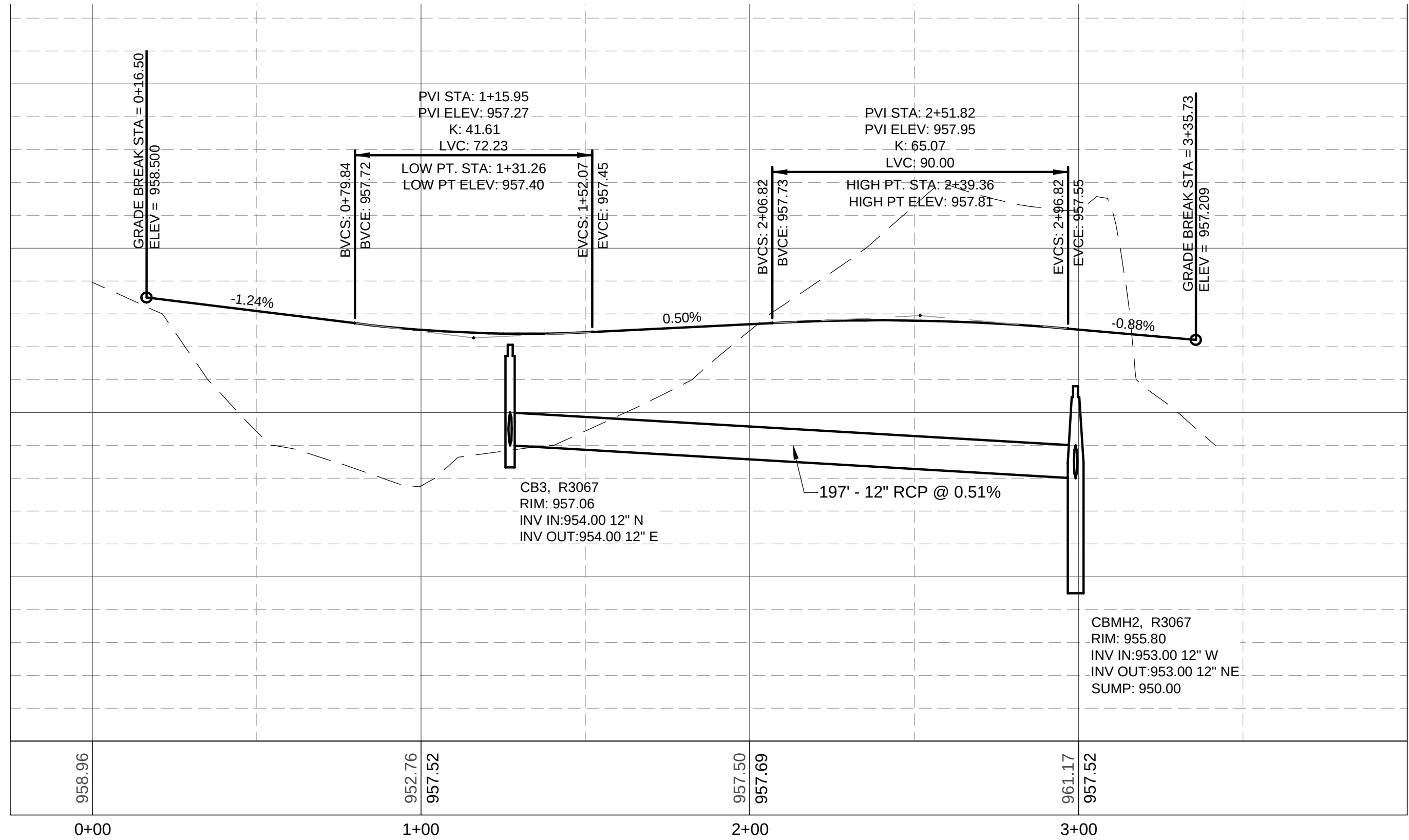
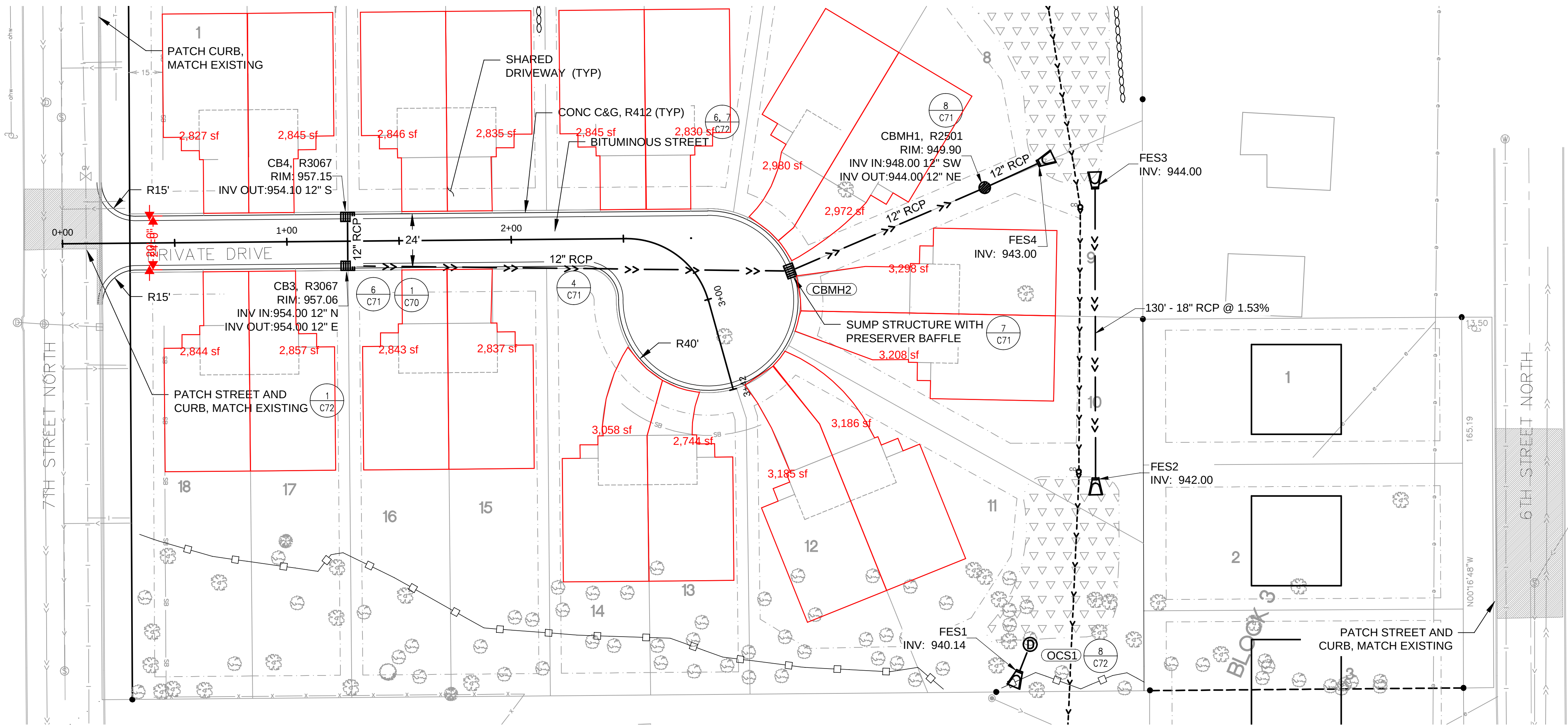
ANDRUS BUILT, LLC
2440 CHARLES STREET N, #210
NORTH ST. PAUL, MN 55109

TITLE:

SITE GRADING
7TH STREET TOWNHOMES
2242 7TH STREET, NORTH ST. PAUL, MN

SHEET NO.:

C20



BENCHMARK
Hydrant at NW corner of property (7th Street)
TNH = 962.32

LEGEND:

PROPERTY LINE	---
EASEMENT	---
CURB & GUTTER	---
BITUMINOUS STREET PATCH	---
SANITARY SEWER	---
STORM SEWER	---
PERFORATED UNDERDRAIN	---
STORMWATER BMP	---
TREE PROTECTION FENCE	---
DETAIL NO. / SHEET NO.	---

GENERAL NOTES:

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- Contractor shall coordinate utility connections and street disturbance with City; traffic control requirements as directed by City.
- Dimensions shown to back of curb, unless noted otherwise.
- Saw cut existing pavement full-depth to provide clean face for pavement patch.
- Storm sewer to be of type indicated; end sections shall be RCP.
- Rim elevations shall be 0.05' below pavement grade in paved areas.



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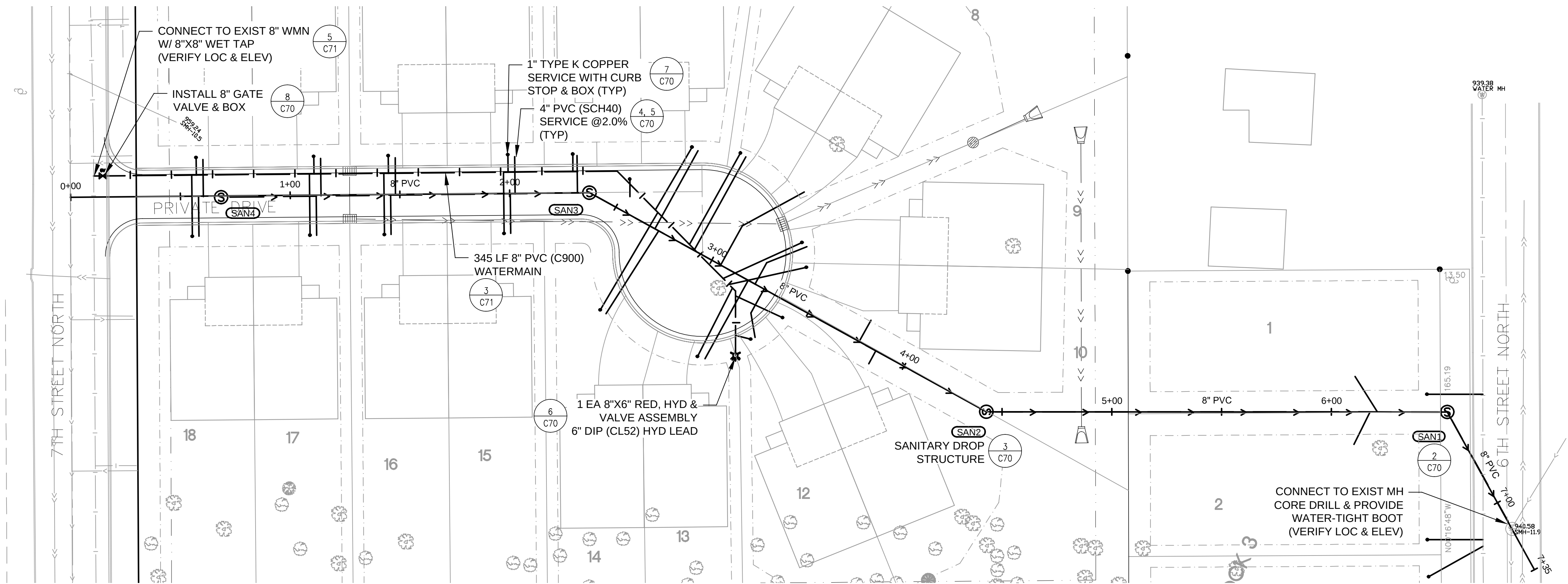
ANDRUS BUILT, LLC
2440 CHARLES STREET N, #210
NORTH ST. PAUL, MN 55109

TITLE:

STREET & STORM SEWER
7TH STREET TOWNHOMES
2242 7TH STREET, NORTH ST. PAUL, MN

SHEET NO:

C30



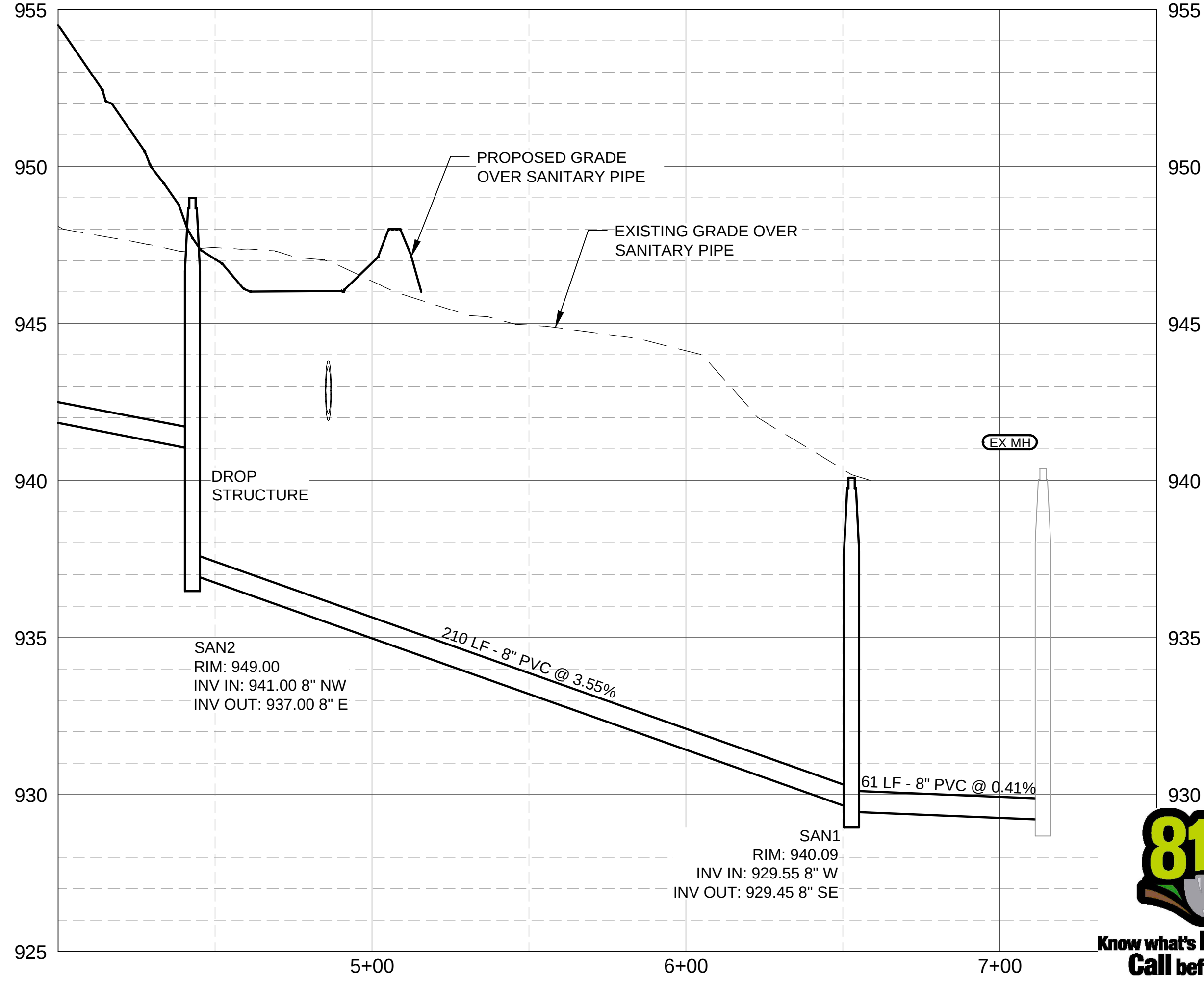
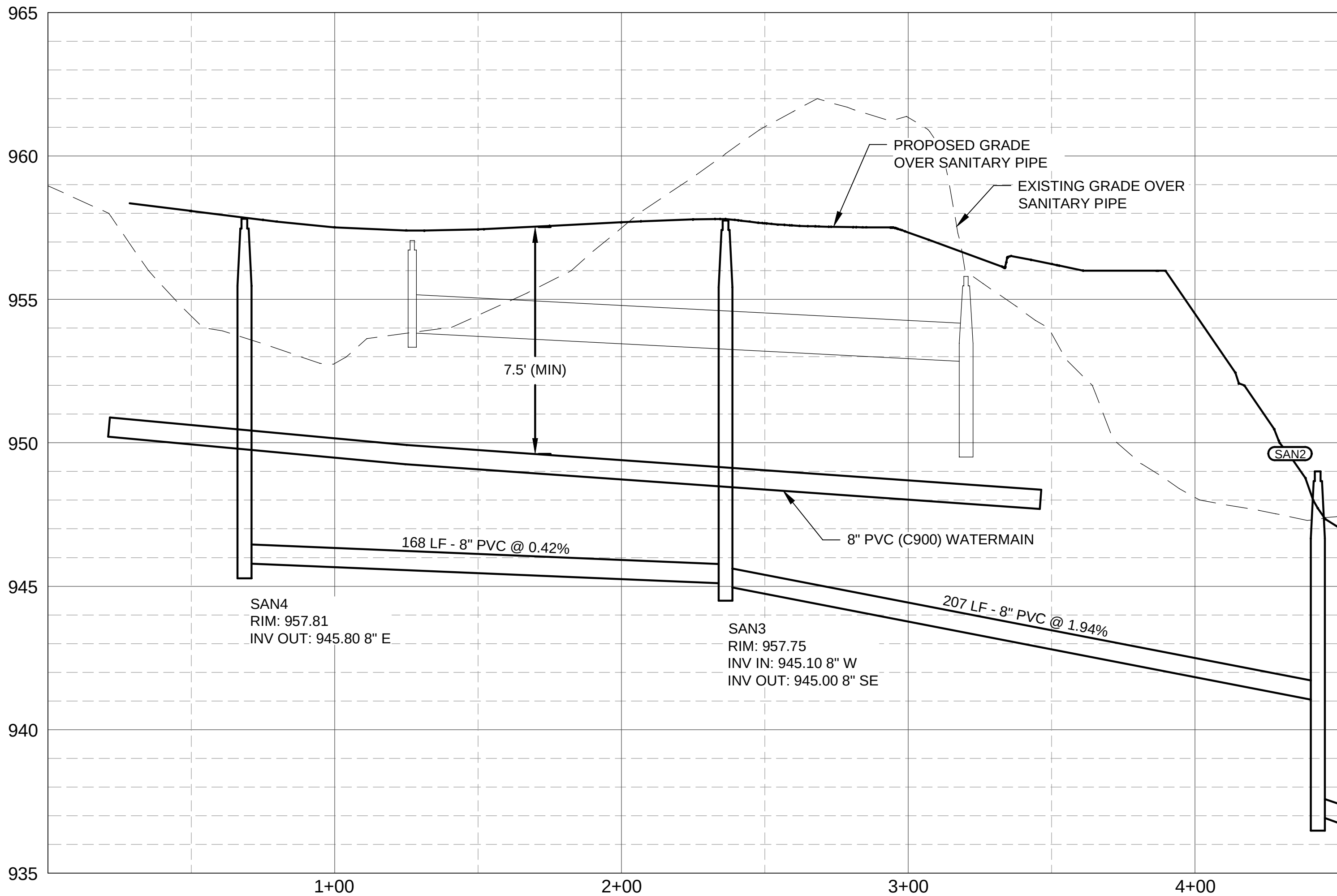
BENCHMARK
Hydrant at NW corner of property (7th Street)
TNH = 962.32

LEGEND:

- PROPERTY LINE
- EASTMENT
- SANITARY SEWER
- WATERMAIN
- SANITARY CLEANOUT
- SANITARY MANHOLE
- DETAIL NO. / SHEET NO.

GENERAL NOTES:

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- Contractor shall coordinate utility connections and street disturbance with City; traffic control requirements as directed by City.
- Protect light poles and other existing utilities, signs, trees, etc. Relocation of any private utilities not directed on these plans shall be coordinated with the utility owner.
- Damaged items or property shall be repaired or replaced at Contractor's expense.
- Watermain pipe shall be PVC, C900 pressure pipe; maintain 18" separation (min.) at crossings (less than 18" separation requires insulation).
- Water service pipe shall be 1" copper, Type K, with curb stop.
- Sanitary sewer shall be 8" PVC (SDR 35).
- Service laterals shall be PVC (Sch40) extended to 5.0' past the lot line, plugged with a gasketed plug, and marked with a steel post with top 2" painted green.
- Sanitary 4" PVC services not be laid flatter than 2.0%.
- All sanitary and water pipe and services shall have a minimum of 7.5' cover.
- Maximum spacing of sanitary cleanouts shall be 100'.
- Sanitary and water mains to be tested per City requirements.



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DAVID M POGGI

DATE: 01-17-2020

UC NO.: 44573

DESIGNED: DMP

DRAWN: DMP

CHECKED: KEB

DATE / REVISION:
01-17-2020 Preliminary Plat Review Set. NOT FOR CONSTRUCTION

OWNER:

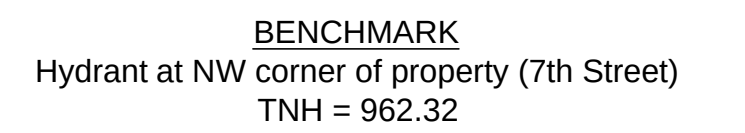
ANDRUS BUILT, LLC
2440 CHARLES STREET N, #210
NORTH ST. PAUL, MN 55109

TITLE:

SANITARY & WATERMAIN
7TH STREET TOWNHOMES
2242 7TH STREET, NORTH ST. PAUL, MN

SHEET NO:

C40

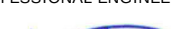


PROPERTY LINE	
EASEMENT	
CONTOUR	
INFILTRATION BASIN, PLANTINGS / SEED	
ROCK RIPRAP, RANDOM CRUSHED	
STABILIZED CONST. ENTRANCE	
EROSION CONTROL BLANKET	
SILT FENCE	
SEDIMENT CONTROL LOG	
INLET PROTECTION	
DETAIL ID: NO. / SHEET	

1. Notify Nicole Soderholm (651.792.7976) at Ramsey Washington Metro Watershed District prior to beginning construction activity.
2. See SWPPP sheet for additional information; Contractor is responsible for obtaining MPCA NPDES Construction Stormwater Permit prior to disturbance.
3. Install construction entrance and perimeter controls prior to beginning grading operations. Additional stabilized entrances may be used; all construction traffic must enter and exit site through stabilized entrance.
4. Topsoil and erosion control items shall conform to Mn/DOT 2574-2575.
5. A minimum of 4" of topsoil shall be placed in all green space.
6. Erosion control blanket, Mn/DOT Cat.3 (3885) shall be installed as indicated.
7. Inlet sediment control shall be in place during all phases of construction and until site is seeded and mulched. Type shall be as appropriate depending on construction phase.
8. Sod or seed areas to be mowed / maintained with low-maintenance turf, Mn/DOT Mix 25-131 (3876) or as directed by Owner.
9. Seed infiltration basin bottom and sides with native wet & dry-tolerant seed, Mn/DOT Mix 33-261. Alternatively, "rain garden" plant plugs may be installed for immediate establishment of vegetation.
10. Seed natural areas with general roadside Mn/DOT Mix 25-141 or alternate prairie mix.
11. All seeded areas, including infiltration basin shall be seeded (or planted) and covered with hydraulic mulch matrix (3884.B2) or blanket (Cat. 0), unless noted otherwise.
12. Sediment control logs shall be minimum 6" diameter and installed as indicated. Logs may be straw, wood, or fiber (no compost) (3897).
13. Install sediment control log around top of infiltration basin on side adjacent to construction after final grading; remove after vegetation established on all disturbed areas.
14. Random crushed geotextile fabric per Mn/DOT 3601 shall be of class and quantity as indicated, and shall include geotextile fabric (3733).
15. Erosion discovered during construction shall be repaired immediately by the Contractor.
16. Contractor is responsible for preventing sediment transport from site; sediment tracked onto adjacent streets will be swept immediately upon discovery (incidental).



