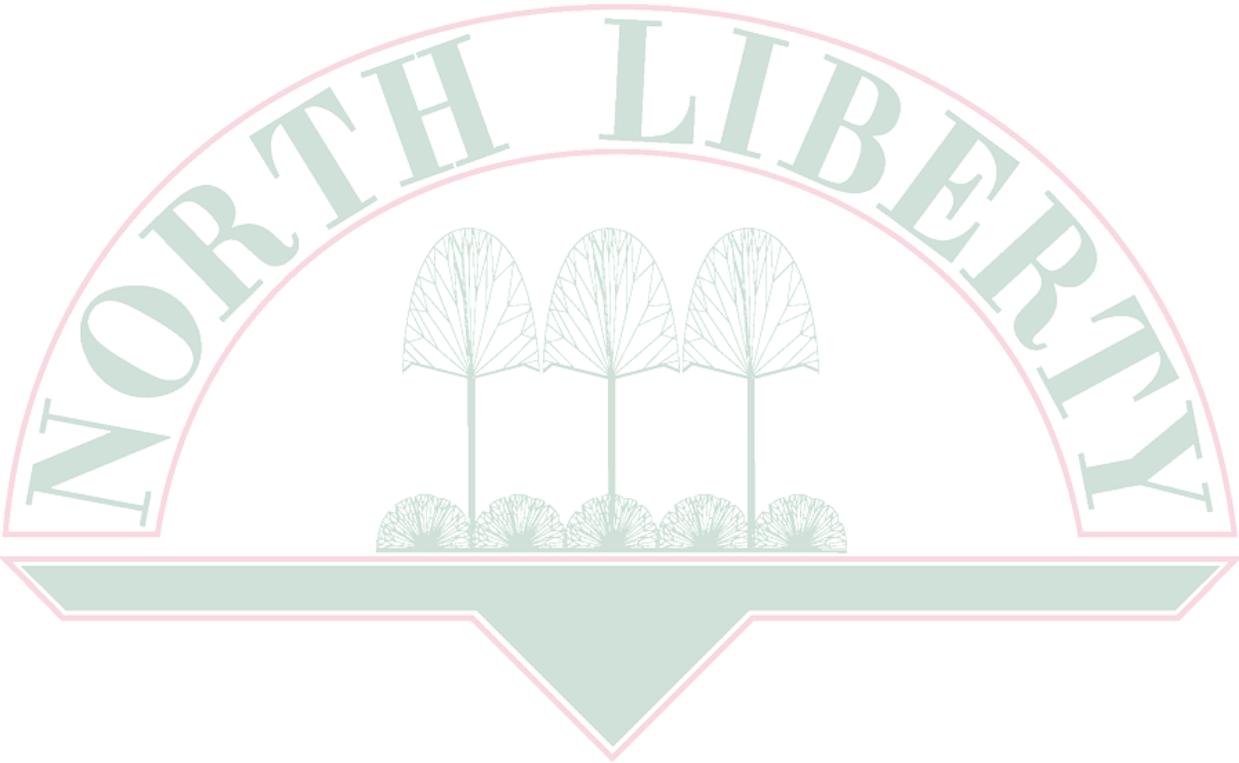




North Liberty City Council
Work & Regular Sessions
February 27, 2018

City Administrator Memo





City Council Memo

for February 27, 2018

from the desk of Ryan C. Heiar

Meetings & Events

Tuesday, Feb 27 at 6:30p.m.
City Council

Monday, Mar 5 at 6:00p.m.
Communications Commission

Tuesday, March 6 at 6:30p.m.
Planning Commission

Thursday, March 8 at 7:00p.m.
Parks & Recreation
Commission

Tuesday, March 13 at 6:30p.m.
City Council

Work Session; Penn & Front Street Improvements

Representatives from Shive Hattery will be in attendance to present preliminary design work and justification for improvements at the Penn Street/Front Street intersection and at specific locations on Penn Street, between Stewart and Front Streets. Additionally, they will be prepared to discuss how the proposed improvements will align with the proposed roundabout at the South Slope/future Christine Grant Elementary school entrances. In addition to the exhibits in your packet, Shive Hattery will have a Power Point presentation, including additional analysis, data and statistics.

Consent Agenda

The following items are on the consent agenda and included in your packet:

- City Council Minutes (02/13/18)
- Claims
- February Revenues
- February Treasurer Report

ICCSA Christine Grant Elementary Site Plan

This is a request from the Iowa City Community School District to approve an elementary school site plan for land located between CENTRO manufacturing and N Front Street. A Good Neighbor meeting was held on October 26 for the rezoning (which is now completed) and plat (still to come) to allow any interested party an opportunity to comment prior to submission, and eight people attended. Those who signed in were contacted by staff to let them know a site plan has been submitted and were offered staff time to review it with them.

Traffic and pedestrian issues anticipated with the new school have been studied and redesigns for N Front Street and Penn Street in the vicinity are being considered, as well as speed limit changes for N Front Street, pending refinement and Council approval. The school site plan as well as existing and planned wide sidewalk and trail connections maximize the potential for walking to this school. It is recommended for approval by staff and the Planning Commission.

Ryan C. Heiar, City Administrator

rheiar@northlibertyiowa.org • office (319) 626-5700 • fax (319) 626-3288 • cell (319) 541-8404

Included in your packet is a memo from ICCSD Physical Plant Manager, Duane Van Hemert and supporting exhibits addressing and responding to the concerns identified by the City Council at their February 13 meeting. Specifically, these documents provide information about parking, vehicle queuing and the playground location. Further, a representative from ICCSD will be at Tuesday's meeting to address remaining questions and concerns.

Run CRANDIC Marathon

The Iowa City/Coralville area CVB, Cedar Rapids Economic Alliance and Corridor Running are hosting the corridor's first marathon on Sunday, April 29. The marathon will start in Cedar Rapids, come through North Liberty and end in Iowa City. In addition, a half marathon is also planned, starting in North Liberty and ending in Iowa City. Full details of the marathons can be found in the special event permit application included in your packet. Iowa City/Coralville Area CVB President Josh Schamberger will be at Tuesday's meeting to speak about the event, provide an overview of the marathon routes and answer questions. Chief Venenga and/or Lieutenant Landsgard, who have been working directly with the Committee, will also be at Tuesday's meeting.

Special events, as defined in the North Liberty City Code, do not require Council approval; rather Chapter 173 states that special event permits are approved administratively. No action is required of the City Council for this agenda item; instead, because this is a first year event and there has been interest/concern expressed by at least one Councilor, this item is on the agenda for informational purposes. It should also be noted that event organizers have been working with the City's police, fire, communication and administrative departments early in the process to ensure public safety and community notification.

Storage Shed Ordinance Amendment, 3rd and Final Reading

The proposed piece of legislation provides more flexibility for the mobile home park residents and reduces the restrictions on storage shed placement within mobile home parks. Mobile home courts are different than other residential subdivisions in that they do not have platted individual lots. Instead, the entire park is platted as one lot and it is up to the park owner to create individual lots. The Building Department worked with the park managers to develop the proposed language, which restricts the placement of storage sheds in front yard areas, but allows them anywhere else on the lot (with the exception of the lots adjacent to the mobile home park boundaries in which case the current zoning ordinance setbacks are applicable).

Police & Fire Department Ordinance , 1st Reading

The proposed ordinance amendment suggests minor revisions to the police and fire department ordinances. The edits, which are identified in the marked up version of the ordinance included in your packet, are either offering clarity on certain provisions or making a change to reflect current practice. For example, currently the Police Chief, not the City Administrator, hires police officers; however our current code states that the City Administrator makes those hires. Staff recommends approval of the first reading of the proposed ordinance.

Living Word Church Site Plan

The main item in this series of actions is a request from Living Word Community Church is to approve a site plan for a church parking lot on property located near the northwestern corner of W Penn Street and Meade Drive, but to make that site plan work, an easement must be vacated and a new easement established so they are listed for action first. This total site under one ownership includes existing lot 3 with an existing building that dates to 2009, and the adjacent vacant lot 4, which are planned to be combined. A plan including the existing building and grounds, a future planned building addition, and the

parking lot has been submitted for reference; no building elevations or information related to the addition have been submitted, so a full site plan review is required prior to building construction. Lot 3 has recently been rezoned from I-1 (Industrial) to C-2-A (Commercial). Staff and the Planning Commission have recommended approval of the site plan late last year, and staff has since then reviewed and recommend approval of the easement vacation and storm water agreement and new easement.

Front Street Project

There was a great deal of bidder interest for this project with seven companies submitting bid documents (see box to the right). Dave Schmitt submitted the low bid at \$1.068 mil, approximately \$150k less than the engineer’s estimate of \$1.222 mil. Staff recommends approval of the low bid and contract award to Dave Schmitt Construction.

Front Street Improvements Project Bid Summary	
Dave Schmitt Construction	\$1,068,481
Dennis Spencer Construction	\$1,077,426
Metro Pavers	\$1,161,882
Cornerstone Excavating	\$1,275,576
Maxwell Construction	\$1,396,357
Portzen Construction	\$1,512,031
Langman Construction	\$1,622,612
Engineer's Estimate	\$1,220,040
Difference	(\$151,559)

FY 19 Budget

Tuesday’s agenda includes a public hearing and resolution approving the FY 19 budget. The budget summary has been published in the North Liberty Leader and staff recommends approval of the FY 19 budget.

Showalter Property Sale

Prior to construction of the North Liberty Road/Dubuque Street roundabout, the City purchased the southeast corner lot from Marjorie Showalter for additional right-of-way needs and because the new roundabout would eliminate access to the lot. In the meantime, staff has had conversations with a group of developers (Ryan Wade, Greg McLaughlin and Joe Clark) who have purchased adjacent property and are now interested in purchasing the remaining Showalter lot. The original lot size was 1.4 acres, but now it is half that size - approximately .7 acres – because the area of the lot closest to the roadway has been converted to city right-of-way and easements. The agreed upon price with the developers is \$125k, which is half of the investment the city made in purchasing the lot, demolition of the building, capping utilities, etc. Staff is recommending approval of the resolution setting the public hearing and the eventual sale of the property to the developers. The proceeds from this sale are intended to reimburse the Dubuque Street project fund.

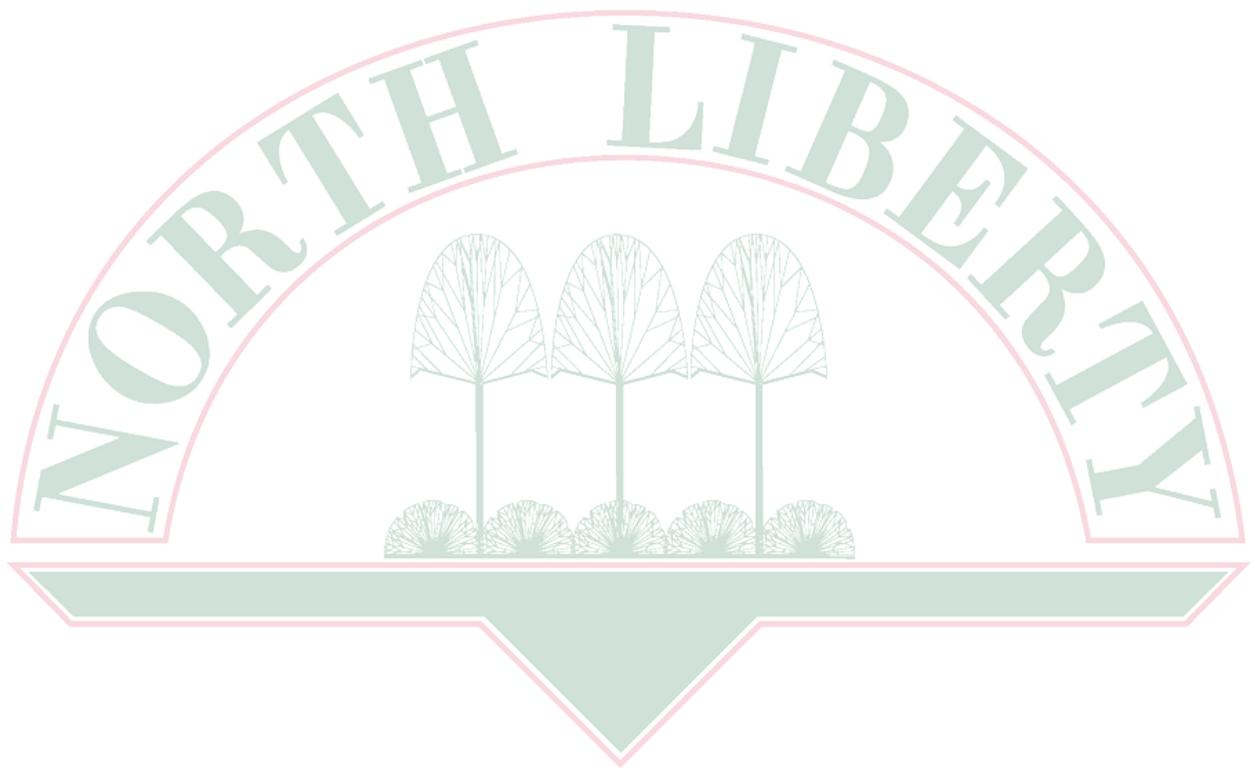
2018-2020 City Council Goals

Included in your packet is the 2018-2020 North Liberty City Council Goal Setting Report. This report looks a little different that in years past as we’ve tried to make it a little more reader friendly. The report includes the tentative final goals as identified by the Council. Approval of this document will solidify the City Council’s goals for 2018-2020. Staff is working on a schedule and progress report, a tool staff will use to keep the Council and public up-to-date as to the status of each goal.

Forevergreen Road Easement

The IDOT is negotiating with property owners along Forevergreen Road for easements and acquisitions for the upcoming road project. While the IDOT is the project lead and initially funding this project, acquisition and easement costs will eventually be the responsibility of the City, thus require Council approval. The easement on the agenda is for property owned by Donna Young (1380 W. Forevergreen Road) in the amount of \$3,700.00. Staff recommends approval of the easement.

Agenda





Agenda

North Liberty City Council
February 27, 2018
Work Session
6:00 p.m.
Regular Session
6:30 p.m.
City Council Chambers
1 Quail Creek Circle

1. Call to order
2. Roll call
3. Approval of the Agenda
4. Work Session – Traffic Impact Study & Front Street/Penn Street Preliminary Engineering
5. Consent Agenda
 - A. City Council Minutes, Regular Session, February 13, 2018
 - B. Claims
 - C. February Revenues
 - D. February Treasurer Report
6. Public Comment
7. City Planner Report
8. City Engineer Report
9. City Attorney Report
10. Assistant City Administrator Report
11. City Administrator Report
12. Mayor Report
13. ICCSD Site Plan
 - A. Reconsideration

- B. Staff and Planning Commission Recommendations
 - C. Applicant Presentation
 - D. Resolution Number 2018-12, A Resolution approving the Development Site Plan for Lot 1, Grant Elementary School Subdivision, North Liberty, Iowa
14. Run CRANDIC Special Event
- A. Information regarding the Run CRANDIC Special Event
15. Storage Shed Ordinance Amendment
- A. Third consideration and adoption of Ordinance Number 2018-01, An Ordinance amending Chapter 168 of the North Liberty Code of Ordinances by revising subsection regarding storage sheds
16. Police Department and Fire Department Authority and Responsibilities Ordinance
- A. Public Hearing regarding proposed ordinance
 - B. First consideration of Ordinance Number 2018-02, An Ordinance amending Chapters 5, 30 and 35 of the North Liberty Code of Ordinances by amending provisions concerning removal of officers and certain amendments regarding Police Department and Fire Department authority and responsibilities
17. Living Word Church Site Plan
- A. Public hearing regarding easement vacation
 - B. Resolution Number 2018-19, A Resolution vacating an Easement being a part of the Final Plat of Inter-City Industrial Park – Part Four, North Liberty, Iowa as recorded in the Plat Records of Johnson County, Iowa in Book 41, Page 39
 - C. Resolution Number 2018-20, A Resolution approving the Stormwater Management Facility Maintenance Agreement and Easement between the City of North Liberty and FIJC, LLC that establishes the terms and conditions under which stormwater management facilities will be maintained for Lot 4, Inter-City Industrial Park – Part Four in the City of North Liberty, Iowa
 - D. Staff and Planning Commission Recommendations
 - E. Applicant Presentation
 - F. Resolution Number 2018-21, A Resolution approving the Development Site Plan for Inter-City Industrial Park – Part Four, Lots 3 and 4, North Liberty, Iowa
18. Front Street Project
- A. Resolution Number 2018-22, A Resolution accepting the bid and authorizing execution of the contract for the Front Street Improvements Project North Liberty, Iowa
19. FY 19 Budget
- A. Public Hearing regarding the proposed FY 19 Annual Budget and Capital Improvements Plan
 - B. Resolution Number 2018-23, A Resolution adopting the Annual Budget and Capital Improvements Plan for the Fiscal Year ending June 30, 2019 for the City of North Liberty, Iowa
20. Showalter Property
- A. Resolution Number 2018-24, A Resolution setting Public Hearing on a proposed Purchase Agreement for Real Estate owned by the City of North Liberty

21. Goal Setting Report

- A. Resolution Number 2018-25, A Resolution accepting the Goal Setting Session Summary Report prepared by the Institute of Public Affairs for the City of North Liberty, Iowa

22. Forevergreen Road Project

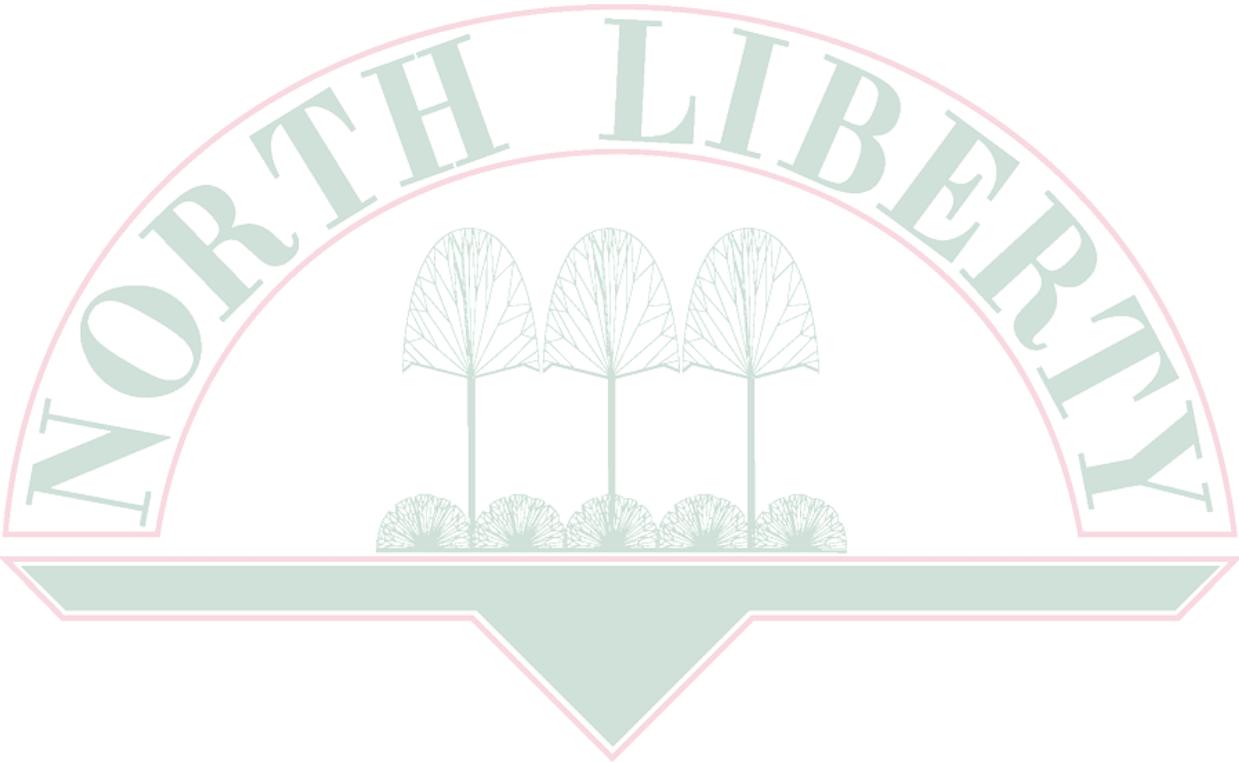
- A. Resolution Number 2018-26, A Resolution approving the Purchase Agreement for the Forevergreen Road Project (Project: IMN-380-6(344)2—OE-52)

23. Old Business

24. New Business

25. Adjournment

Front Street/Penn Street



Date: February 9th, 2018

To: Dean Wheatley; City of North Liberty
Kevin Trom; Shive-Hattery

From: Darian Nagle-Gamm; Sr. Transportation Engineering Planner

Re: North Bend Drive Elementary School Transportation Impact Study

You asked the MPO to evaluate what transportation improvements may be necessary to support a new elementary school on a future extension of North Bend Drive in North Liberty as shown in **Figure 1**. This analysis was predicated on the concept for the elementary school as reflected in **Figure 2** (page 2) provided by the Iowa City Community School District. The study reviews external and internal circulation at the school site including vehicular and bus access, bicycle and pedestrian accommodations, potential turn lanes and traffic control at the proposed Front Street / North Bend Drive / South Slope intersection, an analysis of impacts to the Penn Street / Front Street intersection and an overview of the general impact of the school on area traffic circulation.

Location

The Iowa City Community School District has purchased property for a new elementary school located on a proposed extension of North Bend Drive, just west of the South Slope campus on Front Street as show in yellow in **Figure 1**.

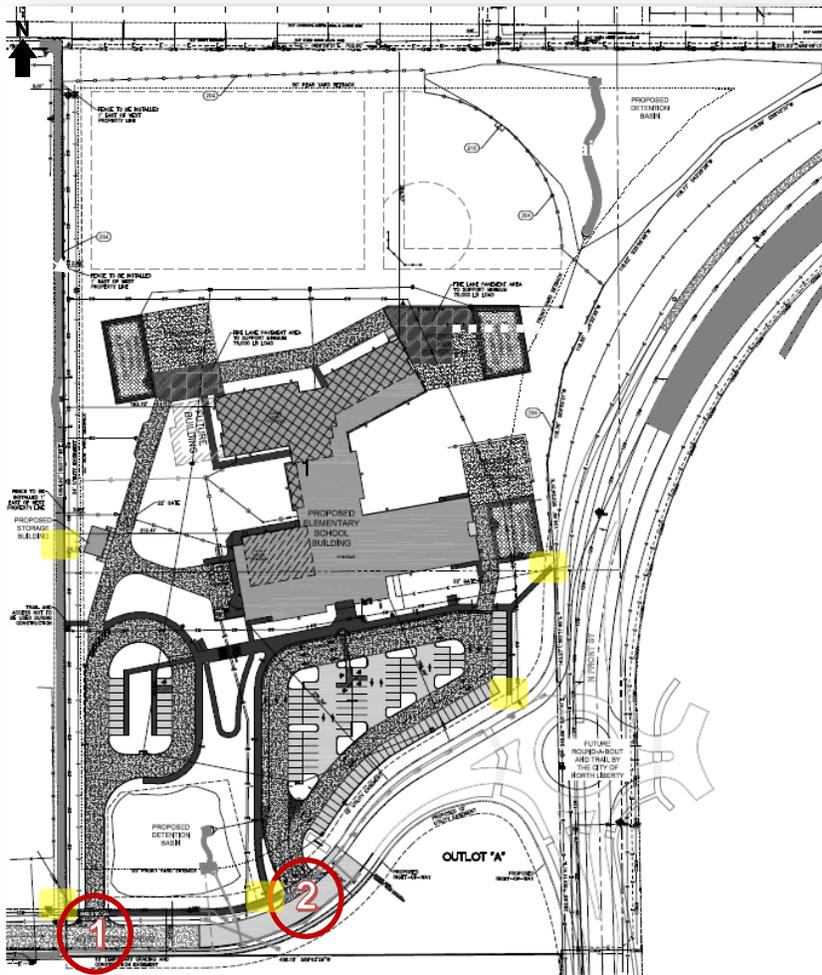
Points of Access

North Bend Drive currently terminates east of the Centro property, adjacent to the proposed school site. The plan is to extend North Bend Drive east to Front Street creating a new intersection at the South Slope driveway coincident with the opening of the school. The concept, shown in **Figure 2**, indicates two points of access for the proposed elementary school along North Bend Drive.

Figure 1: Proposed elementary school and existing bike and pedestrian facilities



Figure 2: Elementary School with Roundabout Concept



Internal Circulation

Two distinct parking lots featuring circular drives are designed to provide vehicular access to the school. The westernmost lot (**Figure 2; Access 1**) will include a pick-up/drop-off loop for buses only while a few parking spaces will be designated for visitor and staff parking. The easternmost lot (**Figure 2; Access 2**) will include a parent pick-up/drop-off loop with parking spaces designated for parent and staff parking. Separating bus traffic from vehicular traffic helps improve pedestrian safety and maximizes pick-up/drop-off efficiency. Locating the driveways as far from Front Street as possible will be beneficial in that it will allow for queuing.

Bicycle & Pedestrian

As shown on **Figure 2**, pedestrians will access the school property by one of five sidewalk access points highlighted in yellow along North Bend Drive, Front

Street, and along the trail that runs the western length of the school. Sidewalk connections from these points provide safe access to the school’s front entrance. Staff also recommends the school district complement the pedestrian facilities with additional sidewalk extensions from the front of the school to the hard surface play areas behind the school. These pedestrian connections will ensure there is adequate access between the front and back of the school and also between the back-of-school amenities (playgrounds, open play areas) and the trail systems that connects the school to adjacent neighborhoods.

Several trails will serve bicycle and pedestrian traffic for the proposed school. The Iowa River Corridor trail runs the length of Front Street, however it crosses from east to the west side of the road at Jefferson Street (a block south of the proposed school). The trail crossing currently has “Bicycle Crossing” signage and continental crosswalks as shown in **Figure 1**. This could serve as a designated school crossing for pedestrians living east of Front Street or a school crossing could be designated at the new North Bend Drive intersection so long as proper sidewalk connections and pedestrian facilities are constructed. There is also a trail that follows Dubuque Street north from Penn Street that crosses from west to east at a mid-block location (also with “Bicycle Crossing” signs and continental crosswalks) north of Copeland Lane. The trail then veers eastward following North Bend Drive until a point just east of the Centro property where it crosses North Bend Drive mid-block (no signage or continental crosswalks) and continues north providing access to residential subdivisions.

Existing Conditions

Front Street Average Daily Traffic & Traffic Speeds

Figure 3 shows average daily traffic (ADT) data collected October 24th – October 27th, 2017, and November 7th – 9th, 2017. Northbound traffic volumes on Front Street near the proposed intersection vary from 4,090 vehicles per day (vpd) south of the South Slope driveway to 3,816 vpd north of the driveway. Southbound traffic volumes vary from 3,979 vpd south of the South Slope driveway and 3,194 north of the driveway. Traffic speeds on Front Street vary between 44 – 50 mph near the South Slope Driveway.

Figure 3: Average Daily Traffic, 85th Percentile Speeds, and Speed Limits on Front Street



Peak Hour Traffic Counts

Peak hour turning movement traffic count data was collected at the intersection of Front Street and the South Slope driveway during the AM (7:15 – 8:15) and School PM peak (2:30 – 3:30) periods on October 31st and November 1st, 2017 respectively as shown in **Figures 4 and 5**.

Figure 4: AM Peak Hour Traffic

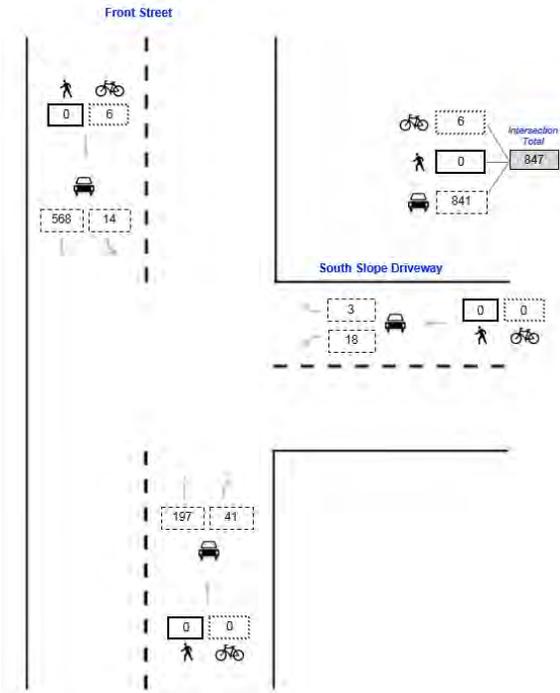
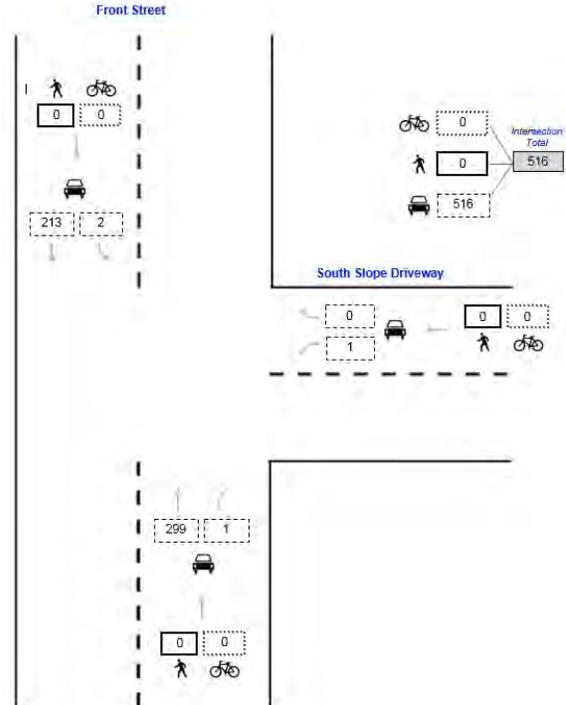


Figure 5: School PM Peak Hour Traffic



Visibility

Visibility at the proposed intersection of Front Street / North Bend Drive / South Slope driveway is reasonably good with little obstruction, although there is a pronounced curve in the road to the northeast as shown in **Image 1** and **2**. Sight distance was measured at approximately 945' to the north (around the curve) and near 1,750' to the south - to the intersection with Penn Street. Recommended stopping sight distance at speeds of 50 mph is 425' per AASHTO standards. This location maximizes visibility for eastbound drivers exiting the proposed North Bend Drive extension and westbound drivers leaving the South Slope property.

Image 1: The view north on Front Street at proposed intersection with South Slope



Image 2: The view south on Front Street at proposed intersection with South Slope



Assumptions

The Iowa City Community School District estimates that on opening day the school will host 633 kindergarten through 6th grade students, 30 preschoolers, and 25-30 staff members. The School District indicated that 85% of the enrollment area is expected to come from north of Penn Street with 15% coming from south of Penn Street.

All school related traffic must access the site via one of two arterial street intersections – the Dubuque Street / North Bend Drive intersection to the west or the proposed Front Street / North Bend Drive / South Slope intersection to the east. Staff evaluated the distribution of households north and south of Penn Street to further estimate where traffic may be drawn from. This information was used to develop the following assumptions about how traffic is likely to be distributed near the school on “opening day”.

AM Peak Hour: Entering Traffic

- 50% will come from the northwest using Dubuque Street and North Bend Drive
- 35% will come from the northeast using Front Street and North Bend Drive
- 5% will come from the southwest using Dubuque Street and North Bend Drive
- 10% will come from the southeast using Front Street and North Bend Drive

AM Peak Hour: Exiting Traffic

- 55% of total exiting traffic will use the Dubuque Street / North Bend Drive intersection
 - 25% will head northbound on Dubuque Street
 - 75% will head southbound on Dubuque Street
- 45% will use Front Street / North Bend Drive intersection
 - 25% will head northbound on Front Street.
 - 75% will head southbound on Front Street.

School PM Peak Hour: Entering Traffic

- 50% of total entering traffic will be generated from households
 - 50% will come from the northwest using Dubuque Street and North Bend Drive
 - 35% will come from the northeast using Front Street and North Bend Drive.
 - 5% will come from the southwest using Dubuque Street and North Bend Drive
 - 10% will come from the southeast using Front Street and North Bend Drive.
- 50% will be generated from employment centers to the south
 - 50% will use the Dubuque Street and North Bend Drive intersection
 - 50% will use the Front Street / North Bend Drive intersection

School PM Peak Hour: Exiting Traffic

- 55% of total exiting traffic will use the Dubuque Street / North Bend Drive intersection
 - 50% will head northbound onto Dubuque Street
 - 50% will head southbound onto Dubuque Street
- 45% will use Front Street / North Bend Drive intersection
 - 50% will head northbound onto Dubuque Street
 - 50% will head southbound onto Front Street

PM Peak Hour: Entering & Exiting Traffic

- 50% of total traffic will enter / exit using Dubuque Street / North Bend Drive intersection
- 50% of total traffic will enter / exit using Front Street / North Bend Drive intersection
 - At each intersection 50% of vehicles will come from the south, 50% from the north
 - Vehicles assumed to return to the direction they travelled from

Opening Day Estimated Traffic Volumes

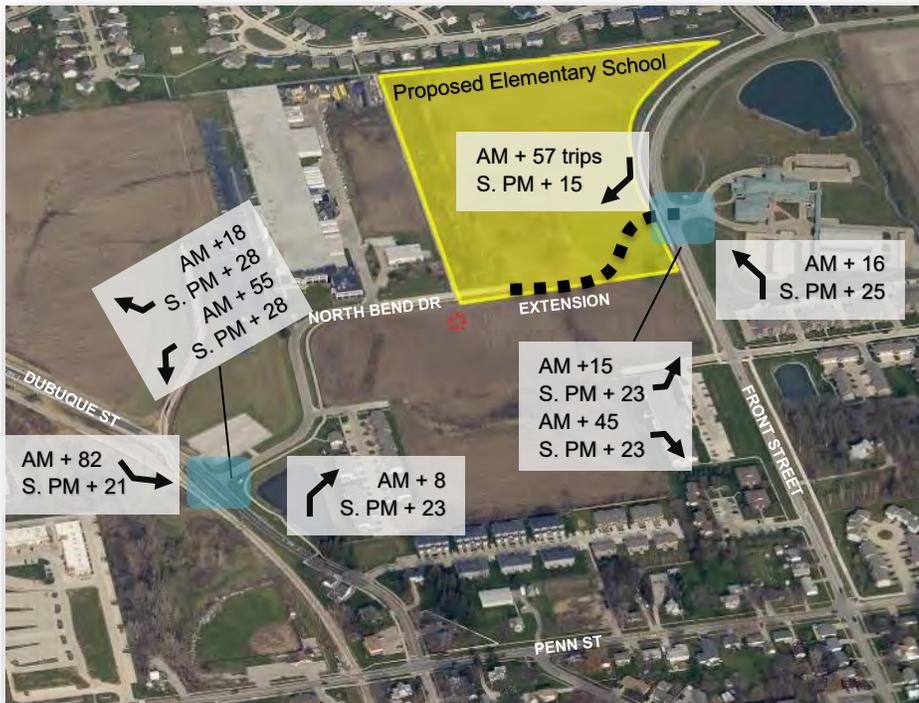
During the AM peak hour, it is estimated that the new elementary school will generate nearly 300 total vehicle trips – 164 entering and 134 exiting. During the school PM peak hour, it is estimated that the school will generate approximately 186 vehicle trips – 84 entering and 102 exiting (**Table 1**)¹. The school district was not able to provide explicit estimations of bicycle and pedestrian mode splits. That said, the vehicular trip generation formulas are generated from traffic studies of upwards of 50 elementary schools presumably with a variety of mode splits, therefore the vehicle trip estimations are assumed to be reflective of typical rates of walking/bicycling.