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DAVID M POGGI

DATE: 01-17-2020

LIC. NO.: 44573

DESIGNED: DMP

DRAWN: DMP

CHECKED: KEB

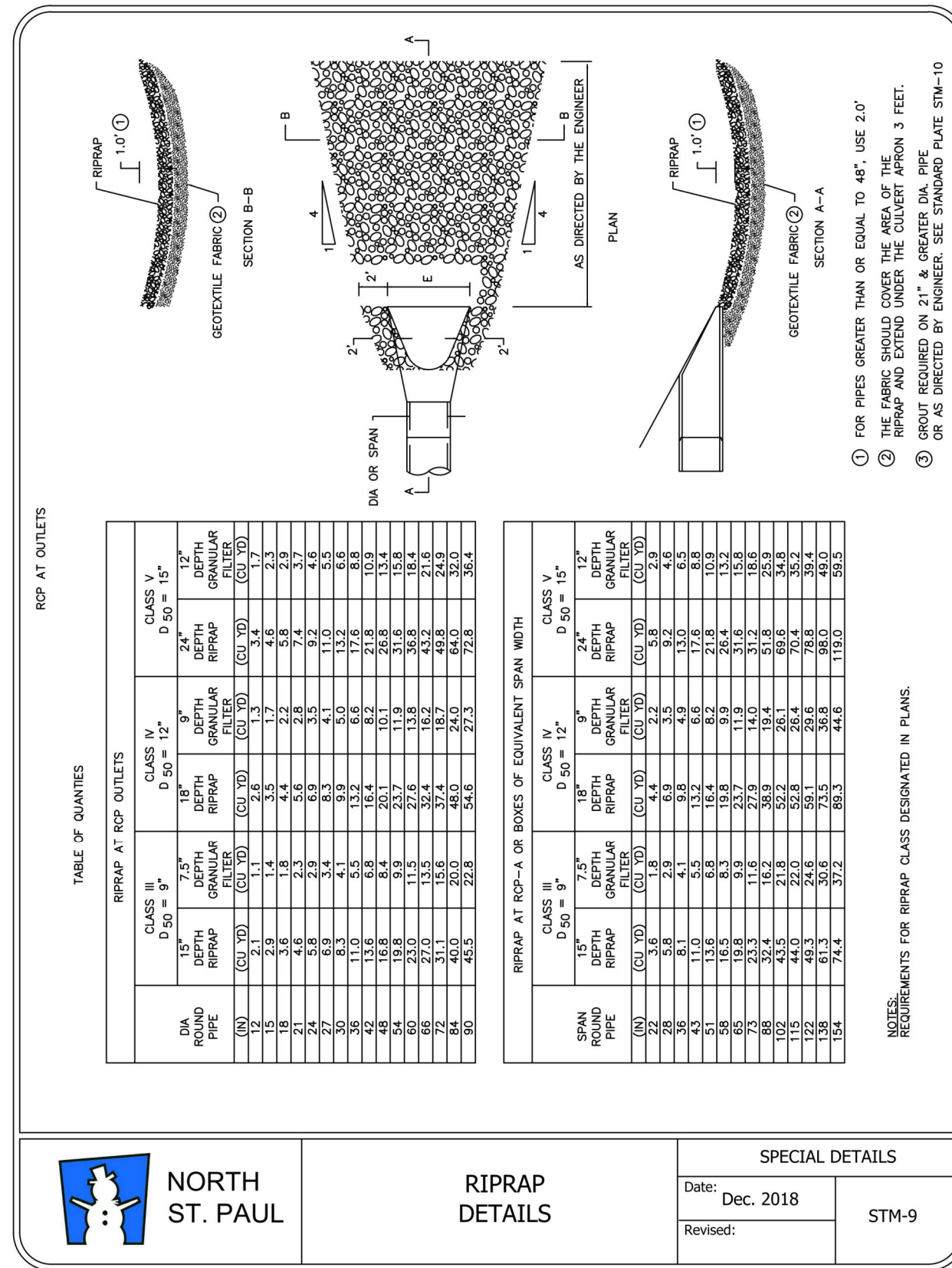
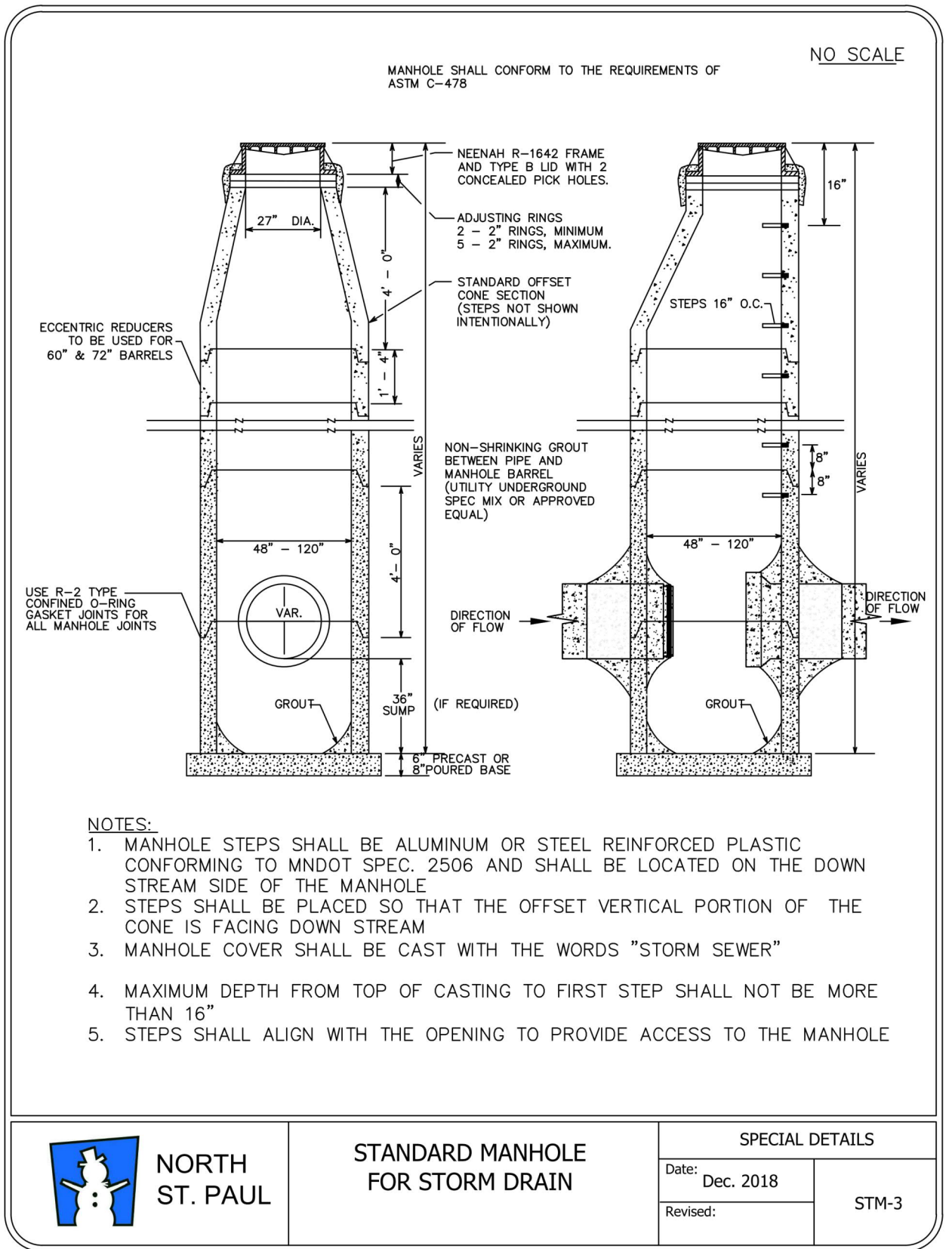
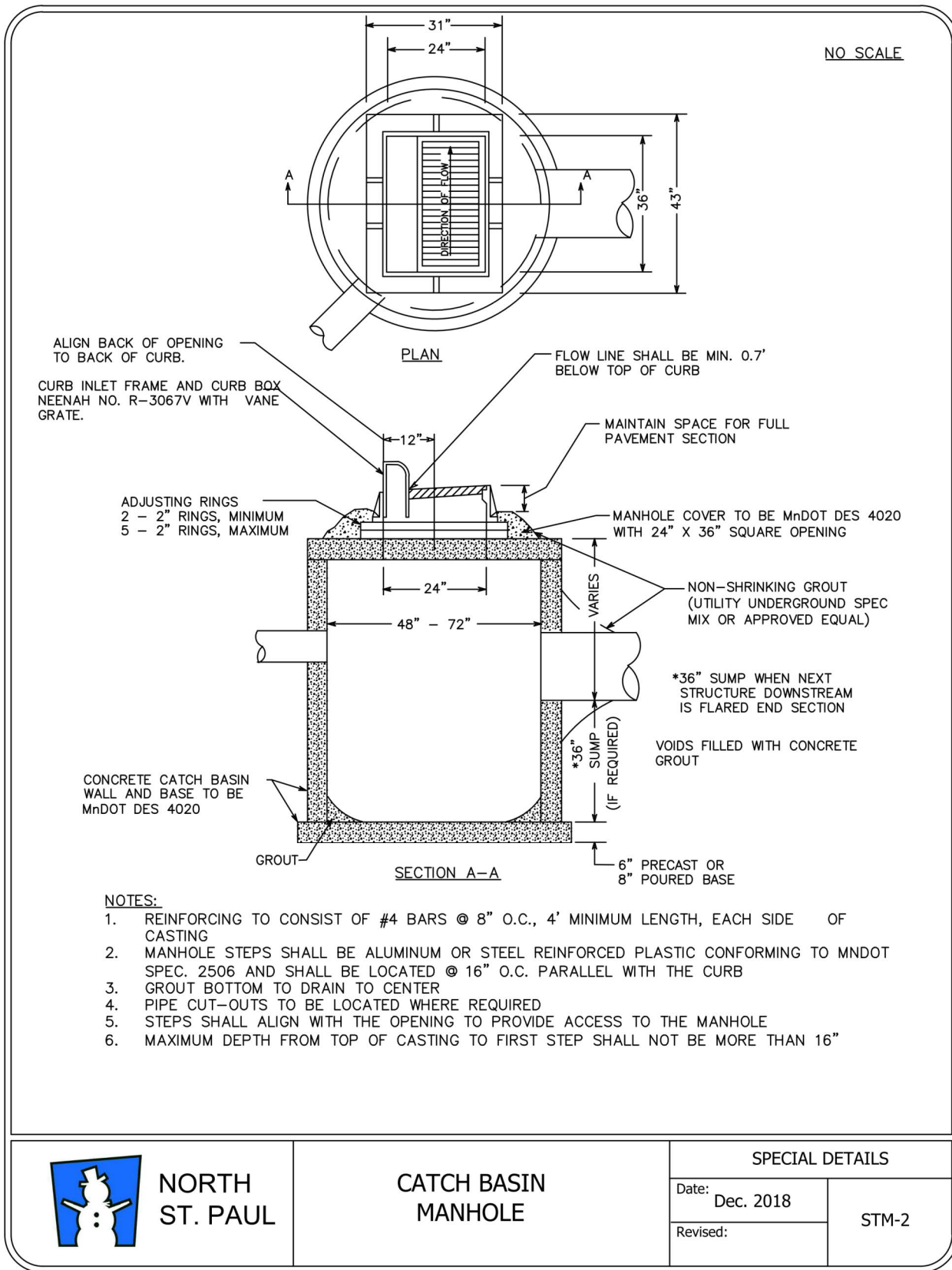
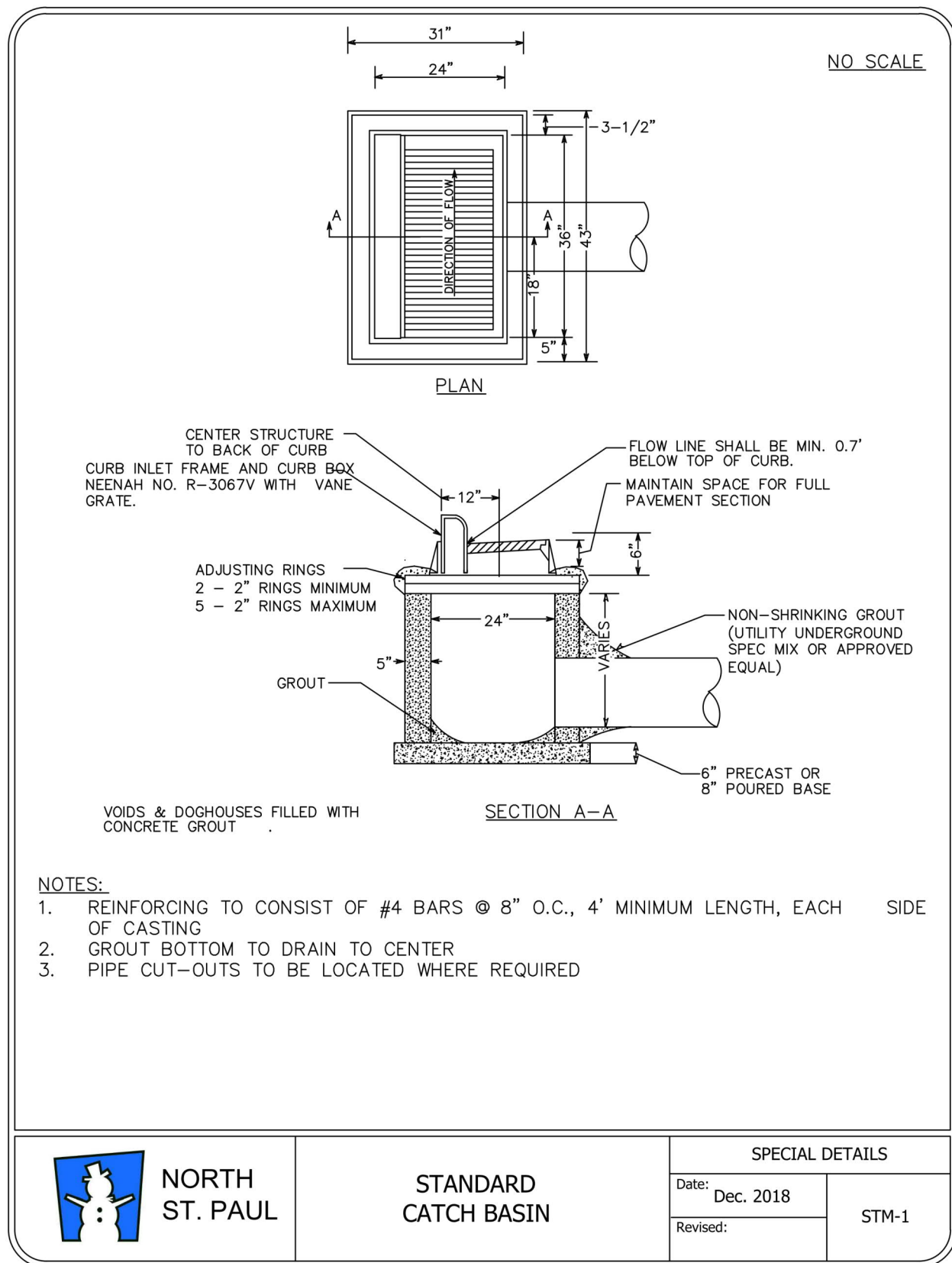
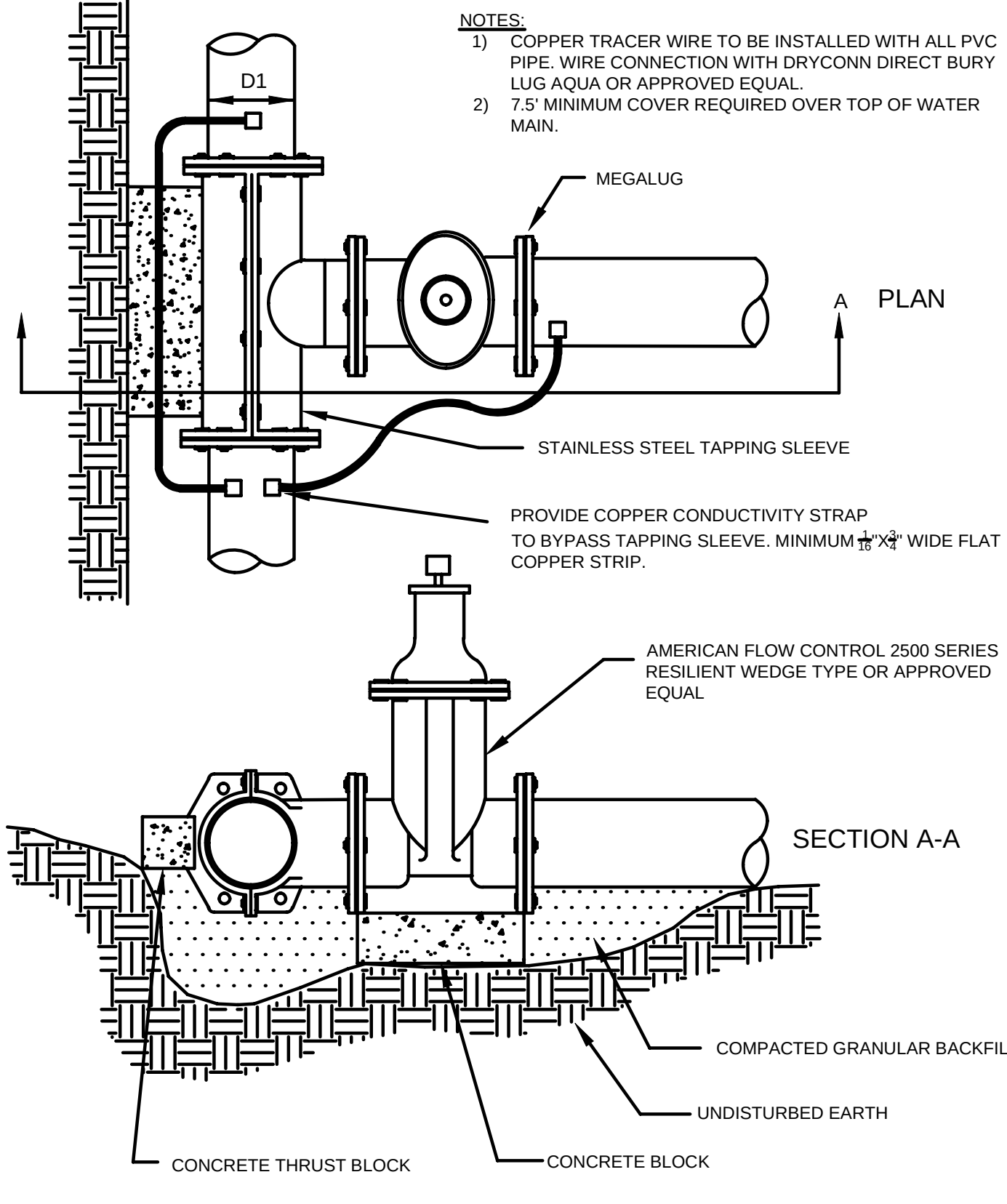
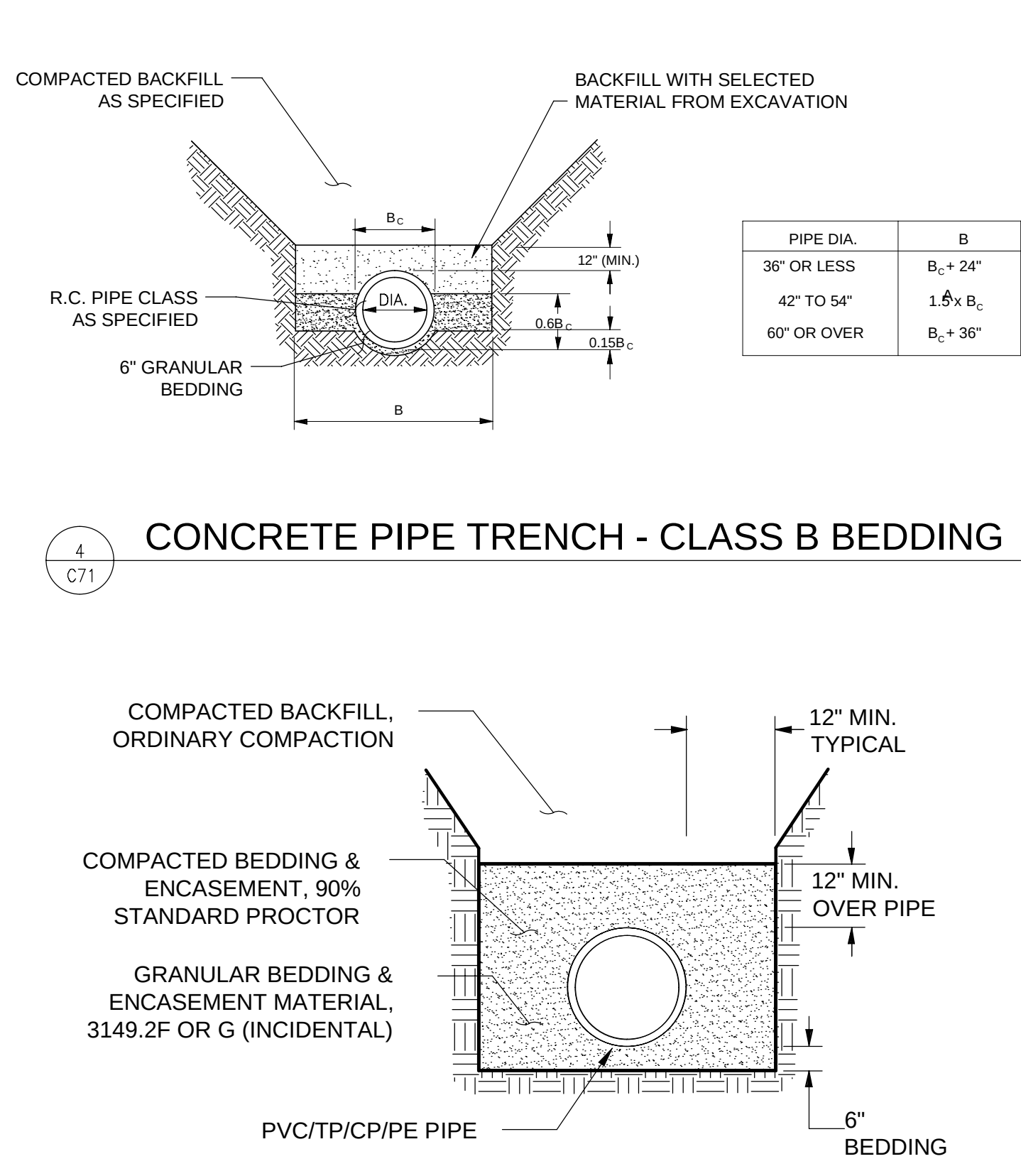
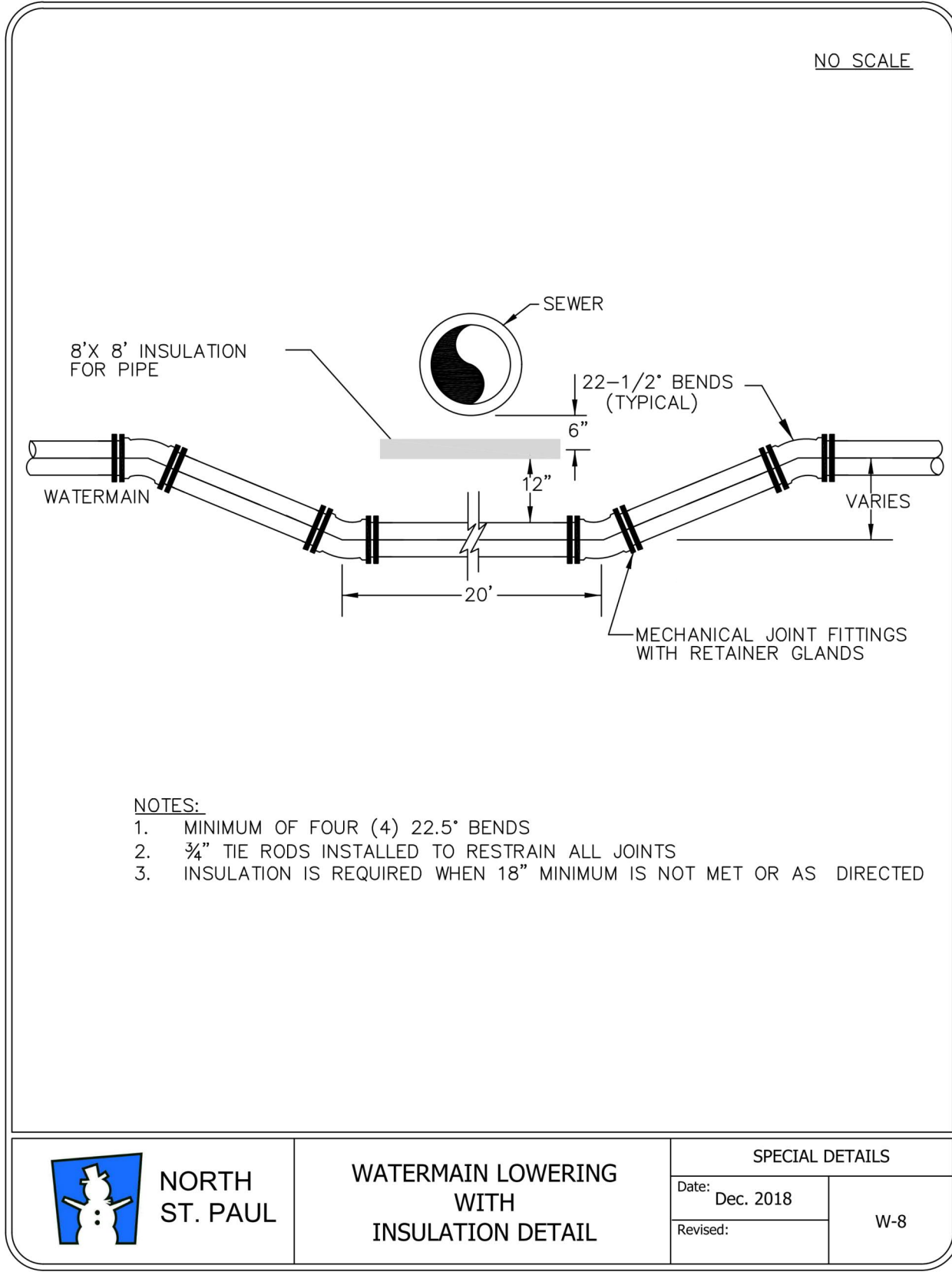
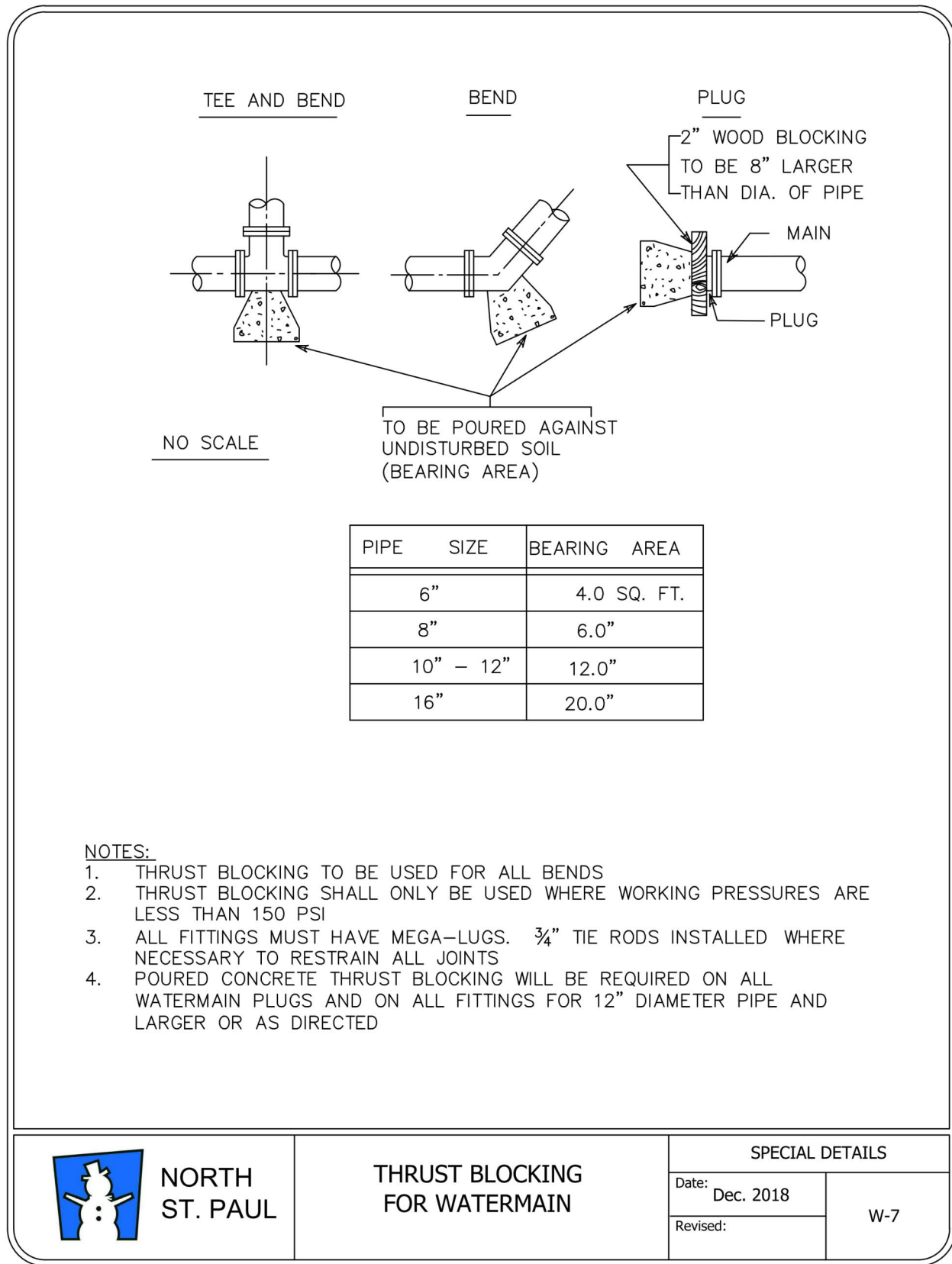
DATE / REVISION:
01-17-2020 Preliminary Plat Review Set. NOT FOR CONSTRUCTION