Table 1: Estimated Traffic Volumes Generated by New Elementary School

Land Use (ITE Code)	Time of Day	Entering	Exiting	# Students	Average Trips per Student	Total Trips	Entering Trips	Exiting Trips
Elementary School (520)	AM Peak Hour (55% in / 45% out)	0.55	0.45	663	0.45	298	164	134
	School PM Peak Hr (45% in / 55% out)	0.45	0.55	663	0.28	186	84	102
	PM Peak Hour (49% in / 51% out)	0.49	0.51	633	0.15	95	47	48
	Average Daily Traffic (50% in / 50% out)	0.50	0.50	663	1.29	855	428	428

Figure 6 reflects the number of vehicle trips that are expected to be added to network traffic by intersection and movement on opening day at the arterial intersections of Front Street / North Bend Drive / South Slope and Dubuque Street / North Bend Drive.

Figure 6: Estimated New AM and School PM Traffic Volumes Generated by Elementary School



Front Street / North Bend Drive / South Slope Peak Hour Turning Movements

Figure 7 and 8 reflect the existing and year 2045 turning movement counts expected at the proposed intersection during the AM and School PM peak hours. The 2045 volumes were generated using ITE Trip Generation calculationsⁱⁱ, 2% annual growth rate (existing legs), and the 2045 Travel Demand Model (proposed leg).

Figure 7: AM Peak Hour Traffic Volumes: Existing and Year 2045 Forecast

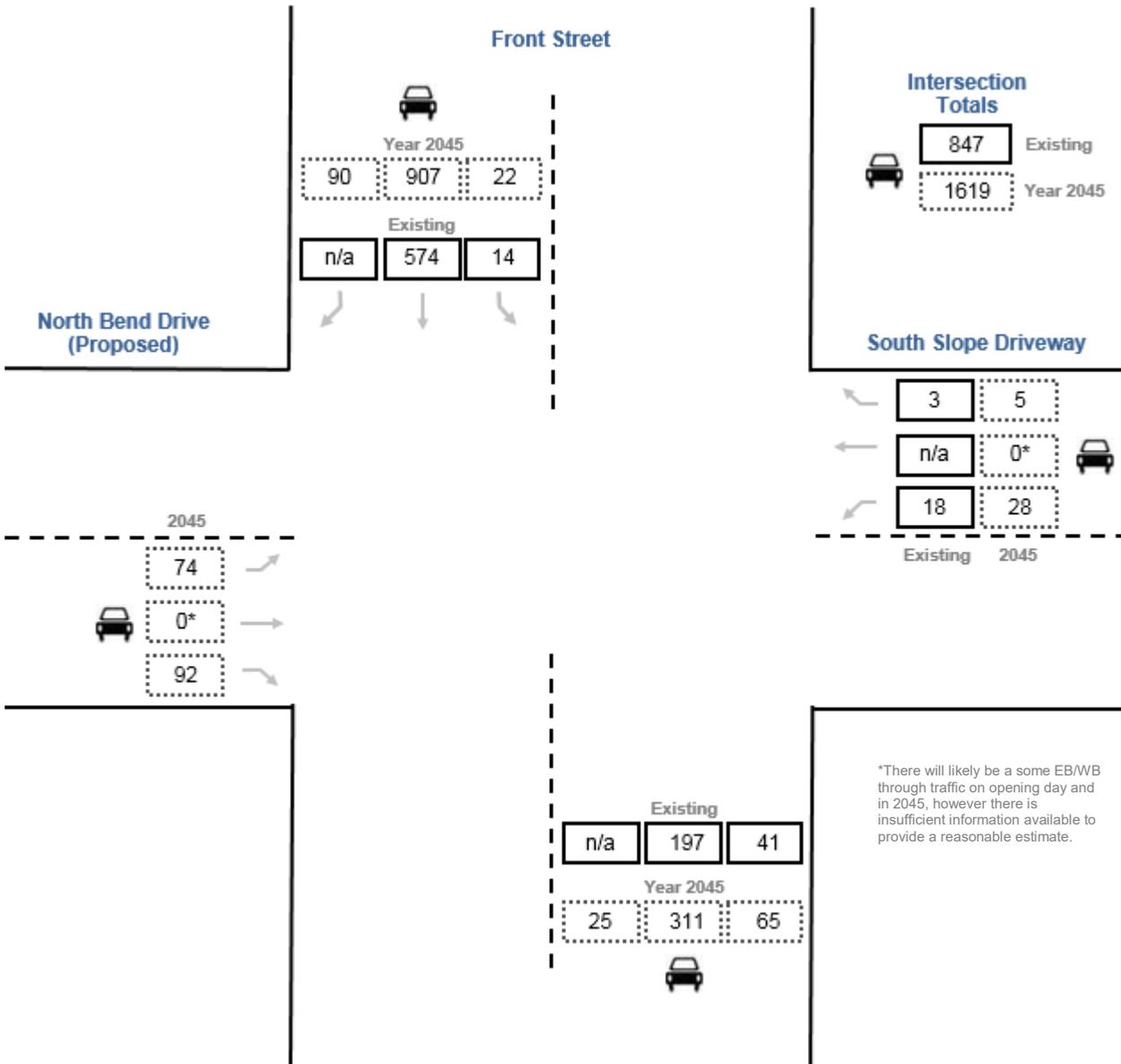
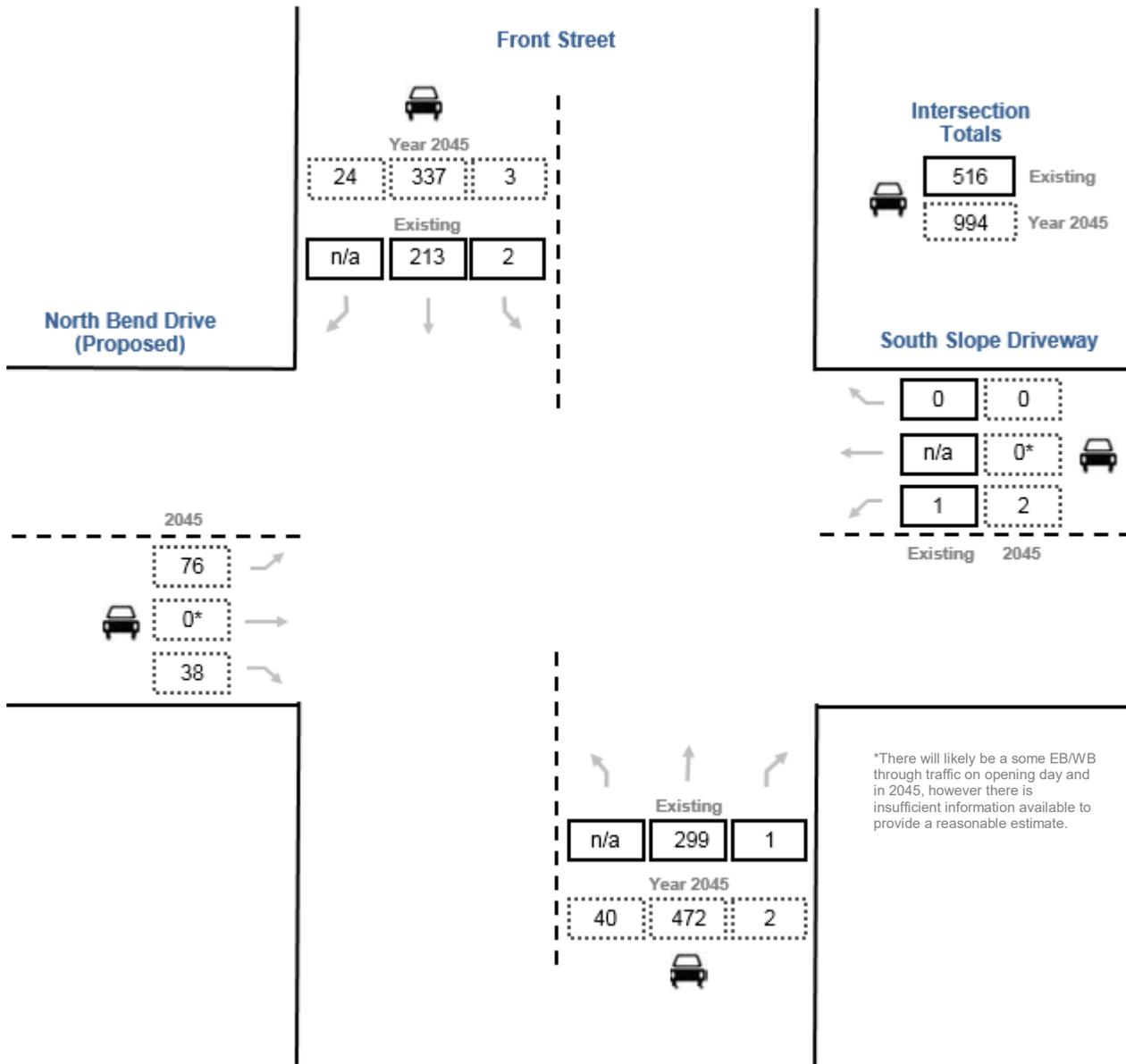


Figure 8: School PM Peak Hour Traffic Existing and Year 2045 Forecast



Front Street / North Bend Drive / South Slope Intersection Turn Lane Analyses

Staff evaluated whether left or right-turn lanes may be warranted under a traditional four-way intersection configuration at the Front Street / North Bend Drive / South Slope intersection in the year 2045. As shown in **Table 2**, turn lane demand is greatest during the AM peak hour when school traffic coincides with commuter traffic. The elementary school PM peak hour, mid-afternoon between 2:30 – 3:30 PM, carries much less traffic as the afternoon commuter peak is not yet underway.

By the year 2045, left and right-turn lanes will be warranted for the southbound approach, and a left-turn lane will be warranted for the northbound approach. Eastbound turn lanes are not warranted from a peak hour traffic volume perspective; however North Liberty may wish to consider the installation of turn lanes (if a traditional four-way intersection is desired – a roundabout would negate the need for turn lanes) as much of daily school traffic occurs during 20-30 minute spikes. Adding a left-turn lane to the eastbound leg would improve traffic flow at the intersection and reduce delays during daily traffic spikes and also during school events.

More information on individual turn lane warrants is available in the appendix.

Table 2: Intersection Turn Lane Warrants

Approach	Time of Day	Lane	Warranted 2045
Southbound	AM Peak	Left-Turn	Yes
		Right-Turn	Yes
	School PM Peak	Left-Turn	No
		Right-Turn	No
Northbound	AM Peak	Left-Turn	Yes
		Right-Turn	No
	School PM Peak	Left-Turn	Yes
		Right-Turn	No
Eastbound	AM Peak	Left-Turn	No
		Right-Turn	No
	School PM Peak	Left-Turn	No
		Right-Turn	No

Stop Control Evaluation

This analysis will identify if an all-way stop is warranted at the intersection of Front Street / North Bend Drive / South Slope on the opening day of the elementary school. In analyzing the intersection, 1 of 4 of the following criteria from the Manual on Uniform Traffic Control Devices (MUTCD) must be satisfied for an all-way stop to be considered.

A. Where traffic control signals are justified, the multi-way stop is an interim measure that can be installed quickly to control traffic while arrangements are being made for the installation of the traffic control signal.

- *A traffic signal is not warranted at this location; therefore **Warrant A is not met.***

B. A crash problem, as indicated by 5 or more reported crashes in a 12-month period that are susceptible to correction by a multi-way stop installation. Such crashes include right and left-turn collisions as well as right-angle collisions.

- *The intersection has yet to be constructed in its proposed form. As such, it is premature to evaluate collisions; therefore **Warrant B is not met.***

C. Minimum volumes:

1. The vehicular volume entering the intersection from the major street approaches (total of both approaches) averages at least 300 vehicles per hour for any 8 hours of an average day, and

- *Traffic from Front Street, the major street, does average at least 300 entering vehicles during ten distinct 1-hour periods of an average day; therefore **Warrant C1 is met.***

2. The combined vehicular, pedestrian, and bicycle volume entering the intersection from the minor street approaches (total of both approaches) averages at least 200 units per hour for the same 8 hours, with an average delay to minor-street vehicular traffic of at least 30 seconds per vehicle during the highest hour, but

- *The vehicular, pedestrian, and bicycle traffic expected during the AM and school PM peak hours on opening day is expected to be much less than 200 units, therefore **it is not likely Warrant C2 will be met.***

3. If the 85th-percentile approach speed of the major-street traffic exceeds 65 km/h or exceeds 40 mph, the minimum vehicular volume warrants are 70 percent of the above values.

- *Front Street traffic speeds near the proposed intersection are near 50 mph; therefore **Warrant C3 is met.** Even if the side street traffic volume criteria (C2) is reduced to 140 vehicles (70%), there is still **not enough forecasted traffic to meet C1 and C2.***

D. Where no single criterion is satisfied, but where Criteria B, C1, and C2 are all satisfied to 80 percent of the minimum values. Criterion C3 is excluded from this condition.

- *This criterion is not applicable since future collisions cannot be evaluated, therefore Criteria B cannot be satisfied to 80 percent. C1 is satisfied however C2 is not likely to be satisfied to 80 percent of the minimum criteria therefore; **Warrant D is not met.***

Four additional optional criteria are available to use based on engineering judgment.

I. The need to control left-turn conflicts

- *Because sight-distance is adequate and does not indicate a particular need to control left-turn conflicts; **optional Warrant I is not met.***

II. The need to control vehicle/pedestrian conflicts near locations that generate high pedestrian volumes;

- *The majority of school children/pedestrians will access the school from the north which would not require crossing Front Street at the intersection, nor is there a sidewalk currently on the east side of Front Street near the intersection. It is not expected that the intersection will have high pedestrian volumes; therefore **optional Warrant II is not met.***

III. Locations where a road user, after stopping, cannot see conflicting traffic and is not able to reasonably safely negotiate the intersection unless conflicting cross traffic is also required to stop; and

- *Sight distance good at the proposed intersection. A driver, after coming to a complete stop, is expected to be able to see conflicting traffic and safely negotiate the intersection, therefore **optional Warrant III is not met.***

IV. An intersection of two residential neighborhood collector (through) streets of similar design and operating characteristics where multi-way stop control would improve traffic operational characteristics of the intersection.

- *The intersection is not residential; therefore **optional Warrant IV is not met.***

Conclusion

While traffic volumes on Front Street are expected to meet the minimum volume requirements on opening day, there is not enough side street traffic expected from North Bend Drive or the South Slope driveway to warrant stopping all traffic on Front Street. As such, none of the major letter warrants or optional warrants are expected to be met. If a four-way intersection is desired, stop signs should be installed on North Bend Drive and at the South Slope driveway at the intersection with Front Street. Installing stop signs or traffic signals in locations where they are not warranted results in a greater chance of rear-end collisions, noncompliance by motorists, higher traffic speeds downstream of the intersection, increased fuel usage and exhaust emissions, and will degrade the overall level of service at the intersection.

Traffic Signal Warrant Analysis

In addition to an all-way stop analysis, staff also performed an abridged traffic signal warrant analysis to determine the need for a traffic signal at the proposed intersection of Front Street / North Bend Drive / South Slope on opening day. At a minimum, at least one of the eight warrants must be met, but the satisfaction of a warrant does not in itself require the installation of a traffic signal. The eight traffic signal warrants are as follows although only three were evaluated for this intersection.

- | | |
|--|---------------------------------------|
| 1) Eight-Hour Vehicular Volume (1A and 1B) | 6) Coordinated Signal System |
| 2) Four-Hour Vehicular Volume | 7) Crash experience |
| 3) Peak Hour | 8) Roadway network |
| 4) Pedestrian Volume (not evaluated) | 9) Intersection Near a Grade Crossing |
| 5) School Crossing (not evaluated as there is not currently a sidewalk on east side of Front Street) | |

Table 3: Opening Day AM and School PM Peak Hour Volumes

Front Street / Proposed North Bend Drive / South Slope Driveway							
Front Street (Total of both approaches)		North Bend / South Slope (highest minor)		Warranted?		Legend	
AM	School PM	AM	School PM	AM	S. PM	AM	S. PM
893	555	60	46	Close	No	◆	◆

Warrant 1A – Minimum Vehicular Volume

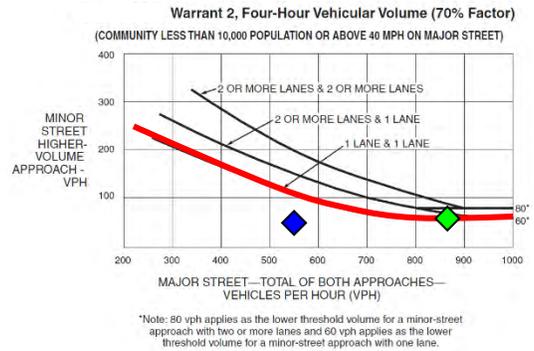
This warrant examines whether the intersection meets the minimum vehicular volume per hour to warrant a traffic signal. This condition is intended for locations where there is a large volume of intersecting traffic. Eight 1-hour periods must meet appropriate traffic volumes. With a one-lane approach at each leg of the intersection and an 85th-percentile speed limit of nearly 50 mph on Front Street, during each hour the major street (Front Street) must have 350 vehicles entering the intersection and the higher minor leg (North Bend Drive) must have 105 vehicles entering the intersection to meet Warrant 1A. On opening day, the AM peak and school PM peak periods are expected to meet the major street traffic volumes, but are not expected to meet the minor street volumes, therefore **Warrant 1A is not likely met.**

Warrant 1B – Interruption of Continuous Traffic

This warrant examines whether the traffic volume on the major street is so heavy that traffic on the minor intersecting street suffers excessive delay or conflict in entering or crossing the major street for eight 1-hour periods. With a one-lane approach at each leg of the intersection and an 85th-percentile speeds near 50 mph, during each hour the major street (Front Street) must have a total of 525 entering vehicles and the higher minor leg (North Bend Drive) must have 53 vehicles entering the intersection to meet Warrant 1B. The major street volumes are likely to be met, and it is expected that the North Bend Drive will have at least 53 eastbound vehicles exiting onto Front Street during the AM, but not the school PM peak hours. That said, based on forecasted school traffic alone, it is unlikely that 8 1-hour periods meet the minor street volume thresholds on opening day, therefore **Warrant 1B is not likely met.**

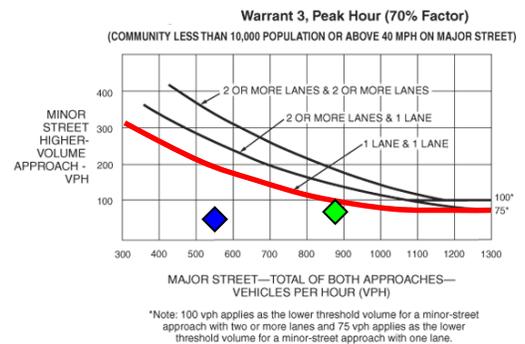
Warrant 2 – Four-Hour Vehicular Volume

The four-hour vehicular volume warrant is applied where the volume of intersecting traffic is a principal reason to consider installing a traffic control signal. To meet Warrant 2, traffic volumes on both streets must meet the required volume threshold for four 1-hour periods. The **Warrant 2** figure to the right graphically depicts the required vehicular volume threshold for the major and minor streets (red line) in comparison to the observed volumes. The AM peak hour (in green) meets the volume warrants for both streets, however the school PM peak (in blue) falls short due to low minor street volumes. Based on forecasted school traffic volumes alone, it is unlikely that three additional 1-hour periods meet the major and minor street traffic volume criteria therefore; therefore **Warrant 2 is not likely met.**



Warrant 3 – Peak Hour

The peak hour signal warrant is intended for use at a location where traffic conditions are such that for a minimum of one hour on an average day, the minor street traffic suffers undue delay when entering or crossing the major street. The **Warrant 3** figure to the right graphically depicts the required vehicular volume threshold for the major and minor streets (red line) in comparison to the observed volumes. On opening day the AM peak hour (in green) meets the major street volume requirement and is approximately 15 vehicles shy of meeting the minor street volume requirements, therefore **Warrant 3 is close to being met during the AM.**



Conclusion

The warrant analysis shows the minor street traffic expected on North Bend Drive on the opening of the elementary school is not sufficient to meet Warrants 1A, 1B, or 2. That said, during the AM peak period, the minor street is expected to *approach* the Warrant 3 volume requirement - approximately 15 vehicles/hour short. It should be noted that this signal warrant analysis was predicated on the increase in traffic volumes relating to school traffic only. If North Bend Drive traffic volumes increase for other reasons (e.g. increase in cut-through traffic between Dubuque Street and Front Street or additional development) it would be beneficial to revisit this signal warrant study in the future after the extension of North Bend Drive is completed and traffic normalizes.

Roundabout Evaluation

If additional traffic control is desired at the Front Street / North Bend Drive / South Slope intersection, North Liberty should consider the installation of a roundabout. A single-lane roundabout would provide the best level-of-service and least overall delay when compared to all-way stop control or traffic signals. Speeds on Front Street would reduce from near 50 mph (today) to 15-20 mph at the intersection. This improves safety by increasing driver reaction time, reducing impact speeds in the instance of a collision, and virtually eliminating the possibility of high-speed broadside collisions at the intersection. Roundabouts have been shown to reduce fatalities by 90% (versus signalized intersections), collisions with injuries by 75% and overall collisions by 37%ⁱⁱⁱ. Studies have also indicated that pedestrian collisions are reduced when a traditional intersection is converted to a roundabout^{iv}. This is attributed to the significant reduction in speeds, increased reaction time, and the fact that pedestrians need to only cross one direction of traffic at a time as splitter islands provide pedestrian refuge. Based on enrollment projections from the school district, the majority of school-related pedestrian traffic is expected to come from neighborhoods to the north which will *not* require crossing the Front Street / North Bend Drive /

South Slope intersection. Based on current and future forecasted traffic volumes on Front Street (8,000 ADT 2017; 9,500 ADT 2045), a single-lane roundabout would be more than adequate now and in the future.

Speed Limits

Currently, the speed limit on Front Street adjacent to the proposed elementary school is 45 mph with 85th percentile speeds between 44 and 50 mph (**Figure 3**). As shown in **Figure 9**, staff recommends extending the 25 mph speed limit on Front Street from Penn Street to a point approximately 650' north of the proposed North Bend Drive / South Slope intersection. Staff also recommends introducing a 20 mph school speed zone from 7 AM – 9 AM and 1 PM to 4 PM on Front Street from a point approximately 400' south of the proposed intersection to 300' north of the proposed intersection. It is recommended that radar feedback signs accompany the school speed zone signs to maximize compliance with the speed limit changes. Radar feedback signs have proven effective in reducing speeds in rural-to-urban transition zones, especially near schools. Staff also recommends introducing a 20 mph school speed zone from 7 AM – 9 AM and 1 PM to 4 PM on North Bend Drive from a point approximately 250' west of the school property to Front Street.

Staff also recommends establishing a 35 mph speed limit approximately 650' north of the proposed intersection, transitioning to a 45 mph speed limit just east of Cedar Springs Drive, and finally transitioning to a 55 mph speed limit approximately 1250' further east. A “45-mph ahead” warning sign should be posted approximately 1000' further east for westbound traffic.

Staff expects the combination of the reduced speed limits, radar feedback signs, and presence of the school will be effective in reducing speeds. A roundabout would also help “calm traffic” in the area. Additional enforcement, especially in the opening weeks, would help to reinforce the change in speed limits.

Figure 9: Opening Day Recommended Speed Limits



Impacts to the Greater Transportation Network

In terms of average *daily* traffic, the new elementary school is expected to bring approximately 850 total trips to the area^v. Most will occur during peak school traffic periods during the AM commuter period and mid-afternoon between 2:30 – 3:30 pm. Roughly half of daily school traffic is expected to use the proposed Front Street / North Bend Drive / South Slope intersection while the other half is expected to use the Dubuque Street / North Bend Drive intersection. Front Street daily traffic is expected to increase by 5% on opening day^{vi}. Dubuque Street daily traffic is expected to increase by 13% on opening day^{vii}.

North Bend Drive Extension Impact

Staff evaluated how a North Bend Drive extension to Front Street will impact area traffic patterns as the road will provide an alternative east-west connection between Front Street and Dubuque Street. Using the 2045 Travel Demand Model, in the future North Bend Drive is expected to carry around 2,100 vehicles per day near Front Street and 2,900 vehicles per day near Dubuque Street. As shown in **Figure 10**, Front Street traffic volumes are expected to remain the about the same north of the proposed North Bend Drive intersection (with and without the extension), while volumes are expected to be around 10% less south of the North Bend Drive intersection after the extension is constructed. Penn Street traffic is expected to decrease by 4 – 10% between Dubuque Street and Front Street as some traffic is expected to be diverted to North Bend Drive after the extension is constructed.

Figure 10: Year 2045 Estimated Net Change and % Change in ADT with North Bend Drive Extension Constructed (when compared to no extension)



Front Street / Penn Street Intersection

The Front Street / Penn Street intersection currently exhibits significant traffic backups during peak travel periods – especially during the PM peak hour. As such, staff evaluated the effects of the school on traffic flow at the intersection on opening day. Synchro 10.0 traffic modeling software was used to evaluate opening day level-of-service and delay at intersection under all-way stop control or with a single-lane roundabout (which is a planned improvement). AM and PM peak hour traffic count data from 2013 was utilized for the analysis and was increased by 2% each year to account for growth. Additional trips generated by the new school were estimated^{viii} during the typical PM peak hour with trips evenly distributed between the northbound and southbound movements on Front Street and Dubuque Street at their respective intersections with North Bend Drive. The additional expected school trips during the AM and PM peak hours were added to the forecasted turning movement counts at the Penn Street / Front Street intersection to provide an estimate of opening day traffic.

Table 4: Level of Service Criteria for Stop Controlled Intersections and Roundabouts

Level of Service	Average Control Delay (s/veh)
A	0 - 10
B	> 10 - 15
C	> 15 - 25
D	> 25 - 35
E	> 35 - 50
F	> 50

As shown in **Table 5**, on opening day under all-way stop conditions the intersection is expected to perform at LOS C at 18.7 seconds of delay/vehicle (s/v) during the AM and LOS F at 71.8 s/v during the PM. If a single-lane roundabout were constructed by opening day, the intersection is expected to perform at LOS A at 9.8 s/v during the AM and LOS B at 12.9 s/v during the PM.

Table 5: Penn Street / Front Street Intersection Opening Day Delay and Level of Service All Way Stop vs. Roundabout

Direction	AWSC				Roundabout			
	AM		PM		AM		PM	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Penn Street								
Eastbound	13.9	B	131.1	F	7.5	A	13.5	B
Westbound	11.8	B	17.0	C	6.4	A	10.9	B
Front Street								
Northbound	11.4	B	37.3	E	5.8	C	16.0	C
Southbound	24.6	C	41.8	E	12.7	B	10.0	A
Intersection	18.7	C	71.8	F	9.8	A	12.9	B

Conclusion

The construction of a new elementary school on the northwest corner of the proposed Front Street / North Bend Drive / South Slope intersection is expected to increase *overall* daily traffic volumes by about 430 vehicles per day on Front Street (5% increase) and by 430 vehicles per day on Dubuque Street (13% increase). This would be the most conservative estimate of traffic impact, as some school trips are already being made in the area and may be reflected in today's ADT. Front Street carries approximately 8,000 vehicles per day in the study area and Dubuque Street carries near 3,200 vehicles per day^{ix}. The impact of vehicular traffic during peak school travel periods (especially the AM) will be felt most distinctly at the intersections of Front Street and Dubuque Street with North Bend Drive. The extension of North Bend Drive to Front Street is expected to decrease traffic on Penn Street between 4-10%, as the new road will provide an alternate east-west connection between Dubuque Street and Front Street. School-related bicycle and pedestrian traffic will be well served by the trails that run along Front Street, North Bend Drive, Dubuque Street, and the western length of the proposed school property so long as proper connections to the school property are constructed and crosswalks are well marked and signed.

Proposed Front Street / North Bend Drive / South Slope Intersection

At the proposed intersection of Front Street / North Bend Drive / South Slope, staff does not recommend an all-way stop on opening day. There is not enough traffic expected on North Bend Drive to warrant stopping all Front Street drivers, nor is there a visibility or other specific safety concern. A traffic signal is also not warranted on opening day, due to low minor street traffic. That said, the peak hour traffic warrant (Warrant 3) is within 15 minor-street vehicles of being met during the AM. The satisfaction of a warrant does not in itself require the installation of a traffic signal, however at a minimum, at least one of the eight warrants should be met. If a traditional four-way intersection configuration is desired, a follow up all-way stop or signal warrant study could be completed after the North Bend Drive extension and elementary school are constructed and traffic normalizes.

In terms of turn lanes – considering a traditional four-way intersection configuration – a southbound left-turn and right-turn lane is warranted during the AM peak hour in the year 2045. A northbound left-turn lane is warranted during both the AM and school-PM peak hour. An eastbound left-turn lane is not warranted based on overall hourly traffic volumes, however due to the nature of the school traffic spikes (20-30 minutes of the peak hours), North Liberty may wish to consider an eastbound left-turn lane to improve traffic flow during peak periods/events.

That said, North Liberty could consider a roundabout as an alternative to adding turn lanes at the intersection. This is an opportune time to consider a roundabout as the west leg has yet to be constructed and turn lanes on Front Street are warranted which would require some level of reconfiguration of the north and south legs. A roundabout would eliminate the need for turn lanes and would also eliminate the future need for an all-way stop or traffic signals. A roundabout would provide the least overall delay and best level of service when compared with an all-way stop or traffic signal. Not only are roundabouts more efficient, but they also are much safer than typical intersections - reducing fatalities by 90% (versus signals), collisions with injuries by 75% and overall collisions by 37%^x. They are desirable in school zones as they act to naturally “calm traffic” while safely and efficiently moving pedestrians, bicyclists, and vehicles. Studies have also indicated that pedestrian collisions are reduced when a traditional intersection is converted to a roundabout^{xi}. This is attributed to the reduction in speeds, increased reaction time, and the fact that pedestrians need only cross one direction of traffic at a time as splitter islands provide pedestrian refuge between lanes. Additionally, based on enrollment projections from the school district, the majority of school-related pedestrian traffic is expected to come from neighborhoods to the north which will *not* require crossing the

Front Street / North Bend Drive / South Slope intersection. As such, the intersection is not expected to generate significant school-related pedestrian traffic volumes.

Summary of Recommendations

Traffic Control, Turn Lanes and Intersection Configuration

- An all-way stop or a traffic signal is not warranted at the proposed intersection of Front Street / North Bend Drive / South Slope on opening day.
- An update to the all-way stop or traffic signal warrant study at the proposed intersection could be performed in the future after the new school opens and traffic in the area normalizes.
- Under a traditional four-way intersection configuration, a southbound left (minimum 75') and right-turn lane (minimum 100') is warranted during the AM peak hour and a northbound left-turn lane (minimum 75') is warranted during the AM and school-PM peak hour. While not strictly warranted based on volumes, a dedicated left-turn lane (minimum 75') for eastbound traffic would help reduce delays – especially during peak school periods. Because the leg is being newly constructed, it would be prudent to consider the installation of an eastbound left-turn lane at this time.
- North Liberty should consider a single-lane roundabout as an alternative to a traditional four-way intersection as it would eliminate the need to add turn lanes and negate any future need for additional traffic control such as an all-way stop or traffic signals.
- Reconstructing the Penn Street / Front Street intersection as a single-lane roundabout before opening day would improve level of service from LOS C (am) and LOS F (pm) to LOS A (am) and LOS B (pm) and would virtually eliminate delay during off-peak hours.

Bike and Pedestrian Accommodations

The following actions are recommended to ensure safe and efficient pedestrian and bicycling access to the school:

- If a traditional four-way intersection is desired, add continental crosswalk pavement markings and R1-1 “Stop” sign on the west leg of the proposed Front Street / North Bend Drive intersection.
- If a roundabout is desired, add continental crosswalk pavement markings to the pedestrian crossings of the west and south legs of the intersection including S1-1 “School Crossing” signs with downward arrows on the approaches. S1-1 “School Crossing” with W16-6P “right arrow” supplemental signs should be installed on Front Street for southbound traffic at the roundabout to alert right-turning drivers that school children may be present.
- Add continental crosswalk pavement markings and S1-1 “School Crossing” signs at and in advance of the unmarked mid-block trail crossing on North Bend Drive just west of the school.
- If the Front Street school crossing is designated at Jefferson Street, replace worn “Bicycle Crossing” signs at the intersection with fluorescent S1-1 “School Crossing” signs with “Downward Arrows” or “Ahead” supplemental signs at and in advance of the intersection. If the Front Street school crossing is moved further north to the North Bend Drive intersection, simply replace the “Bicycle Crossing” signs on Front Street at Jefferson Street due to fading.
- Extend the trail on the south side of the North Bend Drive extension to Front Street and ensure a sidewalk is also available on the north side of the road.
- Add sidewalk extensions from the front of the school to the rear along the east and west sides of the building.
- Evaluate enlisting school crossing guards or school safety patrol to help school children traverse the school crosswalks on Front Street or North Bend Drive.

Speed Limits

Staff recommends that speed limits on Front Street and North Bend Drive are modified as shown on **Figure 9** and outlined below:

- Extend 25 mph speed limit on Front Street from Penn Street to 650' north of the proposed North Bend Drive / South Slope intersection.
- Introduce 20 mph school speed limit from 7 am – 9 am and 1 pm to 4 pm on Front Street from 400' south of proposed intersection to 300' north of the intersection.
- Install radar feedback signs on Front Street with the school speed limit signage to maximize compliance and supplement enforcement efforts.
- Introduce 20 mph school speed limit from 7 am – 9 am and 1 pm to 4 pm on the North Bend Drive from a point approximately 250' west of the westernmost school boundary to Front Street.
- Establish a 35 mph speed limit approximately 650' north of the proposed intersection, transition to a 45 mph speed limit just east of Cedar Springs Drive, and finally transition to a 55 mph speed limit approximately 1250' further east. This would require collaboration with Johnson County to reduce speed limits outside of the municipal boundary.
- Install a W3-5 “45 mph ahead” warning sign approximately 1000' further east of 55 mph signage to alert drivers heading into North Liberty of the change in speed limit.
- Additional police enforcement during the first few weeks of school would help reinforce the new speed limits.

Please feel free to reach out to me if you have any questions or comments on this study or the recommendations contained within. I can be reached at 319.356.5254 or by email at darian-nagle-gamm@iowa-city.org.