OWNER:

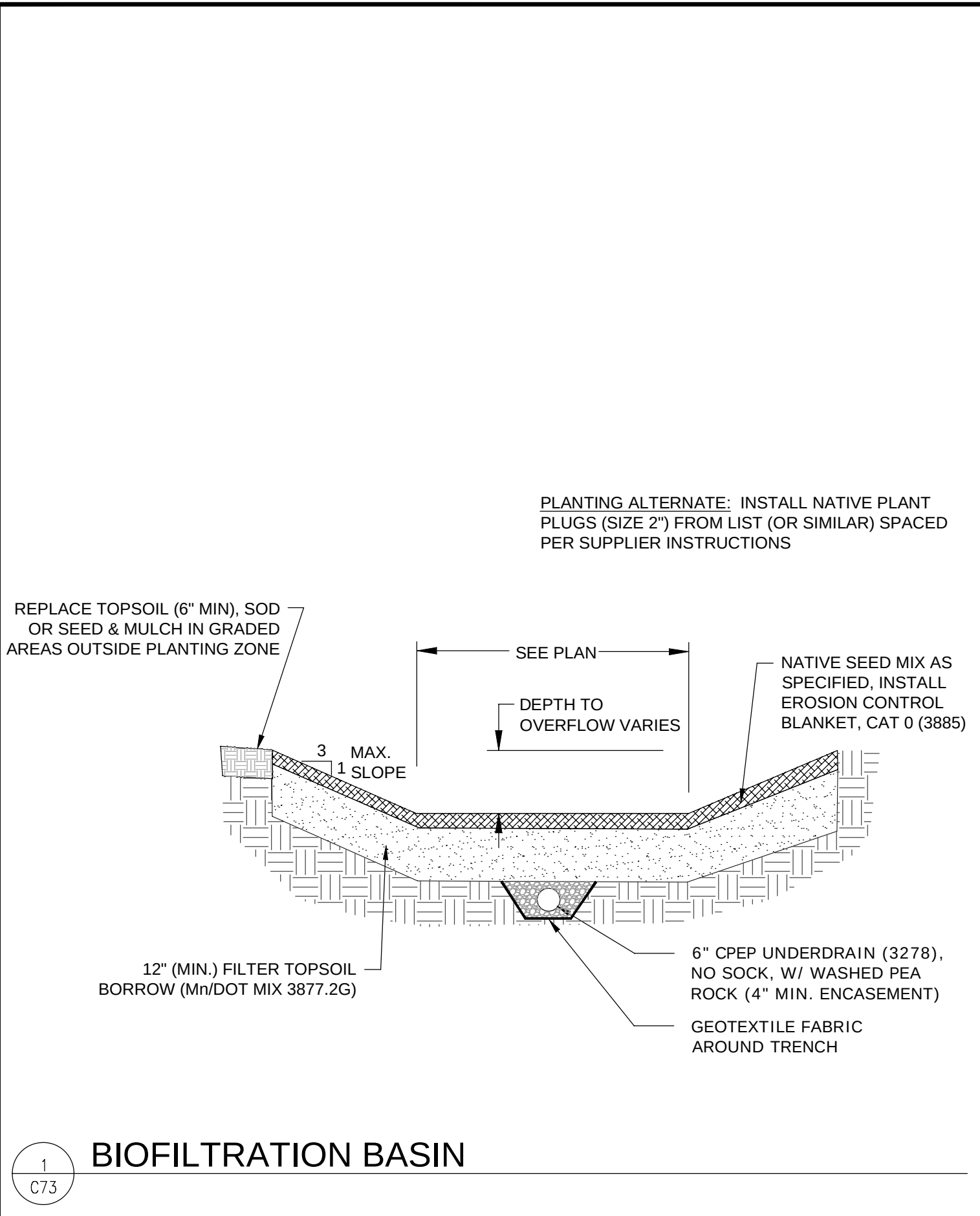
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7TH STREET TOWNHOMES
2242 7TH STREET, NORTH ST. PAUL, MN

SHEET NO:

C50



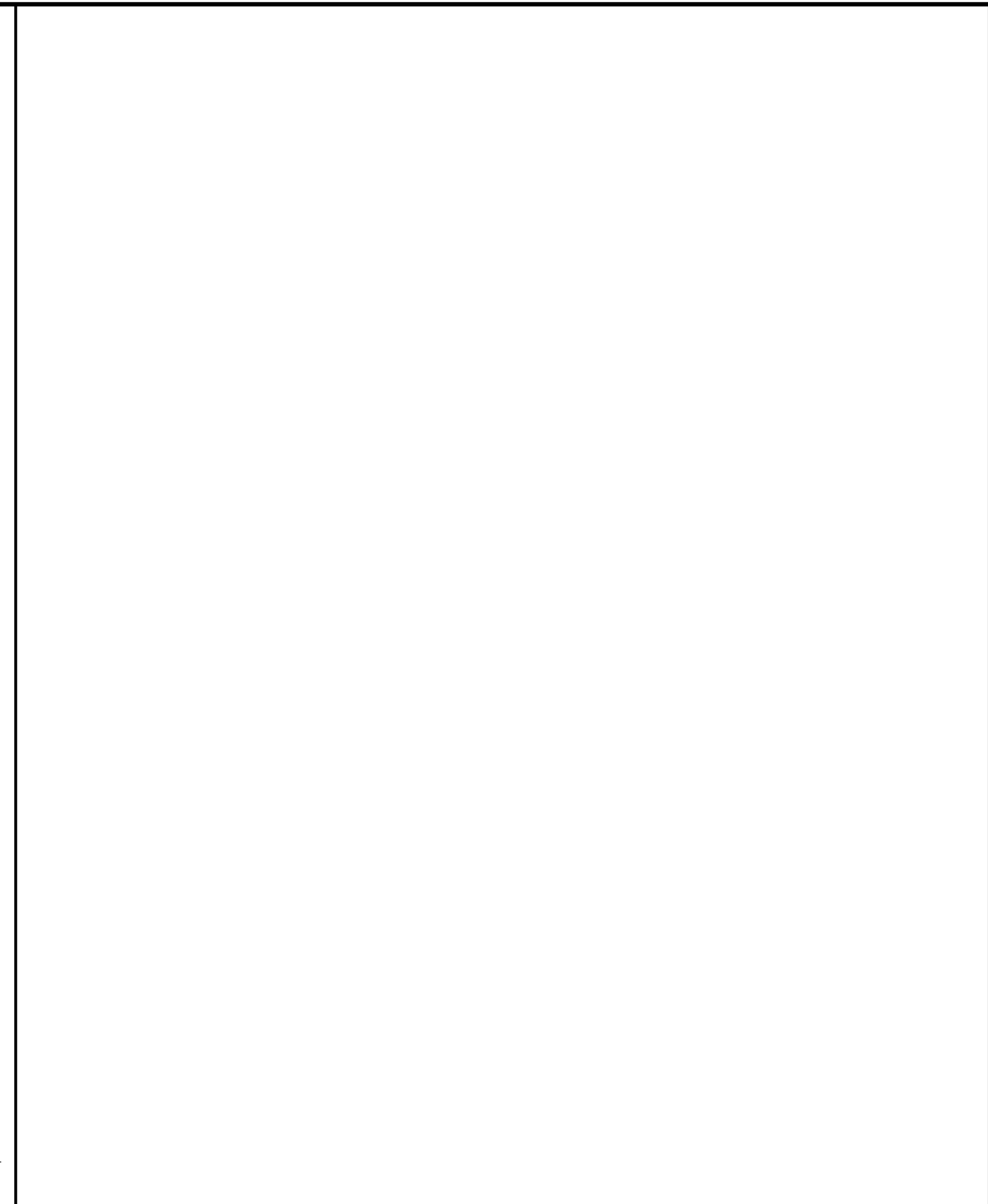
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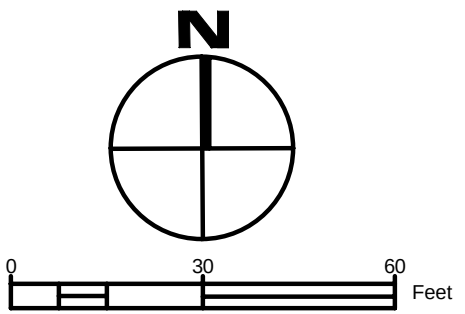
Common Name	Height	Location	Color	Bloom Time
<u>Wildflowers</u>				
Black-Eyed Susan	1.0 - 3.0	Side	Yellow	Jun-Aug
Yellow/Greenhd Coneflower	3.0 - 8.0	Bot	Yellow	Jul-Sept
Sneezeweed	2.0 - 5.0	Bot	Yellow	Aug-Oct
Ironweed	3.0 - 6.0	Bot	Purple	Jul-Sept
Marsh Milkweed	3.0 - 5.0	Bot	Pink/white	Jun-Aug
Joe-Pye Weed	4.0-6.0	Bot	Purple	Jul-Sept
Ox-eye Sunflower	2.0 - 4.0	Bot	Yellow	Jun-Sept
Blue Flag Iris	2.0 - 3.0	Bot	Blue	May-Jul
Great Blue Lobelia	1.0 - 2.5	Bot/Side	Blue	Aug-Sept
Smooth Phlox	2.0 - 3.0	Bot/Side	Pink/Purp	May-Jun
Autumn Joy Sedum	1.5 - 2.0	Side	Pink	Aug-Oct
Compass Plant	5.0 - 8.0	Bot	Yellow	Jul-Sept
Culver's Root	3.0 - 5.0	Bot	White	Jul-Aug
Prairie Blazingstar	2.0-4.0	Bot/side	purple	Jul-Aug
<u>Grasses</u>				
Karl Foerster's Feather Reed	1.0-2.0	Bot/side		
Nodding Sedge	2.0 - 4.0	Bot		
Palm Sedge	1.0-2.0	Bot/side		
Tussock Sedge	1.0 - 3.0	Bot		
Fox Sedge	1.0 - 2.5	Bot/side		
Soft Rush	1.0 - 2.0	Bot		
big bluestem	2.0 - 6.0	Bot		
<u>NOTE:</u> This is a partial list; other wet-tolerant, full-sun, native plants may be suitable.				

WET-TOLERANT PLANT LIST

2
C73



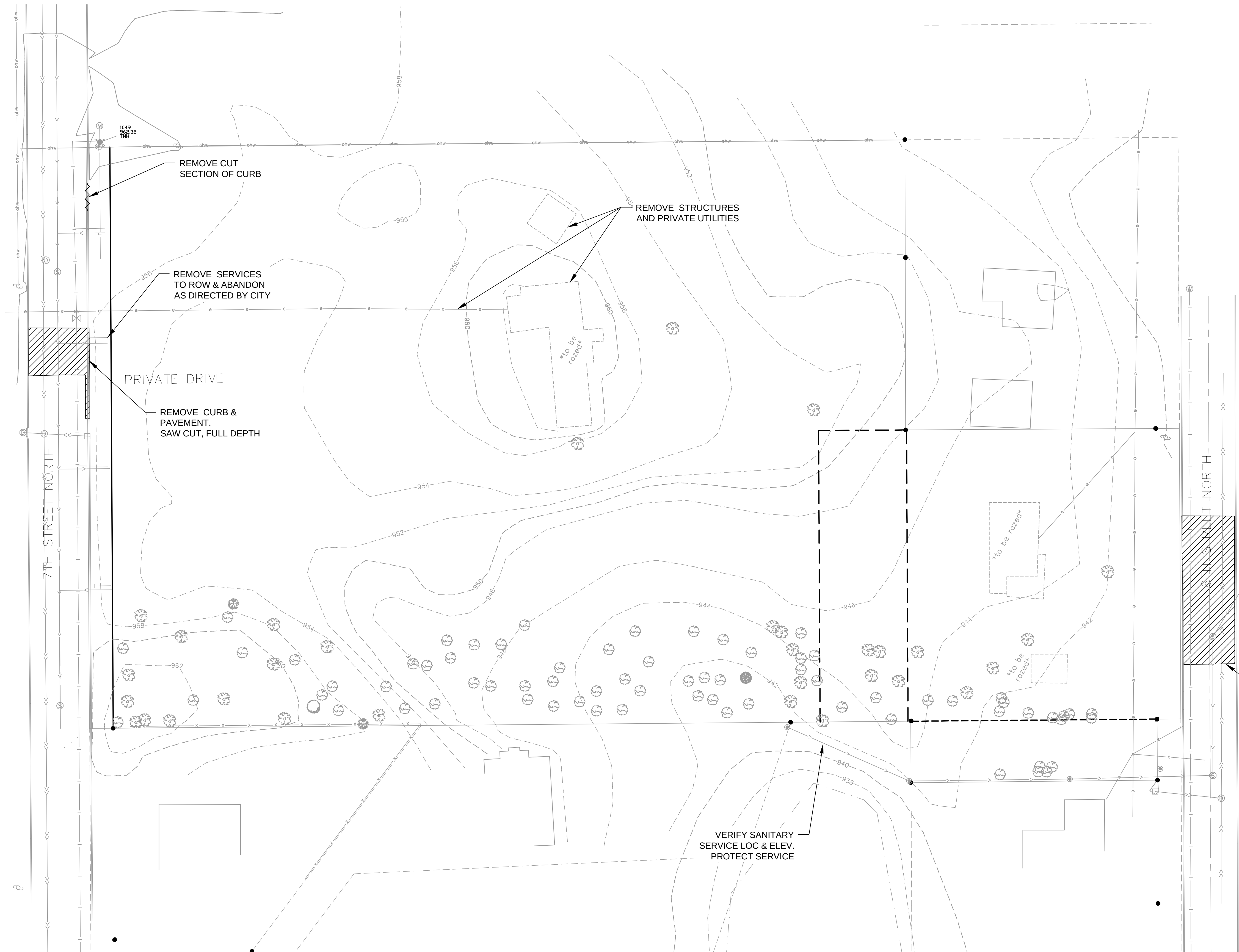
BENCHMARK
Hydrant at NW corner of property (7th Street)
TNH = 962.32



LEGEND:

PROPERTY LINE	
PAVEMENT REMOVAL	
REMOVE	

- GENERAL NOTES:
- The subsurface utility location information in this plan is utility quality level D. This utility quality level was determined according to the guidelines of CII/ASCE 38-02, titled "Standard Guidelines for the Collection and Depiction of Existing Subsurface Utility Data." Engineer does not guarantee the accuracy of utility locations or that all existing utilities are shown; Contractor is responsible for locating utilities prior to digging.
 - Perimeter sediment controls shall be installed prior to beginning site disturbance operations.
 - Existing pavement shall be cut full-depth to provide a clean, uniform face for new connection.
 - Items shall be removed and disposed of offsite as necessary.
 - Protect light poles and other existing utilities, signs, trees, etc. Relocation of any private utilities not directed on these plans shall be coordinated with the utility owner. If drain tile is encountered, Engineer shall be notified immediately; reconnection or rerouting will be required.
 - Damaged items or property shall be repaired or replaced at Contractor's expense.