- ⁱ Institute for Traffic Engineers (v9) Trip Generation Manual
- ⁱⁱ Institute for Traffic Engineers (v9) Trip Generation Manual
- ⁱⁱⁱ Transportation Research Board: <http://www.trb.org/Publications/Blurbs/164470.aspx>
- ^{iv} Federal Highway Administration Roundabout Information Guide 2010
- ^v Institute for Traffic Engineers (v9) Trip Generation Manual
- ^{vi} Based on 2017 MPOJC ADT volumes
- ^{vii} Based on 2010 DOT AADT of 2590 with 2% increase each year until 2017
- ^{viii} Institute for Traffic Engineers (v9) Trip Generation Manual
- ^{ix} Front Street data based on approximate daily average traffic count of 8,000 (2017 MPOJC); Dubuque Street average daily traffic estimated from 2010 DOT AADT of 2590 with 2% increase each year until 2017
- ^{ix} Federal Highway Administration

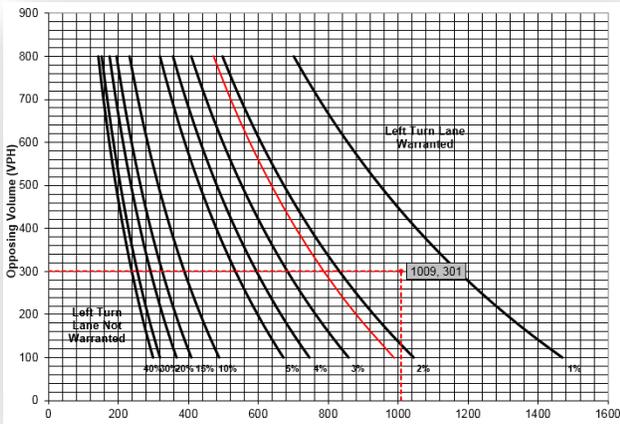
Appendix

Front Street / North Bend Drive / South Slope Intersection Turn Lane Warrants

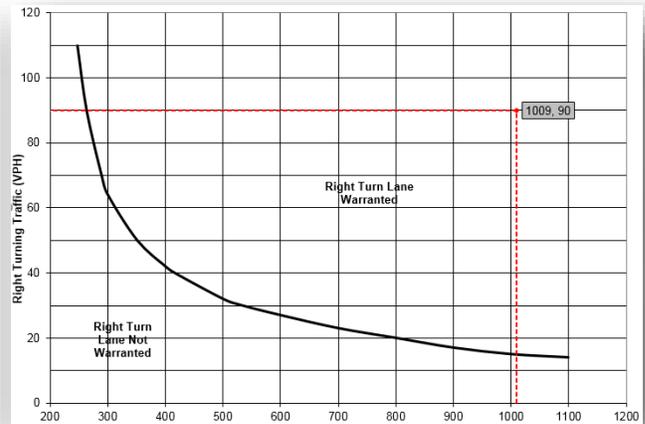
Year 2045

Southbound – AM 2045

Left-Turn Lane

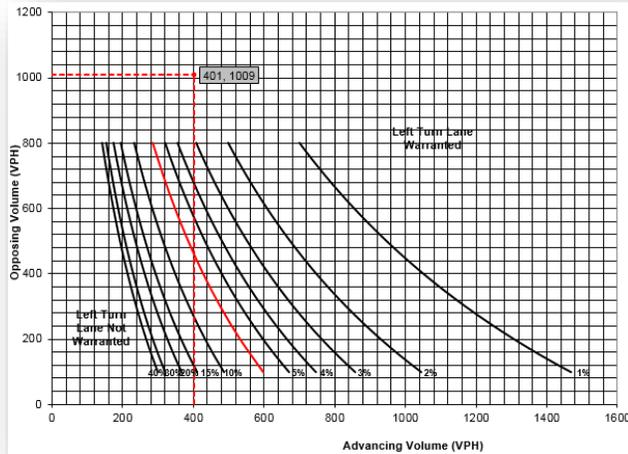


Right-Turn Lane

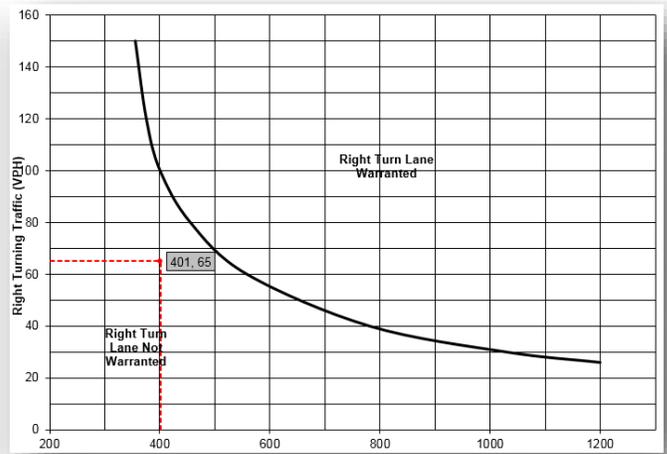


Northbound – AM 2045

Left-Turn Lane

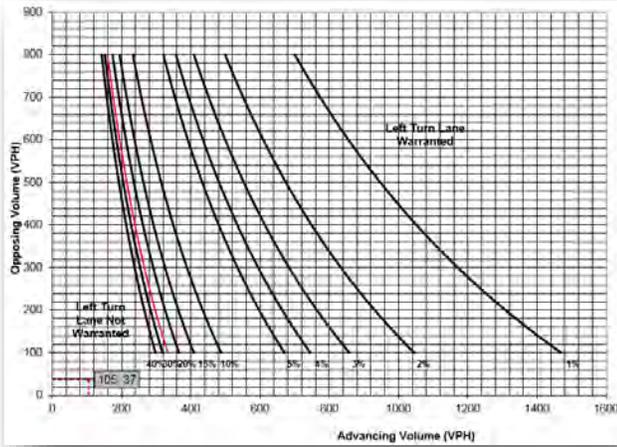


Right-Turn Lane

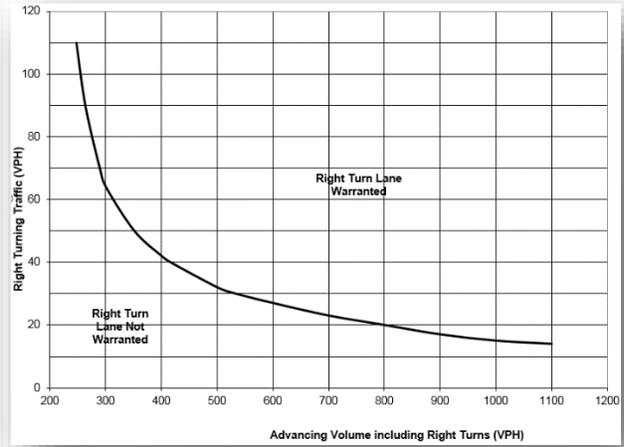


Eastbound – AM 2045

Left-Turn Lane

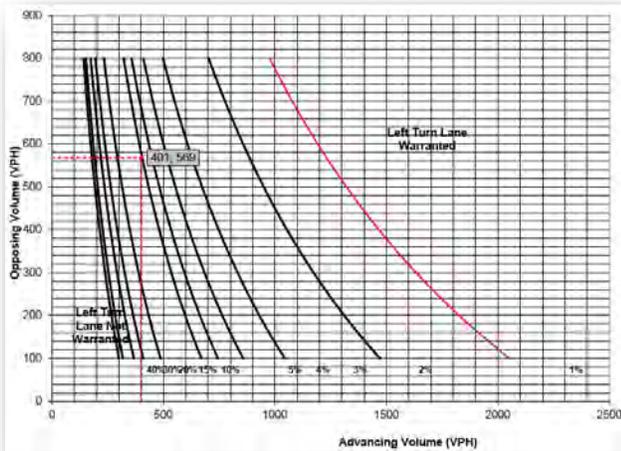


Right-Turn Lane

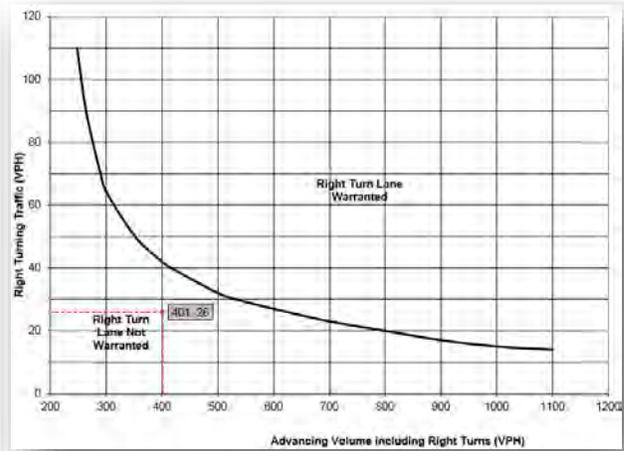


Southbound - School PM 2045

Left-Turn Lane

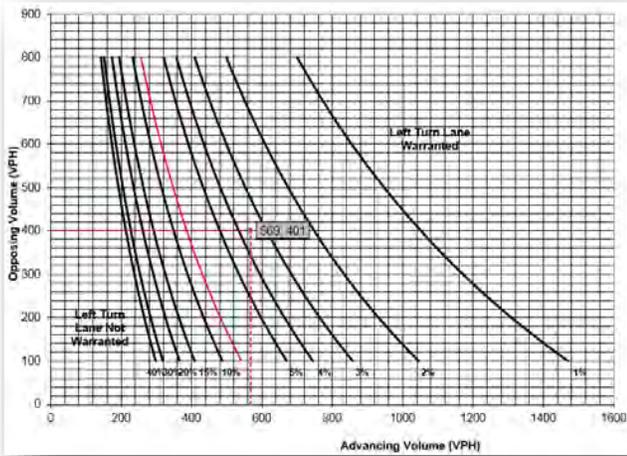


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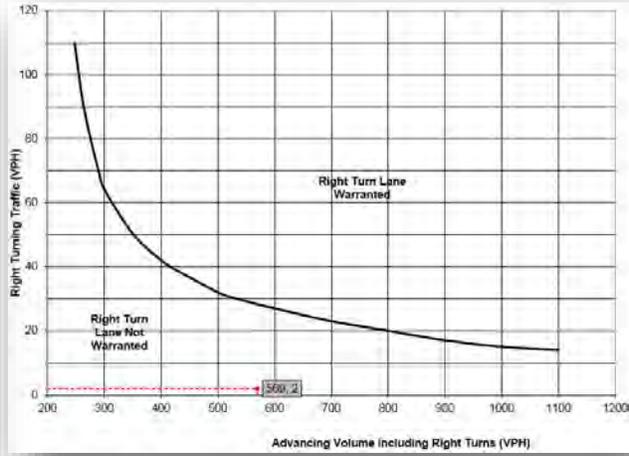


Northbound – School PM 2045

Left-Turn Lane

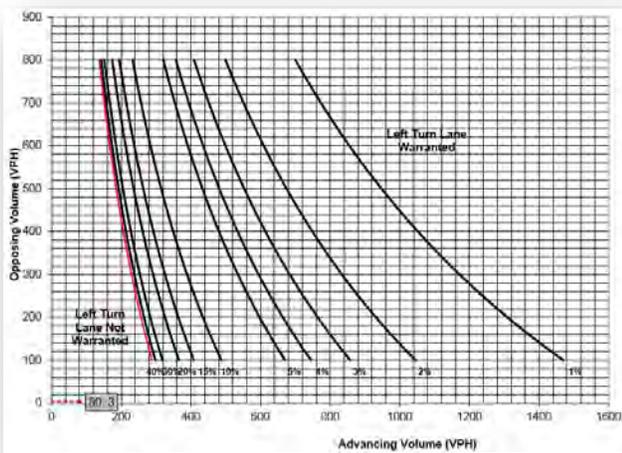


Right-Turn Lane

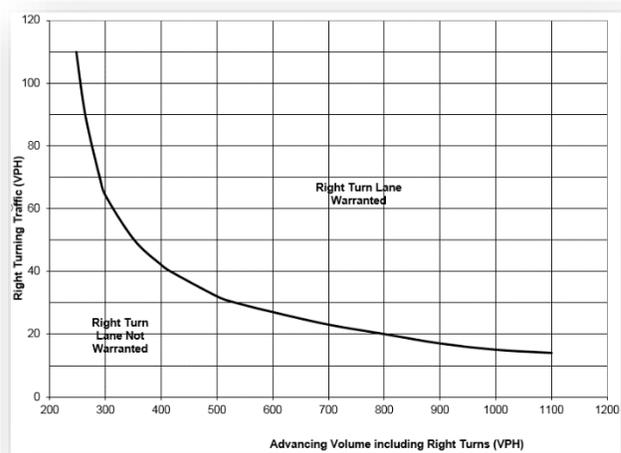


Eastbound – School PM 2045

Left-Turn Lane



Right-Turn Lane



West Penn Street Traffic Study

Report Prepared For
City of North Liberty, Iowa

June 2016

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Appendix 4 Traffic Control Warrant Analysis Worksheets

Appendix 5 Conceptual Drawings

Introduction

The City of North Liberty, Iowa initiated the West Penn Street Traffic Study to identify potential roadway and intersection options within the study area to improve existing safety and operational conditions. This study mainly focuses on analysis and improvements at intersections, because vehicle delay and crashes are primarily occurring at the study intersections. Previous studies of the area were reviewed. The recommendations from these studies were incorporated where appropriate.

In coordination with the City of North Liberty, the following four study intersections within the study area were identified for analysis:

1. Penn Street and Pacha Parkway/Community Drive
2. Penn Street and Dubuque Street/Stewart Street
3. Penn Street and Dubuque Street
4. Penn Street and Front Street

Area immediately surrounding the study intersections generally incorporates residential and commercial land uses. A study area map depicting the location of the study intersections along Penn Street relative to the North Liberty area transportation network is depicted in Figure 1.

Figure 1 Study Area Map



Existing Conditions

Roadway System

The study area roadway network consists of major arterials, minor arterials, collectors, and local roads. Major arterials place an emphasis on through travel and access to/from abutting land is generally limited. Minor arterials augment major arterials and emphasize mobility over land access, serving trips of moderate length within the community. Collectors collect traffic from local roads and convey it to the arterial network. Local roads provide access to abutting land and to collector streets. The posted speed limit is 25 mph at all approaches to the study intersections. Speed data was collected for eastbound and westbound traffic between Pacha Parkway/Community Drive and Dubuque Street/Stewart Street in early June 2016. The 85th percentile speed for eastbound and westbound motorist was approximately 37 mph and 17 mph, respectively. The 85th percentile speed is the speed that 85 percent of motorists did not exceed during the analysis period. The following roadway configuration descriptions are specific to the conditions adjacent to the identified study intersections and are based on the City of North Liberty's Arterial Street Map. PM peak hour traffic volumes are assumed to be 10 percent of daily traffic volume, which is consistent with methodology used by the Federal Highway Administration.

Major Arterials

Penn Street: Penn Street is an east-west two-lane (one lane in each direction) roadway, with additional turn bays at the intersection of Pacha Parkway/Community Drive. On-street parking is prohibited. Approximately 10,300 (eastbound and westbound) daily vehicles travel along Penn Street in the vicinity of the study area.

Minor Arterials

Dubuque Street: Dubuque Street south of Penn Street is a minor arterial. It is a northwest-southeast two-lane (one lane in each direction) roadway. On-street parking is prohibited. Approximately 3,800 (northwest and southeast) daily vehicles travel along Dubuque Street in the vicinity of the study area.

Front Street: Front Street north of Penn Street is a minor arterial. It is a north-south two-lane (one lane in each direction) roadway. On-street parking is prohibited. Approximately 9,900 (north and south) daily vehicles travel along Front Street in the vicinity of the study area.

Collectors

Dubuque Street: Dubuque Street north of Penn Street is a collector. It is a northwest-southeast two-lane (one lane in each direction) roadway. On-street parking is prohibited. Approximately 2,900 (northwest and southeast) daily vehicles travel along Dubuque Street in the vicinity of the study area.

Front Street: Front Street south of Penn Street is a collector. It is a north-south two-lane (one lane in each direction) roadway. On-street parking is prohibited. Approximately 6,300 (north and south) daily vehicles travel along Front Street in the vicinity of the study area.

Local Roads

Pacha Parkway/Community Drive: Pacha Parkway/Community Drive is north-south two-lane (one lane in each direction) roadway, with an additional southbound right-turn bay at the intersection of Penn Street. On-street parking is prohibited. Approximately 2,500 (north and south) daily vehicles travel along Pacha Parkway/Community Drive in the vicinity of the study area.

Stewart Street: Stewart Street is a north-south two-lane (one-lane in each direction) roadway. On-street parking is generally allowed on both sides of the street. Approximately 580 (north and south) daily vehicles travel along Stewart Street in the vicinity of the study area.

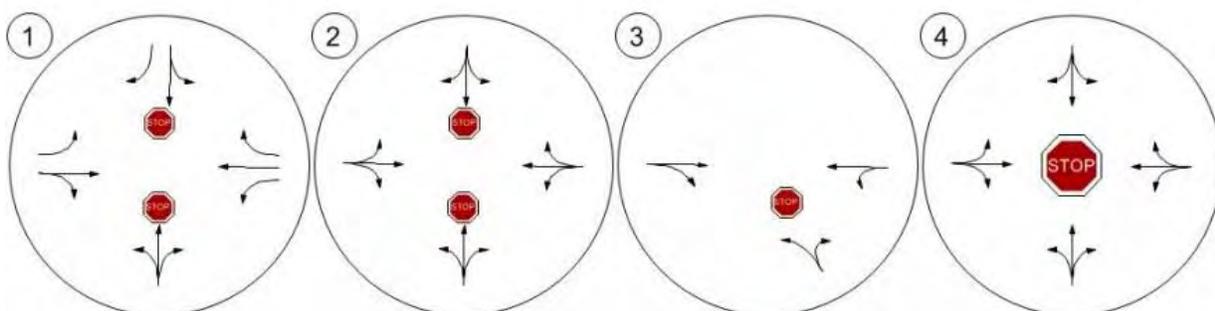
Sidewalks and Multi-Purpose Trails

Sidewalks are adjacent along all approaches to the study intersections. A multi-purpose trail, which begins/terminates as it intersects with Penn Street, is located approximately equidistant between Pacha Parkway/Community Drive and Dubuque Street/Stewart Street.

Study Intersections

The study intersections existing lane configuration and control are presented in Figure 2. The location where speeds were collected are indicated by two red lines extending across Penn Street

Figure 2 Study Intersections - Existing (2016) Lane Configuration and Control



Sight Distance

The Iowa Statewide Urban Design and Specifications (SUDAS) identify the desirable sight distance along 25 mph roadways at 280 and 240 feet for left and right-turn maneuvers, respectively. These distances

correspond to vehicles attempting left and right-turn maneuvers from a stopped position, with free-flow (uncontrolled) intersecting traffic. Sight distances should not contain structures, right-of-way grades, or plantings, which would impede unobstructed views of oncoming traffic along the intersecting roadways.

Penn Street and Pacha Parkway/Community Drive

The intersection of Penn Street and Pacha Parkway/Community Drive is located to the east of the Highway 965 and Penn Street intersection at a relatively close distance. However, the distance is just far enough away to satisfy SUDAS's desirable sight distance requirements for northbound and southbound motorists.

Penn Street and Dubuque Street/Stewart St

Northbound motorist's sight distance to the east is hindered by Penn Street's roadway grade. Southbound motorist's sight distance is hindered by shrubs adjacent to the sidewalk on the northeast quadrant of the intersection.

Penn Street and Dubuque Street

Northbound motorists have limited visibility to the west caused by the grade of Penn Street. Northbound motorist's visibility to the east satisfies SUDAS's desirable sight distance requirements. However, the skewed intersection requires motorists to look over their shoulder to see motorist approaching from the east.

Penn Street and Front Street

There are no unobstructed views at any approach to the Penn Street and Front Street intersection. In addition, sight distance is generally not a concern at all-way stop controlled intersections.

Safety Analysis

The Crash Mapping Analysis Tool (CMAT) software administered by the Iowa Department of Transportation was used to identify available crash data from January 1, 2011, to March 31, 2016 (5.25 years) at the following intersections:

1. Penn Street and Pacha Parkway/Community Drive
2. Penn Street and Dubuque Street/Stewart Street
3. Penn Street and Dubuque Street
4. Penn Street and Front Street

During the analysis period, a total of 19 crashes occurred at these intersections. A total of 8 injuries occurred as a result of these crashes. Crash summary sheets are contained in Appendix 2.

Table 1 presents the number and percentage of vehicle crashes and injuries attributed to types of collisions during the analysis period at the study intersections.

Table 1 Crash Type all Intersections (1/1/11 – 2/31/16)

Crash Type	Number of Crashes	Percent of Total Crashes (19)	Injuries	Percent of Total Injuries (8)
Angle (Not Specific)	1	5.3%	0	0.0%
Rear End	9	47.4%	4	50.0%
Sideswipe	2	10.5%	0	0.0%
Broadside	4	21.1%	1	12.5%
Unknown	1	5.3%	1	12.5%
Ditch	1	5.3%	1	12.5%
Non-Collision	1	5.3%	1	12.5%
Total	19	100%	8	100%

The majority of crashes were classified as rear-end and broadside crashes. Rear-end crashes made up 47.4% (9 out of 19) of crashes and resulted in 50.0% (4 out of 8) of injuries. Broadside crashes made up 21.1% (4 out of 19) of crashes and resulted in 12.5% (1 out of 8) of injuries. In general, rear-end and broadside type crashes are two of the most common types of crashes. Broadside crashes commonly occur due to unexpected crossing vehicles. Rear-end crashes commonly occur due to drivers not paying attention to downstream vehicles slowing to stop at intersections.

Table 2 presents crash statistics at each intersection organized by crash type.

Table 2 Crash Type by Intersection (1/1/11 – 2/31/16)

Intersecting Road with Penn Street	Crash Type							Total	Percent of Total
	Angle (Not Specific)	Rear End	Sideswipe	Broadside	Unknown	ROTR ¹	Non-collision		
Pacha Pkwy/Community Dr	0	0	1	1	0	0	0	2	10.5%
Dubuque St /Stewart St	0	5	1	3	0	0	1	10	52.6%
Dubuque St	0	1	0	0	0	0	0	1	5.3%
Front St	1	3	0	0	1	1	0	6	31.6%
Total	1	9	2	4	1	1	1	19	100%
Percent of Total	5.3%	47.4%	10.5%	21.1%	5.3%	5.3%	5.3%	100%	-

¹ ROTR = Ran off the road

The Stewart Street and Front Street intersections experienced the highest frequency of crashes during the analysis period at 52.6% (10 out of 19) and 31.6% (6 out of 19) of all crashes, respectively. Rear-end type crashes made up 50.0% of all crash types at both intersections.

Table 3 presents crash injury statistics at each intersection organized by crash type.

Table 3 Crash Injuries at each Intersection by Crash Type (1/1/11 – 2/31/16)

Intersecting Road with Penn Street	Crash Injuries by Crash Type							Total	Percent of Total
	Angle (Not Specific)	Rear End	Sideswipe	Broadside	Unknown	ROTR ¹	Non-collision		
Pacha Pkwy/Community Dr	0	0	0	0	0	0	0	0	0.0%
Dubuque St /Stewart St	0	3	0	1	0	0	1	5	62.5%
Dubuque St	0	0	0	0	0	0	0	0	0.0%
Front St	0	1	0	0	1	1	0	3	37.5%
Total	0	4	0	1	1	1	1	8	100%
Percent of Total	0.0%	50.0%	0.0%	12.5%	12.5%	12.5%	12.5%	100%	-

¹ ROTR = Ran off the road

The Stewart Street and Front Street intersections experienced the highest frequency of crash injuries during the analysis period at 66.7% (6 out of 9) and 33.3% (3 out of 9) of all crash injuries, respectively. Rear-end type crashes resulted in the highest number (3 out of 6, or 50.0%) of injuries at the Stewart Street intersection. Three crash injuries occurred at the Front Street intersection, which were equally distributed between rear-end, unknown, and ran off the road (ROTR) crash types.

Intersection crash rates are expressed in crashes per million entering vehicles (crashes/MEV) and can be calculated with the following equation:

$$\text{Crash Rate} = \frac{1,000,000 \times \text{Total Crashes}}{\text{AADT}_{\text{Entering vpd}} \times 365 \times \# \text{ of Years in Study Period}}$$

Table 4 summarizes crash rates at study intersections and compares it to average statewide crash rates for intersections with a similar number of entering vehicles. The statewide average crash rate for intersections with a similar number of entering vehicles was prepared by the Iowa Department of Transportation, Bureau of Transportation Safety.

Table 4 Intersection Crash Rate Summary

Intersecting Road with Penn Street	Total Crashes	Daily Entering Volume	Crash Rate (crashes/MEV)	Statewide Average Crash Rate (crashes/MEV) ¹	Comparison to Statewide Average Crash Rate
Pacha Pkwy/Community Dr	2	12,880	0.08	0.8	10.0 times lower
Dubuque St /Stewart St	10	12890	0.40	0.8	2.0 times lower
Dubuque St	1	12,380	0.04	0.8	20.0 times lower
Front St	6	13,960	0.22	0.8	3.6 times lower

Source: Iowa Department of Transportation, Bureau of Transportation Safety.

The severity index is a weighted measure of crashes occurring at an intersection, with fatal crashes and major injury crashes weighted more heavily (using a multiplier of 8) as compared to minor injury crashes (multiplier of 3) or property damage only (multiplier of 1). The severity index is calculated as follows:

$$\text{Severity Index} = \frac{8(\text{Fatal \& Major Injury}) + 3(\text{Minor Injury}) + 1(\text{Property Damage})}{\text{Total Number of Crashes}}$$

The severity rate is calculated as follows:

$$\text{Severity Rate} = (\text{Crash Rate})(\text{Severity Index})$$

The severity rate provides a weighted measure of crashes per million entering vehicles and therefore is a more equitable statistic to compare between intersections.

Table 5 presents crash severity and crash rate statistics at each intersection.

Table 5 Crash Injury Severity by Intersection

Intersecting Road with Penn Street	Crash Severity				Total	Severity Index	Severity Rate
	Property Damage Only	Minor Injury	Major Injury	Fatality			
Community Dr /Pacha Pkwy	2	0	0	0	2	1.0	0.08
Dubuque St /Stewart St	5	4	1	0	10	2.5	1.01
Dubuque St	1	0	0	0	1	1.0	0.04
Front St	3	3	0	0	6	2.0	0.45
Total	11	7	1	0	19		
Percent of Total	57.9%	36.8%	5.3%	0.0%	100%		

It should be noted a major injury crash occurred at Penn Street and Dubuque Street/Stewart Street that was not included in the analysis herein. Local news reported on this crash; however CMAT data for this crash was unavailable at the time of this analysis. The Dubuque Street/Stewart Street intersection has the highest calculated severity rate at 1.01. If the unaccounted major injury crash at Dubuque Street/Stewart Street is included the intersection severity rate calculates to 1.21, which signifies a comparatively higher frequency of injuries resulting from crashes than at all other study intersections.

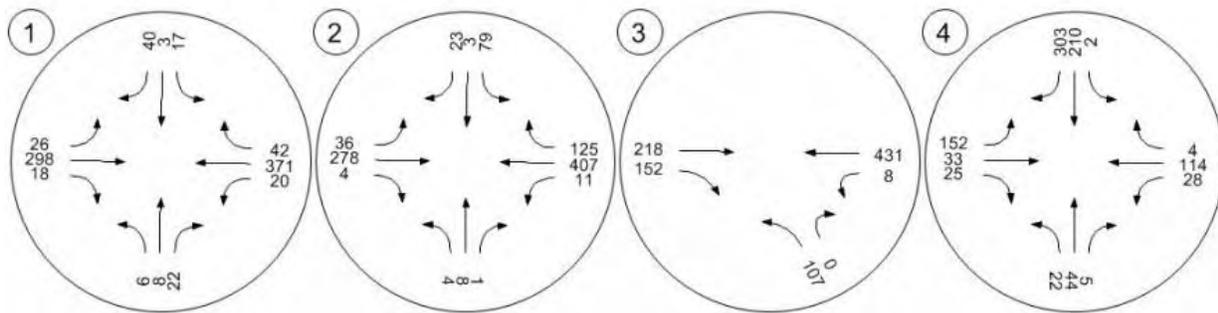
Operational Analysis

The operational analysis presented herein addresses AM and PM Peak hour conditions. The AM peak hour corresponds to the highest consecutive four 15-minute periods between 7:00 AM and 9:00 AM. The PM peak hour corresponds to the highest consecutive four 15-minute periods between 4:00 PM and 7:00 PM. Traffic volumes within the AM or PM peak hours will typically represent the highest hourly daily traffic volume, which is of greatest interest for design and operational analysis usage. AM and PM peak hours are also analyzed in order to account for their different characteristics. For example, the morning peak may have a high eastbound traffic volume and the evening peak may have a high westbound traffic volume. Understanding the different morning and evening peak hour characteristics helps to identify appropriate lane configuration and intersection control that will accommodate traffic volumes throughout the day. Existing (2016) AM and PM peak hour turning movement volumes were collected in early June 2016 using Miovision cameras and are presented in Figure 3. Traffic volume data is contained in Appendix 1.

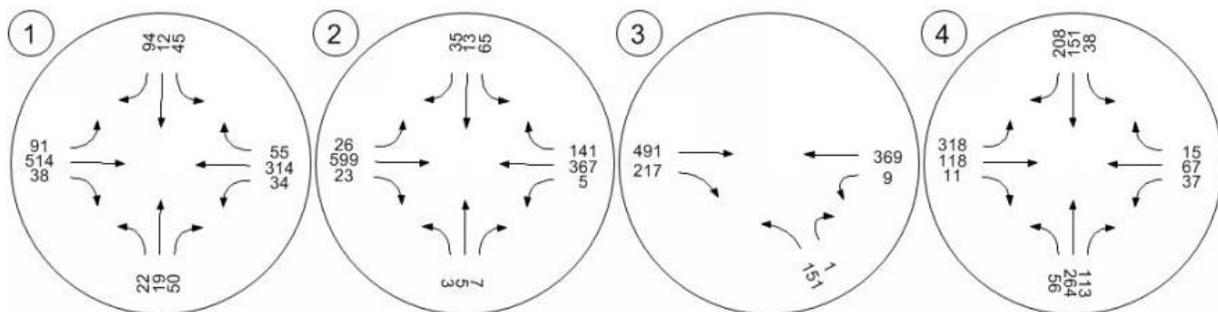
Figure 3 Study Intersections - Existing (2016) AM and PM Peak Hour Turning Movement Volumes



AM Peak Hour Turning Movement Volumes



PM Peak Hour Turning Movement Volumes



Synchro studio 8 is the traffic modeling software used for the intersection analysis presented herein, which is based on Highway Capacity Manual (HCM) 2010 methodology.

Procedures outlined in Chapter 19 (two-way stop-controlled) and 20 (all-way stop-controlled) of the HCM 2010 were used to analyze intersection performance. The quantity of delay is generally categorized in terms of Level of Service (LOS). LOS describes the quality of traffic operations and is graded from A to F; with LOS A representing free-flow conditions and LOS F representing congested conditions. For purposes of comparison with improvement options the control delay at each approach and the average intersection control delay are reported. Control delay is the delay experienced by vehicles slowing down as they are approaching the intersection, the wait time at the intersection and the time for the vehicle to speed up through the intersection and enter into the traffic stream. The average intersection control delay is a volume weighted average of delay experienced by all motorists entering the intersection on all intersection approaches.

Table 6 presents the range of traffic delays associated for unsignalized (stop-controlled) intersections.

Table 6 LOS Criteria for Unsignalized Intersections

LOS	Unsignalized Intersection Average Delay (sec/veh)
A	≤ 10
B	> 10 to 15
C	> 15 to 25
D	> 25 to 35
E	> 35 to 50
F	> 50

Source: HCM 2010, Exhibit 19-1 and 20-2 LOS Criteria for Unsignalized Intersections.
sec/veh = seconds per vehicle

LOS D or better is generally identified as acceptable in urban conditions. The analysis of existing (2016) AM peak hour conditions indicate each study intersection approach is operating at LOS C or better. The analysis of the existing (2016) PM peak hour conditions indicate each study intersection approach is operating at LOS C or better, with the following exceptions:

- Southbound on Dubuque Street/Stewart Street
- Northbound on Dubuque Street
- Eastbound on Front Street
- Northbound on Front Street
- Southbound on Front Street

The undesirable LOS at the Penn Street and Front Street intersection is consistent with home owners adjacent to the intersection who have expressed difficulty in getting out of their driveways in the afternoon hours.

Table 7 presents AM and PM peak hour operations at the study intersections. Operational analysis report sheets are contained in Appendix 3.

Table 7 Study Intersections LOS - Existing Operations

Intersecting Road with Penn Street		Unsignalized									
		AM Peak Hour				PM Peak Hour					
		Approach Delay (sec)	HCM LOS	Int. Delay (sec)	Int. LOS	Approach Delay (sec)	HCM LOS	Int. Delay (sec)	Int. LOS		
1	Pacha Pkwy/ Community Dr	EB	0.6	A	2.0	A	EB	1.2	A	6.1	A
		WB	0.4	A			WB	0.7	A		
		NB	13.8	B			NB	29.3	D		
		SB	13.8	B			SB	27.1	D		
2	Dubuque St /Stewart St	EB	1.0	A	3.9	A	EB	0.3	A	4.0	A
		WB	0.2	A			WB	0.1	A		
		NB	21.3	B			NB	21.5	C		
		SB	30.0	B			SB	40.3	E		
3	Dubuque St	EB	0.0	A	2.5	A	EB	0.0	A	4.5	A
		WB	0.1	A			WB	0.2	A		
		NB	20.9	C			NB	36.1	E		
		SB	-	-			SB	-	-		
4	Front Street	EB	12.8	B	17.7	C	EB	70.7	F	56.6	F
		WB	11.5	B			WB	16.8	C		
		NB	10.0	A			NB	63.0	F		
		SB	22.6	C			SB	45.6	E		

Red cells indicate an unacceptable LOS.

Warrants

Traffic Control Warrants

The satisfaction of a traffic control warrant or warrants does not in itself require a modification to the existing traffic control. In general a modification to an existing traffic control should not be made unless analysis indicates it will improve the overall safety and/or operations of the intersection. The ultimate decision resides on engineering judgement. The traffic control warrant analyses presented herein was performed under the guidelines and procedures as outlined in the 2009 Manual of Uniform Traffic Control Devices (MUTCD). Traffic volumes for the warrant analyses were collected between 7:00 AM and 9:00 AM and 4:00 PM and 7:00 PM for all study intersections. Additional hours between 6:00 AM and 7:00 AM, 11:00 AM and 1:00 PM, and 3:00 PM and 4:00 PM were collected for the intersections of Penn Street and Dubuque Street/Stewart Street and Penn Street and Front Street.

All-Way Stop Control Warrant

There are three basic criteria that should be considered prior to installing an all-way stop control condition.

- A. Where a traffic control signal is justified (meets traffic signal warrants), the all-way stop is an interim measure that can be used before the traffic control signal is installed.
- B. A crash history, as indicated by 5 or more crashes within a 12-month period, which may be correctable by the installation of an all-way stop configuration. Correctable crash types include right-turn, left-turn, and right-angle crashes.
- C. At least one of the following minimum traffic volume conditions exist:
 1. Average of at least 300 entering vehicles from the major roadway (east and west approach of Penn Street) for any 8 hours of an average day.
 2. Combined vehicular, pedestrian, and bicycle volume entering the intersection from the minor street approaches (intersecting roadway with Penn Street, total of both approaches) averages at least 200 units for any 8 hours of an average day. The average delay experienced at a minor approach must also be at least 30 seconds during the peak hour.
 3. If the 85th percentiles approach speed of the major-street traffic exceeds 40 mph.

Traffic Signal Warrant 1 – Eight-Hour Vehicular Volume

Condition A – Minimum Vehicular Volume

The Minimum Vehicular Volume (Condition A) is intended for application where a large volume of intersecting traffic is the principal reason for signalization of an intersection. This warrant is satisfied when the traffic volumes presented in Table 8 exist on the major street and on the higher volume minor street approach for each of any eight hours of an average day.

Table 8 Warrant 1 – Eight-Hour Vehicular Volume (Condition A)

Number of lanes on each approach		Vehicles per hour on major street (total on both approaches)	Vehicles per hour on higher volume minor street approach
Major Street	Minor Street		
1	1	500	150
2 or more	1	600	150
3 or more	2 or more	600	200
1	2 or more	500	200

Source: Manual of Uniform Traffic Control Devices, December 2009, page 438.

Condition B – Interruption of Continuous Traffic

The Interruption of Continuous Traffic (Condition B) is intended for application where the traffic volume on a major street is so heavy that traffic on a minor intersection street suffers excessive delay or conflict in entering or crossing the major street. This warrant is satisfied when the traffic volumes presented in Table 9 exist on the major street and on the higher volume minor street approach to the intersection for each of any eight hours of an average day.