CIVIL METHODS, INC.
1551 Livingston Avenue, Suite 104
West St. Paul, MN 55118
o: 763.210.5713 | www.civilmethods.com

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.

DAVID M. POGGI

DATE: 01-17-2020

LIC. NO.: 44573

DESIGNED: DMP
DRAWN: DMP
CHECKED: KEB

DATE / REVISION:
01-17-2020 Preliminary Plat Review Set. NOT FOR CONSTRUCTION

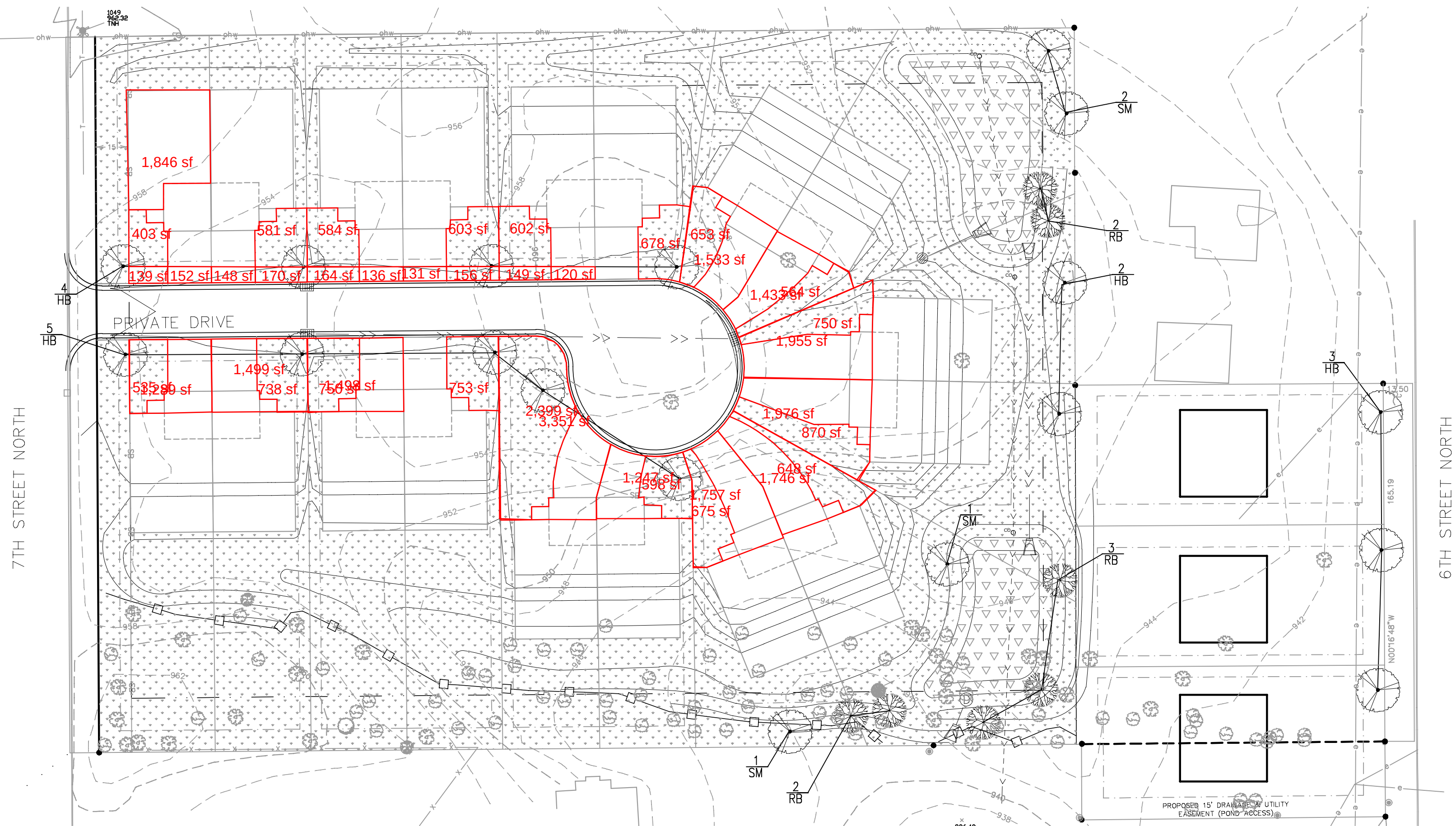
OWNER:

ANDRUS BUILT, LLC
2440 CHARLES STREET N, #210
NORTH ST. PAUL, MN 55109

TITLE: **EXISTING CONDITION & REMOVALS**
7TH STREET TOWNHOMES
2242 7TH STREET, NORTH ST. PAUL, MN

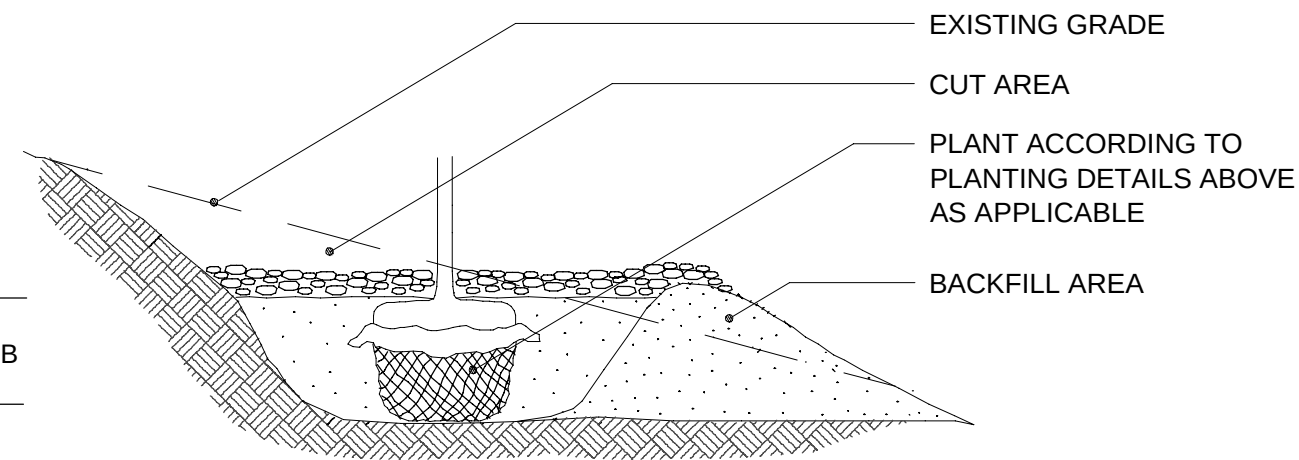
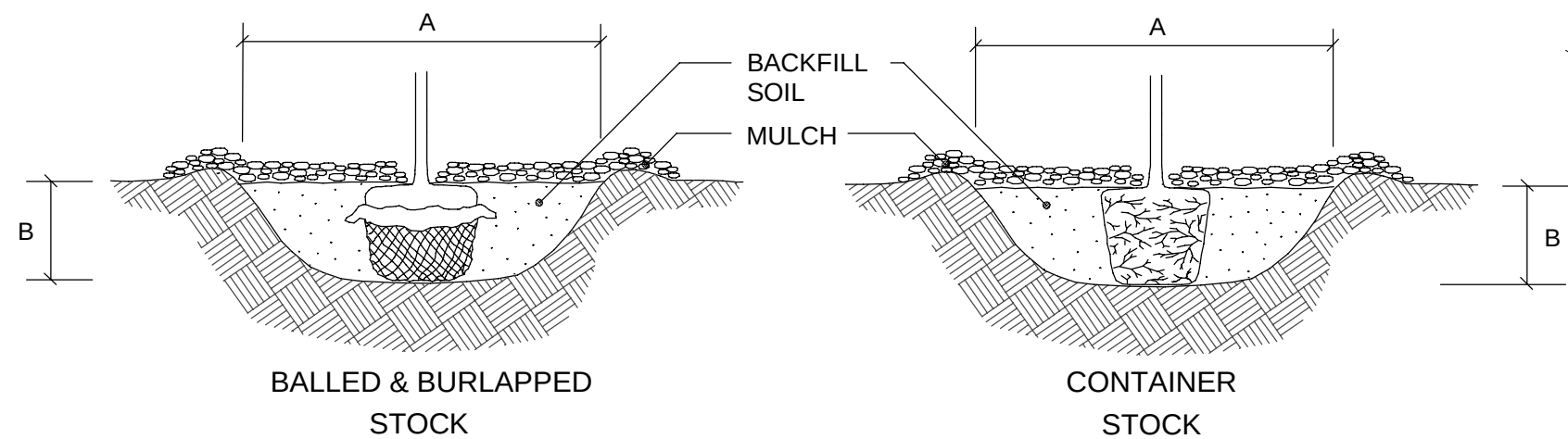
SHEET NO:
C10

Print Date: 1/17/2020 3:12 PM
File Loc: C:\CM\Civil Methods\Projects\0639_North St Paul Residential\09_DRAWINGS AND SPECIFICATIONS\03_Sheets\10_Landscaping.dwg



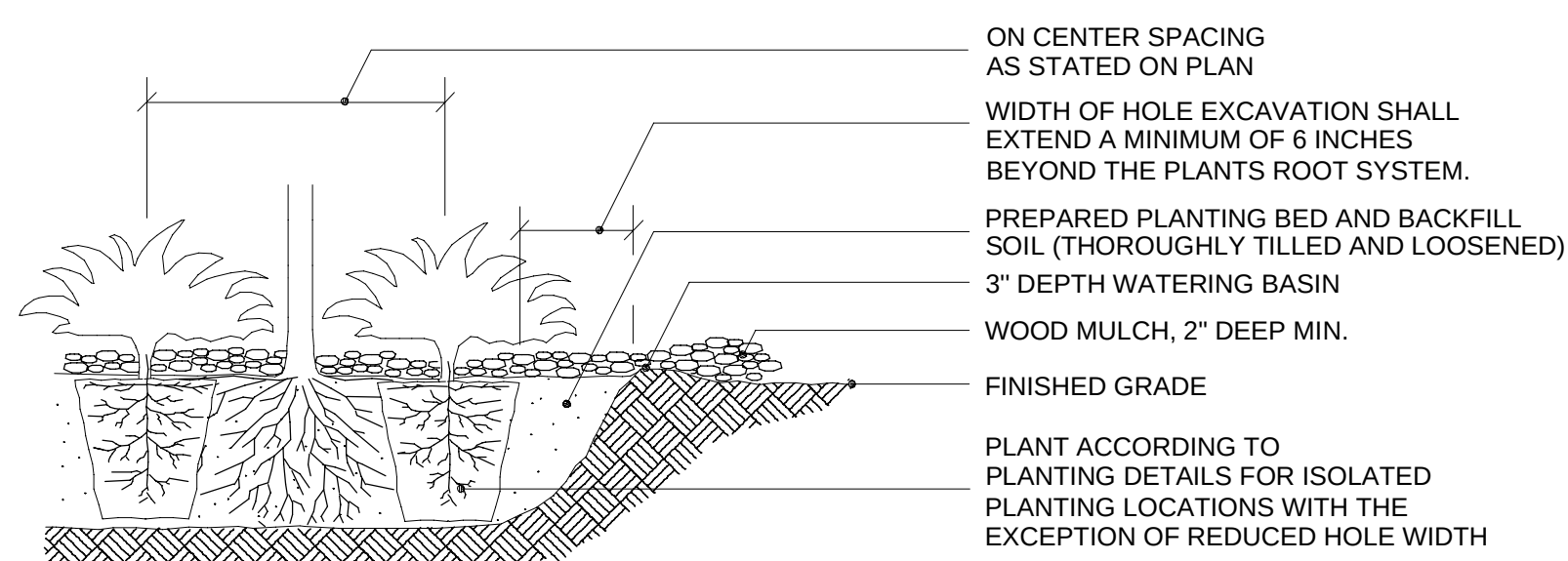
NOTES:

1. ALL TREES SHALL BE 2.5" CALIPER AND SHRUBS SHALL BE #5, MINIMUM, UPON INSTALLATION.
2. TREES AND SHRUBS SHALL BE WARRANTED FOR A PERIOD OF 1 YEAR AFTER INSTALLATION. DEAD OR DISEASED PLANTS WITHIN THIS PERIOD SHALL BE REPLACED AT CONTRACTOR EXPENSE.
3. THE PLANTING DETAILS REPRESENT ADEQUATELY DRAINED SOIL CONDITIONS. THE CONTRACTOR SHOULD EXERCISE DISCRETION IN SETTING PLANTS 1"-3" HIGHER IN POORLY DRAINED SOILS.
4. ON 2:1 SLOPES OR GREATER, DO NOT CONSTRUCT THE UPHILL HALF OF THE WATERING BASIN.
5. ON WET, POORLY DRAINED SOILS, DO NOT CONSTRUCT WATERING BASIN.
6. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ADEQUATE DRAINAGE IN HEAVY POORLY DRAINED OR IMPERVIOUS SOILS.
7. PLANTS SHOULD BE SET AT THE PROPER DEPTH WHEREBY THE BEGINNING TAPER OF THE ROOT FLARE IS AT THE SAME ELEVATION AS THE FINISHED SOIL GRADE. THIS SHOULD BE THE SAME DEPTH AS THE PLANTS WERE GROWN AT IN THE NURSERY. NOTE THAT THE ROOTS OF BALLED AND BURLAPPED PLANTS ARE UNACCEPTABLE WHEN THEY ARE COVERED BY MORE THAN 4" OF SOIL IN THE TOP OF THE BALL.
8. DELAY MULCH PLACEMENT IF NECESSARY TO ALLOW MORE TIME FOR EXCESS SOIL MOISTURE TO EVAPORATE FROM PLANTING AREAS BEFORE PLACING MULCH.
8. ALL OTHER AREAS TO BE SEEDED OR SOD PER EROSION CONTROL PLAN.



NOTE:
1. EXTENDED EXCAVATION AND BACKFILL SOIL TO A POINT DOWNSLOPE EQUAL TO OR LOWER IN ELEVATION THAN THE BOTTOM OF THE HOLE DIRECTLY BENEATH THE PLANT TO INSURE ADEQUATE DRAINAGE IN HEAVY SOILS. GRANULAR SOIL MUST BE ADDED AS BACKFILL IN AREAS OF POOR DRAINAGE.

FOR STEEP SLOPES



MASS PLANTING BEDS

LANDSCAPING SUMMARY:

ZONE: R-1 / R-2

R-1: 1 TREE PER PARCEL

REQUIRED: 3 LOTS = 3 TREES

PROVIDED: 3 TREES

R-2: 1 TREE PER UNIT

REQUIRED: 20 UNITS = 20 TREES

PROVIDED: 20 TREES

TOTAL:

REQUIRED: 23 TREES

PROVIDED: 25 TREES

PLANT SCHEDULE

TREES					
KEY	QTY	COMMON NAME	BOTANICAL NAME	ROOT	CAL/SIZE
SM	4	Sienna Glen Maple	Acer freemanii 'Sienna Glen'	B&B	2.5"
HB	14	Hackberry	Celtis occidentalis	B&B	2.5"
RB	7	River Birch	Betula Nigra	B&B	2.5"

BALLED & BURLAPPED STOCK

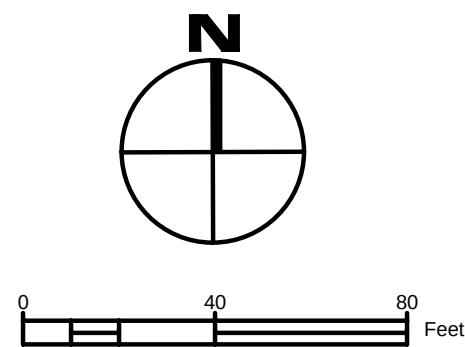
1. SCARIFY SIDES AND BOTTOM OF HOLE.
2. PROCEED WITH CORRECTIVE PRUNING AS DIRECTED BY ENGINEER.
3. SET PLANT ON UNDISTURBED NATIVE SOIL, OR THOROUGHLY COMPACTED BACKFILL SOIL AT THE SAME DEPTH (IF PROPER) AS IT WAS GROWN IN THE NURSERY.
4. PLANT SHALL BE PLACED IN PLANTING HOLE WITH BURLAP AND WIRE BASKET, IF USED. INTACT. ONCE IN PLACE, THE PLANT SHALL BE BACKFILLED TO WITHIN 12" OF THE TOP OF THE ROOTBALL AND WATERED. THE TOP LOOPS OF THE WIRE BASKETS SHALL BE REMOVED AND THE BURLAP SHALL BE FOLDED OR CUT BACK.
5. PLUMB AND BACKFILL WITH THE BACKFILL SOIL SPECIFIED.
6. APPLY WATER TO SETTLE PLANTS AND FILL VOIDS THEN CONSTRUCT 3" DEPTH WATERING BASIN.
7. WATER THOROUGHLY WITHIN 2 HOURS.
8. PLACE MULCH WITHIN 48 HOURS OF THE SECOND WATERING UNLESS SOIL MOISTURE IS EXCESSIVE.
9. BIODEGRADABLE TWINE MAY BE LEFT ON AS SUPPORT BETWEEN THE ROOT BALL AND ROOT COLLAR UNTIL THE END OF THE PLANT ESTABLISHMENT PERIOD AT WHICH TIME IT MUST BE CUT AND TOTALLY REMOVED FROM THE ROOT COLLAR, THE TWINE MUST BE TIED OR RETIED TO MID-LEVEL LOOPS OR POINTS ON THE BASKET. USE OF NONBIODEGRADABLE TWINE SHALL NOT BE PERMITTED.

CONTAINER STOCK

1. SCARIFY SIDES AND BOTTOM OF HOLE.
2. PROCEED WITH CORRECTIVE PRUNING AS DIRECTED BY ENGINEER.
3. REMOVE CONTAINER AND SCORE OR PRUNE OUTSIDE OF SOIL MASS TO REDIRECT CIRCLING FIBROUS ROOTS AS NECESSARY.
4. SET PLANT ON UNDISTURBED NATIVE SOIL, OR THOROUGHLY COMPACTED BACKFILL SOIL AT THE SAME DEPTH (IF PROPER) AS IT WAS GROWN IN THE NURSERY.
5. APPLY WATER TO SETTLE PLANTS AND FILL VOIDS THEN CONSTRUCT 3" DEPTH WATERING BASIN.
6. WATER THOROUGHLY WITHIN 2 HOURS.
7. PLACE MULCH WITHIN 48 HOURS OF THE SECOND WATERING UNLESS SOIL MOISTURE IS EXCESSIVE.



Know what's below.
Call before you dig.



LEGEND:

PROPERTY LINE	---
EASEMENT	---
CONTOUR	---
RESIDENTIAL TURF GRASS	[Pattern]
STORMWATER DRY POND SEED MIX	[Pattern]
CALLOUT	[Symbol]
PROPOSED TREE	[Symbol]

PLANTING HOLE DIMENSIONS

(MINIMUM WIDTH DOES NOT APPLY IN MASS PLANTING BEDS)

PLANT TYPE	PLANT SIZE (UP TO AND INCLUDING)	MINIMUM HOLE WIDTH HOLE DEPTH (INCHES)	
		A	B
CONIFEROUS TREES	3' B.B.	42	11
	4' B.B.	51	13
	5' B.B.	60	13
	6' B.B.	66	15
	7' B.B.	72	16
	8' B.B.	81	18
CONTAINER GROWN PLANTS	9' B.B.	90	20
	10' B.B.	102	21
	#1 cont.	18	6
	#2 cont.	23	7.5
	#3 cont.	29	8.5
	#5 cont.	30	11
NOTE: AT LEAST 2/3 OF ALL CONIFER BRANCHES WILL CONTAIN TERMINAL BUDS	#7 cont.	37	11
	#10 cont.	44	14
	#15 cont.	45	15
	#20 cont.	60	17
	#25 cont.	72	16

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OWNER:

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2440 CHARLES STREET N, #210

NORTH ST. PAUL, MN 55109

TITLE:

LANDSCAPING

7TH STREET TOWNHOMES

2242 7TH STREET, NORTH ST. PAUL, MN

SHEET NO:

L01

PRELIMINARY PLAT OF 7TH STREET TOWNHOMES

for ANDRUS BUILT
EX. HOUSE

EX. GAR.

GRAPHIC SCALE

(IN FEET)
1 inch = 30 ft.

NORTH

OUTLOT A

DEVELOPMENT DATA

LAND USE:
SINGLE FAMILY HOMES (R1 ZONING): 0.65± ACRES 3 LOTS
PROPOSED DEDICATED (6TH AVE.): 0.05± ACRES
PROPOSED DEDICATED (7TH AVE): 0.10± ACRES 18 LOTS
TOWNHOMES (R2 ZONING-w/ PUD Overlay): 3.43± ACRES

TOTAL: 4.23± ACRES 21 UNITS

P.I.D. #112922430109
P.I.D. #112922430008
P.I.D. #112922430023
P.I.D. #112922430022

BELOW IS R1 MINIMUM REQUIREMENTS:
- MINIMUM LOT AREA = 7,920 SQ.FT.
- MINIMUM LOT WIDTH = 60 FEET
- BUILDING SETBACKS:
FRONT = 25 FEET
REAR = 25 FEET
SIDE = 6 FEET
CORNER SIDE = 15 FEET
EXISTING ZONING: R-1 (SINGLE FAMILY RESIDENTIAL)
TOWNHOMES PROPOSED TO BE REZONED TO R-2 W/ PUD OVERLAY

TREE LEGEND



NOTES

- This survey was prepared without the benefit of titlework. Easement, appurtenances and encumbrances may exist in addition to those shown hereon. This survey is subject to revision upon receipt of a title insurance commitment or attorneys title opinion.
- Only a portion of the trees onsite have been field located.

LEGAL DESCRIPTION

Parcel A:
Outlot B, SAUERS POND, Ramsey County, Minnesota. (PID 112922430109)
Parcel B:
The East 50 feet of the West one-half of the East one-half of the South one-half of Lot 24, Castle Wood, Ramsey County, Minnesota. (PID 112922430008)
Parcel C:
The south one-half of the East one-quarter of Lot 24, Castle Wood, Ramsey County, Minnesota. (PID 112922430023)
Parcel D:
All of Lot 24 in Castle Wood, EXCEPT the East one-quarter thereof, and also except the East 50 feet of the West Half of the East Half of the South Half thereof.

I hereby certify that this survey, plan or report was prepared by me or under my direct supervision and that I am a duly Registered Land Surveyor under the laws of the State of Minnesota.

ERIC R. VICKARYOUS

Date: NOV. 4TH, 2019 Reg. No. 44125

C:\Users\eric\OneDrive\CAD-1D\19242 pp Andrus St Paul\dwg\19242pp5.dwg_12/16/2019_ 4:12:55 PM CST

JOB #19242

SHEET C01

ACRE LAND SURVEYING
Serving Twin Cities Metro
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763-458-2997 acrelandsurvey@gmail.com

STORMWATER MANAGEMENT PLAN

7th STREET TOWNHOMES
NORTH ST. PAUL, MN

JANUARY 16, 2020

CMI No: 0538

PREPARED FOR:

Andrus Built, LLC.
North St. Paul, MN

PREPARED BY:

Civil Methods, Inc.
1551 Livingston Avenue, Ste. 104
West St. Paul, MN 55118

ENGINEER CERTIFICATION:

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.

Name: David Poggi, PE

Signed: 

Date: 01-17-2020

Registration: MN No. 44573

Table of Contents

1.	INTRODUCTION	1
2.	SITE DESCRIPTION	1
3.	STORMWATER QUANTITY & QUALITY	2
3.1	VOLUME CONTROL & WATER QUALITY.....	2
3.2	RATE CONTROL.....	3

APPENDIX A – SOIL INFORMATION

APPENDIX B – DRAINAGE DIAGRAMS

APPENDIX C – SUBCATCHMENT DATA

APPENDIX D – HYDROCAD OUTPUT

1. INTRODUCTION

REVISIONS FOR 01-16-2020

The proposed site layout has been revised at the request of the City to save some of the existing trees onsite. Four units have been removed and the stormwater management area has been relocated and split into two basins along the easterly property line. This minimizes grading along the south property line to the extent practical, while still fitting with the site.

The 7th Street Townhomes project is proposed to be built at the 3.53 acre residential parcel located at 2242 7th Street in North St. Paul, MN. The project will include site grading for a new private drive and townhome construction, as well as the necessary utility and stormwater management infrastructure.

In addition, the 0.63 acre residential property located at 2231 6th Street will be subdivided into three single family lots. That minor subdivision project is also included as part of this report.

The combination development will disturb approximately 4.0 acres and will construct approximately 1.61 acres of impervious surface. The project is required to meet the permanent stormwater management requirements of the City of North St. Paul, the Ramsey Washington Metro Watershed District (RWMWD) and the MPCA's NPDES Permit for Construction

The specific requirements addressed herein include:

- 1) Rate control: Existing flow rates must not be exceeded for the 2-year, 10-year and 100-year, Atlas-14 rainfall events.
- 2) Volume reduction of 1.1" of runoff from the site's new and reconstructed impervious area, provided the site is not restricted.
- 3) Biofiltration practices receive 55% volume credit.
- 4) Contributing impervious drainage area can contribute up to 2.5" of volume.
- 5) Alternative treatment methods are required when the site is restricted.
- 6) Infiltration / filtration practices must draw down within 48 hours.
- 7) Provide 2.0' of freeboard from basin HWL to new structure LFE.
- 8) Minimum of 3.0' of separation from bottom of infiltration practice and seasonal high groundwater table.

2. SITE DESCRIPTION

The existing properties are single family residential with mature trees, grasses and minimal hard surface associated with the homes and driveways. It is clear from a visual examination of

hydrology and vegetation that the pond/wetland areas south of the property do not extend onto the project property. Public soil mapping information indicates the area consists of moderately permeable sandy loams of Hydrologic Soil Group (HSG) Type B, though onsite soil borings in the vicinity of the proposed basin indicates the presence of clays, or Type D soils, with minimal infiltration capacity (Appendix A).

In the existing condition, stormwater runoff from the property is split to the northeast and south (Appendix B), with all runoff ultimately draining to 6th Street. Runoff to the south drains to an existing wet retention (and wetland) basin on the adjacent property. The basin was evaluated for use as part of the proposed stormwater management system; however, that option was determined to be unfeasible due to site limitations.

In the post-construction condition, storm sewer will collect runoff from nearly the entire townhome development for conveyance to two new biofiltration basins along the eastern property boundary (Appendix B). While drainage patterns will remain generally unchanged, the new buildings and pavements will increase impervious area at the project properties by 1.36 acres (subcatchment summary information included in Appendix C).

The proposed infiltration basin is designed to meet the City's water quality and quantity standards.

3. STORMWATER QUANTITY & QUALITY

3.1 VOLUME CONTROL & WATER QUALITY

The required infiltration volume of 1.1" from the site's new and reconstructed impervious area will be achieved with two biofiltration basins. The proposed basins as designed will include engineered soil media and 6" underdrain to ensure drawdown. Existing topsoil will be removed and the basin bottom will be scarified prior to being planted with water-tolerant vegetation.

The following volume calculations are provided:

Volume Control Calculation:

$$1.1" \times \text{Impervious Area} = 1.1 \times 1/12 \times 70,235 \text{ sq. ft.} = 6,438 \text{ cu. ft.}$$

$$55\% \text{ Credit for filtration: Total Volume Required} = 11,706 \text{ cu.ft.}$$

$$\text{Total Volume Provided} = 11,790 \text{ cu.ft. (volume below basin outlet elevation)}$$

The provided volume is stored between the bottom elevation (942.0) and the outlet elevation (944.0). The depth of the basin to the outflow elevation is limited to 2.0' to ensure adequate

drawdown within 48 hrs, though it could be deeper with an assumed infiltration rate of 0.8 in/hr for the engineered media.

Pretreatment will be provided in the form of a sump manhole with a turbulence-reducing baffle (Preserver or equal). The manhole will provide a maintainable space for sediment accumulation and be accessible for periodic vacuuming.

3.2 RATE CONTROL

The configuration and outlet works associated with the proposed basin will control the stormwater discharge rate from the majority of the project site. The remaining area at the east end (consisting of the single family residences) will drain directly offsite to 6th Street as the property does currently; this area is factored into the H&H calculations.

The basin outlet structure will include a weir wall with a controlling orifice and overflow grate, as reflected in the modeling and shown in the project plans. As designed, the basin will mitigate the increased runoff flow rates associated with the new construction.

The existing and proposed site conditions have been modeled with the HydroCAD modeling software using the TR-20 methodology and Atlas 14 rainfall amounts for Ramsey County. Reach nodes are included to reflect key property discharge points, including the townhome area to the south (1R), the townhome area to the northeast (2R) and the cumulative discharge from the property (3R). Model results are shown in Table 1, with detailed model output included in Appendix D.

Table 1: Flow Rate Comparison

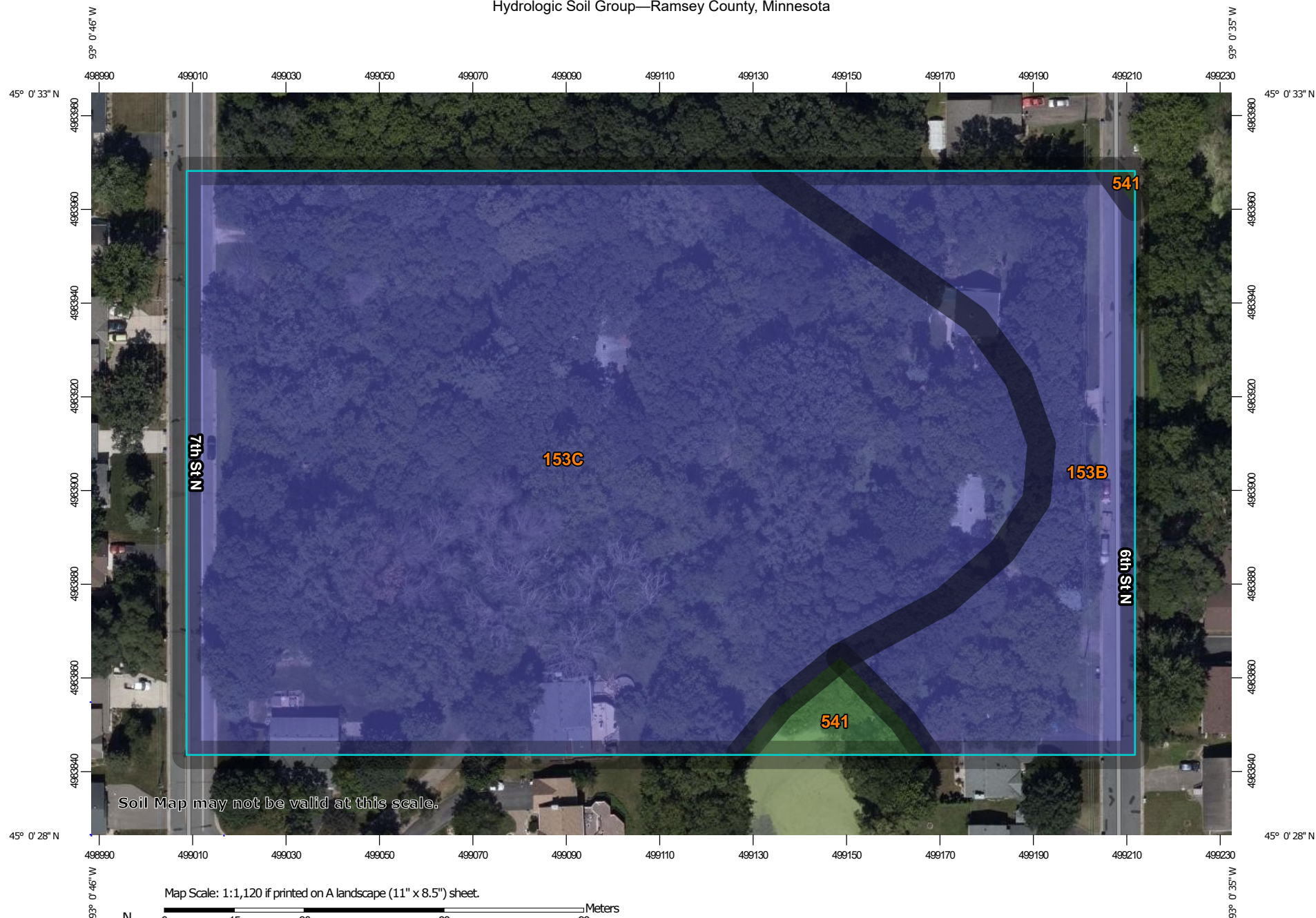
Node, ID	2-Year, 2.81"		10-Year, 4.19"		100-Year, 7.36"	
	Existing (cfs)	Proposed (cfs)	Existing (cfs)	Proposed (cfs)	Existing (cfs)	Proposed (cfs)
1R	0.3	0.6	1.6	1.5	6.9	5.2
2R	0.1	0.0	0.5	0.0	2.2	0.0
3R	0.8	1.2	2.9	2.9	11.6	8.3

As shown, discharge rates are met for the 10- and 100-yr scenarios; however, it is noted that there will be a slight increase in site runoff for the smaller, 2-yr, event in the post-construction condition. The increase is a direct result of the revised layout attempting to save existing trees along the southern property line. Because of this, due to site elevations it is impossible to convey runoff from the southeastern portion of the property to the new basin location at the southeast corner. This results in the southeastern corner discharging unregulated runoff directly to the offsite pond. This has been offset as much as is feasible with the basins, but a small increase is still observed for the 2-yr event. Given this is a

relatively small event, and the quantity of increase is small, it is our opinion that this will not have a measurable impact on the downstream stormwater management system.

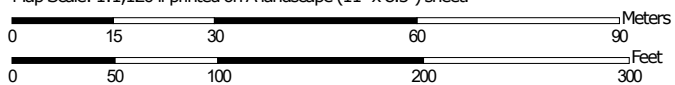
Appendix A – Soil Information

Hydrologic Soil Group—Ramsey County, Minnesota



Soil Map may not be valid at this scale.

Map Scale: 1:1,120 if printed on A landscape (11" x 8.5") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 15N WGS84



**Natural Resources
Conservation Service**

Web Soil Survey
National Cooperative Soil Survey

10/9/2019
Page 1 of 4

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

Soil Rating Polygons

 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Lines

 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Points

 A
 A/D
 B
 B/D

 C
 C/D
 D
 Not rated or not available

Water Features

 Streams and Canals

Transportation

 Rails
 Interstate Highways
 US Routes
 Major Roads
 Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL:
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Ramsey County, Minnesota
 Survey Area Data: Version 14, Sep 16, 2019

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 8, 2019—Aug 9, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
153B	Santiago silt loam, 2 to 6 percent slopes	B	1.3	20.0%
153C	Santiago silt loam, 6 to 15 percent slopes	B	4.9	78.1%
541	Rifle muck	A/D	0.1	1.9%
Totals for Area of Interest			6.3	100.0%

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Interstate Geotechnical Engineering, Inc

Patrick J Hines, PE

8167 100th St S

Cottage Grove MN 55016

(612) 414-5770

29 November 2019

Mr Dave Poggi

Civil Methods, Inc

1551 Livingston Ave, #104

West St Paul MN 55118

Re: Proposed Stormwater Detention/Infiltration Basin

Seventh Street Townhomes

2242 7th St North St Paul, Minn

In accordance with your authorization, I have completed the above referenced investigation to determine site suitability for the proposed construction. I understand that you need soil profile and groundwater conditions only, from which infiltration potential will be determined. Please accept this letter and attachments as my report of work accomplished to date.

The site is a proposed 20-lot subdivision lot at the above address, actually extending east to 6th street in one portion. Terrain is rolling, with moderate elevation difference, and the site is mostly wooded. There are residences and detached garages on the site which will be torn down in the course of subdivision development. At the time of this investigation, the previous summer season had seen record or near record precipitation, and light snows had occurred and melted recently.

Part of the proposed development a stormwater retention facility consisting of one somewhat long and narrow basin along the south side of the parcel. Location was indicated by a site grading plan you sent. As I understand it, there will be major grading on the site. Surface water will flow naturally into the basin from the new hard surfaces, graded areas and natural areas into the basin. If possible, the basin will infiltrate this water into subsoils.

The original plan was to, in an attempt to be least invasive at this point, put down one boring in an easterly portion of the basin by the hand auger method. When refusal occurred at a relatively high level, the boring was reattempted by power means in a more accessible area. Over-all, method of investigation was initially the hand auger (HA) method for greatest accuracy in zones you will likely excavate. When refusal to auger advancement by this method was encountered in what ultimately was the main boring, it was finished by the power flight auger (FA) method. Both of these are described as per an explanation sheet attached to other reports I have prepared for you recently, which attachment also describes the soil classification system used (USDA - chart attached) and method of groundwater measurement. I chose this system as it is more applicable to drainage and infiltration scenarios. I personally performed the borings, immediately classifying soils onsite. Soil strength was determined on an empirical basis by such means of drilling ease or difficulty,

nature of recovered soil samples, etc.

Refer to the attached sketch for boring locations. Base map is a size adjusted portion of the Boundary & Topographic Survey you sent. In addition, borings were marked in the field with lath. Note that the sight line indicated is on the property pin nearest Boring 1, with the cleanout stub (not the nearby property pin) as a backsight. Ground surface elevation at each of the boring locations was determined to the nearest 0.1' using an engineer's level and referenced to the rim of a sanitary sewer manhole casting about on the centerline of Sixth Street, near the southeast corner of the site, as shown on the sketch. According to information found on the sent plan, this temporary bench mark has a reference elevation of 941.00. Datum appears to be mean sea level. Elevations are shown on bore logs and on the site sketch. While results yielded good correlation with plan contours, accuracy of this should not be taken as any greater than the methods used would imply.

Attached is a log for each of the borings together with a key explaining terms and entries on the log sheets. Please be advised that the depth of individual layers of soils may vary somewhat from what is indicated on the logs due to the inexact nature of auger sampling and, most importantly, the occurrence of transition between soil layers. Also be advised that soil conditions not at the boring locations may vary. Note that Unified Soil Classification symbols are provided as well for the various soil descriptions, as this system is more widely recognized. A chart of this system is also attached.

I found variable but generally poor potential to site a detention pond that will infiltrate accumulated water. The bulk of soils encountered are cohesive. There is some granular soil near surface level, but there is not a consistent pattern to any of it. At Boring 1A, in the basin, there is thin topsoil (OL) with clay loam (CL), yellowish brown colors, immediately below. It has a silt and fine sand content and is rather soft at first, medium with depth. Commencing at $3\frac{3}{4}$ ' of depth is a plastic fine sandy loam (SC), with a slightly plastic version commencing at $4\frac{3}{4}$ '. These materials are brown to reddish brown and firm. At a point just above refusal level (5.8'), soils were becoming sandier. The foregoing materials are glacial till. At this point the boring was reattempted farther east, where there was drill rig access, if needed.

Boring 1 shows 8" of a mixed dark colored plastic sandy loam (SC), overmoist and loose, probably because this was a garden area. Below is the inverse of what was found in Boring 1A. At first it is sandy loam, plastic (SC) and then slightly plastic (SM), yellowish brown colors, overmoist and variably loose. Commencing at 2' is loamy sand (SP-SM) with a gravel content, dark brown to reddish brown, rather firm. A clay loam, rather sandy (CL), medium, commences at $4\frac{3}{4}$ '. These materials are a "mixed" glacial till. Refusal was at 5'-, whereupon power drilling commenced.

Base soil found in the power flight auger drilling was a clay loam, somewhat sandy (CL), dark brown to reddish brown, medium to stiff. At depth, plastic sandy loam, borderline sandy clay loam (SC-CL), same color, quite compact, was found. Gravel content is negligible. These materials are a more uniform glacial till. Refusal to power auger advancement was not experienced by planned power boring termination at 15'-, indicating lack of bedrock to this

depth. The hand auger refusals in the range of 5'-6' of depth were due to encountering what seems to be a gravelly layer, which gravel could not be dislodged by manual means. It likely is an "armor" layer that was put down by faster moving water between glacial till deposition regimes. In Boring 1A, the same deeper material likely would be found below refusal level. In general, site soils are predominantly cohesive, but with granular inclusions in upper levels, the latter with little predictable pattern.

Moisture contents vary, partly due to their layered nature, partly due to the recent rather high precipitation. No evidence of any environmental contamination, such as an unusual appearance or odor, was noted in the borings.

Groundwater was not found in Boring 1A at 5.9' (elev 938) after a day's plus time of monitoring, indicating lack of aquifer groundwater. Surprisingly, Boring 1 indicated water in the bore hole at 5.2' (elev 939±). However, this level does not match the lack of waterbearing nature of soils below (medium to stiff clays). And, no groundwater was found a foot lower in Boring 1A. Hence, I hesitated to place a water level symbol on the bore log. Most likely, the gravelly interface above the more uniform lower and nonwaterbearing glacial till traps and stores infiltrating surface water. When Boring 1 was deepened, this water was released into the bore hole. All of this would indicate that *aquifer* groundwater does not exist on the site at the level indicated. It most likely is related to levels in the pond to the south. But bear in mind, as explained in the referenced attachments, that groundwater can still occur and vary due to many variables undeterminable within the time frame, scope and budget allowed in this investigation. Indications are for the time and conditions of testing only.

Some of the upper cohesive soils were mottled at varying depths. This is normal for clays, which mottle easily and does not indicate aquifer groundwater. Again, it is a manifestation of infiltrating surface water being trapped by tighter soils. It should be pointed out that most of the cohesive (clay) soils are technically saturated (all pores filled with water), but not waterbearing (capable of releasing this water). This is a normal condition for a soft to medium or better clay.

Regarding infiltration potential, I have not determined or estimated any coefficients of permeability. Rather, it can be fairly well assumed that most of the soils are USDA Hydrologic Soil Group "C". The sandier soils may have a higher soil group class, with isolated higher coefficients of permeability, but the layers are not thick enough (they are restricted by lower coefficient soils below). I understand that coefficients of permeability may be estimated by your designers on that basis, and the basin designed using this and other parameters..

Refer to the "Limitations of Investigation" attached to this report. Due to the nature of random small volume sampling and testing, no warranty of the site is made or implied.

Thank you for the opportunity to have been of service. If you have any questions on this, or if I can be of assistance in any additional capacity, do not hesitate to contact me at your

Mr Dave Poggi
29 November 2019
Page 4

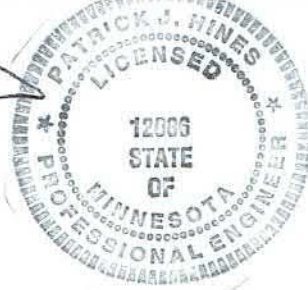
convenience.

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.