Table 9 Warrant 1 – Eight-Hour Vehicular Volume (Condition B)

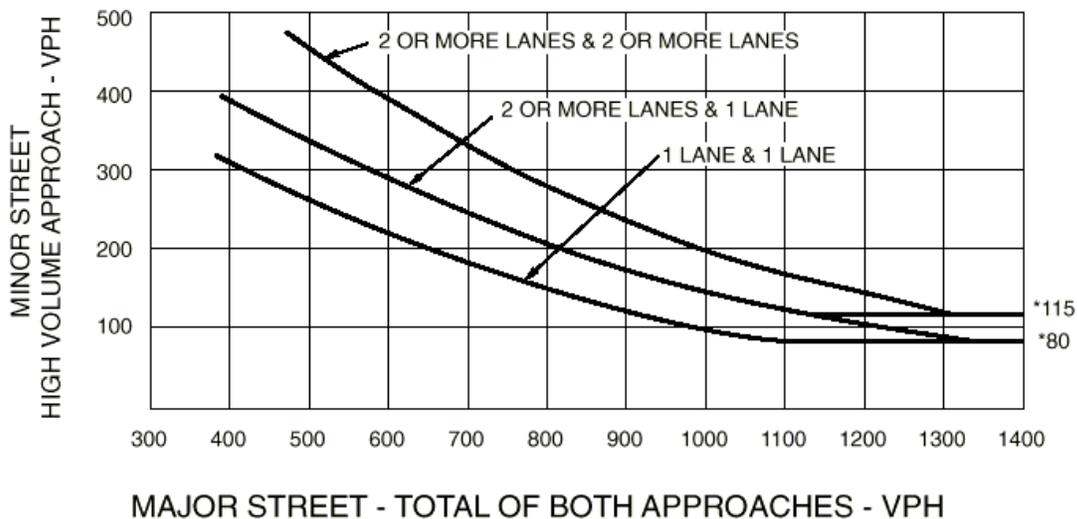
Number of lanes on each approach		Vehicles per hour on major street (total on both approaches)	Vehicles per hour on higher volume minor street approach
Major Street	Minor Street		
1	1	750	75
2 or more	1	900	75
3 or more	2 or more	900	100
1	2 or more	750	100

Source: Manual of Uniform Traffic Control Devices, December 2009, page 438.

Warrant 2 – Four-Hour Vehicular Volume

The Four-Hour Vehicular Volume signal warrant condition is intended to be applied where the volume of intersecting traffic is the principal reason to consider installing a traffic control signal. This warrant is satisfied when the plotted points representing vehicles per hour on the major street (total of both approaches) and corresponding vehicles per hour on the higher minor street approach (one direction only) all fall above the curve in Figure 4 for the existing combination of approach lanes for each of any four hours of an average day. On the minor street, the higher volume is not required to be on the same approach during each of the four hours.

Figure 4 Four Hour Vehicular Volume Warrant



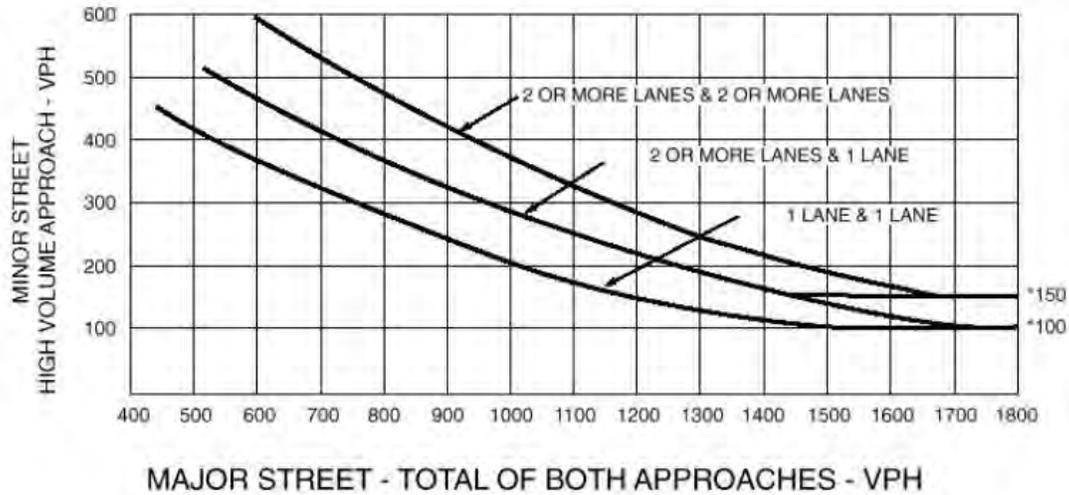
*Note: 115 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 80 vph applies as the lower threshold volume for a minor street approach with one lane.

Source: Manual of Uniform Traffic Control Devices, December 2009, page 440.

Warrant 3 – Peak-Hour Vehicular Volume

The peak hour volume signal warrant is intended for use at a location where minor street traffic suffers undue delay when entering or crossing the major street for a minimum of one hour of an average day. This warrant is satisfied when the plotted point representing vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour of the higher volume minor street approach (one direction only) falls above the curve in Figure 5.

Figure 5 Peak Hour Vehicular Volume Warrant



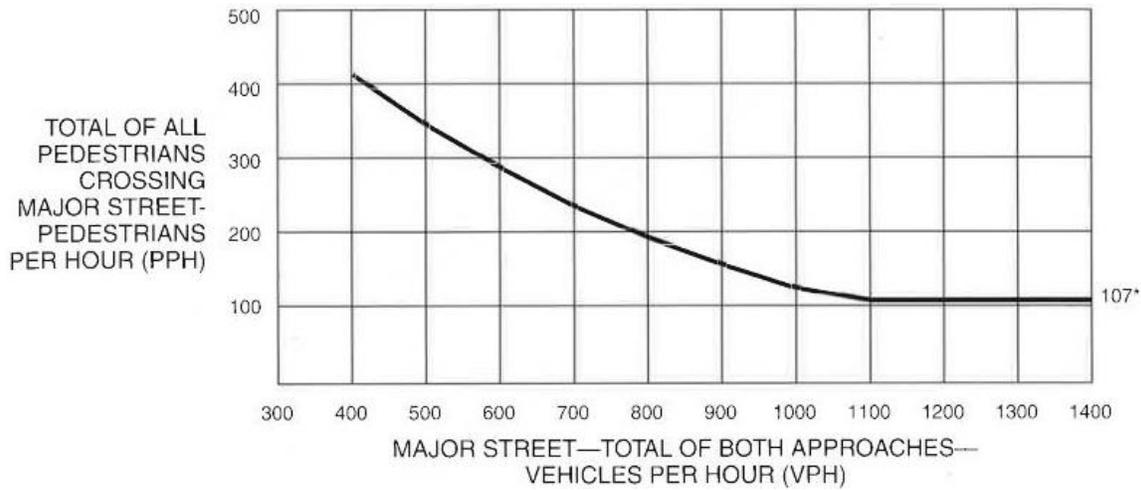
*Note: 150 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor street approach with one lane.

Source: Manual of Uniform Traffic Control Devices, December 2009, page 440.

Warrant 4 – Pedestrian Volume

The pedestrian volume signal warrant is intended for use where traffic volume on a major street is so heavy pedestrians experience excessive delay in crossing the major street. This warrant is satisfied when the plotted point representing vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour of the higher volume minor street approach (one direction only) falls above the curves in Figure 6 and or Figure 7. Figure 6 pertains to a threshold for each of any four hours of an average day. Figure 7 pertains to a threshold for a peak hour (highest daily four consecutive 15-minute periods) of an average day.

Figure 6 Pedestrian Four-Hour Volume Warrant



Source: Manual of Uniform Traffic Control Devices, December 2009, page 440.

Figure 7 Pedestrian Peak-Hour Volume Warrant



*Note: 133 pph applies as the lower threshold volume.

Source: Manual of Uniform Traffic Control Devices, December 2009, page 440.

Northbound (NB), southbound (SB), eastbound (EB), and westbound (WB) pedestrian count data for the intersections of Penn Street and Dubuque Street/Stewart Street and Penn Street and Front Street between the hours of 7:00 AM and 9:00 AM, 11:00 AM and 1:00 PM, and 3:00 PM and 7:00 PM are presented in Table 10 and contained in Appendix 1.

Table 10 Pedestrian Count Data

Hour	Penn St & Dubuque St/Stewart St		Penn St & Front St	
	NB and SB Crossing Pedestrians	EB and WB Crossing Pedestrians	NB and SB Crossing Pedestrians	EB and WB Crossing Pedestrians
7:00 - 8:00	2	0	3	3
8:00 - 9:00	6	0	4	6
11:00 - 12:00	17	2	0	3
12:00 - 1:00	12	10	3	5
3:00 - 4:00	10	5	6	2
4:00 - 5:00	5	1	2	3
5:00 - 6:00	14	2	7	6
6:00 - 7:00	8	0	4	4

The intersection of Penn Street and Dubuque Street/Stewart Street met 1 of 5 criteria for the all way stop control warrants. The intersection of Penn Street and Front Street met the peak hour traffic signal warrant. Summary of the traffic control warrant results are presented in Table 11. Traffic Control warrant analysis worksheets are provided in Appendix 4.

Table 11 Signal Warrant Analysis Summary

Intersecting Roadway with Penn Street		All-Way Stop Warrant					Traffic Signal Warrant 1 (8 Hour)	Traffic Signal Warrant 2 (4 Hour)	Traffic Signal Warrant 3 (Peak Hour)	Traffic Signal Warrant 4 (4 Hour & Peak Hour)
		A	B	C						
				1	2	3				
1	Pacha Pkwy/Community Dr	na	na	na	na	na	na	x	x	na
2	Dubuque St/Stewart St	x	x	✓	x	x	x	x	x	x
4	Front Street	na	na	na	na	na	x	x	✓	x

na Signifies the condition is not applicable or was not analyzed

x Signifies the conditions is not met

✓ Signifies the conditions is met

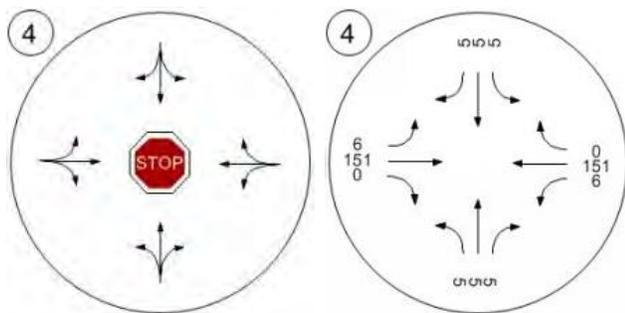
Left-Turn Bay Warrant

Left-turn bays can reduce the potential for crashes and reduce delay by removing stopped vehicles from the main travel lane. However, the cost of a left-turn bay may not justify the potential improvement in safety and reduction in delay if there is a relatively low volume of vehicles transiting the intersection. In order to identify the appropriate volume thresholds to justify the installation of a left-turn bay the National Cooperative Highway Research Program (NCHRP) developed a benefit-cost approach. The volume thresholds resulting from the NCHRP benefit-cost approach are identified in Table 12.

Table 12 NCHRP Recommended Left-turn Treatment Warrant

Left Turn Peak Hour Volume (veh/hr)	Three-Leg Intersection, Major Arterial Volume (veh/hr/ln) that Warrants a Left-Turn Bay	Four-Leg Intersection, Major Arterial Volume (veh/hr/ln) that Warrants a Left-Turn Bay
5	450	150
10	300	50
15	250	50
20	200	< 50
25	200	< 50
30	150	< 50
35	150	< 50
40	150	< 50
45	150	< 50
50 or More	100	< 50

The above table can be used to analyze whether left-turn bays are appropriate at approaches along major arterials. Penn Street is the only major arterial road being studied. Thus, only eastbound and westbound approaches along Penn Street were analyzed. An example of how Table 13 is applied is given below:



The combined eastbound and westbound approach volumes equates to 314 (6+151+6+151=314). 314 is divided by 2 because there are two approach lanes, one on the eastbound leg and one on the westbound leg, which equates to 157 (314/2=157). 6 left turns paired with an average eastbound and westbound volume of 157 meets the left-turn bay warrant. Therefore, left-turn bays warrants are met for both eastbound and westbound approaches, as indicated in the above table.

Table 13 presents PM peak hour warrant results for left-turn bays at the study intersections except for Penn Street and Pacha Parkway/Community Drive. PM peak hour turning movement volumes were generally higher than AM peak hour turning movement volumes. Pacha Parkway/Community Drive already has eastbound and westbound left-turn bays.

Table 13 Left-Turn Bay Warrant Analysis Summary

Intersecting Roadway with Penn Street		Direction	Number of Lanes	Left-turn Volume	Average EB and WB Approach Volume	Left-Turn Bay Warrant Met?
2	Dubuque St/Stewart St	EB	1	36	431	Yes
		WB	1	11	431	Yes
3	Dubuque St	EB	1	na	na	na
		WB	1	8	405	Yes
4	Front Street	EB	1	152	180	Yes
		WB	1	28	180	Yes

na Signifies the condition is not applicable

Study Intersection Assessments

The following descriptions of crashes and injuries correspond to the analysis period beginning January 1, 2011, and ending March 31, 2016 (5.25 years). The following descriptions of LOS correspond to the PM peak hour, which generally experienced greater delay than the AM peak hour. Acceptable LOS was determined to be D or greater. Left-turn bay improvement options are only considered along Penn Street.

Penn Street and Pacha Parkway/Community Drive

The intersection of Penn Street and Pacha Parkway/Community Drive experienced 2 crashes, neither of which resulted in an injury. The crash rate is below the statewide average for other intersections with a similar number of entering vehicles. The northbound and southbound (minor stop controlled) movements are estimated to be operating at an acceptable LOS D. The existing geometric configuration includes turn-bays on multiple approaches, which would make an all-way stop control configuration inadvisable. Implementing an all-way stop control at an intersection with turn-bay(s) creates additional conflicts for motorist transiting the intersection. The following potential improvement options were considered:

- Roundabout
- Traffic control signal

Penn Street and Dubuque Street/Stewart St

The intersection of Penn Street and Dubuque Street/Stewart Street experienced 10 crashes, 5 of which resulted in injuries. Penn Street and Dubuque Street/Stewart Street experienced the highest number of crashes compared to the other study intersections. However, the crash rate is still below the statewide average for other intersections with a similar number of entering vehicles. All approaches are currently single lane (left-through-right turn) approaches. The southbound movement (minor stop controlled) is estimated to be operating at an unacceptable LOS E. The following potential improvements were considered:

- All-way stop control
- Eastbound and or westbound left-turn bays
- Roundabout
- Traffic control signal

Penn Street and Dubuque Street

The intersection of Penn Street and Dubuque Street experienced 1 crash that did not result in an injury. The crash rate is below the statewide average for other intersections with a similar number of entering vehicles. All approaches are currently single lane (left-through-right turn) approaches. The northbound movement (minor stop controlled) is estimated to be operating at an unacceptable LOS E. The following potential improvement options were considered:

- All-way stop control
- Westbound left-turn bay

Penn Street and Front Street

The intersection of Penn Street and Front Street experienced 6 crashes, 3 of which resulted in injuries. Penn Street and Front Street experienced the second highest number of crashes compared to the other study intersections. However, the crash rate is still below the statewide average for other intersections with a similar number of entering vehicles. All approaches are currently single lane (left-through-right turn) approaches. The intersection is currently all-way stop controlled, with all movements estimated to be operating at an unacceptable LOS except for the westbound movement. The following potential improvement options were considered:

- Roundabout
- Traffic control signal

Improvement Options

Safety Improvement Analysis

While it is common to refer to the “cause” of a crash, in reality, most crashes cannot be related to a singular causal event. Instead, crashes are the result of a convergence of a series of events that are influenced by a number of contributing factors (time of day, driver attentiveness, speed, vehicle condition, road design, etc.). These contributing factors influence the sequence of events before, during, and after a crash. In some cases, the roadway/intersection configuration and traffic control may affect the expected average crash frequency. The quantification of this effect is referred to as a crash modification factor (CMF). CMF is an index of how much crash experience is expected to change following a modification in design or traffic control. CMF is the ratio between the number of crashes per unit of time expected after a modification or measure is implemented and the number of crashes per unit of time estimated if the change does not take place. (Highway Safety Manual, 2010).

Table 14 identifies potential safety improvement options at the study intersections.

Table 14 Potential Crash Effects of Improvement Options

Intersection Receiving Treatment	Existing Stop Control/ Configuration	Treatment	Crash Type (Severity)	CMF	Standard Error ¹
<ul style="list-style-type: none"> Dubuque St/Stewart St Dubuque St 	Minor road stop controlled	Convert minor-road stop control to all-way stop control	Right-angle (All severities)	0.25	0.03
			Rear-end (All severities)	0.82	0.10
			Pedestrian (All severities)	0.57	0.20
			All types (Injury)	0.30	0.06
<ul style="list-style-type: none"> Dubuque St/Stewart St 	Minor road stop controlled with single lane approach	Left-turn bay on one approach to four-leg intersection	All types (All severities)	0.73	0.04
			All types (Injury)	0.71	0.05
<ul style="list-style-type: none"> Dubuque St/Stewart St 	Minor road stop controlled with single lane approach	Left-turn bay on two approaches to four-leg intersection	All types (All severities)	0.53	0.04
			All types (Injury)	0.50	0.06
<ul style="list-style-type: none"> Dubuque St 	Minor road stop controlled with single lane approach	Left-turn bay on one approaches to three-leg intersection	All types (All severities)	0.67	0.20
<ul style="list-style-type: none"> Dubuque St/Stewart St 	Minor road stop controlled	Roundabout	All types (All severities)	0.61	0.10
			All types (Injury)	0.22	0.10
<ul style="list-style-type: none"> Pacha Pkwy/ Community Dr 	Minor road stop controlled with one or two lanes	Roundabout	All types (All severities)	0.71	0.10
			All types (Injury)	0.19	0.10
<ul style="list-style-type: none"> Front St 	All-Way stop controlled	Roundabout	All types (All severities)	1.03	0.20
<ul style="list-style-type: none"> Pacha Pkwy/ Community Dr Dubuque St/Stewart St Front St 	Minor road stop controlled	Traffic signal	All types (All severities)	0.95	0.09
			Right-angle (All severities)	0.33	0.06
			Rear-end (All severities)	2.43	0.40

Source: Highway Safety Manual 1st Edition, Volume 3, 2010.

¹ Standard error represents a range of variability that is expected to contain 68% of results

The CMF is multiplied by the number of crashes to identify the expected number of crashes after application of the treatment. The resulting number of crashes is what is expected over the same time period analyzed, in this case 5.25 years. The low and high estimate columns in the following table represent an estimated range of variability (standard error) that is expected to contain approximately 68% of results. The standard error for each CMF is presented in Table 14.

Table 15 presents the expected number of crashes over the same time period analyzed (5.25 years) following the application of the treatments identified in Table 14.

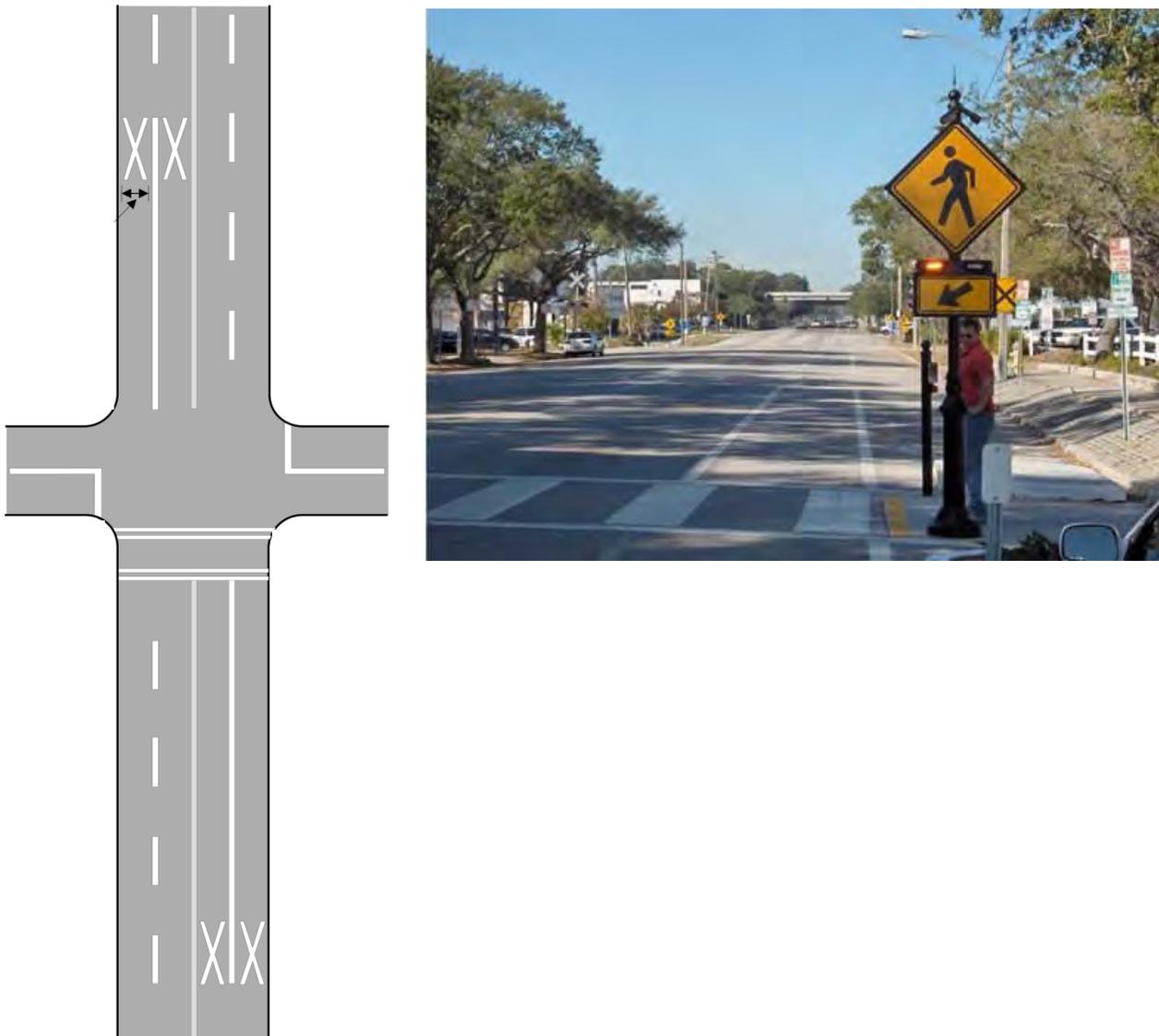
Table 15 Expected Change in Crash Frequency from Improvement Options

Existing Stop Control/ Configuration	Treatment	Intersection Receiving Treatment	Crash Type (Severity)	Crashes Within 5.25 Years	CMF	Expected Crashes Over 5.25 Years After Treatment	
						Low Estimate ¹	High Estimate ¹
Minor road stop controlled	Convert minor-road stop control to all-way stop control	Dubuque St/ Stewart St	Right-angle (All severities)	3	0.25	0.66	0.84
			Rear-end (All severities)	5	0.82	3.60	4.60
			Pedestrian (All severities)	0	0.57	0.00	0.00
			All types (Injury)	5	0.30	1.20	1.80
		Dubuque St	Right-angle (All severities)	0	0.25	0.00	0.00
			Rear-end (All severities)	1	0.82	0.72	0.92
			Pedestrian (All severities)	0	0.57	0.00	0.00
			All types (Injury)	0	0.30	0.00	0.00
Minor road stop controlled with single lane approach	Left-turn bay on one approach to Four-Leg Intersection	Dubuque St/ Stewart St	All types (All severities)	10	0.73	6.90	7.70
			All types (Injury)	5	0.71	3.30	3.80
Minor road stop controlled with single lane approach	Left-turn bay on two approaches to Four-Leg Intersection	Dubuque St/ Stewart St	All types (All severities)	10	0.53	4.90	5.70
			All types (Injury)	5	0.50	2.20	2.80
Minor road stop controlled with single lane approach	Left-turn bay on one approaches to Three-Leg Intersection	Dubuque St	All types (All severities)	1	0.67	0.47	0.87
Minor road stop controlled	Roundabout	Dubuque St/Stewart St	All types (All severities)	10	0.61	5.10	7.10
			All types (Injury)	5	0.22	0.75	1.45
Minor road stop controlled with one or two lanes	Roundabout	Pacha Pkwy/ Community Dr	All types (All severities)	2	0.71	1.22	1.62
			All types (Injury)	0	0.19	0.00	0.00
All-Way stop controlled	Roundabout	Front St	All types (All severities)	6	1.03	4.98	7.38
Minor road stop controlled	Traffic Signal	Pacha Pkwy/ Community Dr	All types (All severities)	2	0.95	1.72	2.08
			Right-angle (All severities)	1	0.33	0.27	0.39
			Rear-end (All severities)	0	2.43	0.00	0.00
		Dubuque St/Stewart St	All types (All severities)	10	0.95	8.60	10.40
			Right-angle (All severities)	3	0.33	0.81	1.17
			Rear-end (All severities)	5	2.43	10.15	14.15

¹ Low and high estimates represents a range of variability that is expected to contain 68% of results.

Pedestrian activated flashing yellow beacons with overhead signs and advanced pavement markings were also considered for the intersection of Penn Street and Dubuque Street/Stewart Street. This treatment is used to alert drivers to pedestrians who may be crossing the roadway. The pavement markings consist of a large white "X" in each traffic lane. The "X" is 20-ft long and each line is 12 to 20 inches wide. The "X" is positioned approximately 100 feet in advance of the crosswalk, which should be at least 8 feet wide with edge lines 6 to 8 inches wide. The Highway Safety Manual states this treatment may decrease pedestrian fatalities. However, the magnitude of the crash effect is not certain. Figure 8 illustrates the pavement markings and pedestrian activated flashing yellow beacon. This treatment would not be appropriate for the intersection of Penn Street and Front Street. This treatment is intended to be used at minor stop controlled intersections with a pedestrian crosswalk extending across the major street, for example Penn Street and Dubuque Street/Stewart Street.

Figure 8 Pedestrian Activated Flashing Yellow Beacon and Pavement Markings



Converting the all-way stop control at Penn Street and Front Street to a traffic control signal was considered. However, the Highway Safety Manual does not provide a specific CMF for this conversion treatment. The Highway Safety Manual does provide a CMF for the conversion of a two-way stop control to a traffic control signal. Based on this CMF the conversion of Penn Street and Front Street from an all-way stop control to a

traffic control signal is likely to result in a decrease in right-angle crashes, an increase in rear-end crashes, and may increase, decrease, or provide no change in the crash expectancy for all types of crashes.

Operational Improvements Analysis

Synchro studio 8 is the traffic modeling software used for the intersection analysis presented herein, which is based on Highway Capacity Manual (HCM) 2010 methodology.

Procedures outlined in Chapter 19 (two-way stop-controlled) and 20 (all-way stop-controlled) of the HCM 2010 were used to analyze performance at unsignalized intersections. Procedures outlined in Chapter 21 of the HCM 2010 were used to analyze intersection performance at roundabout intersections. LOS thresholds and methodology for roundabouts are consistent with those for other unsignalized intersections. Procedures outlined in Chapter 18 of the HCM 2010 were used to analyze intersection performance at signalized intersections. It should be noted that delay thresholds for a given LOS for unsignalized intersections are lower than those given for signalized intersections. This difference, as explained in Chapter 19 of the 2010 HCM, is to account for the greater variability in delay associated with unsignalized movements in addition to different driver expectations associated with each type of intersection control, with the expectation that signalized intersections are designed to carry higher traffic volumes and therefore will experience greater delay than an unsignalized intersection.

The quantity of delay is generally categorized in terms of Level of Service (LOS). LOS describes the quality of traffic operations and is graded from A to F; with LOS A representing free-flow conditions and LOS F representing congested conditions. For purposes of comparison with improvement options the control delay at each approach and the average intersection control delay are reported. Control delay is the delay experienced by vehicles slowing down as they are approaching the intersection, the wait time at the intersection and the time for the vehicle to speed up through the intersection and enter into the traffic stream. The average intersection control delay is a volume weighted average of delay experienced by all motorists entering the intersection on all intersection approaches.

Table 16 presents the range of traffic delays associated for signalized and unsignalized (stop controlled and roundabout) intersections.

Table 16 LOS Criteria for Signalized and Unsignalized Intersections

LOS	Signalized Intersection Average Delay (sec/veh)	Unsignalized Intersection Average Delay (sec/veh)
A	≤ 10	≤ 10
B	> 10 to 20	> 10 to 15
C	> 20 to 35	> 15 to 25
D	> 35 to 55	> 25 to 35
E	> 55 to 80	> 35 to 50
F	> 80	> 50

Source: HCM 2010, Exhibit 18-4 LOS Criteria for Signalized Intersections and HCM 2010, Exhibit 19-1 LOS Criteria for Unsignalized Intersections.
sec/veh = seconds per vehicle

Table 17 presents PM peak hour operational comparisons for existing and improvement option configurations. The PM peak hour generally experienced greater delay than the AM peak hour. Operational analysis report sheets are contained in Appendix 3.

Table 17 Study Intersections PM LOS – Improvement Option Configuration Comparison

Intersecting Roadway with Penn Street	1				2				3				4			
	Pacha Pkwy/Community Dr				Dubuque St/Stewart St				Dubuque St				Front Street			
Option	Existing Configuration				Existing Configuration				Existing Configuration				Existing Configuration			
Approach Delay (sec)	EB	WB	NB	SB	EB	WB	NB	SB	EB	WB	NB	SB	EB	WB	NB	SB
HCM LOS	A	A	D	D	A	A	C	E	A	A	E	-	F	C	F	E
Int. Delay (sec)	6.1				4.0				4.5				56.6			
Int. LOS	A				A				A				F			
Option	Signal				All-Way Stop Control				All-Way Stop Control				Roundabout			
Approach Delay (sec)	EB	WB	NB	SB	EB	WB	NB	SB	EB	WB	NB	SB	EB	WB	NB	SB
HCM LOS	B	A	A	A	E	C	B	B	E	C	B	-	B	B	C	A
Int. Delay (sec)	10.7				31.5				33.7				14.1			
Int. LOS	B				D				D				B			
Option	Multiple Lane Roundabout				EB Left-Turn Bay with Minor Road Stop Control				WB Left-Turn Bay with Minor Road Stop Control				Signal			
Approach Delay (sec)	EB	WB	NB	SB	EB	WB	NB	SB	EB	WB	NB	SB	EB	WB	NB	SB
HCM LOS	B	A	A	A	A	A	C	E	A	A	E	-	B	B	B	B
Int. Delay (sec)	8.8				3.9				4.5				13.2			
Int. LOS	A				A				A				B			
Option					WB Left-Turn Bay with Minor Road Stop Control											
Approach Delay (sec)					EB	WB	NB	SB								
HCM LOS					A	A	C	E								
Int. Delay (sec)					3.9											
Int. LOS					A											
Option					EB and WB Left-Turn Bay with Minor Road Stop Control											
Approach Delay (sec)					EB	WB	NB	SB								
HCM LOS					A	A	C	E								
Int. Delay (sec)					3.9											
Int. LOS					A											
Option					Roundabout											
Approach Delay (sec)					EB	WB	NB	SB								
HCM LOS					B	A	A	A								
Int. Delay (sec)					11.3											
Int. LOS					B											
Option					Traffic Control Signal											
Approach Delay (sec)					EB	WB	NB	SB								
HCM LOS					B	A	A	B								
Int. Delay (sec)					10.8											
Int. LOS					B											

Red cells indicate an unacceptable LOS.
Green cells indicate a recommended improvement.

Summary

The following descriptions of crashes correspond to the analysis period beginning January 1, 2011, and ending March 31, 2016 (5.25 years). The following descriptions of LOS correspond to the PM peak hour, which generally experienced greater delay than the AM peak hour. Acceptable LOS was determined to be LOS D or greater. Left-turn bay improvement options are only considered along Penn Street. Left-turn bays at all-way stop controlled intersections are generally inadvisable, but not the installation of a roundabout or traffic control signal. Implementing an all-way stop control at an intersection with turn-bay(s) creates additional conflicts for motorist transiting the intersection. The justification to install a roundabout can generally be determined based on the same level of analysis used to determine if a traffic control signal is warranted at a stop controlled intersection.

Penn Street is a major arterial, which generally emphasis through travel. Installing all-way stop controls, roundabouts, and traffic signals along Penn Street will increase delay for through movements along Penn Street.

Penn Street and Pacha Parkway/Community Drive

The intersection of Penn Street and Pacha Parkway/Community Drive experienced comparatively few crashes and the minor stop controlled movements (northbound and southbound) were estimated to be operating at an acceptable LOS D. The four-hour and peak-hour signal warrants were not met. Both a roundabout and a traffic control signal would improve operations for the northbound and southbound movements, but would increase delay for the eastbound and westbound (currently free-flow) movements. A roundabout is likely to decrease the frequency of all crashes. A traffic control signal is likely to result in a decrease in right-angle crashes, an increase in rear-end crashes, and may increase, decrease, or provide no change in the crash expectancy for all types of crashes. **No changes to the existing configuration and control are recommended at this time.**

Penn Street and Dubuque Street/Stewart Street

The intersection of Penn Street and Dubuque Street/Stewart Street experienced the highest number of crashes compared to other study intersections. The southbound (minor stop controlled) movement is estimated to currently be operating at an unacceptable LOS E. An all-way stop warrant was met. None of the traffic signal warrants were met. An all-way stop would result in an unacceptable LOS E for the eastbound (currently free-flow) movement. Eastbound and or westbound left-turn bays are expected to result in a slight decrease in delay for all movements. However, the frequency of crashes is expected to decrease as a result of eastbound and or westbound left-turn bays. A roundabout and traffic control signal configurations are expected to redistribute delay more evenly across all movements. A roundabout is likely to decrease the frequency of all crashes. A traffic control signal is likely to result in a decrease in right-angle crashes, an increase in rear-end crashes, and may increase, decrease, or provide no change in the crash expectancy for all types of crashes.

Short term recommendations include the following:

- Install a pedestrian activated flashing yellow beacon and pavement markings as illustrated in Figure 8.
- Relocate the school crossing sign currently on the southeast corner to the southwest corner. This would alert eastbound traffic to the crosswalk in advance of the intersection.
- Maintain visibility of the crosswalk markings by regularly repainting them.
- Coordinate with the owner of 210 Penn Street (house on the northeast quadrant) to address sight distance concerns caused by shrubs.

A medium to long-term recommendation is to install a roundabout.

Penn Street and Dubuque Street

The intersection of Penn Street and Dubuque Street experienced the fewest crashes compared to other study intersections. The northbound movement (minor stop controlled movement) is estimated to currently be operating at an unacceptable LOS E. An all-way stop configuration would result in an unacceptable LOS E for the eastbound movement. A westbound left-turn bay is not expected to decrease delay, but is expected to reduce the frequency of crashes. Placement of a “Cross Traffic Does Not Stop” sign beneath the existing stop sign for northbound motorist would alert motorist unfamiliar with the intersection that Penn Street traffic is not required to stop at the intersection. Installing a street light to the existing utility pole at the southeast quadrant would also provide additional illumination. **A “Cross Traffic Does Not Stop” sign, illustrated below, and an additional street light installed on the existing utility pole at the southeast quadrant of the intersection are recommended.**

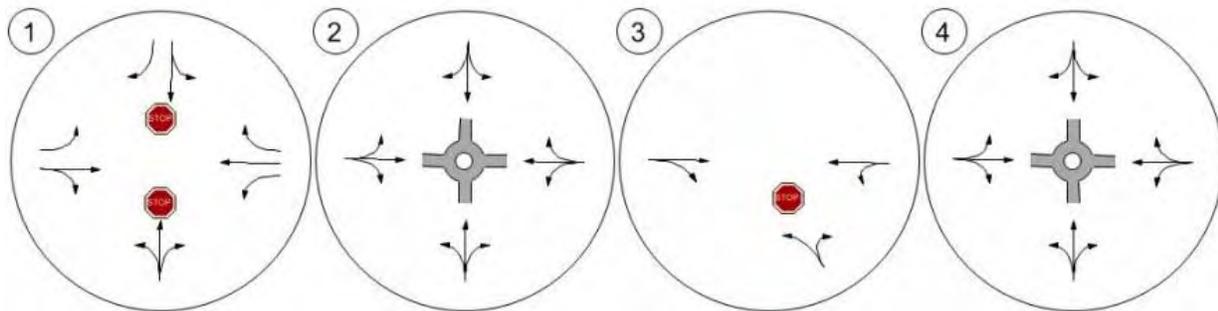


Penn Street and Front Street

The intersection of Penn Street and Front Street experienced the second highest number of crashes compared to other study intersections. All movements except for the westbound movement are estimated to currently be operating at an unacceptable LOS. The peak hour signal warrant was met. A roundabout and traffic control signal configurations are expected to redistribute delay more evenly across all movements, which is expected to reduce the difficulty currently being experienced by home owners trying to get out of their driveways in the afternoon hours. In general, a roundabout configuration is likely to reduce the severity of crashes over a traffic control signal configuration. **A roundabout configuration is recommended.**

Recommended geometric configurations at the study intersections are presented in Figure 9. Conceptual drawings are provided in Appendix 5.

Figure 9 Study Intersections – Recommended Lane Configuration and Control



Additional Considerations

The estimated unacceptable LOS E northbound (minor stop controlled) movement at Penn Street and Dubuque Street may improve as a result of the potential installation of the two recommended roundabouts at Penn Street and Dubuque Street/Stewart Street and Penn Street and Front Street. The improvement in LOS may result due to an increase in acceptable turning gaps created by vehicles slowing down to transit the adjacent intersection roundabouts.

A two-way left-turn lane (TWLTL) in combination with or without the two recommended roundabouts could be considered between the intersections of Penn Street and Dubuque Street/Stewart Street and Penn Street and Front Street. TWLTLs remove turning vehicles from through traffic, which allows motorists that are making turns to decelerate gradually out of the through lane and wait in a dedicated area for an opportunity to complete a turn. This reduces the severity and duration of conflicts between turning vehicles and through traffic and improves the safety and efficiency of roadway intersections. However, a TWLTL is not recommended for the following reasons:

- Right-of-way along Penn Street between Dubuque Street/Stewart Street and Front Street is constrained.
- The operational benefit is projected to be minimal.
- The potential decrease in frequency of crashes as a result of the TWLTL is projected to be similar to the effect of installing roundabouts at Penn Street and Dubuque Street/Stewart Street and Penn Street and Front Street.

It is recommended the existing school crossing at Penn Street and Dubuque Street/Stewart remain and a pedestrian activated flashing yellow beacon with additional pavement markings as described earlier be installed. Some consideration was given to relocating this school crossing to the Penn Street and Front Street intersection. However, the Penn Street and Front Street intersection is expected to have greater pedestrian vehicle conflicts than the Penn Street and Dubuque Street/Stewart Street intersection. This assessment is based on the intersection of Penn Street and Front Street generally having higher overall entering vehicles volumes and right and left-turn vehicle volumes, which create conflicts with pedestrians, than the Penn Street and Dubuque Street/Stewart Street intersection.

MEMORANDUM

TO: Ryan Heiar, City Administrator
FROM: Josiah Bilskemper, P.E.
DATE: February 22, 2018
RE: Penn Street Preliminary Engineering
February 27, 2018 Council Work Session Discussion

The 2016 West Penn Street Traffic Study identified several safety and operational improvements to the Penn Street corridor from Stewart Street to Front Street. In June 2017, the Council approved Resolution No. 2017-70 authorizing preliminary engineering to proceed for intersection improvements at the Penn Street and Front Street intersection, as well as for recommended short-term sight distance improvements along the corridor.

The topics of discussion for the Council Work Session include the following:

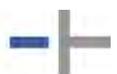
- Penn and Front Intersection
 - Review Prior Traffic Studies and Recommendations
 - Preliminary Roundabout Design and Simulation Video
 - Property Impacts and Costs
- Sight Distance Improvements
 - Penn and Stewart / Dubuque (North Side)
 - Penn and Dubuque (South Side)
 - Property Impacts and Costs
- Related Discussion – Grant Elementary and North Bend Drive Extension to Front Street

Attached are three exhibits for review prior to the meeting:

- Aerial View of Overall Site Locations
- Roundabout Layout at Penn and Front Intersection
- Sight Distance Improvements

Please let me know if you have any questions or want to discuss any of these topics in advance of the meeting.

JDB





**GRANT
ELEMENTARY SITE**



FRONT STREET

N BEND DRIVE

DUBUQUE STREET

JEFFERSON STREET

FRONT STREET

**PENN / DUBUQUE
SIGHT DISTANCE
IMPROVEMENT**

PENN STREET

**PENN / DUBUQUE
SIGHT DISTANCE
IMPROVEMENT**

STEWART STREET

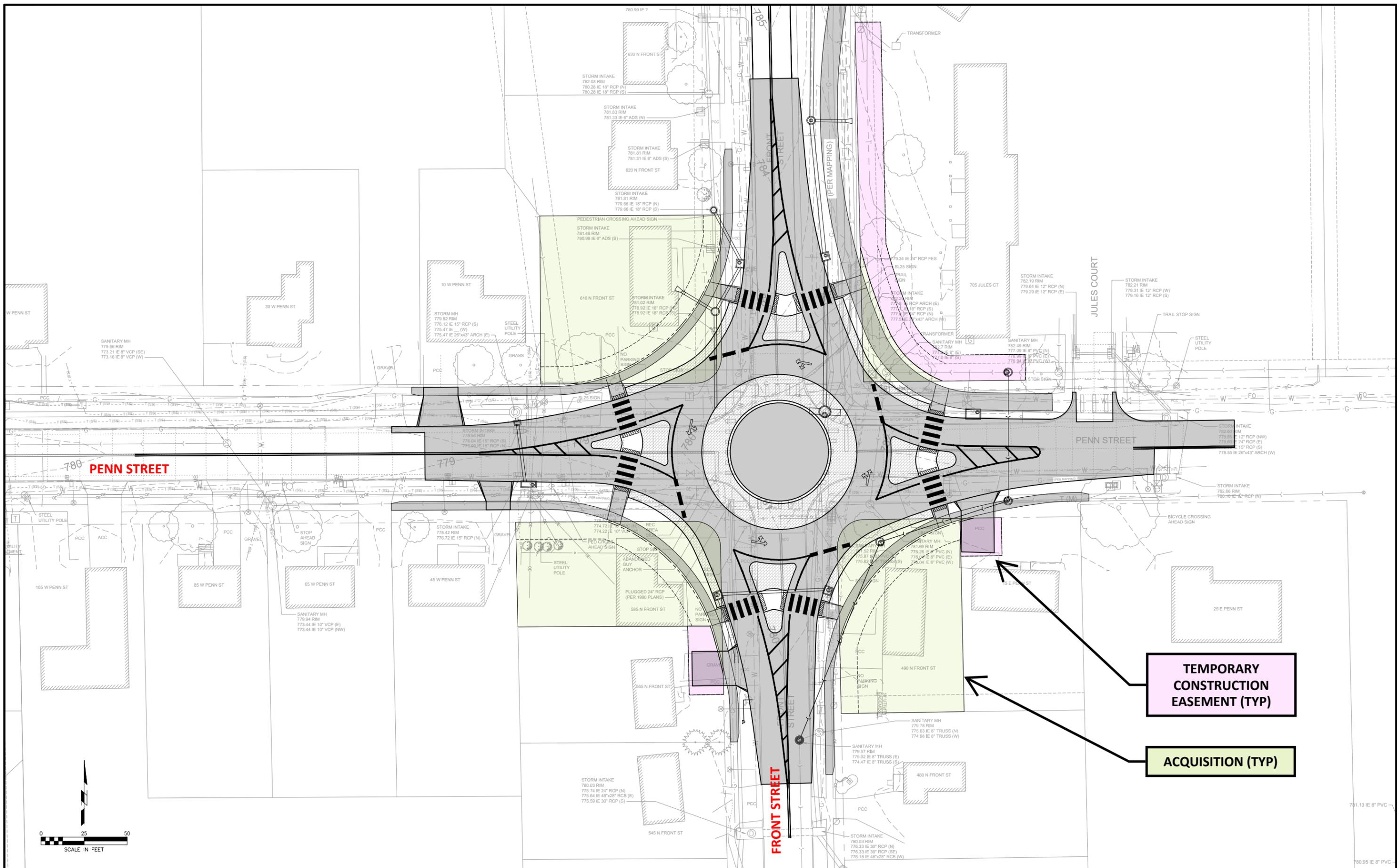
DUBUQUE STREET

**PENN / FRONT
INTERSECTION
IMPROVEMENTS**

PENN STREET

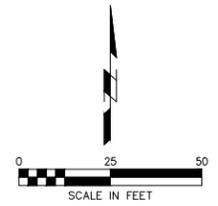


S-H PROJECT NO. 1172130



**TEMPORARY
CONSTRUCTION
EASEMENT (TYP)**

ACQUISITION (TYP)



N DUBUQUE STREET

PENN STREET

STEWART STREET

TEMPORARY CONSTRUCTION EASEMENT

TRIANGLE EASEMENT ACQUISITION

RELOCATE CORNER RETAINING WALL, REMOVE SHRUBS AND SOME TREES, REALIGN AND LOWER SIDEWALK, REBUILD ADA COMPLIANT RAMPS

CONSIDER REBUILDING ADJACENT RAMPS (SE CORNER) AND COMPLETE NEW WALK CONNECTION FROM THE EAST

TEMPORARY CONSTRUCTION EASEMENT (TYP)

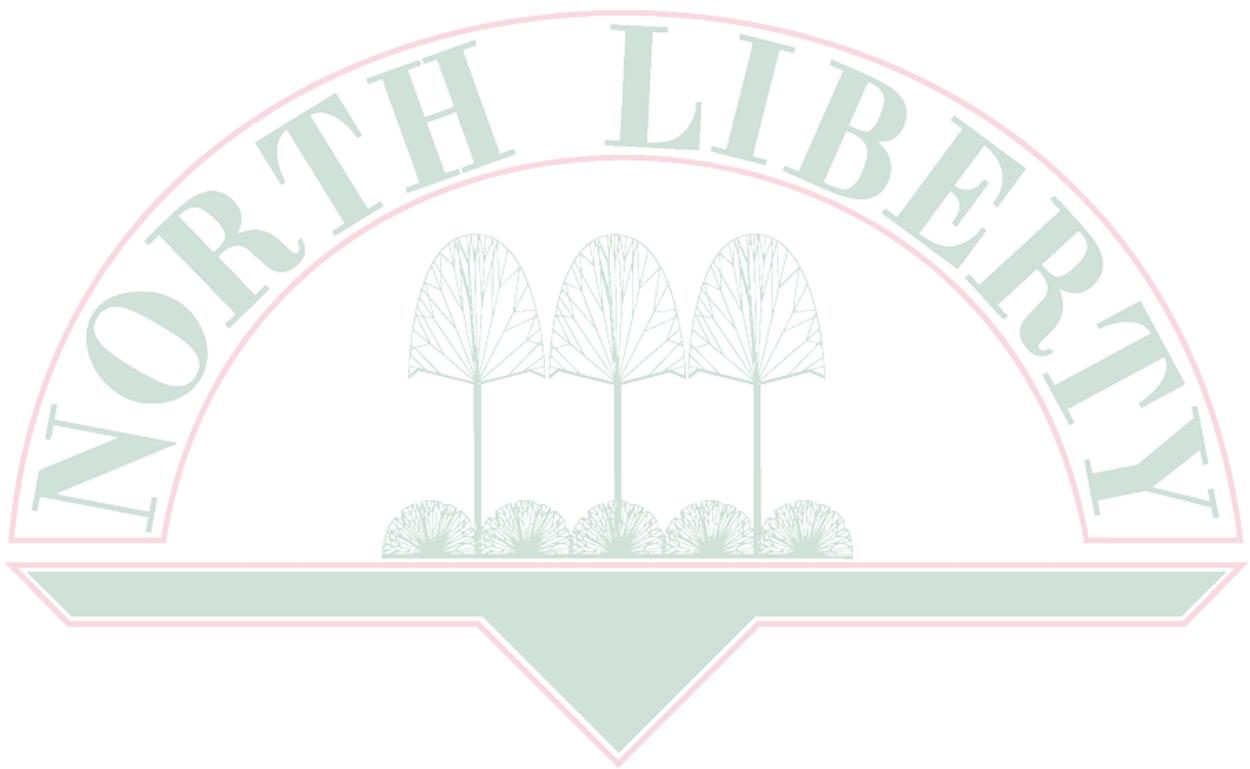
REGRADE AND LOWER HILLSIDE, REALIGN AND LOWER SIDEWALK, RELOCATE SIDEWALK CROSSING, REBUILD ADA COMPLIANT RAMPS

SIGHT DISTANCE LINE (TYP)

RELOCATE SIDEWALK CROSSING, REBUILD ADA COMPLIANT RAMPS, IMPROVES SIGHT DISTANCE BY MOVING STOP BAR CLOSER TO PENN STREET

S-H PROJECT NO. 1172130

Consent Agenda





Minutes (Not official until approved by City Council)

North Liberty City Council
February 13, 2018
Regular Session
City Council Chambers
1 Quail Creek Circle

Call to order

Mayor Terry Donahue called the February 13, 2018 Regular Session of the North Liberty City Council to order at 6:31 p.m. Councilors present: Jennifer Goings, Chris Hoffman, Sarah Madsen, Annie Pollock, Jim Sayre.

Others present: Ryan Heiar, Tracey Mulcahey, Scott Peterson, Kevin Trom, Dean Wheatley, Evan Runkle, Steve Smith and other interested parties.

Approval of the Agenda

Madsen moved, Pollock seconded to approve the agenda. All ayes. Agenda approved.

Consent Agenda

Council discussed the water plant change order. Hoffman moved, Sayre seconded to approve the Consent Agenda including the City Council Minutes from the Regular Session on January 23, 2018; the City Council Minutes from the Special Session on January 25, 2018; the City Council Minutes from the Special Session on January 29, 2018; the attached list of Claims; the Liquor License Renewal, Pancheros Mexican Grill; the Liquor License Renewal, el Cactus Authentic Mexican Cuisine; Phase I Water System Improvements, Div. 1 Water Treatment Plant, Change Order Number 10, Portzen Construction, Inc., \$38,108.00; Phase I Water System Improvements, Div. 1 Water Treatment Plant, Pay Application Number 16, Portzen Construction, Inc., \$981,577.88; Phase II WWTP Improvements, Pay Application Number 29R, Tricon Construction Group, \$3,434.48; Phase I Water System Improvements, Div. III – Well Construction and Rehabilitation, Pay Application Number 11, Gingerich Well & Pump Service, \$235,722.56. The vote was all ayes. Agenda approved.

Public Comment

No public comment was offered.

City Planner Report

City Planner Dean Wheatley had no report.

City Engineer Report

City Engineer Kevin Trom updated on the Water System Project. New pumps were installed last week. The water main has all been installed for the Raw Water Main Project. The public hearings are tonight for the Highway 965, Phase 3 and Front Street Projects. The Trail Network Project will be awarded tonight. Alliant Energy is doing work on both the Highway 965 and Front Street Projects. Design and acquisitions continue for the Kansas RISE Project. Staff will be meeting tomorrow to discuss the Penn Street Study and Preliminary Engineering. Council discussed the report with Trom.

City Attorney Report

City Attorney Scott Peterson reported on the Kansas RISE Project. Council discussed the report with Peterson.

Assistant City Administrator Report

Assistant City Administrator Tracey Mulcahey reported that she helped represent the City's storm water quality program at the Home Show on Sunday. Mulcahey reported that Playful City USA designations will not be given any longer.

City Administrator Report

City Administrator Ryan Heiar reported that he met with the Chamber and North Liberty businesses regarding needs and wants. Heiar would like to have a work session on the February 27 Council meeting starting at 6 p.m. to discuss the Front Street and Penn Street Study. Heiar reported on the baseline email regarding the joint meeting/venture with ICAD and the Chamber. Council discussed the report with Heiar.

Mayor Report

Mayor Terry Donahue proclaimed February as Black History Month in North Liberty, Iowa. Donahue reported on the most recent MPOJC meeting. He has been reappointed to the Iowa League of Cities board as the Past President. The Legislative Day in Des Moines was well attended. Home rule was big in the discussion.

Johnson County Refuse Update

Mulcahey initiated the discussion regarding Johnson County Refuse's proposal for revision of the City's refuse system. Steve Smith, Johnson County Refuse, spoke regarding the proposal for moving to an automated system. Council discussed the proposal with Smith. Brenda Conry spoke in support of automation, but does not support the cost increase. Dick Bornkessel commented on the size of containers, costs, and carts. Andrew Brown spoke regarding the size of the containers, cost, wind and animal issues. Faraz Shah commented that this is a great opportunity to think outside the box. He encouraged that costs be mitigated by a state or city subsidy. Recycling and composting should be incentivized to reduce waste. William Wu has a family of five and uses one 20-gallon trash can. He wants to be able to place all of his trash in one bin and have it all be recycled or composted rather than a multi bin system. Council discussed the options. The consensus was to have additional discussion and research with a new proposal. The program as it stands does not need to be continued. The pricing model should be that the heavy trash user subsidizes recycling users.

Council recessed at 7:43 p.m. Council reconvened at 7:50 p.m.

ICCSA Site Plan

Wheatley presented the site plan. Staff and Planning Commission recommend approval of the site plan.

Luke Newton, MMS Consultants, was present on behalf of the applicant and presented information on the site plan proposal. Council discussed the application with Newton.

Hoffman moved, Pollock seconded to approve Resolution Number 2018-12, A Resolution approving the Development Site Plan for Lot 1, Grant Elementary School Subdivision, North Liberty, Iowa. After discussion, the vote was: ayes – Hoffman, Goings; nays – Madsen, Pollock, Sayre. Motion failed. After further discussion, Sayre moved, Goings seconded for reconsideration of the resolution at the February 27 City Council meeting. After discussion, the vote was: ayes – Goings, Hoffman, Madsen, Sayre, Pollock; nays – none. Motion carried.

Mickelson First Addition, Final Plat

Wheatley presented information regarding the Final Plat. Madsen moved, Hoffman seconded to approve Resolution Number 2018-13, A Resolution approving the Final Plat and accepting improvements for Mickelson First Addition, North Liberty, Iowa. The vote was: ayes – Pollock, Goings, Hoffman, Madsen, Sayre; nays – none.

Lot 8 Golfview Site Plan

Wheatley presented the site plan application. Staff and Planning Commission recommend approval.

No applicant was present.

Goings moved, Madsen seconded to approve Resolution Number 2018-14, A Resolution approving the Development Site Plan for Lot 8, Golf View Commercial Subdivision, Part Two, North Liberty, Iowa. After discussion, the vote was: ayes – Sayre, Madsen, Hoffman, Goings, Pollock; nays – none. Motion carried.

Trail Network Project

Heiar presented information on the bids received. Hoffman moved, Sayre seconded to approve Resolution Number 2018-15, A Resolution accepting the bid and authorizing execution of the contract for the Trail Network Improvements Project, North Liberty, Iowa. After discussion, the vote was: ayes – Goings, Madsen, Hoffman, Sayre, Pollock; nays – none. Motion carried.

Ranshaw House Project

Mulcahey presented information on the bids received. Hoffman moved, Sayre seconded to approve Resolution Number 2018-16, A Resolution accepting the bid and authorizing execution of the contract for the Ranshaw House Renovation (Re-bid) Project North Liberty, Iowa. After discussion, the vote was: ayes – Madsen, Hoffman, Sayre, Goings; nays – Pollock. Motion carried.

Storage Shed Ordinance Amendment

Hoffman moved, Madsen seconded to approve the second consideration of Ordinance Number 2018-01, An Ordinance amending Chapter 168 of the North Liberty Code of Ordinances by revising subsection regarding storage sheds. After discussion, the vote was: ayes – Pollock, Goings, Madsen, Hoffman, Sayre; nays – none. Motion carried.

Ranshaw Way (Highway 965), Phase 3 Improvements Project

At 8:42 p.m., Mayor Donahue opened the public hearing regarding the Ranshaw Way (Highway 965), Phase 3 plans, specifications, and estimate of costs for the project. No oral or written comments were received. The public hearing was closed.

Hoffman moved, Madsen seconded to approve Resolution Number 2018-17, A Resolution finally approving and confirming plans, specifications, and estimate of cost for the Ranshaw Way (Highway 965), Phase 3 Improvements Project. The vote was: ayes - Hoffman, Goings, Pollock, Sayre, Madsen; nays - none. Motion carried.

Front Street Project

At 8:43 p.m., Mayor Donahue opened the public hearing regarding the Front Street Project plans, specifications, and estimate of costs for the project. No oral or written comments were received. The public hearing was closed.

Goings moved, Madsen seconded to approve Resolution Number 2018-18, A Resolution finally approving and confirming plans, specifications, and estimate of cost for the Front Street Improvements Project. The vote was: ayes - Sayre, Pollock, Goings, Madsen, Hoffman; nays - none. Motion carried.

FY 19 Budget

After discussion regarding proposed FY 19 Budget, the Mayor directed the notice be published and the public hearing held on February 27. Councilor Hoffman left the meeting at 9:06 p.m.

Old Business

Councilor Pollock thanked all for Beat the Bitter.

New Business

Mayor Donahue and Council discussed scheduling the joint meeting with the Park Board.

Adjournment

At 9:19 p.m., Mayor Donahue adjourned the meeting.

CITY OF NORTH LIBERTY

By: _____
Terry L. Donahue, Mayor

Attest:

Tracey Mulcahey, City Clerk

JANUARY 31ST, 2018

	MONTH-TO-DATE BALANCE	YEAR-TO-DATE BALANCE
010-GENERAL FUND	640,286.19	6,351,496.31
011-FIRE EQUIPMENT CAPITA	5,323.99	40,147.04
012-LIBRARY CAPITAL FUND	3,321.00	10,019.52
013-RECREATION CAPITAL FU	0.00	0.00
014-POLICE CAPITAL FUND	1,000.00	9,932.06
015-TRANSPORTATION IMPACT	0.00	170,059.33
016-STORMWATER IMPACT FEE	0.00	0.00
017-TREE PROGRAM	0.00	0.00
018-PARK CAPITAL FUND	0.00	33,185.00
019-YOUTH SPORTS SCHOLARS	1,198.68	7,930.91
020-EQUIPMENT REVOLVING	97.68	12,786.01
021-TELECOMMUNICATIONS EQ	1,000.00	1,341.25
022-LIBRARY TAG	0.00	0.00
023-LIBRARY ENDOWMENT	0.00	0.00
024-DRUG TASK FORCE	0.00	563.76
025-POLICE SEIZED FUNDS	0.00	17.03
026-HOTEL/MOTEL TAX	48,726.16	48,726.16
060-ROAD USE TAX FUND	152,656.16	1,425,930.88
061-STREET CAPITAL PROJEC	0.00	567,035.00
062-IJOBS STREETS	0.00	0.00
090-TIF FUND	44,001.14	2,183,688.68
110-DEBT SERVICE FUND	16,343.10	476,970.39
210-TRUST AND AGENCY	34,286.43	934,175.71
280-CUSTOMER DEPOSITS	7,550.00	107,540.00
310-COMMUNITY CENTER II C	0.00	0.00
311-FRONT STREET RECONSTR	0.00	0.00
312-CHERRY STREET RECONST	0.00	0.00
313-TIF PROJECTS	0.00	0.00
314-ENTRYWAY DEVELOPMENT	0.00	0.00
315-HIGHWAY 965 IMPROVEME	0.00	0.00
316-COMMUNITY CENTER PHAS	0.00	0.00
317-TRAIL PROJECTS	0.00	0.00
318-EC DEVELOPMENT PROJEC	0.00	0.00
319-PENN STREET IMPROVEME	0.00	815,550.00
320-LIBERTY CENTER PROJEC	0.00	0.00
321-LAND/FACILITIES	0.00	0.00
322-LIBRARY BUILDING FUND	10.55	8,073.56
323-LIBERTY CENTRE BLUES/	0.00	0.00
324-RANSHAW HOUSE PROJECT	0.00	0.00
510-WATER FUND	295,997.68	2,211,154.99
511-WATER CAPITAL RESERVE	0.00	0.00
512-WATER SINKING FUND	101,095.58	707,669.06
513-WATER BOND RESERVE	0.00	0.00
514-WATER CAPITAL PROJECT	0.00	5,783,470.53
520-SEWER FUND	367,453.53	2,640,427.95
521-SEWER CAPITAL RESERVE	17,125.00	150,729.10
522-SEWER SINKING FUND	183,967.75	1,287,774.25
523-WASTEWATER TREATMENT	37,653.00	753,143.00
524-SEWER TRUNK AND I&I	0.00	262,421.00
525-SEWER DEBT SERVICE RE	0.00	0.00
530-STORMWATER MANAGEMENT	16,932.00	119,223.91
532-STORMWATER SINKING FU	0.00	0.00
GRAND TOTAL REVENUE	1,976,025.62	27,121,182.39

CITY OF NORTH LIBERTY

TREASURER'S REPORT

January 31, 2018

FUNDS	BALANCE FORWARD	REVENUE	EXPENSE	BALANCE ENDING
	01/01/2018			01/31/2018
GENERAL	6,217,111.38	701,493.69	-964,038.40	5,954,566.67
SPECIAL REVENUE	6,528,815.25	230,943.73	-90,911.16	6,668,847.82
DEBT SERVICE	362,022.70	16,343.10	0.00	378,365.80
CAPITAL PROJECTS	-2,942,268.84	10.55	-253,092.11	-3,195,350.40
WATER ENTERPRISE	3,650,183.15	418,148.31	-1,176,363.27	2,891,968.19
WASTEWATER ENTERPRISE	5,626,044.67	620,488.59	-419,197.64	5,827,335.62
STORM WATER ENTERPRISE	160,619.54	17,225.91	-11,736.94	166,108.51
TOTAL	19,602,527.85	2,004,653.88	-2,915,339.52	18,691,842.21

Iowa City Community School District Site Plan





Iowa City Community School District

Educational Services Center

Stephen F. Murley Superintendent of Schools

1725 North Dodge Street • Iowa City, IA 52245 • (319) 688-1000 • Fax (319) 688-1009 • www.iowacityschools.org

22 February, 2018

To: Ryan Heiar, City Administrator, North Liberty
Dean Wheatley, City Planner, North Liberty

From: Duane Van Hemert, Director Facilities Management, Iowa City Community Schools

Grant Elementary Site Plan

Gentlemen,

As you are aware, the Iowa City Community School District is currently planning a new elementary school, Christine Grant Elementary, on the property immediately to the west of South Slope Communications on North Front Street. This \$18,500,000 project is being funded as part of a \$191,000,000 General Obligation Bond Referendum that received the over-whelming support of the community.

Grant Elementary has been designed to accommodate approximately 625 students at full capacity, but it is anticipated that the school will open with 480 students. The school will serve students in Kindergarten through the Sixth Grade and will also have a Pre-K School program.

Our planning calls for a bid letting on March 29, 2018, with construction beginning in late April or early May of 2018 and being completed in time for the start of school in the fall of 2019. An additional feature of this school will be a reinforced storm shelter that is basically the Kindergarten and Pre-school wing in the front or north part of the building.

The school building, playgrounds and parking areas have been placed on the site to best utilize the existing topography, thereby allowing the district to invest the maximum funds available in student learning areas. Careful consideration has been given to the needs of the community, parents and our students and staff to develop and build a school that is the best possible for our community. Simply stated and with limited funds, it is a delicate balancing act as every dollar spent on site improvements and parking is a dollar that can not be spent on students and educational programs.

We understand that the City Council has expressed some concerns regarding the District request to approve the Site Plan at their February 13th meeting and that they opted to table the site plan and reconsider it at the February 27th meeting. We appreciate the opportunity to address those concerns and have summarized them and provided our responses below.

We have also provided two attachments for your consideration. The first is a proposed revision to add 18 staff parking stalls along the west side of the school bus drop-off lane. The second attachment is a cross-sectional diagram showing the relationship of the Pre-K playground area and Front Street. The actual changes in topography, the distance between the playground and the roadway and the proposed construction of a proposed landscape berm and fencing, we believe would make it very unlikely that a vehicle leaving the roadway would be unable to, if not virtually impossible, impact the playground or safety of the students.

Summary of Questions and our Responses:

- Q. *What is the anticipated number of vehicles that will be dropping off and picking up during the AM and PM peak at full build out and enrollment? This will probably be different depending on the boundaries that are established and thus will have to have multiple scenarios.*
- A. We believe that the morning drop-off car counts are not problematic as the parents arrive at staggered times, then drop off their students and do not typically have much waiting time or stack up in a queue.

There are two exceptions that can create issues. The first being parents that wish to enter the school with their child and those parents are asked to park in a designated parking space so as to allow the drop-off lane to move freely. The second, is the rare occurrence of a delayed start time and many parents will arrive just prior to the start of school creating a temporary back up of vehicles. School staff on site at other buildings do an exceptional job of assisting students entering the school and keeping the line moving. These events are obviously dependent on inclement weather and the number of events on an annual basis are unpredictable. Delayed starts are typically after the normal morning rush hour.

The potential school boundary discussions are still taking place and the variable that probably affects the number of vehicles is the number of students who are within a comfortable walking distance. We do tend to see more vehicles during cold or adverse weather conditions.

The number of vehicles that we may see during the afternoon pickup, on a daily basis, is unpredictable at this time. We did conduct a survey of the afternoon session at Garner Elementary, a school with a current enrollment of 665, on Wednesday, February 21st, a typical winter day and 29^o, 126 parking spaces are available and it revealed the following;

2:30 PM, 65 vehicles were parked in the south lot and 18 vehicles were parked in the new north auxiliary lot for a total of 83 vehicles. Garner has approximately 55-60 staff members that require parking.

2:55 PM, Dismissal Time, 42 additional vehicles were either in the parking lot or the queue line, an additional 22 vehicles were parked on nearby city streets. A total of 147 vehicles which included staff and parents.

3:10 PM, Site was clear of vehicles in the queue and only staff vehicles remained.

It can be expected that a similar number of vehicles (150) will be present when Grant reaches capacity.

- Q. *How many vehicles can the current design accommodate before vehicles are queuing on the streets?*
- A. The current site design (see attachment) for Grant Elementary provides for 186 vehicles on site, which includes 135 parking stalls and queue lines for 51 vehicles. An additional 40 spaces are provided on hard surface playground areas for event overflow parking.
- Q. *Will this site ever be considered for expansion of students beyond the 600, or so, if it's planned for now? How many vehicles would be expected at that build out?*
- A. The current Facility Master Plan and the General Obligation Bonds funding plan do not provide for any future additions to Grant Elementary School. However, prudent planning of new structures does anticipate an area or provision be made for any possible future additions. This planning was done on the current site plan. The number of additional vehicles would be dependent on the number of classrooms added. Parking needs would be reassessed at that time.

- Q. *If using a second drive lane within the drop-off and pick-up areas is expected, will there be school staff on site during the drop off and pick up process to ensure that children are walking between vehicles safely and that vehicles aren't stopping for more than the time it takes for children to get out of the vehicle? Will there be school staff in the drop off and pick up area during both morning and afternoon peaks?*
- A. Management of the parking lot and student pickup and drop-off is a school management decision. But in general, most every school will have several staff members supervising and managing the process. We will certainly recommend that the staff at Grant be actively involved.
- Q. *Do we anticipate that we will need school crossing guards anywhere in this area as a result of the new school? If so, will the district pay the cost associated with those crossing guards for the life of the school or will this be an expense the city incurs for as long as the school is there?*
- A. The decision to use school crossing guards, their placement and the funding of is a City function. We would certainly be involved in discussions with City staff to determine the best use of crossing guards with limited City funding.
- Q. *The Council would like to know the formula used to (equation and appropriate calculations for) determine the parking totals and length of queuing (including base & overflow). Not just that this school has more than Garner; what calculation says this is the right amount of parking and queuing lane.*
- A. Chapter 169 of the Zoning Code-Development Regulations was used to determine the number of parking stalls. The code does not address queuing. Information provided to the Planning and Zoning Commission indicated 117 stalls plus 910 LF of queuing lane (roughly 25LF / car = 36 cars) = 153 cars = 25% of the student population. We have proposed an additional 18 parking stalls be included in a revised site plan which would increase the number of stalls to 135 plus 51 cars in the que for a total of 186 vehicles. This would equal approximately 30% of the student population and exceeds the 150 cars experienced at Garner Elementary. Although the code may only be viewed as a guideline for schools, the parking code requires 1 for every 3.5 seats in assembly rooms and 1 for each faculty member. This equals 95 stalls required. There is no code requirement of a queuing lane. We have, with the proposed and revised site plan provided space for 195% of the parking required by code. This count does not include the use for the bus loop for parent/car drop off/pick up.
- Q. *Can the North fire lane/playground drive extend out to Front Street?*
- A. No, the current and finished topography will not allow for the fire lane to be connected to Front Street.
- Q. *Where is the dedicated staff parking lot? What is the number of staff?*
- A. The location of the staff parking stalls is an individual school management issue, but we do encourage that they park in the perimeter parking stalls so as to not create issues with the queuing line.

Q. Does the school provide onsite parking for the large events?

A. It would be impractical and cost prohibitive to provide Parking lots large enough for the few large events at Elementary Schools. We do however work very closely with our neighboring businesses, churches and private lodges when we have events that will attract significant number.

Q. Why is the orientation of the building skewed? Why is there more distance from the west property line to the building than between the building and the road? Is there enough space left over for a significant buffer from the playground to Front Street.

A. The building is situated to take best advantage of the existing topography. The site itself slopes from south to north and allows for ground level access at the entrance and for the primary grades on the lower north wing. The location of the Pre-school in our buildings are typically towards the front because state regulations require that students younger than 5 be escorted to the classroom by an adult. The location of the Pre-school playground is therefore adjacent. We believe that after reviewing the distance from the road and the recommended speed limits per the completed traffic study, that our students will be safe. Any vehicle leaving the roadway will need to transverse a bicycle trail, then go through a ditch, back up a steep incline, over a raised berm with trees and landscaping and then through a reinforced fence.

Please do not hesitate to ask, should any additional concerns or questions arise. We value our working relationship with the City of North Liberty and are looking forward to a wonderful project that will only enhance your City and our school district.