Respectfully submitted,

INTERSTATE GEOTECHNICAL ENGINEERING, Inc


Patrick J Hines, PE
President
Reg No 12086



enclosures

pH/SC

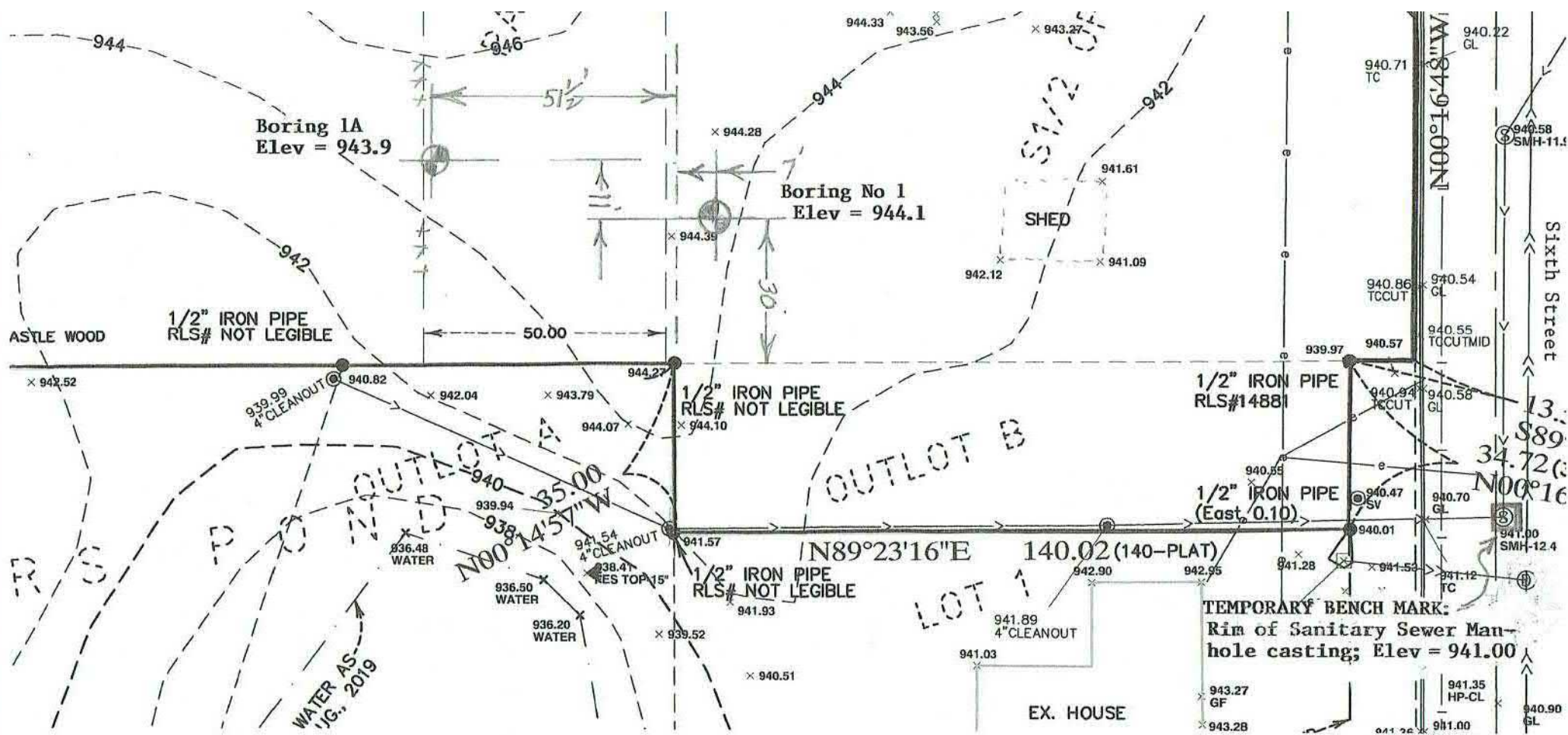
LIMITATIONS OF INVESTIGATION

The Soils Engineer has prepared this report in accordance with generally accepted soils engineering practice utilizing an ordinary level of care. Because the borings represent only a small portion of the total site and for other reasons, it is not warranted that the borings are necessarily representative of the entire site but only of the boring locations at the time of the investigation. No warranty of the site is made or implied, nor can the soils engineer be held responsible for facts not disclosed.

The scope of this report is limited strictly to geotechnical issues which include identifying and analyzing soils and only those conclusions expressly made. Note that, with the exception of noting no obvious signs of environmental contamination, this work is not intended to document the presence or absence of any other environmental contaminants at the site, and is not intended to identify applicable local, state or federal laws or regulations of a non-geotechnical nature which may or may not be applicable to this site.

Soils retrieved in the field investigation process were classified in the field by the Soils Engineer. All of them were immediately discarded.

This report is provided only for the use of the Client named in the report and consultants and agents for the stated purpose. No other representations are made to other parties or for other purposes.



Drawn by: pH
 (base drawing is a size altered portion of a
 Boundary & Topographic Survey for the site
 by Acre Land Surveying, dated 4 November 2019)

Locations of Soil Borings
 Proposed Infiltration Basin - 7th Street Townhomes
 2242 7th Street, North St Paul, Minn

1" = 30' *

*@ 8 1/2 x 11 sizing

SOIL BORING LOG

Patrick J Hines, PE

8167 100th St S
Cottage Grove MN 55016PROJECT: Proposed Infiltration Basin - 7th Street Townhomes
2242 7th Street, North St Paul, Minn

LOG OF BORING NO: 1

DEPTH IN FEET	SURFACE ELEVATION: 944.1		GEOLOGY	N	WB	SAMPLE			LAB & OTHER TESTS			
	DESCRIPTION AND CLASSIFICATION					#	TYPE	R	W	DEN	L.L. P.L.	
8"	FINE SANDY LOAM, Plastic, Very Dk Brn & Very Dk Yellowish Brn (SC), w/ sm roots, very moist, loose		Disturbed Soil		N	1	HA					
1	SANDY LOAM, Plastic, Dark Yellowish Brn (SC), very moist, loose (somewhat finer gr)		Mixed Glacial Till		N	2	HA					
1 1/4	SANDY LOAM, Sl Plastic, Dark Yellowish Brn (SM) w/ a little gravel, moist to very moist, loose to firm				N	3	HA					
2	LOAMY SAND, Dark Brn to Reddish Brn (SM-SP), w/ a little to some gravel, moist, rather firm				N	4	HA					
2.75	CLAY LOAM, rather sandy, Dark Brown to Reddish Brown (CL), saturated medium (soft to medium @ onset)				N	5	HA					
3	less sandy @ 3 1/2'											
3.75	mottled											
4	gravelly interface				N	6	HA					
5	CLAY LOAM, somewhat sandy, Dark Brown to Reddish Brown (CL), saturated, medium to stiff		Glacial Till		N	7	FA					
6												
7												
8												
9												
10	stiff				N	8	FA					
11												
12												
13	SANDY LOAM, Plastic (borderline SANDY CLAY LOAM), Dark Brown to Reddish Brown (SC-CL) moist, firm to compact				N	9	FA					
14												
14.9	End of Boring - No Refusal											
15	Bore hole void backfilled w/ produced cuttings on 29 November 2019											
16												
WATER LEVEL MEASUREMENTS						DRILLING DATA						
DATE	TIME hrs	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING MUD LEVEL	WATER LEVEL	Crew Chief: _____ pH					
26 Nov	15:54	4.9'		None		None	Method: 3" Hand & 4" Power Flight*					
27 "	16:20			"		"	Augers *Mobile B-47 Drill					
"	16:45	to 14.9'		9'		"	Rig on F450					
29 "	13:38			"		5.2'	Commenced: 26 November 2019					
							Boring Completed: 27 November 2019					

Wind
(27th) 31°F, Overcast, NNW 5-10 mph±
Weather: (26th) 35°F, Cloudy, NNE 0-5 mph± Wind

SOIL BORING LOG

Patrick J Hines, PE

8167 100th St S
Cottage Grove MN 55016PROJECT: Proposed Infiltration Basin - 7th Street Townhomes
2242 7th Street, North St Paul, Minn

LOG OF BORING NO: 1A

DEPTH IN FEET	SURFACE ELEVATION: 943.9 DESCRIPTION AND CLASSIFICATION	GEOLOGY	N	WB	SAMPLE			LAB & OTHER TESTS				
					#	TYPE	R	W	DEN	LL	PL	
3"±	FINE SANDY LOAM, Sl Plastic, Mildly Organic, Lt Black (OL), w/ small roots	Topsoil		N	1	HA						
1	CLAY LOAM, somewhat silty, w/ fine sand, Very Dark Yellowish Brown (CL), w/ a few small roots to saturated, rather soft 1 1/2'±	Glacial Till		N	2	HA						
2	Dark Yellowish Brown soft to medium											
	mottled											
3	medium											
	w/ fine sand laminations											
4	FINE SANDY LOAM, Plastic, Brown to Reddish Brown (SC), w/ tr gravel moist to very moist, firm			N	3	HA						
5	FINE SANDY LOAM, Sl Plastic, Brown to Reddish Brown (SM), w/ a little gravel moist to very moist, firm			N	4	HA						
5.8	sandier, coarser gr, higher gravel											
6	Refusal - End of Boring											
7	Bore hole void backfilled w/ produced cuttings on 29 November 2019											
WATER LEVEL MEASUREMENTS							DRILLING DATA Occ Very Lt Snow					
DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING MUD LEVEL	WATER LEVEL	Crew Chief: _____ pH _____					
26 Nov	15:13	5.8'		None		None	Method: 3" SCS Bucket (Hand) Auger					
27 "	16:55			"		"						
29 "	14:35			"		"						
							Boring Completed: 26 November 2019					

Weather: 35°F, Cloudy, NNE 0-5 mph± Wind

Appendix B – Drainage Diagrams

Appendix C – Subcatchment Data

Hydrology Parameter Summary

Project: 7th Street Townhomes

Date: 1/7/2020

Location: North St Paul

Watershed: Ramsey Washington Metro WD

EXISTING CONDITIONS

Area / Region ID	Total (sq ft)	Total (acre)	Imperv. (sq ft)	Imperv. (acre)	Imperv. (%)	Perv 1 (sq ft)	Perv 1 (acre)	Perv 1 CN	Perv 2 (sq ft)	Perv 2 (acre)	Perv 2 CN	Perv 3 (sq ft)	Perv 3 (acre)	Perv 3 CN
1	124604	2.861	4938	0.113	4.0%	119666	2.747	55		0.000			0.000	
2	31387	0.721	1296	0.030	4.1%	30091	0.691	55		0.000			0.000	
3	34459	0.791	4568	0.105	13.3%	29891	0.686	61		0.000				
Total:	190450	4.372	10802	0.248		179648	4.124		0	0				

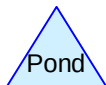
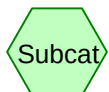
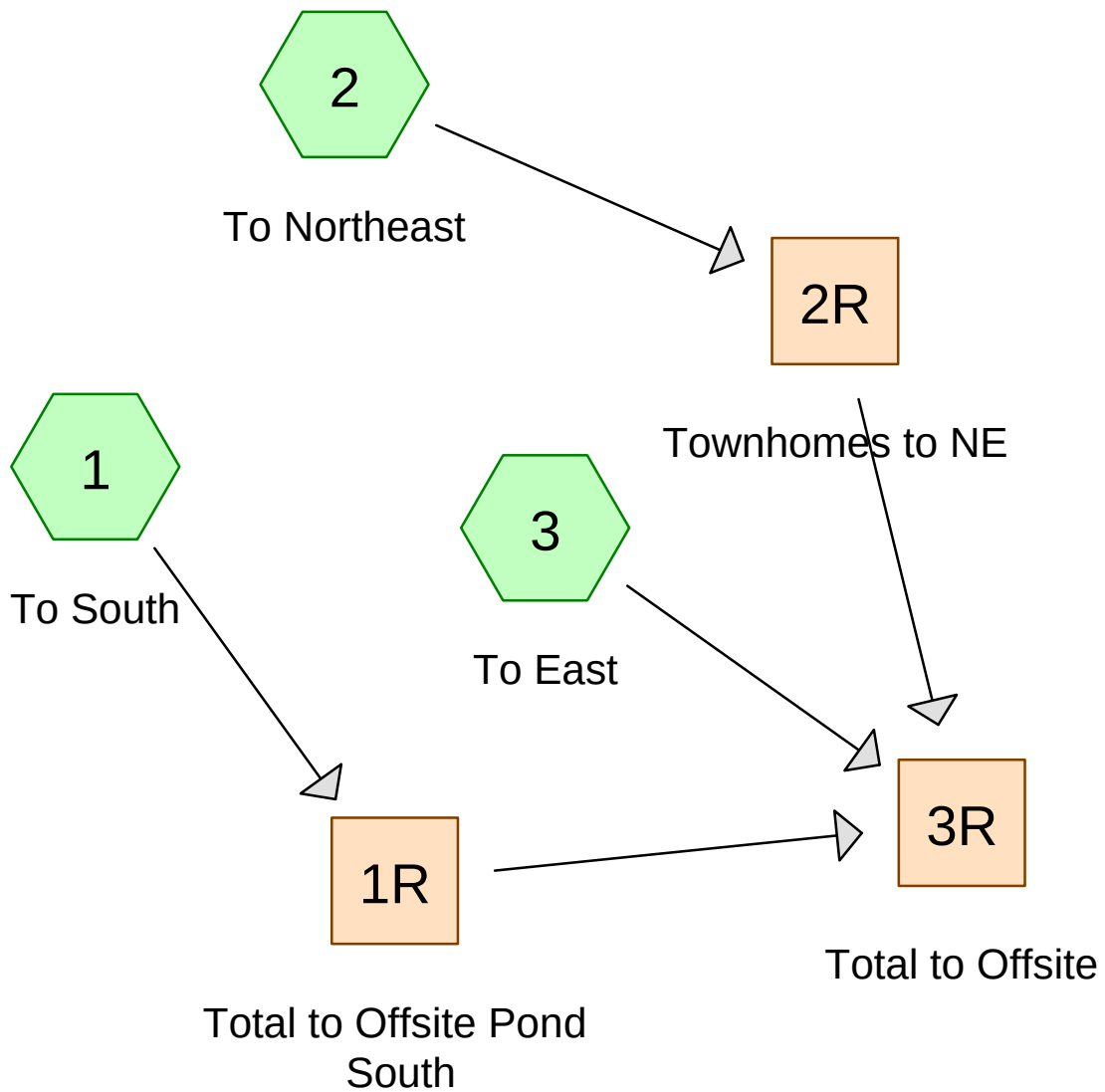
PROPOSED CONDITIONS

Area / Region ID	Total (sq ft)	Total (acre)	Imperv. (sq ft)	Imperv. (acre)	Imperv. (%)	Perv 1 (sq ft)	Perv 1 (acre)	Perv 1 CN	Perv 2 (sq ft)	Perv 2 (acre)	Perv 2 CN	Perv 3 (sq ft)	Perv 3 (acre)	Perv 3 CN
1	16665	0.383	4560	0.105	27.4%	12105	0.278	61	0	0.000	58		0.000	
2	100710	2.312	49055	1.126	48.7%	40875	0.938	61	10780	0.247	58		0.000	
3	29320	0.673	7500	0.172	25.6%	21820	0.501	61		0.000	58			
4	43755	1.004	9120	0.209	20.8%	22355	0.513	61	12280	0.282	55			
TOTAL:	190450	4.372	70235	1.612		97155	2.23		23060	0.5294				

Net New Impervious Area: 59433 sq ft 1.364 1.1 in = 5448 cu ft

Total Site Impervious Area: 70235 sq ft 1.612 1.1 in = 6438 cu ft 55% cr 11706 cu ft

Appendix D – HydroCAD Output



Routing Diagram for 191028_7thStTH_EX
 Prepared by Civil Methods, Inc., Printed 1/17/2020
 HydroCAD® 10.00-24 s/n 07283 © 2018 HydroCAD Software Solutions LLC

191028_7thStTH_EX*MSE 24-hr 3 2-Year Rainfall=2.81"*

Prepared by Civil Methods, Inc.

Printed 1/17/2020

HydroCAD® 10.00-24 s/n 07283 © 2018 HydroCAD Software Solutions LLC

Page 2

Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: To South

Runoff Area=2.860 ac 3.64% Impervious Runoff Depth=0.24"
Flow Length=530' Tc=24.1 min CN=55/98 Runoff=0.32 cfs 0.056 af

Subcatchment 2: To Northeast

Runoff Area=0.721 ac 4.16% Impervious Runoff Depth=0.25"
Flow Length=165' Tc=15.8 min CN=55/98 Runoff=0.10 cfs 0.015 af

Subcatchment 3: To East

Runoff Area=0.791 ac 13.27% Impervious Runoff Depth=0.60"
Flow Length=211' Tc=15.4 min CN=61/98 Runoff=0.44 cfs 0.039 af

Reach 1R: Total to Offsite Pond South

Inflow=0.32 cfs 0.056 af
Outflow=0.32 cfs 0.056 af

Reach 2R: Townhomes to NE

Inflow=0.10 cfs 0.015 af
Outflow=0.10 cfs 0.015 af

Reach 3R: Total to Offsite

Inflow=0.80 cfs 0.111 af
Outflow=0.80 cfs 0.111 af

Total Runoff Area = 4.372 ac Runoff Volume = 0.111 af Average Runoff Depth = 0.30"
94.53% Pervious = 4.133 ac 5.47% Impervious = 0.239 ac

Summary for Subcatchment 1: To South

Runoff = 0.32 cfs @ 12.42 hrs, Volume= 0.056 af, Depth= 0.24"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-Year Rainfall=2.81"

Area (ac)	CN	Description
* 0.104	98	
2.456	55	Woods, Good, HSG B
0.300	58	Woods/grass comb., Good, HSG B
2.860	57	Weighted Average
2.756	55	96.36% Pervious Area
0.104	98	3.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.8	100	0.0600	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.80"
5.0	165	0.0120	0.55		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
4.3	265	0.0420	1.02		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
24.1	530	Total			

Summary for Subcatchment 2: To Northeast

Runoff = 0.10 cfs @ 12.28 hrs, Volume= 0.015 af, Depth= 0.25"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-Year Rainfall=2.81"

Area (ac)	CN	Description
* 0.030	98	
* 0.691	55	Woods, Good, HSG B
0.721	57	Weighted Average
0.691	55	95.84% Pervious Area
0.030	98	4.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.8	100	0.0600	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.80"
1.0	65	0.0460	1.07		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
15.8	165	Total			

Summary for Subcatchment 3: To East

Runoff = 0.44 cfs @ 12.26 hrs, Volume= 0.039 af, Depth= 0.60"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-Year Rainfall=2.81"

Area (ac)	CN	Description
* 0.105	98	
0.686	61	>75% Grass cover, Good, HSG B
0.791	66	Weighted Average
0.686	61	86.73% Pervious Area
0.105	98	13.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	100	0.0750	0.12		Sheet Flow,
					Woods: Light underbrush n= 0.400 P2= 2.80"
1.8	111	0.0400	1.00		Shallow Concentrated Flow,
					Woodland Kv= 5.0 fps
15.4	211	Total			

Summary for Reach 1R: Total to Offsite Pond South

Inflow Area = 2.860 ac, 3.64% Impervious, Inflow Depth = 0.24" for 2-Year event
Inflow = 0.32 cfs @ 12.42 hrs, Volume= 0.056 af
Outflow = 0.32 cfs @ 12.42 hrs, Volume= 0.056 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Summary for Reach 2R: Townhomes to NE

Inflow Area = 0.721 ac, 4.16% Impervious, Inflow Depth = 0.25" for 2-Year event
Inflow = 0.10 cfs @ 12.28 hrs, Volume= 0.015 af
Outflow = 0.10 cfs @ 12.28 hrs, Volume= 0.015 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Summary for Reach 3R: Total to Offsite

Inflow Area = 4.372 ac, 5.47% Impervious, Inflow Depth = 0.30" for 2-Year event
Inflow = 0.80 cfs @ 12.29 hrs, Volume= 0.111 af
Outflow = 0.80 cfs @ 12.29 hrs, Volume= 0.111 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: To South

Runoff Area=2.860 ac 3.64% Impervious Runoff Depth=0.73"
Flow Length=530' Tc=24.1 min CN=55/98 Runoff=1.55 cfs 0.174 af

Subcatchment 2: To Northeast

Runoff Area=0.721 ac 4.16% Impervious Runoff Depth=0.75"
Flow Length=165' Tc=15.8 min CN=55/98 Runoff=0.50 cfs 0.045 af

Subcatchment 3: To East

Runoff Area=0.791 ac 13.27% Impervious Runoff Depth=1.31"
Flow Length=211' Tc=15.4 min CN=61/98 Runoff=1.15 cfs 0.087 af

Reach 1R: Total to Offsite Pond South

Inflow=1.55 cfs 0.174 af
Outflow=1.55 cfs 0.174 af

Reach 2R: Townhomes to NE

Inflow=0.50 cfs 0.045 af
Outflow=0.50 cfs 0.045 af

Reach 3R: Total to Offsite

Inflow=2.89 cfs 0.305 af
Outflow=2.89 cfs 0.305 af

Total Runoff Area = 4.372 ac Runoff Volume = 0.305 af Average Runoff Depth = 0.84"
94.53% Pervious = 4.133 ac 5.47% Impervious = 0.239 ac

Summary for Subcatchment 1: To South

Runoff = 1.55 cfs @ 12.40 hrs, Volume= 0.174 af, Depth= 0.73"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-Year Rainfall=4.19"

Area (ac)	CN	Description
* 0.104	98	
2.456	55	Woods, Good, HSG B
0.300	58	Woods/grass comb., Good, HSG B
2.860	57	Weighted Average
2.756	55	96.36% Pervious Area
0.104	98	3.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.8	100	0.0600	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.80"
5.0	165	0.0120	0.55		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
4.3	265	0.0420	1.02		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
24.1	530	Total			

Summary for Subcatchment 2: To Northeast

Runoff = 0.50 cfs @ 12.28 hrs, Volume= 0.045 af, Depth= 0.75"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-Year Rainfall=4.19"

Area (ac)	CN	Description
* 0.030	98	
* 0.691	55	Woods, Good, HSG B
0.721	57	Weighted Average
0.691	55	95.84% Pervious Area
0.030	98	4.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.8	100	0.0600	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.80"
1.0	65	0.0460	1.07		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
15.8	165	Total			