Respectfully Submitted,



Duane Van Hemert, Director Facilities Management

cc: Steve Murley, Superintendent, ICCSD
Amy Kortemeyer, Assistant Superintendent, ICCSD
Matt Degner, Assistant Superintendent, ICCSD
Craig Hansel, Chief Financial Officer, ICCSD

PARKING SPACES = 117 + 18 = 135
QUEING LANES = 36 + 15 = 51

DAILY ACCOMODATION OF CARS = 186

OVERFLOW EVENT PARKING ON
PLAYGROUNDS = 41

TOTAL VEHICLE ACCOMODATION = 227

TREES ADDED
ALONG
PLAYGROUND /
FRONT STREET
RIGHT-OF-WAY

18 PARKING
SPACES ADDED

3 BUS AND 15 CAR
QUEUING SPACES
AVAILABLE

36 CAR QUEUING
SPACES

OUTLOT "A"

NORTH BEND DRIVE

N FRONT ST

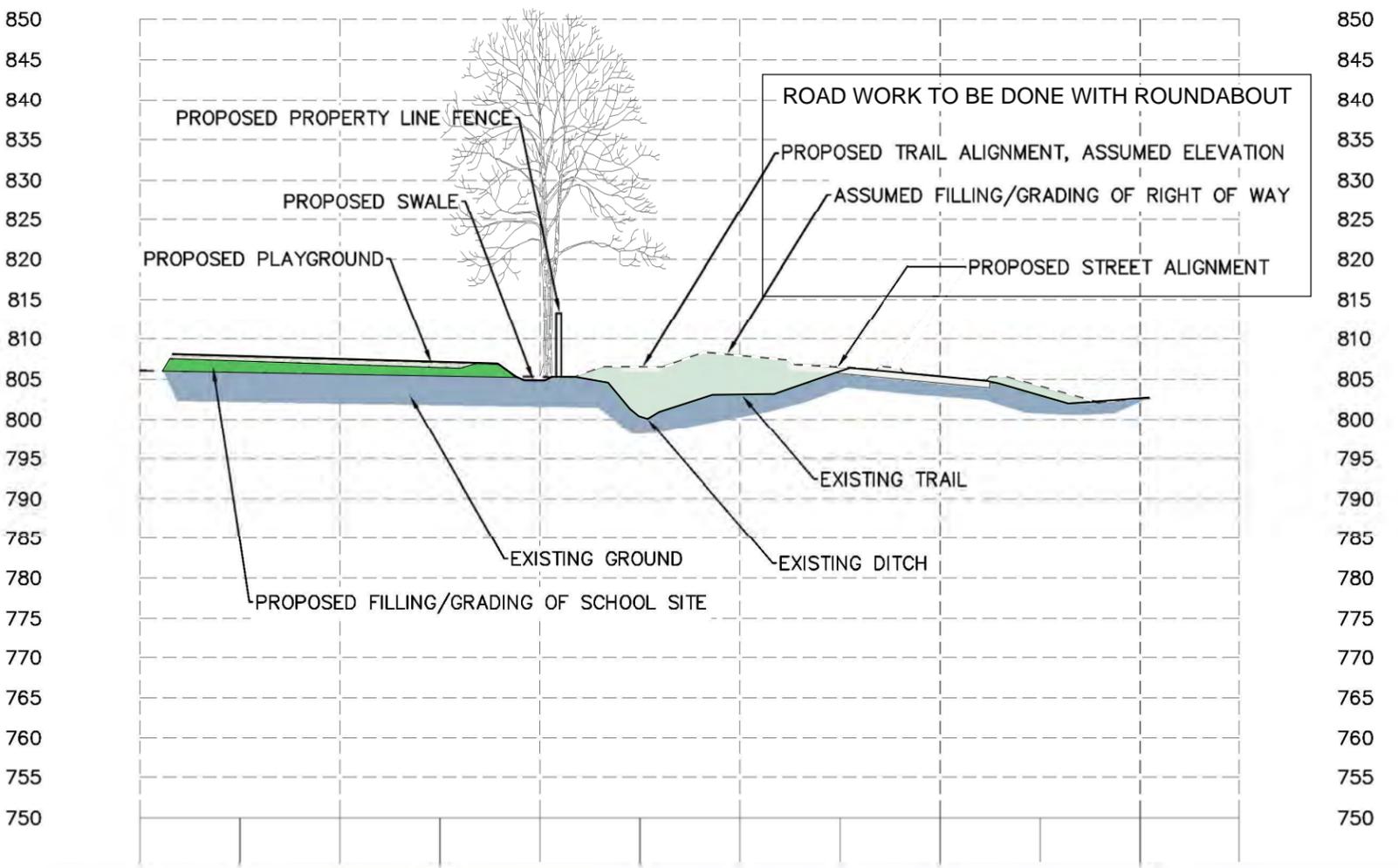
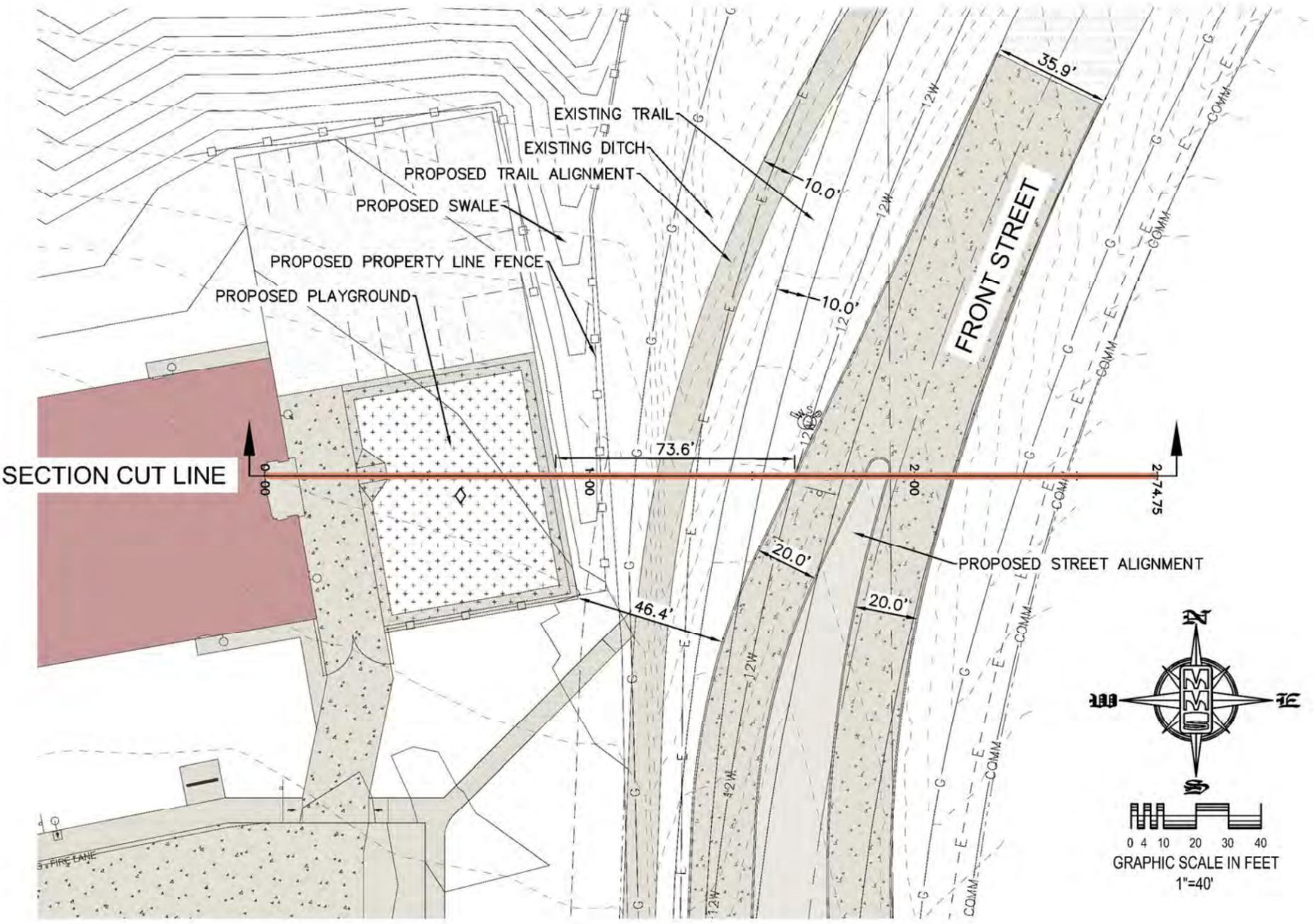
PLUMBING MARK
CURRENT ROAD EXTENSION

FUTURE
BUILDING

LOWER
LEVEL
FFE=794,00

GYM
FLOOR
FFE=805,50

FFE=808,00



NMS CONSULTANTS, INC.
Date: 02-21-2018
Designed by: LCN FIELDBOOK
Drawn by: TAV Scale:
Checked by: LCN Sheet No.: 1
Project No.: 1270-227 of 1

**Front Street
Cross Section**
GRANT ELEMENTARY
SCHOOL,
ICCS, D,
NORTH LIBERTY,
JOHNSON COUNTY,
IOWA

Date	Revision

www.mmsconsultants.net
1917 S. GILBERT ST.
IOWA CITY, IOWA 52240
(319) 351-8282
CIVIL ENGINEERS
LAND PLANNERS
LAND SURVEYORS
LANDSCAPE ARCHITECTS
ENVIRONMENTAL SPECIALISTS





Recommended for approval by Planning Commission at their meeting on February 6, 2018.

January 26, 2018

Memo

To: North Liberty Planning Commission
From: Dean Wheatley, Planning Director
Subject: Site Plan Approval Request
(Proposed Grant Elementary Addition)

Your North Liberty city staff has reviewed the subject submission, and offer comments presented in this memo. The staff review team includes the following personnel:

Ryan Heiar, City Administrator
Tracey Mulcahey, Assistant City Administrator
Tom Palmer, City Building Official
Scott Peterson, City Attorney
Kevin Trom, City Engineer
Dean Wheatley, Planning Director

This is a request from the Iowa City Community School District to approve an elementary school site plan for land located between CENTRO manufacturing and N Front Street. A Good Neighbor meeting was held on October 26 for the rezoning (which is now completed) and plat to allow any interested party an opportunity to comment on this rezoning prior to submission, and eight people attended. Most were interested in the site plan rather than the rezoning, so staff contacted those who signed in to let them know a site plan has been submitted and offered to review it with them. Bob and Mary Burns, as well as Jesse Burns, strongly advocated for the extension of North Bend Drive to not curve as shown on the preliminary site plan but to extend straight east to N Front Street. Chuck Deisbach of South Slope also had concerns related to difficulty they have entering and exiting the South Slope driveway, which is where City staff has directed the future alignment of North Bend Drive to terminate. Staff provided early guidance to the school district's engineers to locate North Bend Drive at the location shown on the site plan, and we feel strongly that the southerly location advocated by the Burns' does not meet safety standards related to sight distance and would create dangerous turning movements on Front Street.

Traffic issues anticipated with the new school have been studied and redesigns for North Front Street and Penn Street in the vicinity are being considered, with construction anticipated prior to school opening, pending Council approval. North Bend Drive will be extended east to Front Street, and will provide the vehicular access points for the new school. The first access point is planned to be approximately 380 feet west of N Front Street, more than double the comparable distance at Garner school, which is anticipated to provide more vehicular storage and ease of access. Also, the intersection at N Front Street will be designed for better flow. The site is well served by the City's trail and sidewalk systems within the anticipated attendance area.

Setbacks far exceed the minimum requirements of the district, and storm water management features have been thoughtfully incorporated. The site topography is quite rolling, so the building will have the look of a single-story at the south and a two-story at the north elevations. The shortest dimension

between the proposed school building and the rear lot lines of homes in Cedar Springs is approximately 360 feet, more than a typical city block. Internal sidewalks are provided throughout the site, with connections to the City trails and sidewalks adjacent to the site.

Storm water basins are designed to incorporate a somewhat improved look when compared to the bare minimum, with a sinuous rock channels and native prairie seeding.

The building design is an attractive modern style with very high masonry content, numerous wall offsets, roof variety, and a sprawling presence.

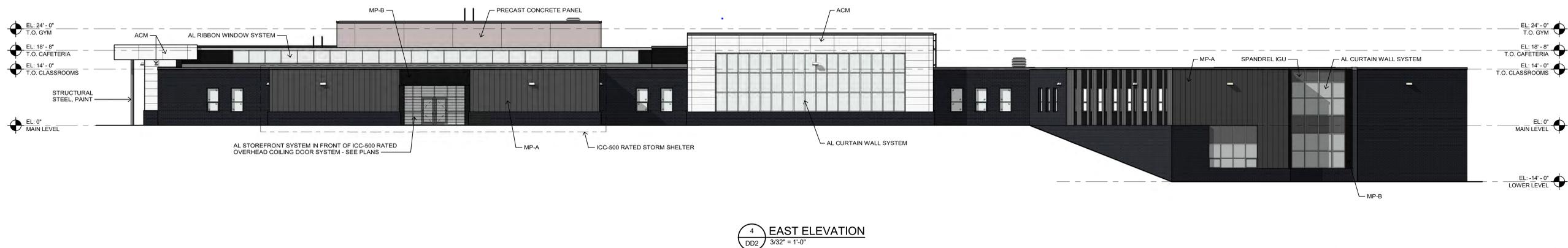
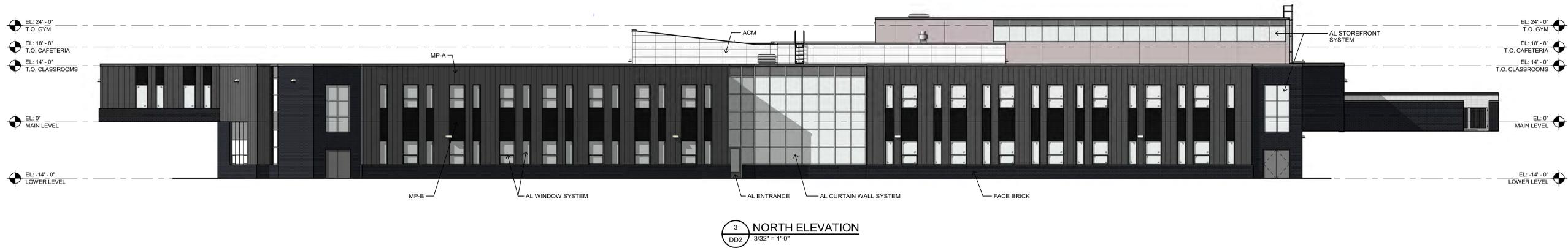
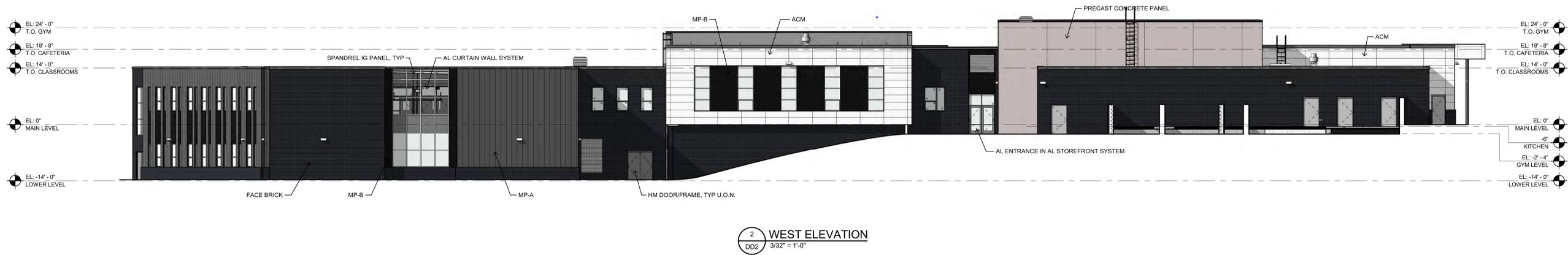
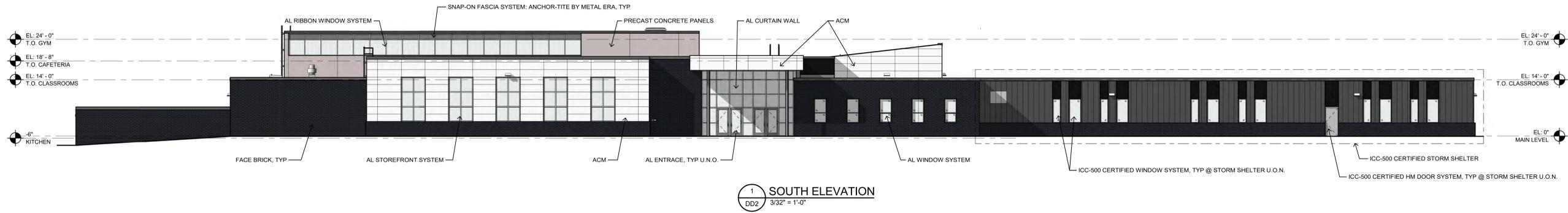
It is reasonable to compare this proposed school with the other recently built elementary, Garner, and here are some figures provided by the school district engineer:

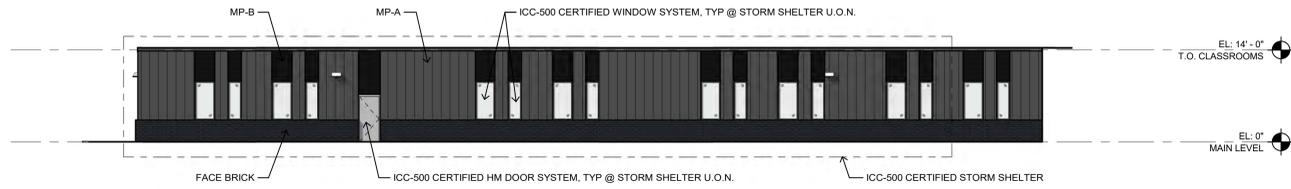
	Garner	Proposed Grant
Student Population	665 (current)	600
Parking Count	138	158 (117 + 41 overflow on playgrounds)
Car Queuing Lane	520' from front door to Birch Street 740' total length	645' from front door to North Bend 910' total length

Staff recommends approval of the site plan. There are a number of notes for items that need to be taken care of as the overall City-School development process continues.

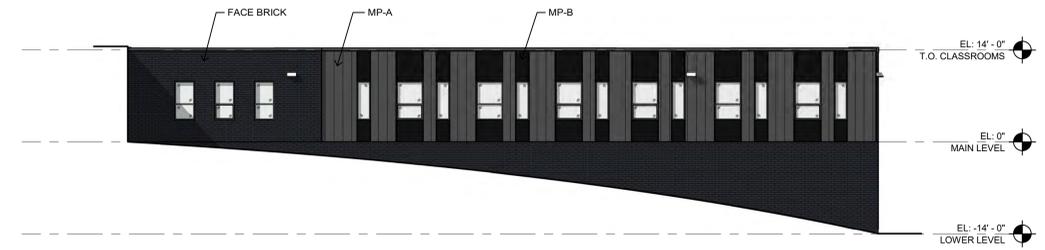
Notes:

- The preliminary plat, final plat, and BMP Agreement will need to be developed and submitted together after site plan approval but before occupancy is permitted. The BMP (aka SMF) maintenance agreement is required between the Owner and the City for long term maintenance responsibilities of the stormwater management features. The owner is to provide proposed maintenance requirements to the City Engineer in Word format so that the City Attorney can fold them into the standard agreement format.
- A Site Plan Agreement between the district and the City establishing obligations for a number of issues related to the short schedule needed by the school district to start construction will be required prior to issuance of a building permit. Items to be included in the agreement include:
 - Cost share for the proposed roundabout design and construction.
 - Schedule for completion of the preliminary plat, final plat, and BMP Agreement.
- Actual fire lane markings and signs will be determined by the fire department at a future time.

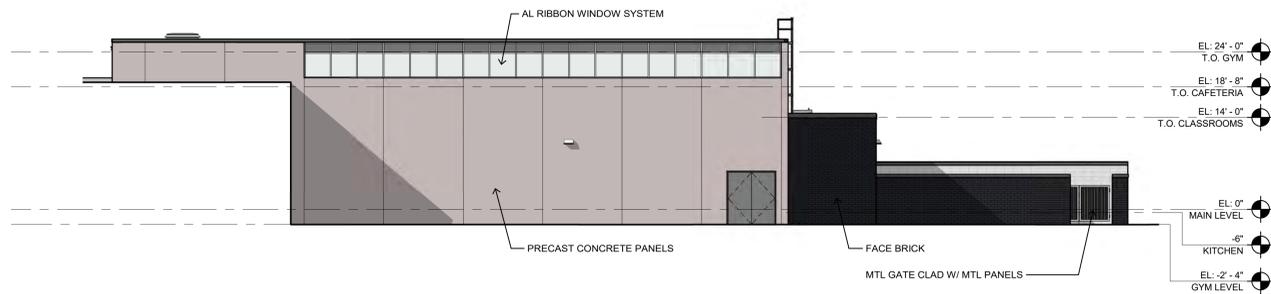




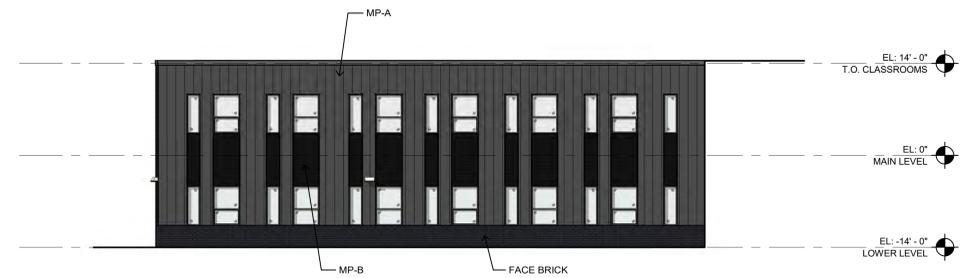
2 PARTIAL NORTH ELEVATION @ KINDERGARTEN
DD3 3/32" = 1'-0"



1 PARTIAL SOUTH ELEVATION @ EAST
DD3 3/32" = 1'-0"



4 PARTIAL NORTH ELEVATION @ GYM
DD3 3/32" = 1'-0"



3 PARTIAL SOUTH ELEVATION @ 2-STORY
DD3 3/32" = 1'-0"

EXTERIOR ELEVATION NOTES:

1. METAL PANEL SYSTEM, MP-A: CONCEALED FASTENER, CENTRIA CONCEPT SERIES CS-200 + CS-220, (1) STANDARD COLOR. EACH MODULE CONSISTS OF (1) CS-200 PANEL & (2) CS-220 PANELS
2. METAL PANEL SYSTEM, MP-B: CONCEALED FASTENER, CENTRIA CONCEPT SERIES CS-660, (1) STANDARD COLOR
3. ALUMINUM COMPOSIT PANEL SYSTEM, ACM: SPLINE REVEAL DRAINED & BACK VENTILATED REINSCREEN, sERIES 20 BY METAL DESIGN SYSTEMS
4. MP-A, MP-B, AND ACM ARE APPLIED OVER RAINSCREEN ATTACHMENT SYSTEM: KNIGHT HSI BY KNIGHT WALL SYSTEMS
5. FACE BRICK: UTILITY FACEBRICK, 4"x4"x12" (NOM), SIM TO EBONITE x VELOUR BY SIOUX CITY BRICK & TILE CO
6. FEMA-361/ICC-500 CERTIFIED WINDOW SYTEM: TH600 W/ TOR-GUARD NBR IG SECURITY GLAZING BY INSULGUARD SECURITY PRODUCTS

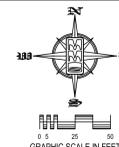
	%	TOTAL SF	1/DD2 SOUTH ELEV	2/DD2 WEST ELEV	3/DD2 NORTH ELEV	4/DD2 EAST ELEV	1/DD3 PARTIAL SOUTH ELEV	2/DD3 PARTIAL NORTH ELEV	3/DD3 PARTIAL SOUTH ELEV	4/DD3 PARTIAL NORTH ELEV
BRICK	40%	11281	2193	3611	1155	2177	977	445	276	447
PRECAST	12%	3373	293	881		401				1798
ACM	11%	3015	1020	898	503	594				
MP-A	30%	8491	906	736	2828	1151	634	984	1252	
MP-B	8%	2322	183	438	687	206	300	204	304	
TOTAL	100%	28482								

SITE PLAN GRANT ELEMENTARY SCHOOL NORTH LIBERTY, IOWA

PLAT PREPARED BY:
MMS CONSULTANTS INC.
1917 S. GILBERT STREET
IOWA CITY, IA 52240

OWNER/APPLICANT:
ICCSO
1725 N. DODGE STREET
IOWA CITY, IA 52245

OWNER'S ATTORNEY:
C. JOSEPH HOLLAND
122 N. LINN STREET
IOWA CITY, IA 52240



MMS CONSULTANTS, Inc.
Iowa City, Iowa (319) 351-8282
◀ CIVIL ENGINEERS ▶ LAND PLANNERS ▶
◀ LANDSCAPE ARCHITECTS ▶ LAND SURVEYORS ▶
◀ ENVIRONMENTAL SPECIALISTS ▶

frk architects + engineers
2800 westown parkway, suite 340, west des moines, iowa 50396
p. 515.223.1001 f. 515.223.7226 www.frk-ae.com

STANDARD LEGEND AND NOTES

---	PROPERTY &/OR BOUNDARY LINES
---	CONGRESSIONAL SECTION LINES
---	RIGHT-OF-WAY LINES
---	EXISTING RIGHT-OF-WAY LINES
---	CENTER LINES
---	EXISTING CENTER LINES
---	LOT LINES, INTERNAL
---	LOT LINES, PLATTED OR BY DEED
---	PROPOSED EASEMENT LINES
---	EXISTING EASEMENT LINES
---	BENCHMARK
---	RECORDED DIMENSIONS
---	CURVE SEGMENT NUMBER
---	POWER POLE
---	POWER POLE W/DRIP
---	POWER POLE W/TRANS
---	POWER POLE W/LIGHT
---	SOY POLE
---	LIGHT POLE
---	SANITARY MANHOLE
---	FIRE HYDRANT
---	WATER VALVE
---	DRAINAGE MANHOLE
---	CURB INLET
---	EXISTING SANITARY SEWER
---	PROPOSED SANITARY SEWER
---	EXISTING STORM SEWER
---	PROPOSED STORM SEWER
---	WATER LINES
---	ELECTRICAL LINES
---	TELEPHONE LINES
---	CONTOUR LINES (1 INTERVAL)
---	PROPOSED GROUND
---	EXISTING TREE LINE
---	EXISTING DECIDUOUS TREE & SHRUB
---	EXISTING EVERGREEN TREES & SHRUBS

THE ACTUAL SIZE AND LOCATION OF ALL PROPOSED FACILITIES SHALL BE VERIFIED WITH CONSTRUCTION DOCUMENTS, WHICH ARE TO BE PREPARED AND SUBMITTED SUBSEQUENT TO THE APPROVAL OF THIS DOCUMENT.

SUPPLEMENTARY LEGEND

---	WATER SHUT-OFF VALVE INCLUDED IN CITY OF NORTH LIBERTY UTILITY CONSTRUCTION PROJECT BY OTHERS
---	PROPOSED LIGHT POLES, REFER TO ELECTRICAL PLANS
---	PROPOSED ELECTRICAL HANDHOLE, REFER TO ELECTRICAL PLANS
---	PROPOSED ELECTRICAL CABINET, REFER TO ELECTRICAL PLANS
---	PROPOSED SIGN
---	PROPOSED SANITARY MANHOLE STRUCTURE
---	PROPOSED STORM SEWER STRUCTURES

- ### EROSION CONTROL NOTES
- AREAS OF SLOPE GREATER THAN 1:6 MUST HAVE EROSION CONTROL BLANKETS (E.C.B.). E.C.B. SHALL BE NORTH AMERICAN GREEN (N.A.G.) SCISSOR OR APPROVED EQUIVALENT. SEE L-100 FOR DESCRIBED AREAS.
 - ALL DISTURBED AREAS MUST RECEIVE TEMPORARY SEEDING AND MULCHING.
 - AREAS TO BE SODDED SHALL RECEIVE TEMPORARY SEEDING AND MULCHING UNTIL FINAL GRADING AND SODDING.
 - ALL SEEDING MUST BE MULCHED AT TIME OF SEEDING PER SDAS SECTION 9040, 2.16 & 3.21

PAVING LEGEND

---	7" PCC (7.693 SY) ON 4" GRANULAR BASE
---	6" PCC (3.085 SY) ON 5" GRANULAR BASE
---	5" PCC SIDEWALK (2.531 SY) ON 4" GRANULAR BASE
---	7" HMA (1,009 SY) ON 6" GRANULAR BASE
---	5" HMA (1,109 SY) ON 6" GRANULAR BASE

NOTE: AREAS INCLUDE ALL PROPOSED PAVING OUTSIDE OF RIGHT-OF-WAY

LEGAL DESCRIPTION
LOT 1, GRANT ELEMENTARY SCHOOL SUBDIVISION

SITE PLAN NOTES

CURRENT ZONING: P
REQUIRED SETBACKS:
FRONT = 50'
SIDE = 20'
REAR = 50'

BUILDING CHARACTERISTICS:
PROPOSED SCHOOL BUILDING = 56,937 SF

LOT CHARACTERISTICS:
LOT AREA = 685,485 SF (15.74 AC) (100%)
BUILDING AREA = 59,337 SF (8.7%)
PARKING AREA = 78,033 SF (11.4%)
SIDEWALK AREA = 19,278 SF (2.8%)
HMA PLAYGROUND AREA = 26,310 SF (3.9%)
TOTAL IMPERVIOUS AREA = 183,578 SF (26.8%)
OPEN SPACE = 501,907 SF (73.2%)

PARKING REQUIREMENTS:
PARKING REQUIRED:
1/3.5 SEATS IN LARGEST ASSEMBLY PLUS 1/FACULTY MEMBER
200 @ 1/2.5 = 58 SPACES
PLUS 40 FACULTY MEMBERS = 40 SPACES
TOTAL PARKING REQUIRED = 98 SPACES
TOTAL PARKING PROVIDED = 158 SPACES (112 + 41 OVERFLOW ON PLAYGROUNDS, 5 ADA)

GENERAL NOTES

ALL CONSTRUCTION SHALL BE COMPLETED IN ACCORDANCE WITH THE CURRENT VERSION OF THE SDAS DESIGN STANDARDS AND THE CITY OF NORTH LIBERTY REQUIREMENTS.

THE CONTRACTOR SHALL COORDINATE WITH CONSTRUCTION OF NORTH BEND DRIVE EXTENSION.

THE CONTRACTOR SHALL PROVIDE TRAFFIC CONTROL ACCORDING TO THE I.D.O.T. STANDARD ROAD PLAN TC-202 FOR ALL WORK WITHIN PUBLIC RIGHT OF WAY.

SPECIFIC NOTES

- SEE ARCHITECTURAL PLANS FOR BUILDING DIMENSIONS
- SEE LANDSCAPE PLANS FOR TREE REQUIREMENTS

KEYNOTES

NUMBER	KEYNOTE	DETAIL SHEET
204	INSTALL 5' HIGH CHAIN LINK FENCE	16 C-500
210	INSTALL 5' HIGH - 12' WIDE DOUBLE GATE (2-6' GATES)	16 C-500

I hereby certify that this engineering document was prepared by me or under my direct supervision and I am a duly licensed Professional Engineer under the laws of the State of Iowa.

SCOTT B. POTTOFF, P.E. Iowa Lic. No. 16932
31, 20...

31 sheets covered by this seal:

SEAL

UTILITY COMPANY CONTACTS

SERVICE	SUPPLIER	PHONE NO.
TELEPHONE & CABLE TV	SOUTH SLOPE COOPERATIVE ATTN: BRIAN FRESE	319-227-7111
TELEPHONE & CABLE TV	WINSTREAM COMMUNICATIONS ATTN: LOCATE DESK	800-289-1901
TELEPHONE & CABLE TV	MEDACOM IOWA CITY ATTN: KEVIN FOUNTAIN	319-351-0408
ELECTRICITY	ALLIANT ENERGY ATTN: LAURA BARR	319-286-1615
ELECTRICITY	LINN COUNTY REC ATTN: JOHNA NUNEMAKER	319-377-1587
NATURAL GAS	MIDAMERICAN ENERGY ATTN: DONALD WASTON	319-341-4461
WATER	CITY OF NORTH LIBERTY ATTN: MIKE KEATING	319-626-5719
SEWER	CITY OF NORTH LIBERTY ATTN: MIKE KEATING	319-626-5719

NOTE: THE CONTACTS LISTED WERE PROVIDED BY IOWA ONE CALL SERVICE.

SURVEY CONTROL

POINT	NORTHING	EASTING	ELEVATION	DESCRIPTION
V1	645700.106	2159365.915	809.118	BURY BOLT ON FIRE HYDRANT EAST SIDE OF FRONT STREET APPROX. 11.0' EAST OF EDGE OF ASPHALT AND APPROX. 17' SOUTH OF SOUTH SIDE OF SOUTHSLOPE DRIVE.
V2	646092.876	2159338.878	804.413	BURY BOLT ON FIRE HYDRANT WEST SIDE OF FRONT STREET APPROX. 23' NW OF A RIGHT CURVE CHEVRON SIGN AND APPROX. 185' NORTH OF FRONT STREET CORNER.
V3	646621.484	2158667.147	794.064	ARROW BOLT ON FIRE HYDRANT EAST SIDE OF TRAIL APPROX. 8.5' WEST OF A SANITARY MANHOLE AND APPROX. 1,052' NORTH OF NORTH BEND DRIVE.
H1	645797.727	2159303.127	----	CUT "X" ON TRAIL DIRECTLY ACROSS FROM THE ENTRANCE TO SOUTHSLOPE.
H2	646647.975	2159831424	----	CUT "X" IN CORNER OF WALK NW OF INTERSECTION OF FRONT STREET AND CEDAR SPRINGS DRIVE.
H3	645540.198	2158454.236	----	CUT "X" IN NW CORNER OF INTAKE ON SOUTH SIDE OF NORTH BEND DRIVE APPROX. 130' EAST OF EOR.



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NORTH LIBERTY
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IOWA CITY COMMUNITY SCHOOL DISTRICT
NORTH LIBERTY, IOWA

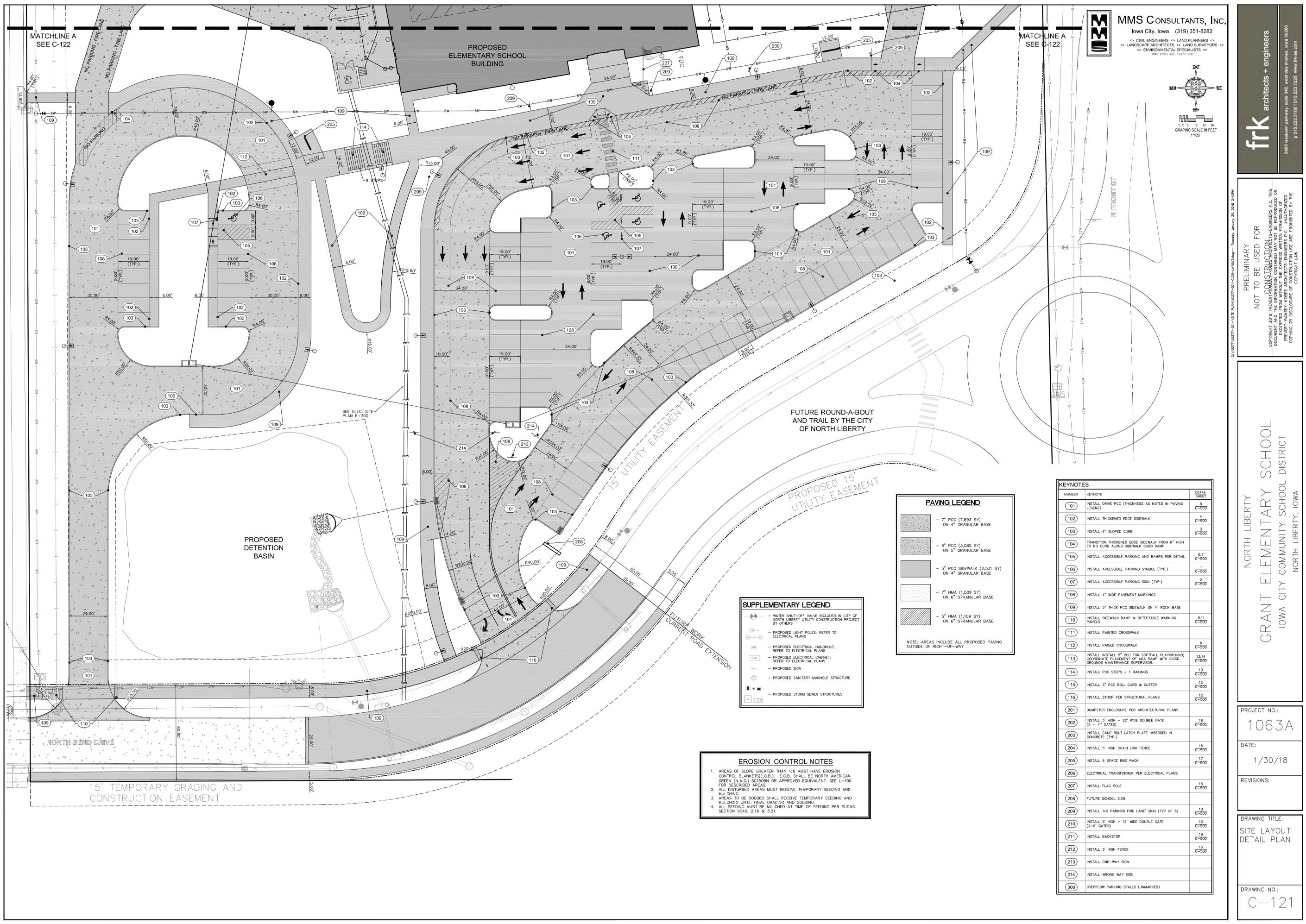
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DATE:
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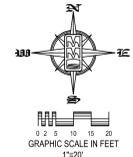
REVISIONS:

DRAWING TITLE:
**OVERALL SITE
LAYOUT PLAN**

DRAWING NO.:
C-120



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 IOWA CITY COMMUNITY SCHOOL DISTRICT
 NORTH LIBERTY, IOWA

PROJECT NO.:
1063A
 DATE:
 1/30/18

REVISIONS:
 DRAWING TITLE:
**SITE LAYOUT
 DETAIL PLAN**
 DRAWING NO.:
C-121

MATCHLINE A
 SEE C-122

MATCHLINE A
 SEE C-122

PROPOSED
 ELEMENTARY SCHOOL
 BUILDING

PROPOSED
 DETENTION
 BASIN

FUTURE ROUND-A-BOUT
 AND TRAIL BY THE CITY
 OF NORTH LIBERTY

PAVING LEGEND

	7" PCC (7,693 SY) ON 4" GRANULAR BASE
	6" PCC (3,085 SY) ON 5" GRANULAR BASE
	5" PCC SIDEWALK (2,531 SY) ON 4" GRANULAR BASE
	7" HMA (1,009 SY) ON 6" GRANULAR BASE
	5" HMA (1,109 SY) ON 6" GRANULAR BASE

NOTE: AREAS INCLUDE ALL PROPOSED PAVING OUTSIDE OF RIGHT-OF-WAY

SUPPLEMENTARY LEGEND

- WATER SHUT-OFF VALVE INCLUDED IN CITY OF NORTH LIBERTY UTILITY CONSTRUCTION PROJECT BY OTHERS
- PROPOSED LIGHT POLES; REFER TO ELECTRICAL PLANS
- PROPOSED ELECTRICAL HANDHOLE; REFER TO ELECTRICAL PLANS
- PROPOSED ELECTRICAL CABINET; REFER TO ELECTRICAL PLANS
- PROPOSED SIGN
- PROPOSED SANITARY MANHOLE STRUCTURE
- PROPOSED STORM SEWER STRUCTURES

EROSION CONTROL NOTES

- AREAS OF SLOPE GREATER THAN 1:6 MUST HAVE EROSION CONTROL BLANKETS (E.C.B.). E.C.B. SHALL BE NORTH AMERICAN GREEN (N.A.G.) SC150BN OR APPROVED EQUIVALENT. SEE L-100 FOR DESCRIBED AREAS.
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- ALL SEEDING MUST BE MULCHED AT TIME OF SEEDING PER SUDAS SECTION 9040, 2.16 & 3.21

KEYNOTES

NUMBER	KEYNOTE	DETAIL SHEET
101	INSTALL DRIVE PCC (THICKNESS AS NOTED IN PAVING LEGEND)	5 C-500
102	INSTALL THICKENED EDGE SIDEWALK	4 C-500
103	INSTALL 6" SLOPED CURB	3 C-500
104	TRANSITION THICKENED EDGE SIDEWALK FROM 6" HIGH TO NO CURB ALONG SIDEWALK CURB RAMP	6,7 C-500
105	INSTALL ACCESSIBLE PARKING AND RAMPS PER DETAIL	6,7 C-500
106	INSTALL ACCESSIBLE PARKING SYMBOL (TYP.)	6 C-500
107	INSTALL ACCESSIBLE PARKING SIGN (TYP.)	2 C-500
108	INSTALL 4" WIDE PAVEMENT MARKINGS	6 C-500
109	INSTALL 5" THICK PCC SIDEWALK ON 4" ROCK BASE	8,11 C-500
110	INSTALL SIDEWALK RAMP & DETECTABLE WARNING PANELS	8,11 C-500
111	INSTALL PAINTED CROSSWALK	6 C-500
112	INSTALL RAISED CROSSWALK	6 C-500
113	INSTALL 5" PCC FOR SOFTBALL PLAYGROUND; COORDINATE PLACEMENT OF ADA RAMP WITH HESD00 GROUNDS MAINTENANCE SUPERVISOR.	13,14 C-500
114	INSTALL PCC STEPS - 1 RAILINGS	10 C-500
115	INSTALL 3" PCC ROLL CURB & GUTTER	12 C-500
116	INSTALL STOOP PER STRUCTURAL PLANS	12 C-500
201	DUMPSTER ENCLOSURE PER ARCHITECTURAL PLANS	
202	INSTALL 5' HIGH - 22" WIDE DOUBLE GATE (2 - 11' GATES)	16 C-500
203	INSTALL CANE BOLT LATCH PLATE IMBEDDED IN CONCRETE (TYP.)	
204	INSTALL 5' HIGH CHAIN LINK FENCE	16 C-500
205	INSTALL 9 SPACE BIKE RACK	17 C-500
206	ELECTRICAL TRANSFORMER PER ELECTRICAL PLANS	
207	INSTALL FLAG POLE	15 C-500
208	FUTURE SCHOOL SIGN	
209	INSTALL 'NO PARKING FIRE LANE' SIGN (TYP. OF 5)	18 C-500
210	INSTALL 5' HIGH - 12' WIDE DOUBLE GATE (2-6' GATES)	16 C-500
211	INSTALL BACKSTOP	19 C-500
212	INSTALL 3' HIGH FENCE	16 C-500
213	INSTALL ONE-WAY SIGN	
214	INSTALL WRONG WAY SIGN	
300	OVERFLOW PARKING STALLS (UNMARKED)	

15' TEMPORARY GRADING AND
 CONSTRUCTION EASEMENT

15' UTILITY EASEMENT

PROPOSED 15'
 UTILITY EASEMENT

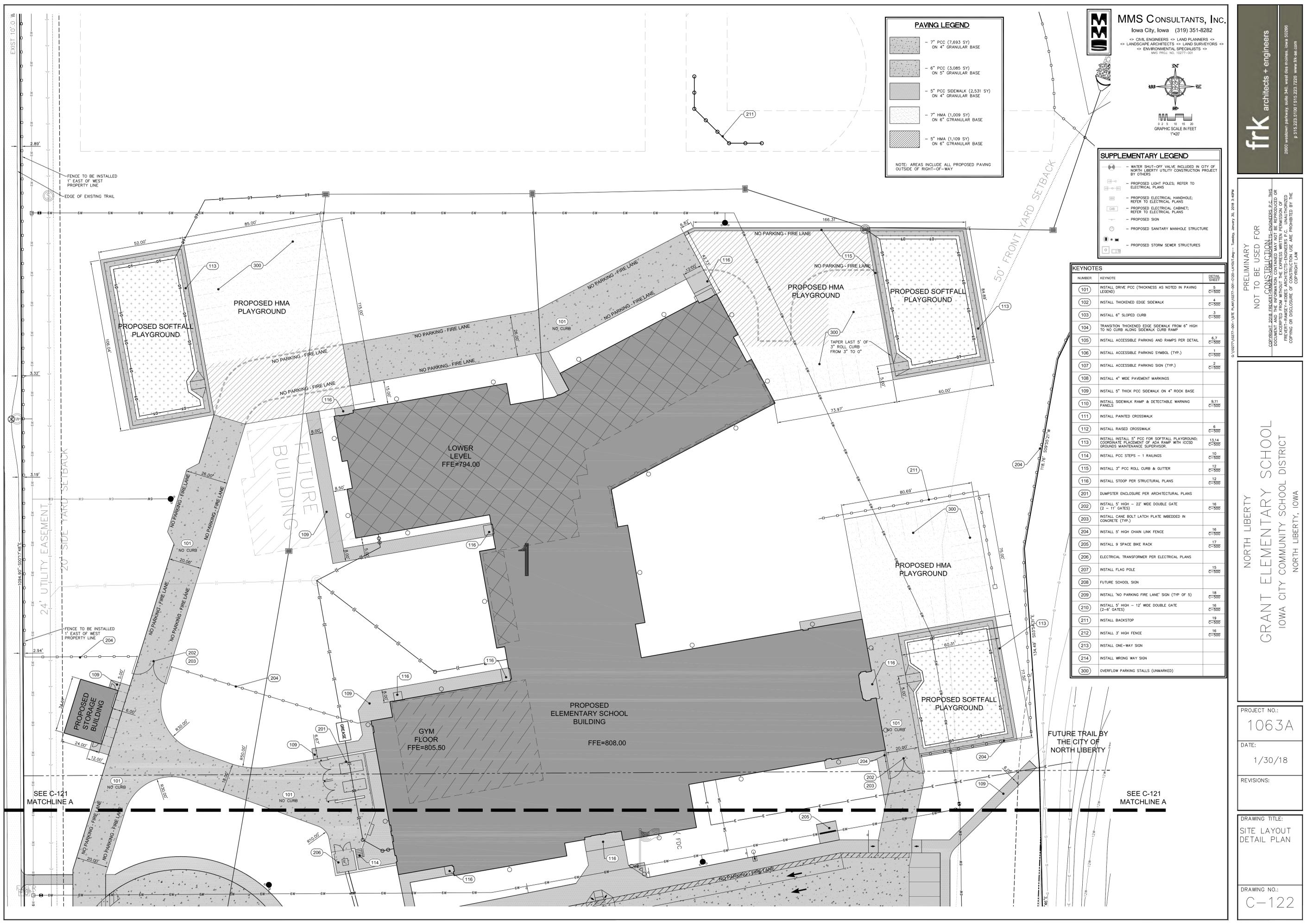
FUTURE WORK
 CURRENT ROAD EXTENSION

SEE ELEC. SITE
 PLAN E-300

NORTH BEND DRIVE

N FRONT ST

NO PARKING - FIRE LANE



PAVING LEGEND

- 7" PCC (7,693 SY) ON 4" GRANULAR BASE
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GRAPHIC SCALE IN FEET
 1"=20'

SUPPLEMENTARY LEGEND

- WATER SHUT-OFF VALVE INCLUDED IN CITY OF NORTH LIBERTY UTILITY CONSTRUCTION PROJECT BY OTHERS
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- PROPOSED ELECTRICAL HANDHOLE; REFER TO ELECTRICAL PLANS
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214	INSTALL WRONG WAY SIGN	18 C-500
300	OVERFLOW PARKING STALLS (UNMARKED)	

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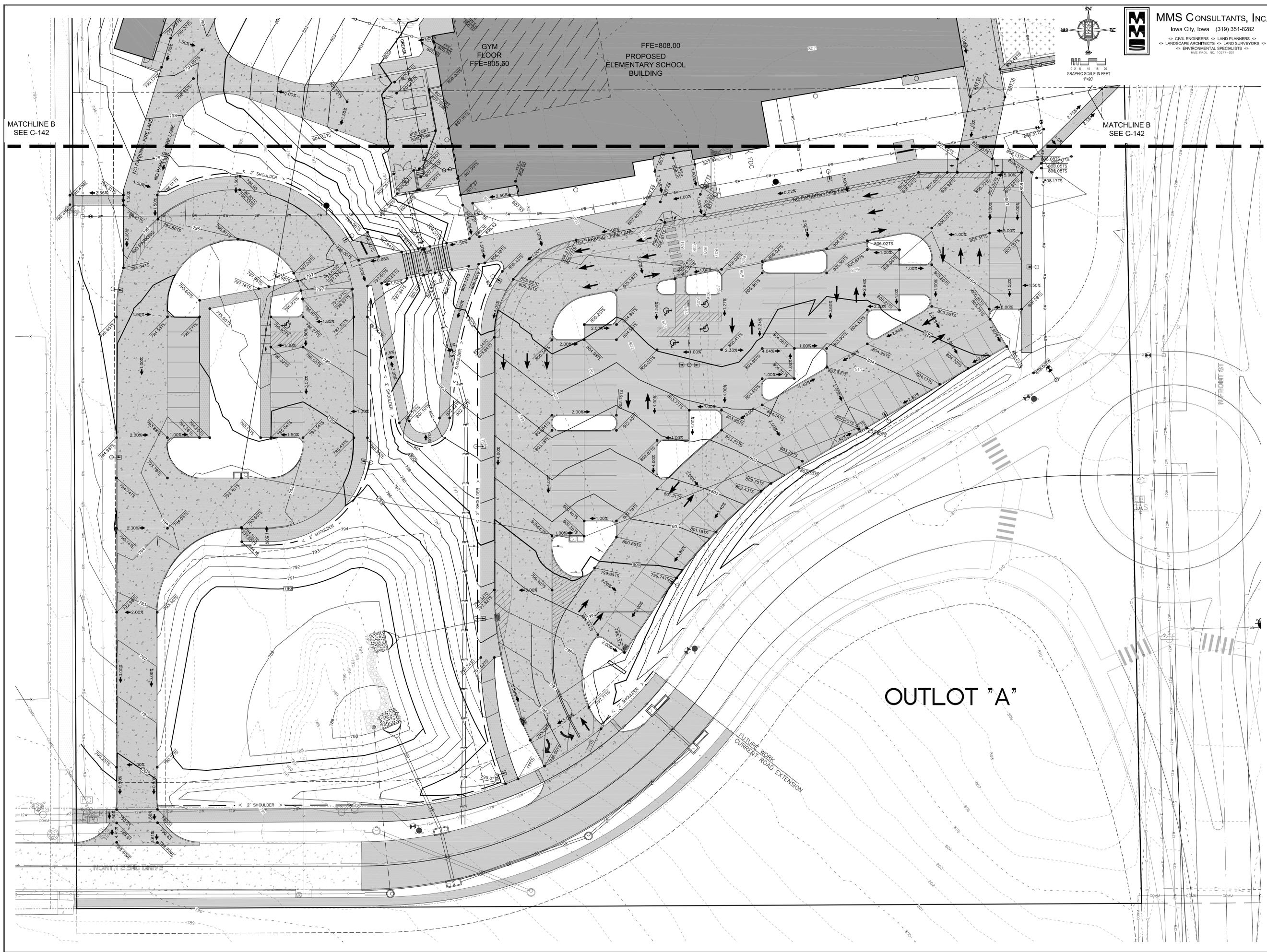
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NORTH LIBERTY
 GRANT ELEMENTARY SCHOOL
 IOWA CITY COMMUNITY SCHOOL DISTRICT
 NORTH LIBERTY, IOWA

PROJECT NO.:
 1063A
 DATE:
 1/30/18
 REVISIONS:

DRAWING TITLE:
 SITE LAYOUT
 DETAIL PLAN

DRAWING NO.:
 C-122



MATCHLINE B
SEE C-142

MATCHLINE B
SEE C-142



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 IOWA CITY COMMUNITY SCHOOL DISTRICT
 NORTH LIBERTY, IOWA

PROJECT NO.:
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DRAWING TITLE:
 SITE GRADING
 DETAIL PLAN

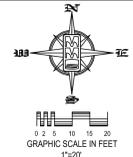
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OUTLOT "A"

FUTURE WORK
 CURRENT ROAD EXTENSION

NORTH BEND DRIVE

FRONT ST



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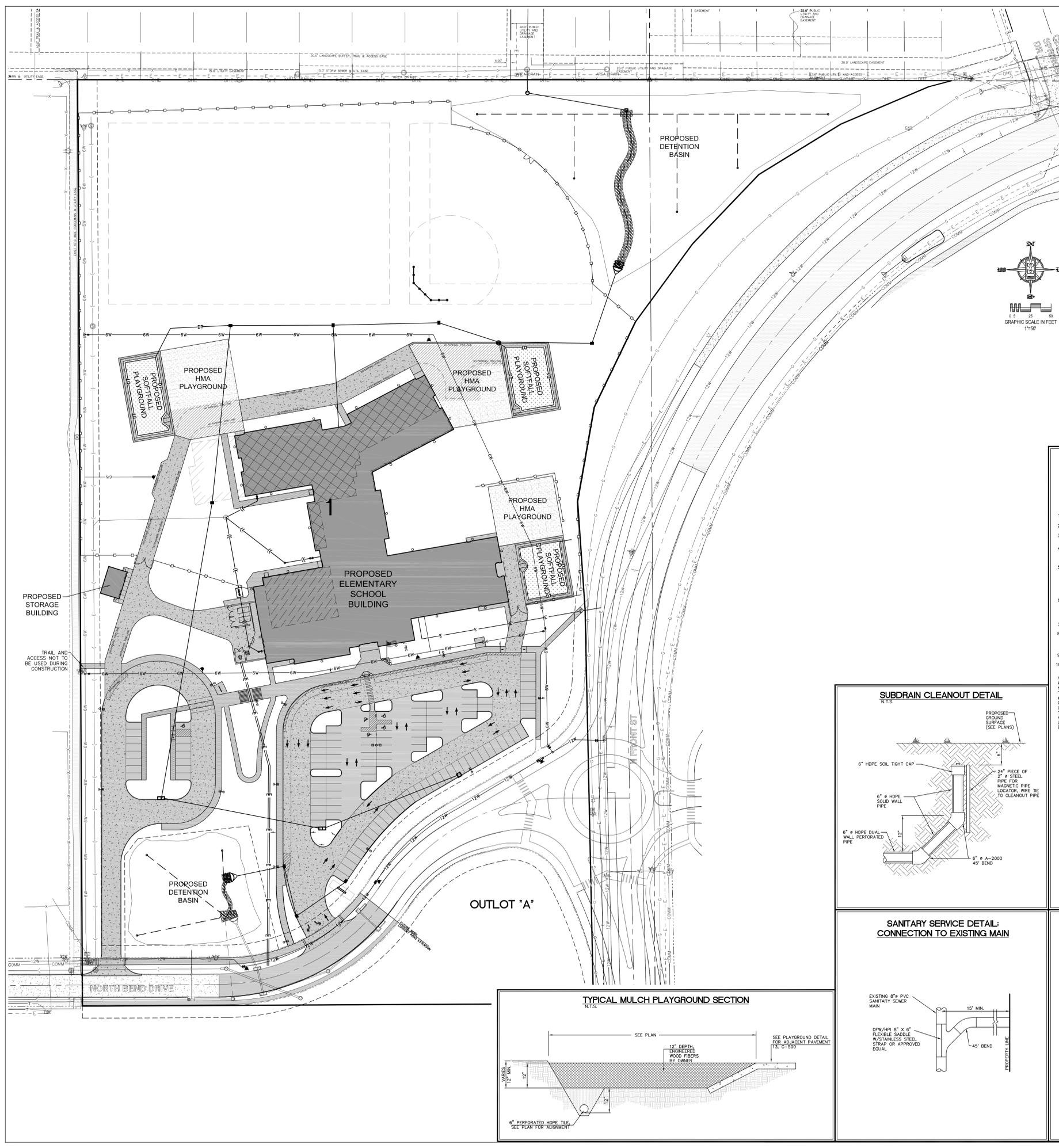
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 SITE GRADING
 DETAIL PLAN

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STANDARD LEGEND AND NOTES

- PROPERTY &/or BOUNDARY LINES
- CONGRESSIONAL SECTION LINES
- RIGHT-OF-WAY LINES
- EXISTING RIGHT-OF-WAY LINES
- CENTER LINES
- EXISTING CENTER LINES
- LOT LINES INTERNAL
- LOT LINES PLATTED OR BY DEED
- PROPOSED EASEMENT LINES
- EXISTING EASEMENT LINES
- BENCHMARK
- RECORDED DIMENSIONS
- CURVE SEGMENT NUMBER

LEGEND

- EXIST - POWER POLE W/DROP
- EXIST - POWER POLE W/TRANS
- EXIST - POWER POLE W/LIGHT
- EXIST - GUY POLE
- EXIST - LIGHT POLE
- EXIST - SANITARY MANHOLE
- EXIST - FIRE HYDRANT
- EXIST - WATER VALVE
- EXIST - DRAINAGE MANHOLE
- EXIST - CURB INLET
- EXIST - FENCE LINE
- EXIST - EXISTING SANITARY SEWER
- EXIST - PROPOSED SANITARY SEWER
- EXIST - EXISTING STORM SEWER
- EXIST - PROPOSED STORM SEWER
- EXIST - WATER LINES
- EXIST - ELECTRICAL LINES
- EXIST - TELEPHONE LINES
- EXIST - GAS LINES
- EXIST - CONTOUR LINES (1' INTERVAL)
- EXIST - PROPOSED GROUND
- EXIST - EXISTING TREE LINE
- EXIST - EXISTING DECIDUOUS TREE & SHRUB
- EXIST - EXISTING EVERGREEN TREES & SHRUBS

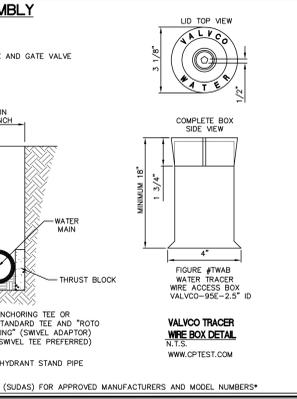
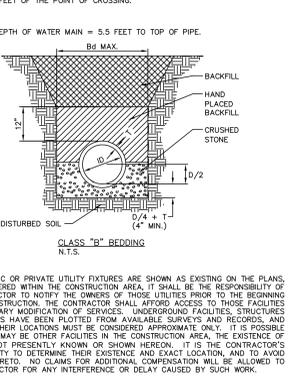
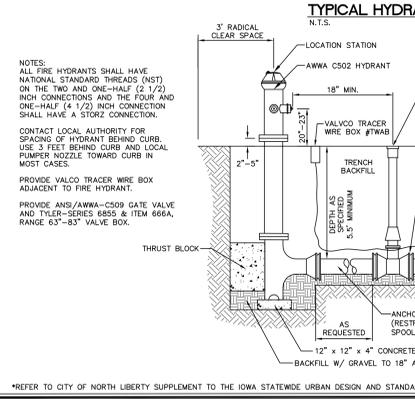
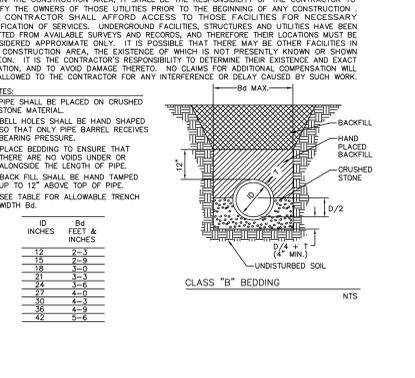
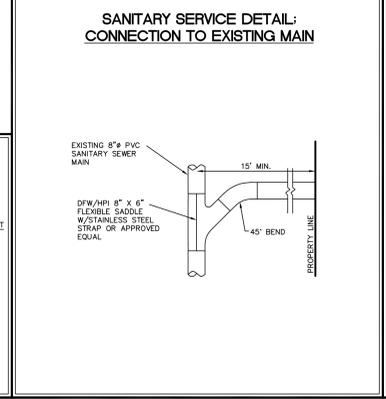
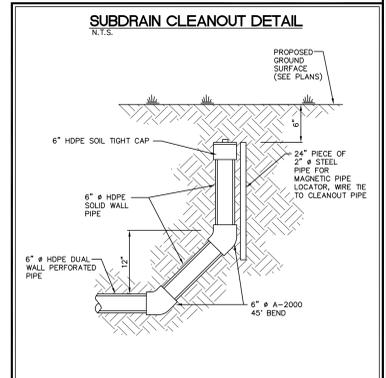
THE ACTUAL SIZE AND LOCATION OF ALL PROPOSED FACILITIES SHALL BE VERIFIED WITH CONSTRUCTION DOCUMENTS, WHICH ARE TO BE PREPARED AND SUBMITTED SUBSEQUENT TO THE APPROVAL OF THIS DOCUMENT.

STORM SEWER CONSTRUCTION NOTES

- ALL STORM SEWER INTAKE AND MANHOLE LIDS SHALL HAVE THE WORDS "STORM SEWER" CAST INTO THE LID.
- CITY OF NORTH LIBERTY DESIGN AND CONSTRUCTION STANDARDS AND PROCEDURES SHALL PREVAIL.
 - ALL STORM SEWERS SHALL BE CLASS 3 RCP OR AOS N-12 UNLESS NOTED OTHERWISE IN THE PLANS.
 - AT PLACES WHERE A FLARED END SECTION IS REQUIRED, PIPE LENGTH INCLUDES THE FLARED END. THE LAST TWO JOINTS ARE TO BE TIED WHERE FLARED END SECTIONS ARE REQUIRED.
 - ALL RCP STORM SEWERS SHALL BE PROVIDED WITH CLASS "B" BEDDING UNLESS NOTED OTHERWISE. AOS N-12 STORM SEWERS SHALL HAVE CLASS F-3 BEDDING AS SHOWN IN IOWA DOT STANDARD ROAD PLAN SW-103.
 - STORM SEWER TRENCHES UNDER PAVING SHALL BE BACKFILLED WITH SUITABLE EXCAVATED MATERIAL COMPACTED TO 90% STANDARD PROCTOR DENSITY. STORM SEWER STRUCTURES IN PAVED AREAS SHALL BE BACKFILLED WITH CLASS "A" CRUSHED STONE. ENTIRE DEPTH OF TRENCH FOR STORM SEWERS WITHIN 10' OF STRUCTURES UNDER PAVING SHALL BE BACKFILLED WITH CLASS "A" CRUSHED STONE. STORM SEWERS INSTALLED UNDER BUILDING SLAB SHALL BE BACKFILLED WITH CLASS "A" CRUSHED STONE COMPACTED TO 90% STANDARD PROCTOR DENSITY.
 - ALL RCP STORM SEWERS SHALL HAVE CONFINED "O" RING GASKETS. STORM SEWERS 36" AND SMALLER SHALL HAVE BELL AND SPIGOT JOINTS. STORM SEWERS LARGER THAN 36" MAY HAVE TONGUE AND GROOVE JOINTS. NO MASTIC JOINTS ALLOWED. AOS N-12 STORM SEWERS SHALL HAVE SOIL TIGHT GASKETED JOINTS.
 - ALL PIPE SHALL BE CERTIFIED.
 - ALL STORM INTAKES SHALL BE A MINIMUM OF 48 INCHES FROM TOP OF CURB/RIM TO SUBGRADE. IF INVERT ELEVATIONS ARE INSUFFICIENT TO PROVIDE THIS REQUIRED DEPTH, THE CONTRACTOR TO PROVIDE DEEPER STRUCTURE AND POUR CONCRETE FILLET IN INTAKE TO MAKE INTAKE PIPES DRAIN AT INVERT ELEVATIONS LISTED.
 - LIFT HOLES IN STORM SEWER WILL NOT BE ALLOWED.
 - PROVIDE CONCRETE FILLETS IN ALL NEW & EXISTING DRAINAGE STRUCTURES PER REFERENCED DETAILS.

WATER MAIN NOTES

- CONSTRUCTION NOTES:**
- CITY OF NORTH LIBERTY DESIGN AND CONSTRUCTION STANDARDS AND PROCEDURES SHALL PREVAIL.
 - 6" AND 8" DIAMETER WATER MAINS SHALL BE DR-18 PVC PIPE, EXCEPT AROUND CURB-TO-SEAS AND SMALL RADIUS CURVES WHERE CLASS 52 DIP SHALL BE USED, UNLESS NOTED OTHERWISE ON THE PLANS.
 - GRANULAR TRENCH BACKFILL SHALL BE CLASS A CRUSHED STONE CONFORMING TO I.O.T. STANDARD SPECIFICATION #103.04 WITH 1" MAXIMUM AGGREGATE SIZE. COMPACT TO 90% MODIFIED PROCTOR DENSITY.
 - WATER MAINS WITHIN STREET RIGHT OF WAYS OR WITHIN EASEMENTS ADJACENT TO THE STREET RIGHT OF WAYS SHALL BE BACKFILLED WITH EITHER OF THE FOLLOWING COMPACTED TO 90% MODIFIED PROCTOR DENSITY:
 - A. SUITABLE EXCAVATED MATERIAL IF EXCAVATED MATERIAL IS NOT SUITABLE, THEN:
 - B. CRUSHED STONE AS SPECIFIED FOR GRANULAR TRENCH BACKFILL SHALL BE USED.
- THE FOLLOWING MINIMUM CLEARANCES MUST BE MAINTAINED:**
- WATER MAIN SHALL BE LOCATED 10 FEET HORIZONTALLY DISTANT FROM ALL SANITARY SEWER AND STORM SEWER.
 - WATER MAIN SHALL NOT PASS THROUGH NOR CONTACT A SEWER OR A SEWER MANHOLE. A MINIMUM HORIZONTAL SEPARATION OF 3 FEET SHALL BE MAINTAINED.
 - VERTICAL SEPARATION OF WATER MAINS CROSSING OVER ANY SANITARY SEWER SHALL BE A MINIMUM OF 18-INCHES MEASURED OUTSIDE TO OUTSIDE FROM THE CLOSEST EDGE OF EACH PIPE. IF PHYSICAL CONDITIONS PROHIBIT THIS SEPARATION, THE WATER MAIN SHALL BE PLACED CLOSER THAN 6-INCHES ABOVE A SEWER OR 18-INCHES BELOW A SEWER. THE SEPARATION DISTANCE SHALL BE THE MAXIMUM FEASIBLE IN ALL CASES.
 - WHERE THE WATER MAIN CROSSES SEWER, ONE FULL LENGTH OF WATER PIPE SHALL BE LOCATED SO BOTH JOINTS ARE AS FAR AS POSSIBLE FROM THE SEWER. THE WATER AND SEWER PIPES MUST BE ADEQUATELY SUPPORTED AND HAVE WATER TIGHT JOINTS. A MINIMUM PERMISSIBLE SOIL SHALL BE USED FOR BACKFILL MATERIAL WITHIN 10-FEET OF THE POINT OF CROSSING.
 - NOMINAL DEPTH OF WATER MAIN = 5.5 FEET TO TOP OF PIPE.



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GRANT ELEMENTARY SCHOOL
IOWA CITY COMMUNITY SCHOOL DISTRICT
NORTH LIBERTY, IOWA

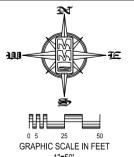
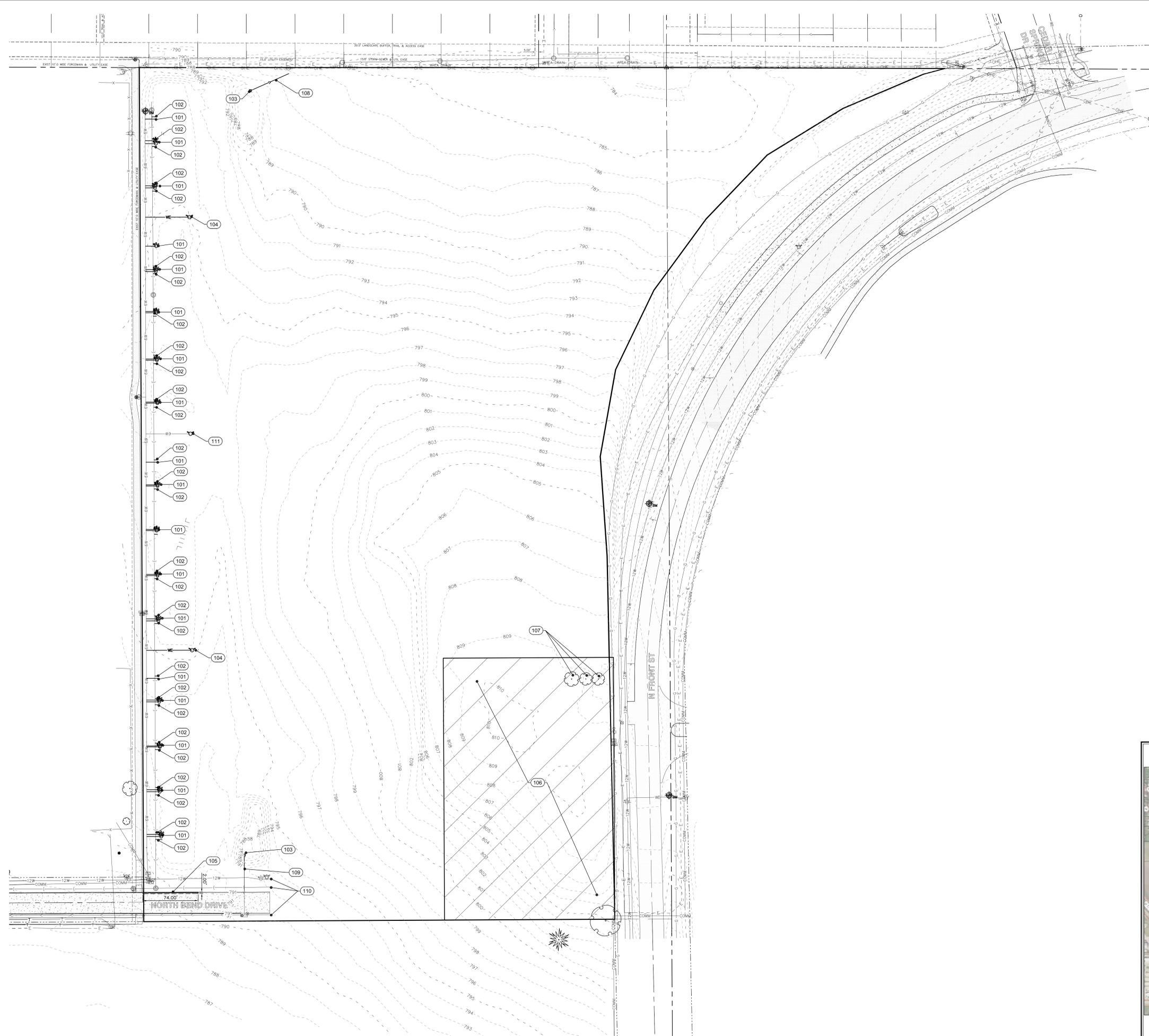
PROJECT NO.:
1063A

DATE:
1/30/18

REVISIONS:

DRAWING TITLE:
OVERALL SITE
UTILITY PLAN

DRAWING NO.:
C-160



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 CIVIL ENGINEERS & LAND PLANNERS
 LANDSCAPE ARCHITECTS & LAND SURVEYORS
 ENVIRONMENTAL SPECIALISTS
 MMS PROJ. NO. 1063A-001

STANDARD LEGEND AND NOTES

- PROPERTY &/or BOUNDARY LINES
- CONGRESSIONAL SECTION LINES
- RIGHT-OF-WAY LINES
- EXISTING RIGHT-OF-WAY LINES
- EXISTING CENTER LINES
- EXISTING CENTER LINES
- LOT LINES, INTERNAL
- LOT LINES, PLATTED OR BY DEED
- PROPOSED EASEMENT LINES
- EXISTING EASEMENT LINES
- BENCHMARK
- RECORDED DIMENSIONS
- CURVE SEGMENT NUMBER

EXISTING

- POWER POLE
- POWER POLE W/DRIP
- POWER POLE W/TRANS
- POWER POLE W/LIGHT
- CITY POLE
- LIGHT POLE
- SANITARY MANHOLE
- FIRE HYDRANT
- WATER VALVE
- DRAINAGE MANHOLE
- CURB INLET
- FENCE LINE
- EXISTING SANITARY SEWER
- PROPOSED SANITARY SEWER
- EXISTING STORM SEWER
- PROPOSED STORM SEWER
- WATER LINES
- ELECTRICAL LINES
- TELEPHONE LINES
- GAS LINES
- CONTOUR LINES (1' INTERVAL)
- PROPOSED GROUND
- EXISTING TREE LINE
- EXISTING DECIDUOUS TREE & SHRUB
- EXISTING EVERGREEN TREES & SHRUBS

PROPOSED

- 22-1

THE ACTUAL SIZE AND LOCATION OF ALL PROPOSED FACILITIES SHALL BE VERIFIED WITH CONSTRUCTION DOCUMENTS, WHICH ARE TO BE PREPARED AND SUBMITTED SUBSEQUENT TO THE APPROVAL OF THIS DOCUMENT.