Summary for Subcatchment 3: To East

Runoff = 1.15 cfs @ 12.25 hrs, Volume= 0.087 af, Depth= 1.31"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-Year Rainfall=4.19"

Area (ac)	CN	Description
* 0.105	98	
0.686	61	>75% Grass cover, Good, HSG B
0.791	66	Weighted Average
0.686	61	86.73% Pervious Area
0.105	98	13.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	100	0.0750	0.12		Sheet Flow,
					Woods: Light underbrush n= 0.400 P2= 2.80"
1.8	111	0.0400	1.00		Shallow Concentrated Flow,
					Woodland Kv= 5.0 fps
15.4	211	Total			

Summary for Reach 1R: Total to Offsite Pond South

Inflow Area = 2.860 ac, 3.64% Impervious, Inflow Depth = 0.73" for 10-Year event
Inflow = 1.55 cfs @ 12.40 hrs, Volume= 0.174 af
Outflow = 1.55 cfs @ 12.40 hrs, Volume= 0.174 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Summary for Reach 2R: Townhomes to NE

Inflow Area = 0.721 ac, 4.16% Impervious, Inflow Depth = 0.75" for 10-Year event
Inflow = 0.50 cfs @ 12.28 hrs, Volume= 0.045 af
Outflow = 0.50 cfs @ 12.28 hrs, Volume= 0.045 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Summary for Reach 3R: Total to Offsite

Inflow Area = 4.372 ac, 5.47% Impervious, Inflow Depth = 0.84" for 10-Year event
Inflow = 2.89 cfs @ 12.32 hrs, Volume= 0.305 af
Outflow = 2.89 cfs @ 12.32 hrs, Volume= 0.305 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: To South

Runoff Area=2.860 ac 3.64% Impervious Runoff Depth=2.53"
Flow Length=530' Tc=24.1 min CN=55/98 Runoff=6.89 cfs 0.603 af

Subcatchment 2: To Northeast

Runoff Area=0.721 ac 4.16% Impervious Runoff Depth=2.55"
Flow Length=165' Tc=15.8 min CN=55/98 Runoff=2.19 cfs 0.153 af

Subcatchment 3: To East

Runoff Area=0.791 ac 13.27% Impervious Runoff Depth=3.52"
Flow Length=211' Tc=15.4 min CN=61/98 Runoff=3.38 cfs 0.232 af

Reach 1R: Total to Offsite Pond South

Inflow=6.89 cfs 0.603 af
Outflow=6.89 cfs 0.603 af

Reach 2R: Townhomes to NE

Inflow=2.19 cfs 0.153 af
Outflow=2.19 cfs 0.153 af

Reach 3R: Total to Offsite

Inflow=11.62 cfs 0.988 af
Outflow=11.62 cfs 0.988 af

Total Runoff Area = 4.372 ac Runoff Volume = 0.988 af Average Runoff Depth = 2.71"
94.53% Pervious = 4.133 ac 5.47% Impervious = 0.239 ac

Summary for Subcatchment 1: To South

Runoff = 6.89 cfs @ 12.37 hrs, Volume= 0.603 af, Depth= 2.53"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=7.36"

Area (ac)	CN	Description
* 0.104	98	
2.456	55	Woods, Good, HSG B
0.300	58	Woods/grass comb., Good, HSG B
2.860	57	Weighted Average
2.756	55	96.36% Pervious Area
0.104	98	3.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.8	100	0.0600	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.80"
5.0	165	0.0120	0.55		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
4.3	265	0.0420	1.02		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
24.1	530	Total			

Summary for Subcatchment 2: To Northeast

Runoff = 2.19 cfs @ 12.26 hrs, Volume= 0.153 af, Depth= 2.55"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=7.36"

Area (ac)	CN	Description
* 0.030	98	
* 0.691	55	Woods, Good, HSG B
0.721	57	Weighted Average
0.691	55	95.84% Pervious Area
0.030	98	4.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.8	100	0.0600	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.80"
1.0	65	0.0460	1.07		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
15.8	165	Total			

Summary for Subcatchment 3: To East

Runoff = 3.38 cfs @ 12.24 hrs, Volume= 0.232 af, Depth= 3.52"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=7.36"

Area (ac)	CN	Description
* 0.105	98	
0.686	61	>75% Grass cover, Good, HSG B
0.791	66	Weighted Average
0.686	61	86.73% Pervious Area
0.105	98	13.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	100	0.0750	0.12		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.80"
1.8	111	0.0400	1.00		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
15.4	211	Total			

Summary for Reach 1R: Total to Offsite Pond South

Inflow Area = 2.860 ac, 3.64% Impervious, Inflow Depth = 2.53" for 100-Year event
Inflow = 6.89 cfs @ 12.37 hrs, Volume= 0.603 af
Outflow = 6.89 cfs @ 12.37 hrs, Volume= 0.603 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Summary for Reach 2R: Townhomes to NE

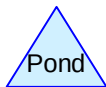
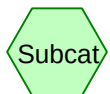
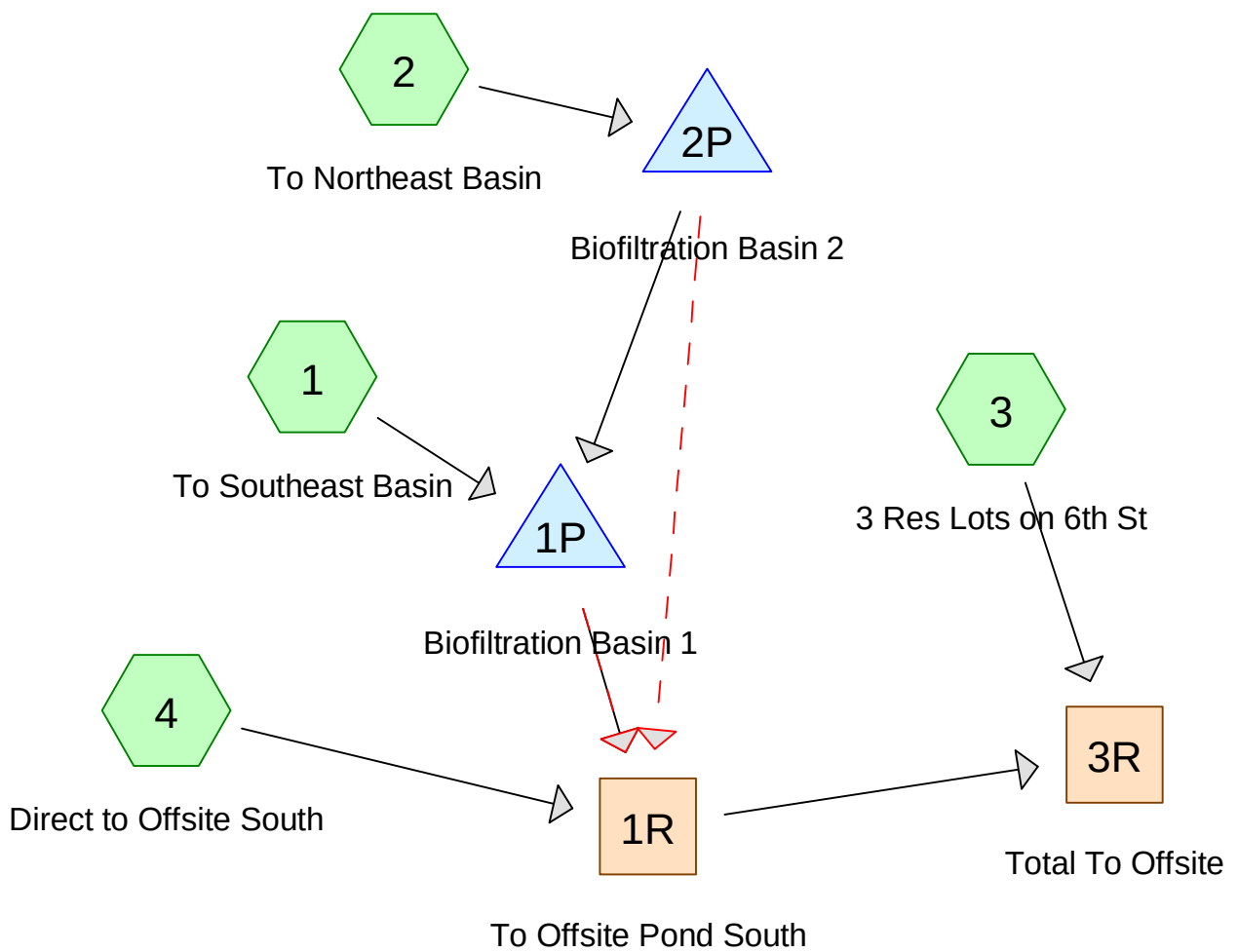
Inflow Area = 0.721 ac, 4.16% Impervious, Inflow Depth = 2.55" for 100-Year event
Inflow = 2.19 cfs @ 12.26 hrs, Volume= 0.153 af
Outflow = 2.19 cfs @ 12.26 hrs, Volume= 0.153 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Summary for Reach 3R: Total to Offsite

Inflow Area = 4.372 ac, 5.47% Impervious, Inflow Depth = 2.71" for 100-Year event
Inflow = 11.62 cfs @ 12.30 hrs, Volume= 0.988 af
Outflow = 11.62 cfs @ 12.30 hrs, Volume= 0.988 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs



Routing Diagram for 200106_7thStTH_PR
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Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: To Southeast Basin	Runoff Area=0.383 ac 27.42% Impervious Runoff Depth=0.65" Tc=6.0 min CN=71 Runoff=0.44 cfs 0.021 af
Subcatchment 2: To Northeast Basin	Runoff Area=2.311 ac 48.59% Impervious Runoff Depth=1.05" Flow Length=440' Tc=10.8 min CN=79 Runoff=3.62 cfs 0.203 af
Subcatchment 3: 3 Res Lots on 6th St	Runoff Area=0.673 ac 35.81% Impervious Runoff Depth=0.79" Flow Length=211' Tc=15.4 min CN=74 Runoff=0.63 cfs 0.044 af
Subcatchment 4: Direct to Offsite South	Runoff Area=1.005 ac 22.29% Impervious Runoff Depth=0.53" Flow Length=450' Tc=20.0 min CN=68 Runoff=0.49 cfs 0.044 af
Reach 1R: To Offsite Pond South	Inflow=0.59 cfs 0.268 af Outflow=0.59 cfs 0.268 af
Reach 3R: Total To Offsite	Inflow=1.17 cfs 0.312 af Outflow=1.17 cfs 0.312 af
Pond 1P: Biofiltration Basin 1	Peak Elev=942.17' Storage=359 cf Inflow=0.44 cfs 0.021 af Primary=0.00 cfs 0.000 af Secondary=0.04 cfs 0.021 af Outflow=0.04 cfs 0.021 af
Pond 2P: Biofiltration Basin 2	Peak Elev=943.97' Storage=6,303 cf Inflow=3.62 cfs 0.203 af Primary=0.00 cfs 0.000 af Secondary=0.07 cfs 0.203 af Outflow=0.07 cfs 0.203 af
Total Runoff Area = 4.372 ac Runoff Volume = 0.312 af Average Runoff Depth = 0.86"	
61.28% Pervious = 2.679 ac 38.72% Impervious = 1.693 ac	

Summary for Subcatchment 1: To Southeast Basin

Runoff = 0.44 cfs @ 12.14 hrs, Volume= 0.021 af, Depth= 0.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-Year Rainfall=2.81"

Area (ac)	CN	Description
* 0.105	98	
0.278	61	>75% Grass cover, Good, HSG B
0.383	71	Weighted Average
0.278	61	72.58% Pervious Area
0.105	98	27.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Summary for Subcatchment 2: To Northeast Basin

Runoff = 3.62 cfs @ 12.19 hrs, Volume= 0.203 af, Depth= 1.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-Year Rainfall=2.81"

Area (ac)	CN	Description
* 1.123	98	
0.941	61	>75% Grass cover, Good, HSG B
* 0.247	58	OFFSITE Woods/grass comb., Good, HSG B
2.311	79	Weighted Average
1.188	60	51.41% Pervious Area
1.123	98	48.59% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.8	60	0.0150	0.13		Sheet Flow, Grass: Short n= 0.150 P2= 2.80"
3.0	380	0.0200	2.12		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
10.8	440	Total			

Summary for Subcatchment 3: 3 Res Lots on 6th St

Runoff = 0.63 cfs @ 12.26 hrs, Volume= 0.044 af, Depth= 0.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-Year Rainfall=2.81"

200106 7thStTH PR

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MSE 24-hr 3 2-Year Rainfall=2.81"

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Area (ac)	CN	Description
* 0.241	98	
0.432	61	>75% Grass cover, Good, HSG B
0.673	74	Weighted Average
0.432	61	64.19% Pervious Area
0.241	98	35.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	100	0.0750	0.12		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.80"
1.8	111	0.0400	1.00		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
15.4	211	Total			

Summary for Subcatchment 4: Direct to Offsite South

Runoff = 0.49 cfs @ 12.34 hrs, Volume= 0.044 af, Depth= 0.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-Year Rainfall=2.81"

Area (ac)	CN	Description
* 0.224	98	
0.499	61	>75% Grass cover, Good, HSG B
0.282	55	Woods, Good, HSG B
1.005	68	Weighted Average
0.781	59	77.71% Pervious Area
0.224	98	22.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.1	50	0.0250	0.07		Sheet Flow, Retained tree area Woods: Light underbrush n= 0.400 P2= 2.80"
2.7	50	0.1500	0.31		Sheet Flow, Yard slope Grass: Short n= 0.150 P2= 2.80"
3.0	180	0.0200	0.99		Shallow Concentrated Flow, Yard swale Short Grass Pasture Kv= 7.0 fps
2.2	170	0.0350	1.31		Shallow Concentrated Flow, Retained natural area Short Grass Pasture Kv= 7.0 fps
20.0	450	Total			

Summary for Reach 1R: To Offsite Pond South

Inflow Area = 3.699 ac, 39.25% Impervious, Inflow Depth = 0.87" for 2-Year event
 Inflow = 0.59 cfs @ 12.34 hrs, Volume= 0.268 af
 Outflow = 0.59 cfs @ 12.34 hrs, Volume= 0.268 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Summary for Reach 3R: Total To Offsite

Inflow Area = 4.372 ac, 38.72% Impervious, Inflow Depth = 0.86" for 2-Year event
 Inflow = 1.17 cfs @ 12.29 hrs, Volume= 0.312 af
 Outflow = 1.17 cfs @ 12.29 hrs, Volume= 0.312 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Summary for Pond 1P: Biofiltration Basin 1

Inflow Area = 2.694 ac, 45.58% Impervious, Inflow Depth = 0.09" for 2-Year event
 Inflow = 0.44 cfs @ 12.14 hrs, Volume= 0.021 af
 Outflow = 0.04 cfs @ 13.26 hrs, Volume= 0.021 af, Atten= 91%, Lag= 67.3 min
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Secondary = 0.04 cfs @ 13.26 hrs, Volume= 0.021 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 942.17' @ 13.26 hrs Surf.Area= 2,141 sf Storage= 359 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 80.2 min (923.7 - 843.5)

Volume	Invert	Avail.Storage	Storage Description
#1	942.00'	16,318 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
942.00	2,030	0	0
944.00	3,325	5,355	5,355
946.00	4,910	8,235	13,590
946.50	6,000	2,728	16,318

Device	Routing	Invert	Outlet Devices
#1	Primary	941.30'	15.0" Round Culvert L= 30.0' Ke= 0.500 Inlet / Outlet Invert= 941.30' / 941.00' S= 0.0100 ' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#2	Device 1	944.00'	6.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	945.40'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)
#4	Secondary	942.00'	0.800 in/hr Exfiltration over Surface area

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=942.00' TW=0.00' (Dynamic Tailwater)

↑ **1=Culvert** (Passes 0.00 cfs of 1.78 cfs potential flow)
 ↑ **2=Orifice/Grate** (Controls 0.00 cfs)
 ↑ **3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Secondary OutFlow Max=0.04 cfs @ 13.26 hrs HW=942.17' TW=0.00' (Dynamic Tailwater)

↑ **4=Exfiltration** (Exfiltration Controls 0.04 cfs)

Summary for Pond 2P: Biofiltration Basin 2

Inflow Area = 2.311 ac, 48.59% Impervious, Inflow Depth = 1.05" for 2-Year event
 Inflow = 3.62 cfs @ 12.19 hrs, Volume= 0.203 af
 Outflow = 0.07 cfs @ 17.26 hrs, Volume= 0.203 af, Atten= 98%, Lag= 303.9 min
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Secondary = 0.07 cfs @ 17.26 hrs, Volume= 0.203 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 943.97' @ 17.26 hrs Surf.Area= 3,940 sf Storage= 6,303 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 956.1 min (1,782.3 - 826.2)

Volume	Invert	Avail.Storage	Storage Description
#1	942.00'	21,815 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
942.00	2,470	0	0
944.00	3,965	6,435	6,435
946.00	5,470	9,435	15,870
947.00	6,420	5,945	21,815

Device	Routing	Invert	Outlet Devices
#1	Primary	944.00'	18.0" Round Culvert L= 130.0' Ke= 0.500 Inlet / Outlet Invert= 944.00' / 942.00' S= 0.0154 '/' Cc= 0.900 n= 0.011, Flow Area= 1.77 sf
#2	Secondary	942.00'	0.800 in/hr To underdrain over Surface area

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=942.00' TW=942.00' (Dynamic Tailwater)

↑**1=Culvert** (Controls 0.00 cfs)

Secondary OutFlow Max=0.07 cfs @ 17.26 hrs HW=943.97' TW=0.00' (Dynamic Tailwater)

↑**2=To underdrain** (Exfiltration Controls 0.07 cfs)

Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: To Southeast Basin	Runoff Area=0.383 ac 27.42% Impervious Runoff Depth=1.53" Tc=6.0 min CN=71 Runoff=1.09 cfs 0.049 af
Subcatchment 2: To Northeast Basin	Runoff Area=2.311 ac 48.59% Impervious Runoff Depth=2.12" Flow Length=440' Tc=10.8 min CN=79 Runoff=7.40 cfs 0.408 af
Subcatchment 3: 3 Res Lots on 6th St	Runoff Area=0.673 ac 35.81% Impervious Runoff Depth=1.74" Flow Length=211' Tc=15.4 min CN=74 Runoff=1.48 cfs 0.097 af
Subcatchment 4: Direct to Offsite South	Runoff Area=1.005 ac 22.29% Impervious Runoff Depth=1.33" Flow Length=450' Tc=20.0 min CN=68 Runoff=1.42 cfs 0.111 af
Reach 1R: To Offsite Pond South	Inflow=1.54 cfs 0.568 af Outflow=1.54 cfs 0.568 af
Reach 3R: Total To Offsite	Inflow=2.93 cfs 0.665 af Outflow=2.93 cfs 0.665 af
Pond 1P: Biofiltration Basin 1	Peak Elev=944.24' Storage=6,171 cf Inflow=1.72 cfs 0.224 af Primary=0.15 cfs 0.046 af Secondary=0.07 cfs 0.179 af Outflow=0.22 cfs 0.224 af
Pond 2P: Biofiltration Basin 2	Peak Elev=944.56' Storage=8,789 cf Inflow=7.40 cfs 0.408 af Primary=1.55 cfs 0.176 af Secondary=0.08 cfs 0.233 af Outflow=1.63 cfs 0.408 af
Total Runoff Area = 4.372 ac Runoff Volume = 0.665 af Average Runoff Depth = 1.83"	
61.28% Pervious = 2.679 ac 38.72% Impervious = 1.693 ac	

Summary for Subcatchment 1: To Southeast Basin

Runoff = 1.09 cfs @ 12.14 hrs, Volume= 0.049 af, Depth= 1.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-Year Rainfall=4.19"

Area (ac)	CN	Description
* 0.105	98	
0.278	61	>75% Grass cover, Good, HSG B
0.383	71	Weighted Average
0.278	61	72.58% Pervious Area
0.105	98	27.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Summary for Subcatchment 2: To Northeast Basin

Runoff = 7.40 cfs @ 12.19 hrs, Volume= 0.408 af, Depth= 2.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-Year Rainfall=4.19"

Area (ac)	CN	Description
* 1.123	98	
0.941	61	>75% Grass cover, Good, HSG B
* 0.247	58	OFFSITE Woods/grass comb., Good, HSG B
2.311	79	Weighted Average
1.188	60	51.41% Pervious Area
1.123	98	48.59% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.8	60	0.0150	0.13		Sheet Flow, Grass: Short n= 0.150 P2= 2.80"
3.0	380	0.0200	2.12		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
10.8	440	Total			

Summary for Subcatchment 3: 3 Res Lots on 6th St

Runoff = 1.48 cfs @ 12.24 hrs, Volume= 0.097 af, Depth= 1.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-Year Rainfall=4.19"

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MSE 24-hr 3 10-Year Rainfall=4.19"

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Area (ac)	CN	Description
* 0.241	98	
0.432	61	>75% Grass cover, Good, HSG B
0.673	74	Weighted Average
0.432	61	64.19% Pervious Area
0.241	98	35.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	100	0.0750	0.12		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.80"
1.8	111	0.0400	1.00		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
15.4	211	Total			

Summary for Subcatchment 4: Direct to Offsite South

Runoff = 1.42 cfs @ 12.32 hrs, Volume= 0.111 af, Depth= 1.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-Year Rainfall=4.19"

Area (ac)	CN	Description
* 0.224	98	
0.499	61	>75% Grass cover, Good, HSG B
0.282	55	Woods, Good, HSG B
1.005	68	Weighted Average
0.781	59	77.71% Pervious Area
0.224	98	22.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.1	50	0.0250	0.07		Sheet Flow, Retained tree area Woods: Light underbrush n= 0.400 P2= 2.80"
2.7	50	0.1500	0.31		Sheet Flow, Yard slope Grass: Short n= 0.150 P2= 2.80"
3.0	180	0.0200	0.99		Shallow Concentrated Flow, Yard swale Short Grass Pasture Kv= 7.0 fps
2.2	170	0.0350	1.31		Shallow Concentrated Flow, Retained natural area Short Grass Pasture Kv= 7.0 fps
20.0	450	Total			

Summary for Reach 1R: To Offsite Pond South

Inflow Area = 3.699 ac, 39.25% Impervious, Inflow Depth = 1.84" for 10-Year event
Inflow = 1.54 cfs @ 12.32 hrs, Volume= 0.568 af
Outflow = 1.54 cfs @ 12.32 hrs, Volume= 0.568 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Summary for Reach 3R: Total To Offsite