DEMOLITION KEYNOTES

NUMBER	KEYNOTE
101	REMOVE EXISTING WATER SERVICES
102	REMOVE EXISTING SANITARY SERVICES
103	REMOVE EXISTING STORM STRUCTURE
104	REMOVE EXISTING FIRE HYDRANT AND WATER LINE
105	SAWCUT AND REMOVE 74 LF EXISTING CURB & GUTTER
106	THIS AREA MAY CONTAIN OLD BUILDING FOUNDATIONS AND OTHER DEBRIS. CONTRACTOR TO VERIFY AND REMOVE FROM THE SITE ALL FOUNDATIONS AND OTHER DEBRIS FROM FORMER HOMESTEAD.
107	REMOVE EXISTING TREES
108	REMOVE EXISTING STORM SEWER
109	REMOVE 20 LF EXISTING STORM SEWER, CAP END OF REMAINING
110	SEE UTILITY SHEET (C-140 AND C-141) FOR CONTINUATION OF WATER/STORM/SANITARY.
111	REMOVE EXISTING FIRE HYDRANT



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 GRANT ELEMENTARY SCHOOL
 IOWA CITY COMMUNITY SCHOOL DISTRICT
 NORTH LIBERTY, IOWA

PROJECT NO.:
 1063A
 DATE:
 1/30/18
 REVISIONS:

DRAWING TITLE:
 SIITE DEMOLITION
 PLAN

DRAWING NO.:
 CD-100

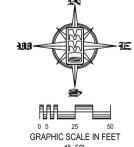
SITE PLAN GRANT ELEMENTARY SCHOOL NORTH LIBERTY, IOWA

PLAT PREPARED BY:
MMS CONSULTANTS INC.
1917 S. GILBERT STREET
IOWA CITY, IA 52240

OWNER/APPLICANT:
ICCSA
1725 N. DODGE STREET
IOWA CITY, IA 52245

OWNER'S ATTORNEY:
C. JOSEPH HOLLAND
122 N. LINN STREET
IOWA CITY, IA 52240

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Iowa City, Iowa (319) 351-8282
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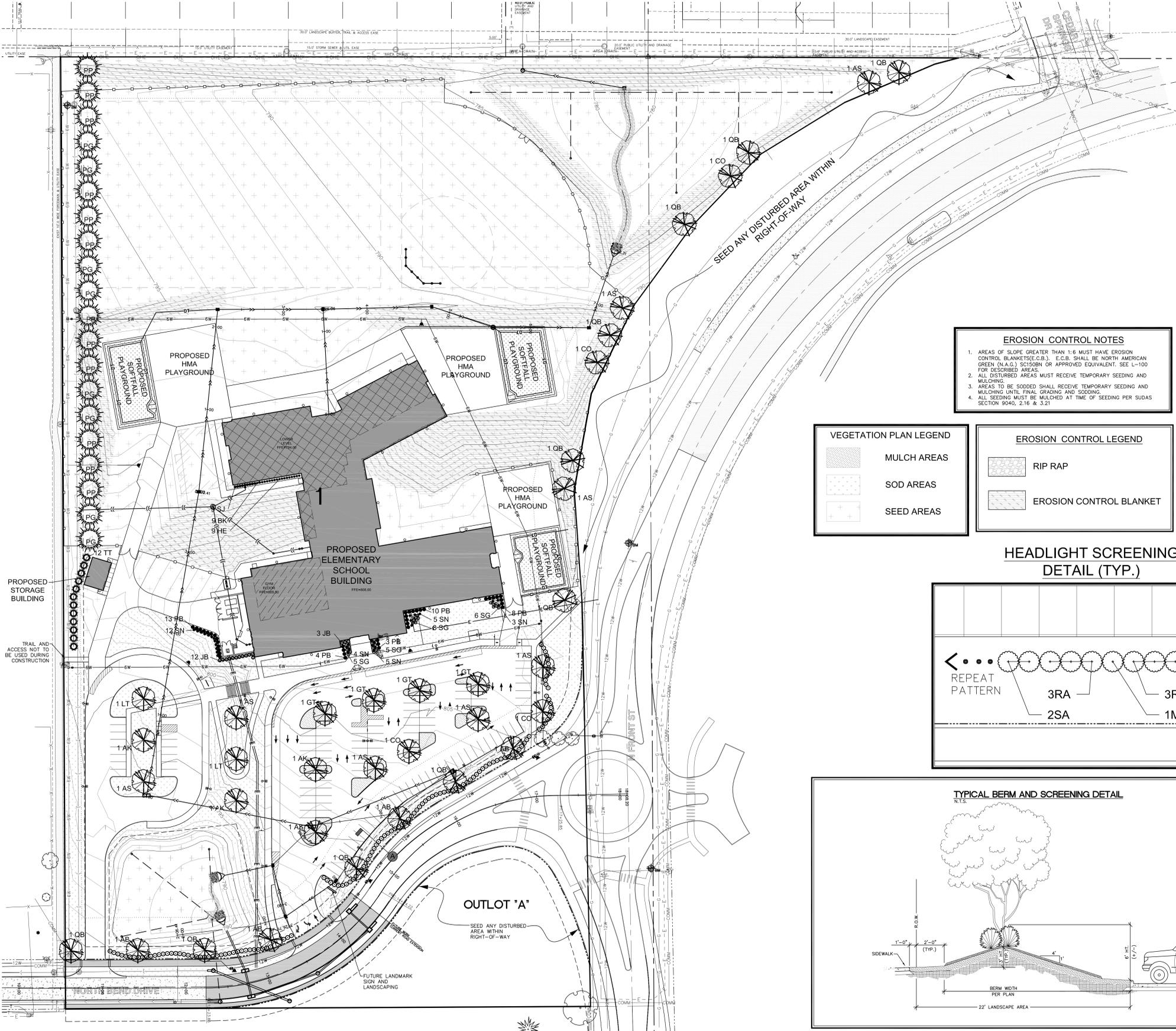


STANDARD LEGEND AND NOTES

---	PROPERTY &/OR BOUNDARY LINES
---	CONGRESSIONAL SECTION LINES
---	EXISTING RIGHT-OF-WAY LINES
---	EXISTING CENTER LINES
---	LOT LINES, PLATTED OR BY DEED
---	PROPOSED EASEMENT LINES
---	EXISTING EASEMENT LINES
---	BENCHMARK
---	RECORDED DIMENSIONS
---	CURVE SEGMENT NUMBER
---	EXISTING TREE LINE
---	EXISTING DEODOUOUS TREE & SHRUB
---	EXISTING EVERGREEN TREES & SHRUBS

LANDSCAPE REQUIREMENTS:
1. LARGE TREE WITHIN 40' OF EVERY PARKING SPACE
- 18 TREES REQUIRED
- 56 TREES PROVIDED

THE ACTUAL SIZE AND LOCATION OF ALL PROPOSED FACILITIES SHALL BE VERIFIED WITH CONSTRUCTION DOCUMENTS, WHICH ARE TO BE PREPARED AND SUBMITTED SUBSEQUENT TO THE APPROVAL OF THIS DOCUMENT.



EROSION CONTROL NOTES

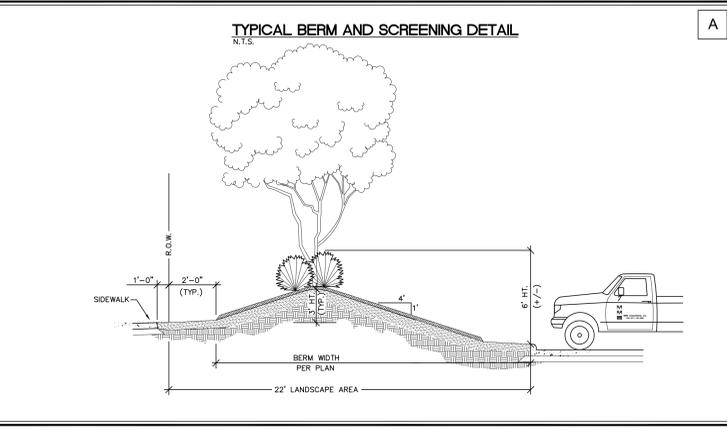
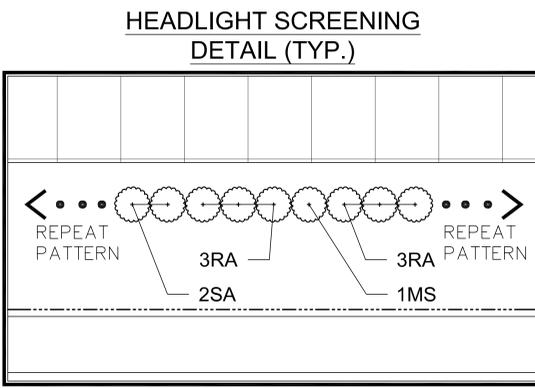
- AREAS OF SLOPE GREATER THAN 1:6 MUST HAVE EROSION CONTROL BLANKETS (E.C.B.). E.C.B. SHALL BE NORTH AMERICAN GREEN (N.A.G.) SECTION OR APPROVED EQUIVALENT. SEE L-100 FOR DESCRIBED AREAS.
- ALL DISTURBED AREAS MUST RECEIVE TEMPORARY SEEDING AND MULCHING.
- AREAS TO BE SODDED SHALL RECEIVE TEMPORARY SEEDING AND MULCHING UNTIL FINAL GRADING AND SODDING.
- ALL SEEDING MUST BE MULCHED AT TIME OF SEEDING PER SUDAS SECTION 9040, 2.16 & 3.21

VEGETATION PLAN LEGEND

[Pattern]	MULCH AREAS
[Pattern]	SOD AREAS
[Pattern]	SEED AREAS

EROSION CONTROL LEGEND

[Pattern]	RIP RAP
[Pattern]	EROSION CONTROL BLANKET



PLANT LIST - TREES

QTY	KEY	BOTANICAL NAME	COMMON NAME	INSTALL SIZE	COMMENT	MATURE SIZE
4	AP	ACER x FREEMANI 'AUTUMN BLAZE'	AUTUMN BLAZE RED MAPLE	2" CAL.	D & D	50' X 50'
3	AK	ACER PLATANOIDES 'GRIMON KIN'	GRIMON KIN MAPLE	2" CAL.	D & D	40' X 50'
3	AS	ACER SACCHARIN	SUGAR MAPLE	2" CAL.	D & D	70' X 50'
4	GD	GELTIS OCCIDENTALIS	COMMON HAZELBERRY	2" CAL.	D & D	10' X 50'
4	ST	SELEPTIA TRIACANTHOS INTERMIS 'SUNBURST'	SUNBURST THORNLESS HONEYLOCUST	2" CAL.	D & D	50' X 50'
3	LT	LIRIODENDRON TULIPIFERA	TULIPTREE	2" CAL.	D & D	80' X 50'
1	PP	PICEA PENSILVANICA	COLORADO BLUE SPRUCE	6" HT.	D & D	50' X 25'
8	PB	PICEA ALBA DENSATA	BLACK HILLS SPRUCE	6" HT.	D & D	50' X 50'
12	QB	QUERCUS BUREALIS	NORTHERN RED OAK	2" CAL.	D & D	70' X 50'

PLANT LIST - SHRUBS, PERENNIALS, ORNAMENTAL GRASSES & GRASSCOVER

QTY	KEY	BOTANICAL NAME	COMMON NAME	INSTALL SIZE	COMMENT	MATURE SIZE
3	PK	PAVIA MICROPHYLLA 'GREEN VELVET'	GREEN VELVET BOWDOEN	12" HT.	CONT.	3' X 3'
3	FE	HOSTA 'BEDOLIANA ELEGANS'	ELEGANT HOSTA	8" HT.	CONT.	3' X 3'
3	LD	LAMERIS HORIZONTALIS 'BLUE CHIP'	BLUE CHIP JUNCUS	24" DIA.	CONT.	1' X 5'
3	MS	MISCANTHUS SINENSIS 'SILVERFEATHER'	SILVER FEATHER MISCANTHUS	24" HT.	CONT.	6' X 4'
30	PB	PICEA PENSILVANICA 'ALBA DENSATA'	GLAUC BLUE SPRUCE	6" HT.	CONT.	4' X 4'
3	RA	RIBES ALPINA 'GREEN MOUNTAIN'	GREEN MOUNTAIN ALPINE CURRENT	12" HT.	CONT.	4' X 4'
3	SA	SPYRAEA ANTHONY WATERER	ANTHONY WATERER SPYREA	12" HT.	CONT.	5' X 5'
3	SB	SPYRAEA x BUNALDA 'BOLUPLANE'	BOLUPLANE SPYREA	12" HT.	CONT.	5' X 5'
3	SW	SPYRAEA JAPANESE WHITE	JAPANESE WHITE SPYREA	12" HT.	CONT.	2' X 2'
3	SD	SODORASTRUM NITRARI	INDIAN GRASS	12" HT.	CONT.	5' X 5'
3	TT	TRITUM OCCIDENTALIS 'TEQUINI'	TEQUINI ANDROPOGON	12" HT.	D & D	10' X 4'

SUPPLEMENTARY LEGEND

[Symbol]	WATER SHUT-OFF VALVE INCLUDED IN CITY OF NORTH LIBERTY UTILITY CONSTRUCTION PROJECT BY OTHERS
[Symbol]	PROPOSED LIGHT POLES, REFER TO ELECTRICAL PLANS
[Symbol]	PROPOSED ELECTRICAL HANDHOLES, REFER TO ELECTRICAL PLANS
[Symbol]	PROPOSED ELECTRICAL CABINETS, REFER TO ELECTRICAL PLANS
[Symbol]	PROPOSED SIGN
[Symbol]	PROPOSED SANITARY MANHOLE STRUCTURE
[Symbol]	PROPOSED STORM SEWER STRUCTURES



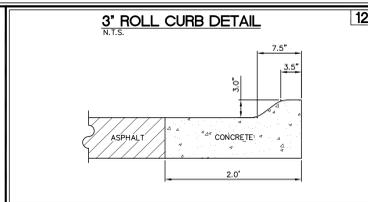
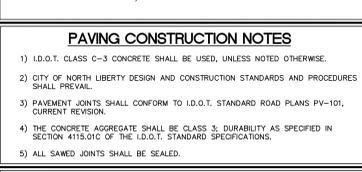
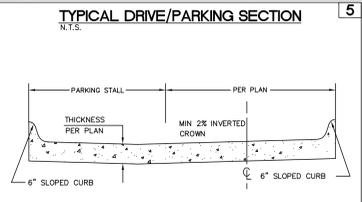
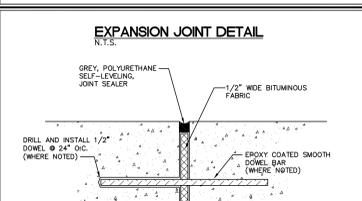
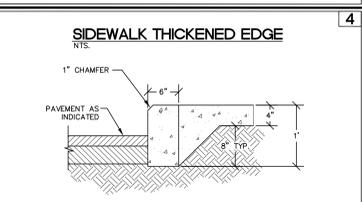
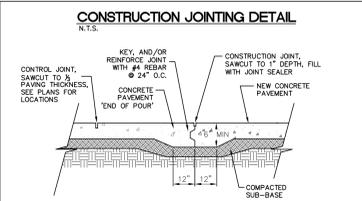
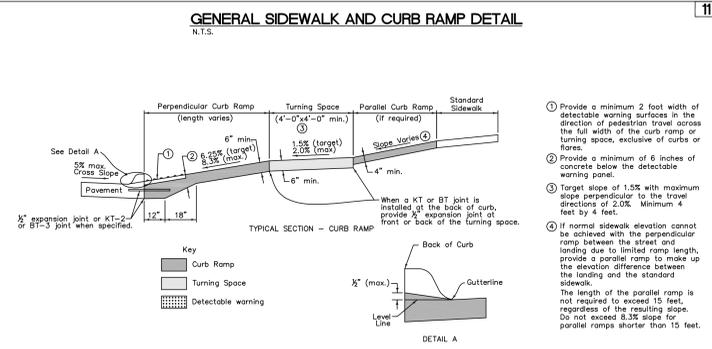
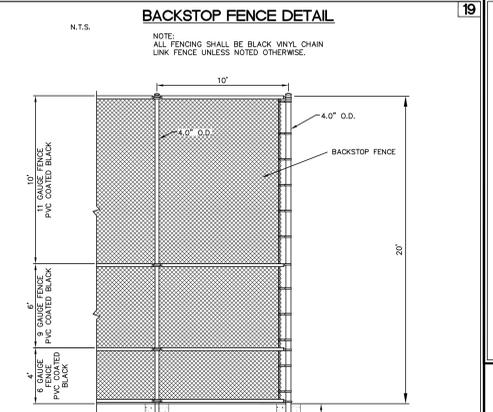
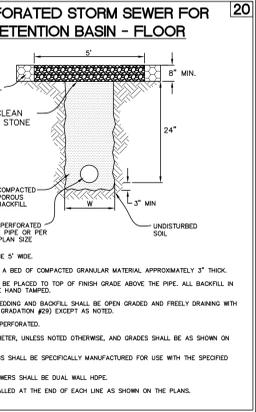
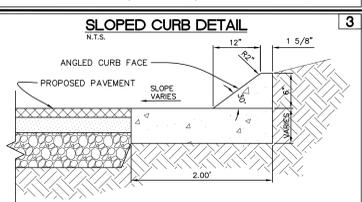
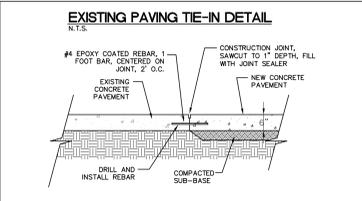
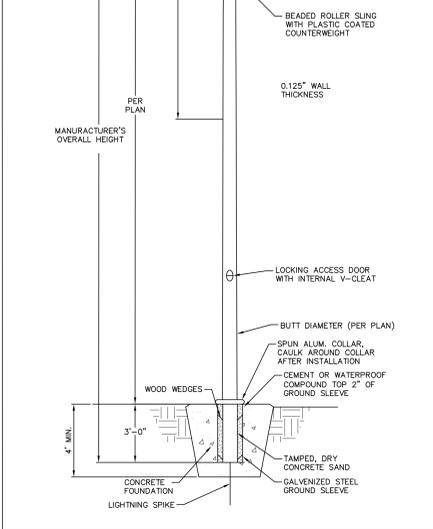
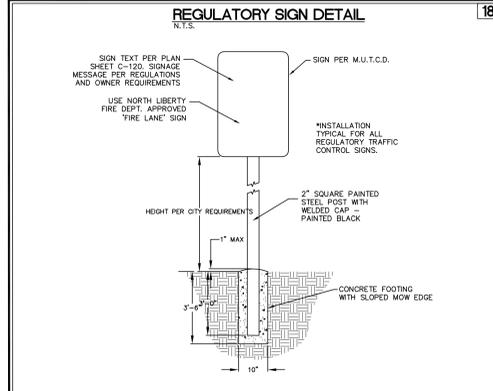
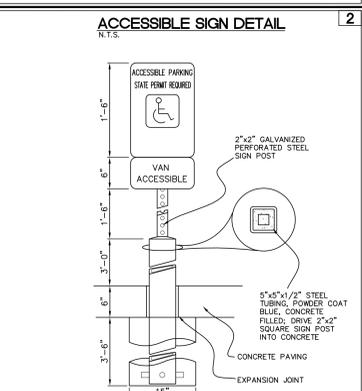
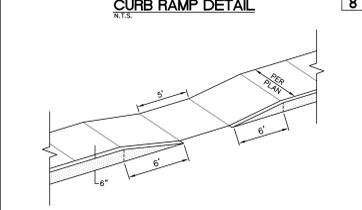
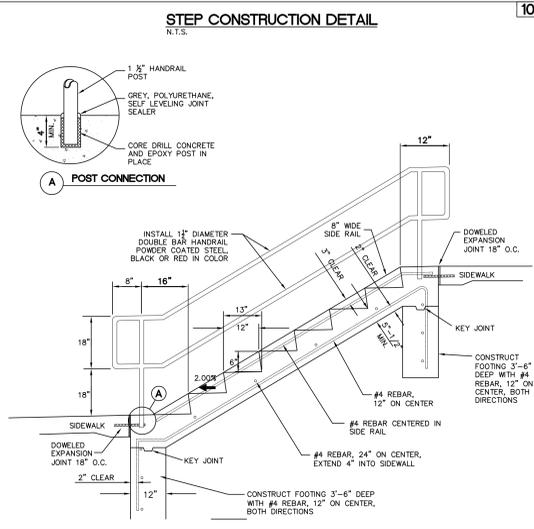
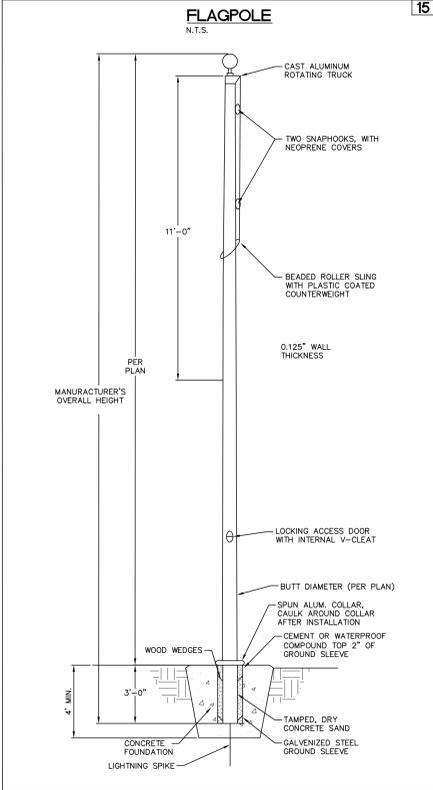
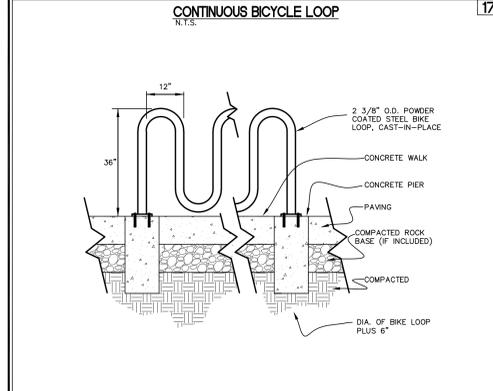
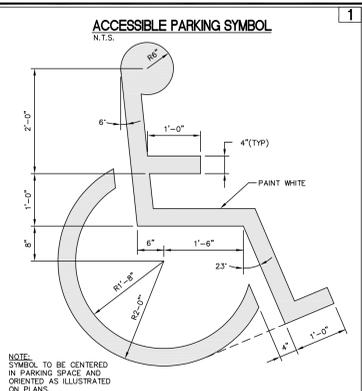
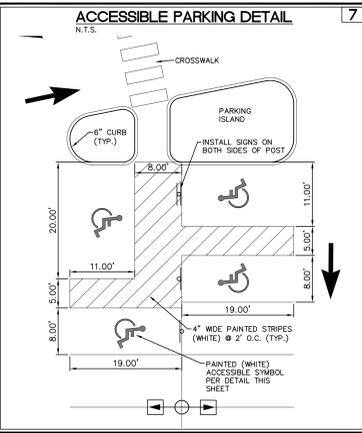
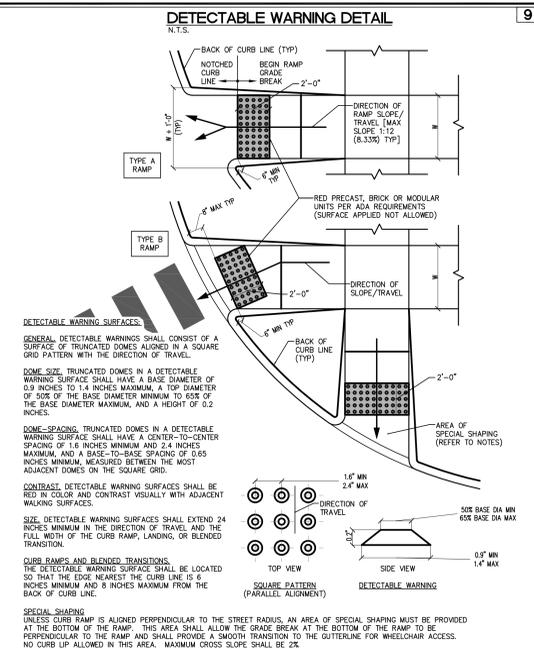
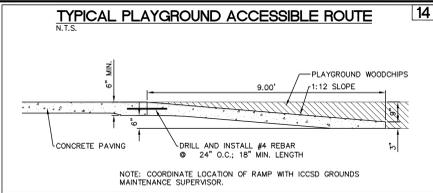
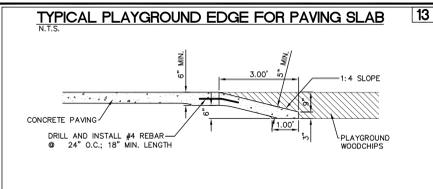
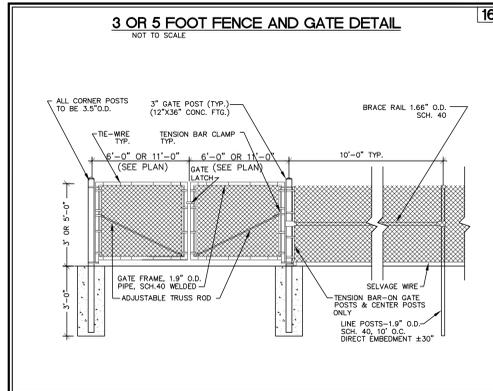
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IOWA CITY COMMUNITY SCHOOL DISTRICT
NORTH LIBERTY, IOWA

PROJECT NO.:
1063A
DATE:
1/30/18
REVISIONS:

DRAWING TITLE:
LANDSCAPE PLAN
DRAWING NO.:
L-100



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 NORTH LIBERTY, IOWA

PROJECT NO.:
 1063A

DATE:
 1/30/18

REVISIONS:

DRAWING TITLE:
 GENERAL NOTES AND DETAILS

DRAWING NO.:
 C-500



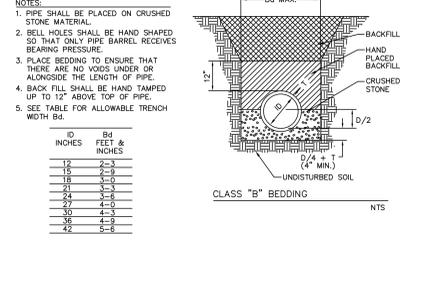
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IOWA CITY COMMUNITY SCHOOL DISTRICT
NORTH LIBERTY, IOWA

PROJECT NO.:
1063A
DATE:
1/30/18
REVISIONS:
DRAWING TITLE:
UTILITY NOTES AND DETAILS
DRAWING NO.:
C-501

STORM SEWER CONSTRUCTION NOTES

- ALL STORM SEWER INTAKE AND MANHOLE LIDS SHALL HAVE THE WORDS "STORM SEWER" CAST INTO THE LID
- 1) CITY OF NORTH LIBERTY DESIGN AND CONSTRUCTION STANDARDS AND PROCEDURES SHALL PREVAIL.
 - 2) ALL STORM SEWERS SHALL BE CLASS 3 RCP OR ADS N-12 UNLESS NOTED OTHERWISE IN THE PLANS.
 - 3) AT PLACES WHERE A FLARED END SECTION IS REQUIRED, PIPE LENGTH INCLUDES THE FLARED END. THE LAST TWO JOINTS ARE TO BE TIED WHERE FLARED END SECTIONS ARE REQUIRED.
 - 4) ALL RCP STORM SEWERS SHALL BE PROVIDED WITH CLASS "B" BEDDING, UNLESS NOTED OTHERWISE. ADS N-12 STORM SEWERS SHALL HAVE CLASS F-3 BEDDING AS SHOWN IN IOWA DOT STANDARD ROAD PLAN SW-103.
 - 5) STORM SEWER TRENCHES UNDER PAVING SHALL BE BACKFILLED WITH SUITABLE EXCAVATED MATERIAL COMPACTED TO 98% STANDARD PROCTOR DENSITY. STORM SEWER STRUCTURES IN PAVED AREAS SHALL BE BACKFILLED WITH CLASS "A" CRUSHED STONE. ENTIRE DEPTH OF TRENCH FOR STORM SEWERS WITHIN 10' OF STRUCTURES UNDER PAVING SHALL BE BACKFILLED WITH CLASS "A" CRUSHED STONE. STORM SEWERS INSTALLED UNDER BUILDING SLAB SHALL BE BACKFILLED WITH CLASS "A" CRUSHED STONE COMPACTED TO 98% STANDARD PROCTOR DENSITY.
 - 6) ALL RCP STORM SEWERS SHALL HAVE CONFINED "O" RING GASKETS. STORM SEWERS 36" AND SMALLER SHALL HAVE BELL AND SPIGOT JOINTS. STORM SEWERS LARGER THAN 36" MAY HAVE TONGUE AND GROOVE JOINTS. NO MASTIC JOINTS ALLOWED. ADS N-12 STORM SEWERS SHALL HAVE SOIL TIGHT GASKETED JOINTS.
 - 7) ALL PIPE SHALL BE CERTIFIED.
 - 8) ALL STORM INTAKES SHALL BE A MINIMUM OF 48 INCHES FROM TOP OF CURB/RM TO SUBGRADE. IF INVERT ELEVATIONS ARE INSUFFICIENT TO PROVIDE THIS REQUIRED DEPTH, THE CONTRACTOR TO PROVIDE DEEPER STRUCTURE AND POUR CONCRETE FILLET IN INTAKE TO MAKE INTAKE PIPES DRAIN AT INVERT ELEVATIONS LISTED.
 - 9) LIFT HOLES IN STORM SEWER WILL NOT BE ALLOWED.
 - 10) PROVIDE CONCRETE FILLETS IN ALL NEW & EXISTING DRAINAGE STRUCTURES PER REFERENCED DETAILS.
- WHERE PUBLIC UTILITY FIXTURES ARE SHOWN AS EXISTING ON THE PLANS, OR ENCOUNTERED WITHIN THE CONSTRUCTION AREA, IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO NOTIFY THE OWNERS OF THOSE UTILITIES PRIOR TO THE BEGINNING OF ANY CONSTRUCTION. THE CONTRACTOR SHALL AFFORD ACCESS TO THOSE FACILITIES FOR NECESSARY MODIFICATION OF SERVICES. UNDERGROUND FACILITIES, STRUCTURES AND UTILITIES HAVE BEEN PLOTTED FROM AVAILABLE SURVEYS AND RECORDS, AND THEREFORE THEIR LOCATIONS MUST BE CONSIDERED APPROXIMATE ONLY. IT IS POSSIBLE THAT THERE MAY BE OTHER FACILITIES IN THE CONSTRUCTION AREA, THE EXISTENCE OF WHICH IS NOT PRESENTLY KNOWN OR SHOWN HEREON. IT IS THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THEIR EXISTENCE AND EXACT LOCATION, AND TO AVOID DAMAGE THEREOF. NO CLAIMS FOR ADDITIONAL COMPENSATION WILL BE ALLOWED TO THE CONTRACTOR FOR ANY INTERFERENCE OR DELAY CAUSED BY SUCH WORK.

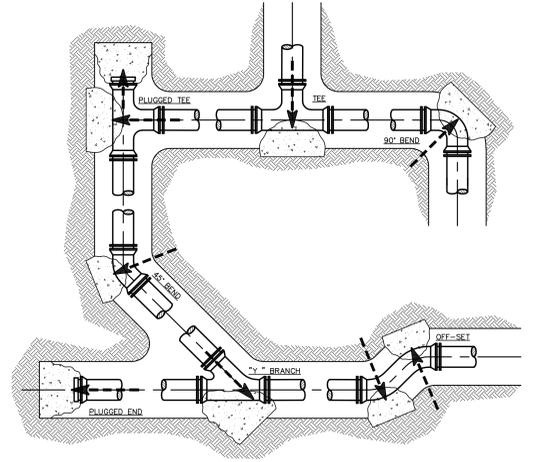


NOTES:

1. PIPE SHALL BE PLACED ON CRUSHED STONE MATERIAL.
2. BELL HOLES SHALL BE HAND SHAPED SO THAT ONLY PIPE BARREL RECEIVES BEARING PRESSURE.
3. PLACE BEDDING TO ENSURE THAT THERE ARE NO VOIDS UNDER OR ALONGSIDE THE LENGTH OF PIPE.
4. BACK FILL SHALL BE HAND TAMPED UP TO 12" ABOVE TOP OF PIPE.
5. SEE TABLE FOR ALLOWABLE TRENCH WIDTH Sd.

PIPE SIZE (INCHES)	Bd FEET & INCHES	Sd FEET & INCHES
12	2-3	2-3
15	2-3	2-3
18	2-3	2-3
21	2-3	2-3
24	2-3	2-3
27	2-3	2-3
30	2-3	2-3
36	2-3	2-3
42	2-3	2-3

THRUST BLOCK DETAIL
N.T.S.



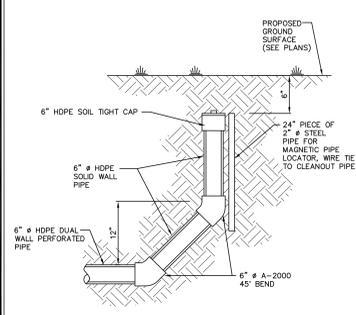
THRUST BLOCKS ARE REQUIRED AT PIPING DIRECTION CHANGES, AT DEAD ENDS, AND AT FIRE HYDRANTS. THRUST BLOCKS MAY BE PRECAST MASONRY UNITS, CAST-IN PLACE CONCRETE OR TREATED HARDWOOD. CAST-IN-PLACE CONCRETE SHALL NOT BE USED AT FIRE HYDRANTS.

POURED-IN-PLACE CONCRETE SHALL BE 2000 P.S.I. MINIMUM STRENGTH, A MINIMUM OF 18 INCHES THICK, AND SHALL BE CAST AGAINST A SOLID, UNDISTURBED EDGE OF TRENCH FOR BEARING. NO BOLTS, JOINTS OR DRAIN HOLES SHALL COME INTO CONTACT WITH THE CONCRETE THRUST BLOCK AND THE PIPE SHALL BE WRAPPED WITH A PLASTIC SHEET AT THE CONCRETE BEARING SURFACES. THE MINIMUM THICKNESS OF ANY THRUST BLOCK SHALL BE 18 INCHES.

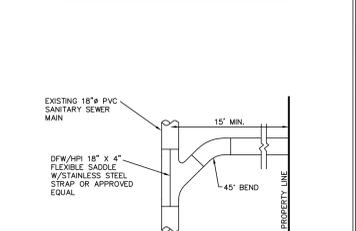
THRUST BLOCK MINIMUM BEARING AREA (IN CUBIC FEET)

PIPE SIZE	DEAD END OR TEE	90° BEND	45° BEND	11-1/4 OR 22-1/2 BEND
4"	3.0	4.0	2.0	1.5
6"	6.0	8.0	4.5	2.5
8"	10.0	14.0	7.5	4.0
10"	14.5	20.5	11.0	6.0
12"	20.5	29.0	16.0	8.0
14"	27.5	39.0	21.0	11.0
16"	35.5	50.5	27.5	14.0
20"	55.0	78.0	42.0	21.5
24"	78.5	111.0	60.0	30.5

SUBDRAIN CLEANOUT DETAIL
N.T.S.



SANITARY SERVICE DETAIL: CONNECTION TO EXISTING MAIN



NOTES:
ALL FIRE HYDRANTS SHALL HAVE NATIONAL STANDARD THREADS (NST) ON THE TWO AND ONE-HALF (2 1/2) INCH CONNECTIONS AND THE FOUR AND ONE-HALF (4 1/2) INCH CONNECTION SHALL HAVE A STORZ CONNECTION.

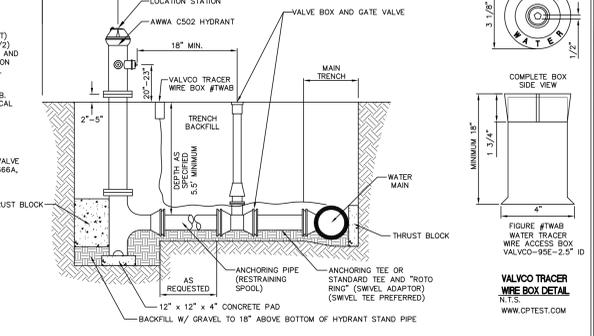
CONTACT LOCAL AUTHORITY FOR SPACING OF HYDRANT BEHIND CURB. USE 3 FEET BEHIND CURB AND LOCAL PLUMBER NOZZLE TOWARD CURB IN MOST CASES.

PROVIDE VALCO TRACER WIRE BOX ADJACENT TO FIRE HYDRANT.

PROVIDE ANSI/AWWA-C509 GATE VALVE AND TYLER-SERIES 6905 & ITEM 666A, RANGE 63"-83" VALVE BOX.

REFER TO CITY OF NORTH LIBERTY SUPPLEMENT TO THE IOWA STATEWIDE URBAN DESIGN AND STANDARD SPECIFICATIONS (SUDAS) FOR APPROVED MANUFACTURERS AND MODEL NUMBERS

TYPICAL HYDRANT
N.T.S.



VALCO TRACER WIRE BOX DETAIL
N.T.S.
WWW.CPTST.COM