Inflow Area = 4.372 ac, 38.72% Impervious, Inflow Depth = 1.83" for 10-Year event
 Inflow = 2.93 cfs @ 12.28 hrs, Volume= 0.665 af
 Outflow = 2.93 cfs @ 12.28 hrs, Volume= 0.665 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Summary for Pond 1P: Biofiltration Basin 1

Inflow Area = 2.694 ac, 45.58% Impervious, Inflow Depth = 1.00" for 10-Year event
 Inflow = 1.72 cfs @ 12.54 hrs, Volume= 0.224 af
 Outflow = 0.22 cfs @ 15.06 hrs, Volume= 0.224 af, Atten= 87%, Lag= 151.0 min
 Primary = 0.15 cfs @ 15.06 hrs, Volume= 0.046 af
 Secondary = 0.07 cfs @ 15.06 hrs, Volume= 0.179 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 944.24' @ 15.06 hrs Surf.Area= 3,514 sf Storage= 6,171 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 803.6 min (1,650.4 - 846.9)

Volume	Invert	Avail.Storage	Storage Description
#1	942.00'	16,318 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
942.00	2,030	0	0
944.00	3,325	5,355	5,355
946.00	4,910	8,235	13,590
946.50	6,000	2,728	16,318

Device	Routing	Invert	Outlet Devices
#1	Primary	941.30'	15.0" Round Culvert L= 30.0' Ke= 0.500 Inlet / Outlet Invert= 941.30' / 941.00' S= 0.0100 ' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#2	Device 1	944.00'	6.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	945.40'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)
#4	Secondary	942.00'	0.800 in/hr Exfiltration over Surface area

Primary OutFlow Max=0.15 cfs @ 15.06 hrs HW=944.24' TW=0.00' (Dynamic Tailwater)

↑ **1=Culvert** (Passes 0.15 cfs of 8.99 cfs potential flow)
 ↑ **2=Orifice/Grate** (Orifice Controls 0.15 cfs @ 1.66 fps)
 ↑ **3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Secondary OutFlow Max=0.07 cfs @ 15.06 hrs HW=944.24' TW=0.00' (Dynamic Tailwater)

↑ **4=Exfiltration** (Exfiltration Controls 0.07 cfs)

Summary for Pond 2P: Biofiltration Basin 2

Inflow Area = 2.311 ac, 48.59% Impervious, Inflow Depth = 2.12" for 10-Year event
 Inflow = 7.40 cfs @ 12.19 hrs, Volume= 0.408 af
 Outflow = 1.63 cfs @ 12.56 hrs, Volume= 0.408 af, Atten= 78%, Lag= 22.7 min
 Primary = 1.55 cfs @ 12.56 hrs, Volume= 0.176 af
 Secondary = 0.08 cfs @ 12.56 hrs, Volume= 0.233 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 944.56' @ 12.56 hrs Surf.Area= 4,389 sf Storage= 8,789 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 607.4 min (1,418.9 - 811.5)

Volume	Invert	Avail.Storage	Storage Description
#1	942.00'	21,815 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
942.00	2,470	0	0
944.00	3,965	6,435	6,435
946.00	5,470	9,435	15,870
947.00	6,420	5,945	21,815

Device	Routing	Invert	Outlet Devices
#1	Primary	944.00'	18.0" Round Culvert L= 130.0' Ke= 0.500 Inlet / Outlet Invert= 944.00' / 942.00' S= 0.0154 '/' Cc= 0.900 n= 0.011, Flow Area= 1.77 sf
#2	Secondary	942.00'	0.800 in/hr To underdrain over Surface area

Primary OutFlow Max=1.55 cfs @ 12.56 hrs HW=944.56' TW=942.91' (Dynamic Tailwater)
 ↑ **1=Culvert** (Inlet Controls 1.55 cfs @ 2.56 fps)

Secondary OutFlow Max=0.08 cfs @ 12.56 hrs HW=944.56' TW=0.00' (Dynamic Tailwater)
 ↑ **2=To underdrain** (Exfiltration Controls 0.08 cfs)

200106_7thStTH_PR*MSE 24-hr 3 100-Year Rainfall=7.36"*

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Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: To Southeast Basin	Runoff Area=0.383 ac 27.42% Impervious Runoff Depth=4.03" Tc=6.0 min CN=71 Runoff=2.86 cfs 0.129 af
Subcatchment 2: To Northeast Basin	Runoff Area=2.311 ac 48.59% Impervious Runoff Depth=4.91" Flow Length=440' Tc=10.8 min CN=79 Runoff=16.88 cfs 0.947 af
Subcatchment 3: 3 Res Lots on 6th St	Runoff Area=0.673 ac 35.81% Impervious Runoff Depth=4.36" Flow Length=211' Tc=15.4 min CN=74 Runoff=3.74 cfs 0.244 af
Subcatchment 4: Direct to Offsite South	Runoff Area=1.005 ac 22.29% Impervious Runoff Depth=3.70" Flow Length=450' Tc=20.0 min CN=68 Runoff=4.17 cfs 0.310 af
Reach 1R: To Offsite Pond South	Inflow=5.23 cfs 1.385 af Outflow=5.23 cfs 1.385 af
Reach 3R: Total To Offsite	Inflow=8.31 cfs 1.630 af Outflow=8.31 cfs 1.630 af
Pond 1P: Biofiltration Basin 1	Peak Elev=945.69' Storage=12,094 cf Inflow=9.71 cfs 0.816 af Primary=3.12 cfs 0.611 af Secondary=0.09 cfs 0.205 af Outflow=3.21 cfs 0.816 af
Pond 2P: Biofiltration Basin 2	Peak Elev=945.83' Storage=14,972 cf Inflow=16.88 cfs 0.947 af Primary=8.85 cfs 0.688 af Secondary=0.10 cfs 0.259 af Outflow=8.95 cfs 0.947 af
Total Runoff Area = 4.372 ac Runoff Volume = 1.630 af Average Runoff Depth = 4.47"	
61.28% Pervious = 2.679 ac 38.72% Impervious = 1.693 ac	

Summary for Subcatchment 1: To Southeast Basin

Runoff = 2.86 cfs @ 12.13 hrs, Volume= 0.129 af, Depth= 4.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=7.36"

Area (ac)	CN	Description
* 0.105	98	
0.278	61	>75% Grass cover, Good, HSG B
0.383	71	Weighted Average
0.278	61	72.58% Pervious Area
0.105	98	27.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Summary for Subcatchment 2: To Northeast Basin

Runoff = 16.88 cfs @ 12.18 hrs, Volume= 0.947 af, Depth= 4.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=7.36"

Area (ac)	CN	Description
* 1.123	98	
0.941	61	>75% Grass cover, Good, HSG B
* 0.247	58	OFFSITE Woods/grass comb., Good, HSG B
2.311	79	Weighted Average
1.188	60	51.41% Pervious Area
1.123	98	48.59% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.8	60	0.0150	0.13		Sheet Flow, Grass: Short n= 0.150 P2= 2.80"
3.0	380	0.0200	2.12		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
10.8	440	Total			

Summary for Subcatchment 3: 3 Res Lots on 6th St

Runoff = 3.74 cfs @ 12.24 hrs, Volume= 0.244 af, Depth= 4.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=7.36"

200106 7thStTH PR

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MSE 24-hr 3 100-Year Rainfall=7.36"

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Area (ac)	CN	Description
* 0.241	98	
0.432	61	>75% Grass cover, Good, HSG B
0.673	74	Weighted Average
0.432	61	64.19% Pervious Area
0.241	98	35.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	100	0.0750	0.12		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 2.80"
1.8	111	0.0400	1.00		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
15.4	211	Total			

Summary for Subcatchment 4: Direct to Offsite South

Runoff = 4.17 cfs @ 12.29 hrs, Volume= 0.310 af, Depth= 3.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=7.36"

Area (ac)	CN	Description
* 0.224	98	
0.499	61	>75% Grass cover, Good, HSG B
0.282	55	Woods, Good, HSG B
1.005	68	Weighted Average
0.781	59	77.71% Pervious Area
0.224	98	22.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.1	50	0.0250	0.07		Sheet Flow, Retained tree area Woods: Light underbrush n= 0.400 P2= 2.80"
2.7	50	0.1500	0.31		Sheet Flow, Yard slope Grass: Short n= 0.150 P2= 2.80"
3.0	180	0.0200	0.99		Shallow Concentrated Flow, Yard swale Short Grass Pasture Kv= 7.0 fps
2.2	170	0.0350	1.31		Shallow Concentrated Flow, Retained natural area Short Grass Pasture Kv= 7.0 fps
20.0	450	Total			

Summary for Reach 1R: To Offsite Pond South

Inflow Area = 3.699 ac, 39.25% Impervious, Inflow Depth = 4.49" for 100-Year event
Inflow = 5.23 cfs @ 12.55 hrs, Volume= 1.385 af
Outflow = 5.23 cfs @ 12.55 hrs, Volume= 1.385 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Summary for Reach 3R: Total To Offsite

Inflow Area = 4.372 ac, 38.72% Impervious, Inflow Depth = 4.47" for 100-Year event
 Inflow = 8.31 cfs @ 12.29 hrs, Volume= 1.630 af
 Outflow = 8.31 cfs @ 12.29 hrs, Volume= 1.630 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Summary for Pond 1P: Biofiltration Basin 1

Inflow Area = 2.694 ac, 45.58% Impervious, Inflow Depth = 3.64" for 100-Year event
 Inflow = 9.71 cfs @ 12.29 hrs, Volume= 0.816 af
 Outflow = 3.21 cfs @ 12.65 hrs, Volume= 0.816 af, Atten= 67%, Lag= 21.5 min
 Primary = 3.12 cfs @ 12.65 hrs, Volume= 0.611 af
 Secondary = 0.09 cfs @ 12.65 hrs, Volume= 0.205 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 945.69' @ 12.65 hrs Surf.Area= 4,662 sf Storage= 12,094 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 294.1 min (1,141.0 - 846.9)

Volume	Invert	Avail.Storage	Storage Description
#1	942.00'	16,318 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
942.00	2,030	0	0
944.00	3,325	5,355	5,355
946.00	4,910	8,235	13,590
946.50	6,000	2,728	16,318

Device	Routing	Invert	Outlet Devices
#1	Primary	941.30'	15.0" Round Culvert L= 30.0' Ke= 0.500 Inlet / Outlet Invert= 941.30' / 941.00' S= 0.0100 ' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#2	Device 1	944.00'	6.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	945.40'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)
#4	Secondary	942.00'	0.800 in/hr Exfiltration over Surface area

Primary OutFlow Max=3.12 cfs @ 12.65 hrs HW=945.69' TW=0.00' (Dynamic Tailwater)

↑ **1=Culvert** (Passes 3.12 cfs of 11.46 cfs potential flow)

↑ **2=Orifice/Grate** (Orifice Controls 1.13 cfs @ 5.77 fps)

↑ **3=Sharp-Crested Rectangular Weir** (Weir Controls 1.99 cfs @ 1.75 fps)

Secondary OutFlow Max=0.09 cfs @ 12.65 hrs HW=945.69' TW=0.00' (Dynamic Tailwater)

↑ **4=Exfiltration** (Exfiltration Controls 0.09 cfs)

Summary for Pond 2P: Biofiltration Basin 2

Inflow Area = 2.311 ac, 48.59% Impervious, Inflow Depth = 4.91" for 100-Year event
 Inflow = 16.88 cfs @ 12.18 hrs, Volume= 0.947 af
 Outflow = 8.95 cfs @ 12.31 hrs, Volume= 0.947 af, Atten= 47%, Lag= 7.4 min
 Primary = 8.85 cfs @ 12.31 hrs, Volume= 0.688 af
 Secondary = 0.10 cfs @ 12.56 hrs, Volume= 0.259 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 945.83' @ 12.56 hrs Surf.Area= 5,345 sf Storage= 14,972 cf

Plug-Flow detention time= 323.5 min calculated for 0.946 af (100% of inflow)
 Center-of-Mass det. time= 323.7 min (1,118.3 - 794.6)

Volume	Invert	Avail.Storage	Storage Description
#1	942.00'	21,815 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
942.00	2,470	0	0
944.00	3,965	6,435	6,435
946.00	5,470	9,435	15,870
947.00	6,420	5,945	21,815

Device	Routing	Invert	Outlet Devices
#1	Primary	944.00'	18.0" Round Culvert L= 130.0' Ke= 0.500 Inlet / Outlet Invert= 944.00' / 942.00' S= 0.0154 ' /' Cc= 0.900 n= 0.011, Flow Area= 1.77 sf
#2	Secondary	942.00'	0.800 in/hr To underdrain over Surface area

Primary OutFlow Max=8.63 cfs @ 12.31 hrs HW=945.82' TW=944.67' (Dynamic Tailwater)
 ↑1=Culvert (Outlet Controls 8.63 cfs @ 5.11 fps)

Secondary OutFlow Max=0.10 cfs @ 12.56 hrs HW=945.83' TW=0.00' (Dynamic Tailwater)
 ↑2=To underdrain (Exfiltration Controls 0.10 cfs)

Agenda Information Memorandum
North St. Paul Planning Commission
February 1, 2020

VIII. REPORTS FROM STAFF

A. 2020 Zoning Updates Discussion

ACTION TO BE CONSIDERED

Provide feedback and/or additions to the list of ordinance updates to be undertaken in 2020.

FACTS

- The 2040 Comprehensive Plan was adopted in December, 2019
- Per state statute, the City's official controls must be updated to be in compliance with the new comprehensive plan within nine months of adoption
- Several updates are needed to the ordinance based on the comprehensive plan; the City may wish to consider additional updates while we are evaluating the ordinance
- An initial inventory of ordinance updates is provided for discussion purposes

ATTACHMENTS

2020 Zoning Ordinance Updates – initial draft list

Zoning Ordinance Updates 2020

Modifications needed to existing districts (required):

- Table 4.
 - Residential Districts Design Requirements: R-1 Density: 3 – 5.5 units per acre, does not account for instance where Special Infill Housing CUP is requested. Density could be as high as 6.11 units per acre if the full 10% reduction in lot area is granted.
 - Change to the R-2 district: change to allow up to 12 dwelling units per acre or a minimum lot size per unit of 3,630 sf. (currently 5,967 sf.)
 - Include minimum density requirements per comp plan Ch. 4 page 12
- Table 7:
 - Add residential density maximums and minimums for each district per the comp plan Ch. 4 page 12
 - Include a 30% residential requirement in the MU-3 district (district-wide)
- Generally, inventory non-conformities and change zoning districts to account for them
 - Lot size, width
- Tables 3 and 6:
 - Review permitted and conditional uses for uses that are out of date
 - Add new uses that provide appropriate opportunities for desired type and diversity of development

Map Changes:

- Add multi-family residential areas along 7th Avenue and along the south side of the downtown
- Add medium density residential areas between the downtown and single family neighborhoods
- Change parcels along Century Avenue to medium density residential that are larger in size to allow duplex or quad-plex units
- Change housing redevelopment areas within single family neighborhoods to medium density residential.
- Map of changes needed attached

Housing Policy-Based Changes:

- Definition of family: not sensitive to multi-generational households or cultural differences
- Include density bonuses or other incentives for things like smaller unit sizes, single-story options? Affordable units?
- Consider allowances for tiny houses and other alternatives like co-ops in some way *other* than a PUD (or specifically in a PUD)
- Allow reduced setbacks, lot coverage, flexibility in rehabilitating/updating existing homes on small lots

Townhouses:

- Outdated definition
- Open space requirement – 500 sf. per unit...is that adequate? Up to date?

- 154.010 (D) (45):
 - (a) does this imply a garage is required?
 - (f) public road access requirement contradicts (a)
- 154.010 (E)(4)(b)
 - Restricts townhouse units to 5 in a row in any one building
 - Is diversity requirement too restrictive?
- Table 6: why are they not allowed in MU-1 and MU-2?

Parking

- 154.010 (J) Off street parking & loading (10)(h) Yards. Off-street parking and loading facilities shall be subject to the front yard, side yard, and rear yard regulations for the use district in which the parking is located, except in the MU-1, MU-2, and MU-3 Districts, yard setbacks may be reduced if a substantial landscape setback is provided having a width meeting at least the minimum specified. **This is vague/unclear**
- Table 8: Confusing layout, hard to interpret in online version
- Amendments dealing with residential v. commercial vehicles (continuation of home occupation discussion)

PUD Standards:

- Add clarity on the purpose of the PUD, and what constitutes a “public benefit”. Potentially use some of the existing language on when density bonuses could be granted:

(d) Density. Increased density shall be permitted to encourage the preservation of natural topography and geological features. The city may, but shall not be required to, provide concessions in setbacks, density, or lot size to protect waterways or water bodies, steep slopes or other areas which would normally not be developable. The city will consider allowing an increase in the allowable density upon proof by the applicant that some of the following features are being provided as part of the proposed development:

i. Preservation of natural site features, wetlands, lowlands, wooded areas, and the like, protected by the Minnesota Department of Natural Resources, by the city and/or Ramsey County ordinances.

ii. Creation of conservation easements due to steep slopes, wooded areas and/or environmentally sensitive areas, as identified in the Comprehensive Plan.

iii. Creation of park/public areas for active and passive park uses beyond required standards or other public purposes such as schools, public buildings, greenways, and the like which meet the intent of the Park and Recreation goals of the Comprehensive Plan and are consistent with the public dedication requirements for the proposed development.

iv. Installation of public improvements designed to serve areas beyond the project boundary.

v. The city may consider increased density for housing projects which provide affordable housing options, consistent with the Comprehensive Plan.

- Resolve vague, conflicting language regarding minimum lot size:

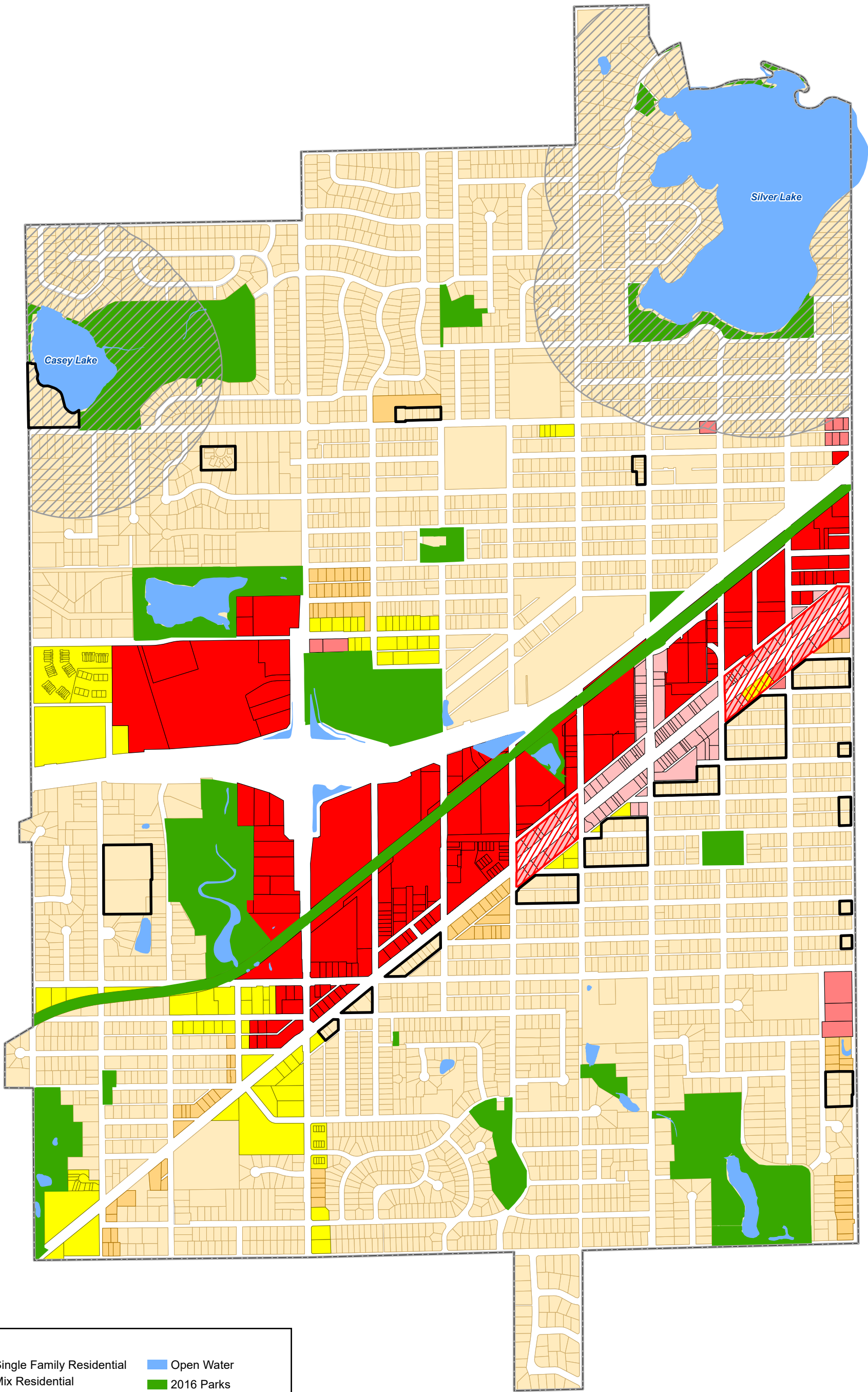
(e) Minimum lot size. The minimum lot size requirements of other sections of this chapter do not apply to a PUD except that the minimum lot size requirements of the underlying zone shall serve as a guideline to determine the maximum dwelling unit density of a total development. The maximum dwelling unit density shall be determined by the area remaining after appropriate space for street right-of-ways and any other public dedications have been determined and subtracted from the total PUD area. If the property involved in the PUD includes land in more than one zoning district, the number of dwelling units or the square footage of commercial, residential or industrial uses in the PUD shall be proportional to the amount that would be allowed separately on the parcels located in each of the underlying zoning districts.

Miscellaneous

Definition for SOLAR ENERGY EASEMENT. See 'Renewable Energy Easement'. Renewable energy easement does not exist

CUP Approval standards inconsistently numbered – numerals instead of letters.

Usable open space: better define what we want to see



Zoning

R1- Single Family Residential	Open Water
R2- Mix Residential	2016 Parks
R3- Multiple Family Residential	Shoreland Overlay
MU1- Downtown Mix Use	DtDistrict_Overlay
MU2- Transistional Mix Use	Zoning_Change
MU3- Corridor Mix Use	